November 30, 2021

Sent via email

Mr. Michael Regan, EPA Administrator
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Mail Code 50304-P
Washington DC, 20460

RE: Preliminary Alternate Liner Demonstration
DTE Electric Company Monroe Power Plant
Fly Ash Basin Coal Combustion Residuals Unit
7955 East Dunbar Road, Monroe, Michigan

Dear Administrator Regan:

The DTE Electric Company (DTE Electric) is submitting the enclosed preliminary Alternate Liner Demonstration (ALD) to the U.S. Environmental Protection Agency (EPA) as a "place holder" and out of an abundance of caution to meet the November 30, 2021 date for submitting ALDs under the Part B rule.

As EPA has publicly acknowledged, the EPA has experienced unanticipated internal delays in reviewing and making decisions on the Part B applications that were submitted a year ago on November 30, 2020, and that this extended delay has practically eliminated the timeframe contemplated in the Part B rule for facilities to prepare their ALDs. Given this, EPA explains on their CCR Part B Implementation web page that they intend to "take actions to ensure that any facility approved to conduct a demonstration has the same amount of time anticipated by the current regulation to initiate and complete the demonstration after an approval."

DTE Electric appreciates EPA's commitment to take this corrective action and believes it is both necessary and appropriate. Regardless of the Agency's internal delays DTE Electric proceeded expeditiously with the hydrogeological site characterization and laboratory study as detailed in the September 1, 2021 extension request due to analytical limitations. The extension request detailed the compatibility laboratory testing program results as of late August 2021, and projected termination criteria to be met by November 2, 2023. EPA has not yet responded to the extension request.

The enclosed preliminary ALD prepared by Geosyntec using preliminary data, concludes that the low permeability natural clay soils underlying the Monroe Power Plant Fly Ash Basin are consistently present across the basin and have sufficiently low hydraulic conductivity to prevent groundwater contamination at the solid waste boundary through the active life of the unit.

As allowed by the agency, electronic files were submitted to Richard Huggins, Mary Jackson, Michelle Long, and Jason Mills via email. If you have any questions regarding this submittal, please contact me at 313.235.0153 or christopher.scieszka@dteenergy.com

Sincerely,

Christopher Scieszka
Project Manager, Environmental Management and Safety, DTE Energy

Enclosure

cc: Richard Huggins, Mary Jackson, Michelle Long, and Jason Mills

Prepared for

DTE Electric Company
One Energy Plaza
Detroit, Michigan 48226

PRELIMINARY ALTERNATIVE LINER DEMONSTRATION FLY ASH BASIN

MONROE POWER PLANT

Monroe, Michigan

Prepared by

Geosyntec consultants

engineers | scientists | innovators

2100 Commonwealth Avenue, Suite 100
Ann Arbor, Michigan 48105

GLP8014

November 2021

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1. INTRODUCTION

This report has been prepared to provide the Preliminary Alternate Liner Demonstration (ALD) of Monroe Fly Ash Basin (FAB) coal combustion residuals (CCR) unit in accordance with 40 CFR Part 257 as amended on November 20, 2020 (CCR Rule). **Figure 1-1** provides the site location.

The FAB is one of the two CCR units at the site, the other CCR unit is the Vertical Extension Landfill (Landfill) located at the northwest quadrant of FAB. DTE is planning to operate the Landfill through the end of 2040.

This report concludes that there is no reasonable probability that water from FAB will cause releases to groundwater throughout its active life that will exceed the groundwater protection standard (GWPS) at the waste boundary over the projected active life of the CCR unit.

1.1 Background

DTE Electric Company (DTE) submitted the Alternative Liner Demonstration Application for the FAB to the United States Environmental Protection Agency (USEPA) on November 30, 2020 [1] in accordance with the CCR Rule. In December, DTE started the field and laboratory investigation studies to meet the requirements of the CCR Rule.

One of the requirements of the CCR rule is to conduct hydraulic conductivity testing using site-specific permeant liquid. The CCR Rule acknowledges that these tests may last a long time such that the operator of the CCR unit may need to submit an extension request for the laboratory testing program, and submit a preliminary ALD.

DTE submitted an extension request due to "analytical limitation" under a separate cover, on September 1, 2021 [2]. The extension request detailed the compatibility testing program results as of late August 2021, and projected termination criteria to be met by November 2, 2023. The EPA has not yet responded to the extension request.

1.2 Purpose

The purpose of this report is to provide the ALD approach, analysis details, and present preliminary results based on available data in accordance with the CCR Rule. Although the Part B Rule does not require the submittal of a preliminary ALD by November 30, 2021 if an extension request is submitted in accordance with §257.71(d)(2)(ii)(A), DTE is providing this preliminary ALD as a "place holder" and out of an abundance of caution and with confidence in the performance of the liner system to comply with the requirement to submit an ALD by November 30, 2021. A final ALD will be submitted in accordance with the schedule expected to be included in the forthcoming EPA decisions.

1.3 Report Organization

The remainder of this report is organized as follows:

- Section 2 – provides the field and laboratory investigation details, information on site geology/hydrogeology, and conceptual site model details.
- Section 3 – provides results of hydraulic conductivity testing, termination criteria details, chemistry testing of site-specific water, and discussion of results.
- Section 4 – provides analysis approach, details, GWPS, and evaluation of results as to whether or not the FAB meets the ALD requirement of the CCR Rule.
- Section 5 – provides a summary of the report.
- Section 6 – provides certification by a qualified professional engineer.
- Section 7 – provides references.

1.4 Terms of Reference

This report was prepared by Mike Coram C.P.G., Omer Bozok P.E., Jesse Varsho P.E., and reviewed by John Seymour, P.E. of Geosyntec.

2. CHARACTERIZATION OF SITE HYDROGEOLOGY

The CCR Rule requires the following:

> *§257.71(d)(ii)(A) Characterization of site hydrogeology. A characterization of the variability of site-specific soil and hydrogeology surrounding the surface impoundment that will control the rate and direction of contaminant transport from the impoundment. The owner or operator must provide all of the following as part of this line of evidence:*
>
> *(1) Measurements of the hydraulic conductivity in the uppermost aquifer from all monitoring wells associated with the impoundment(s) and discussion of the methods used to obtain these measurements;*
>
> *(2) Measurements of the variability in subsurface soil characteristics collected from around the perimeter of the CCR surface impoundment to identify regions of substantially higher conductivity;*
>
> *(3) Documentation that all sampling methods used are in line with recognized and generally accepted practices that can provide data at a spatial resolution necessary to adequately characterize the variability of subsurface conditions that will control contaminant transport;*
>
> *(4) Explanation of how the specific number and location of samples collected are sufficient to capture subsurface variability if:*
>
> > *(i) Samples are advanced to a depth less than the top of the groundwater table or 20 feet beneath the bottom of the nearest water body, whichever is greater, and/or*
> >
> > *(ii) Samples are spaced further apart than 200 feet around the impoundment perimeter;*
>
> *(5) A narrative description of site geological history; and*
>
> *(6) Conceptual site models with cross-sectional depictions of the site environmental sequence stratigraphy that include, at a minimum:*
>
> > *(i) The relative location of the impoundment with depth of ponded water noted;*
> >
> > *(ii) Monitoring wells with screening depth noted;*
> >
> > *(iii) Depiction of the location of other samples used in the development of the model;*

(iv) The upper and lower limits of the uppermost aquifer across the site;

(v) The upper and lower limits of the depth to groundwater measured from monitoring wells if the uppermost aquifer is confined; and

(vi) Both the location and geometry of any nearby points of groundwater discharge or recharge (e.g., surface waterbodies) with potential to influence groundwater depth and flow measured around the unit.

2.1 Introduction

This section provides information on site geology and hydrogeology, data used in site characterization, a summary of ALD-specific field and laboratory study, and a conceptual site model built using the Environmental Visualization System (EVS).

2.2 Site Geology

The geology of Monroe County consists of primarily unconsolidated (soil) alluvium and glacial till deposits overlying bedrock. The unconsolidated material consists of shallow/surficial alluvium deposits (sand and gravel) on top of clay-rich glacial drift with some sporadic glaciofluvial deposits that range from not present to more than 150 ft thick, with an average thickness of about 50 ft [1].

In the area of the FAB CCR unit, clay-rich glacial drift directly overlays the bedrock and varies in thickness from 14- to 34-ft thick. There does not appear to be glaciolacustrine or glaciofluvial deposits as there are few sand and gravel lenses. It appears the drift was deposited directly from glacial events as there is a relatively consistent clay-rich glacial drift with minimal sands and gravels usually associated with a meltwater discharge. Bedrock in Monroe County is predominantly Devonian and Silurian-aged carbonates and includes the Antrim Shale, Traverse Group, Dundee Formation (limestone and some dolostone), Detroit River Group, Sylvania Sandstone, Bass Islands Group, and Salina Group. Monroe County's eastern boundary is Lake Erie, and in general, regional groundwater flow is to the east towards Lake Erie [1]. Much of the carbonate bedrock aquifer in Monroe County is confined and naturally artesian. Saturated bedrock of the Bass Islands Group is generally encountered from 37 to 53.5 ft below ground surface (ft-bgs). Groundwater flow in the carbonate bedrock aquifer in Monroe County is primarily through secondary porosity consisting of fractures often evident along bedding-plane partings [1].

2.2.1 Fly Ash Basin Site-Specific Geology

The FAB is located about one mile southwest of the Plant near Monroe, Michigan, and is bounded on the east by Lake Erie and the Plant discharge canal, on the west by Interstate Highway 75 (I-75), on the south by an agricultural field, and on the north by residential property and Plum Creek.

The FAB is encapsulated by an embankment that is up to 46 ft higher than the surrounding ground surface. The perimeter of the embankment crest defines the outer limits of the watershed, which is the plan area of rainfall. There is no outer watershed area that flows directly into the FAB.

During the ALD investigation in December 2020, 95 cone penetration tests (CPTs) and 9 soil borings were drilled along the top of the embankment to augment existing data. Based on the data from Geosyntec's 2020 investigation, the geology was relatively consistent with previous geologic interpretations that the underlying clay-rich soil had consistently low hydraulic conductivity values. Although the geology was consistent, the naming of the clay-rich soils has been changed as described below:

- The embankment was created with the upper 10-ft of clay-rich native soils and compacted to act as a barrier along the perimeter of the FAB CCR unit. The embankment material is described as a compacted lean clay.

- Directly underlying the embankment, the native soils consist of up to approximately 15-ft thick lean clay. Under the FAB (starting at approximate elevation 563 ft[1]) the geology consists of a 14 to 34 ft thickness of clay-rich soils identified as sandy lean clay. The sandy lean clay descriptor is consistent with ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) [3] and differs from previous soil descriptions.

- There is a transitional unit that also differs from previous soil descriptions and is identified as weathered bedrock and/or a mix of clay, sand and gravel. This unit is approximately 5 to 10 ft thick and directly underlays the sandy lean clay and sits atop the bedrock. This unit is wet and is considered the top of the uppermost aquifer unit which is the underlying fractured bedrock.

Further discussion of geologic descriptors of soil types is discussed in the conceptual site model (Section 2.6)

2.3 Uppermost Aquifer Field Testing and Hydrogeology

The uppermost aquifer unit begins at the top of the transition unit and originates in the underlying fractured bedrock. The aquifer within the bedrock exhibits artesian conditions. In 2016 TRC installed seven bedrock monitoring wells to the north, east, south and west of the FAB. All monitoring wells exhibit artesian conditions except MW-16-01. Monitoring well MW-16-01 is located within several hundred feet of several off-site domestic residential wells located to the

[1] Elevations are referenced to National Geodetic Vertical Datum of 1929.

north along Dunbar Road adjacent to Plum Creek that likely lower the hydraulic head in the area of MW-16-01 [1]. Wells located hydraulically upgradient of the CCR unit include MW-16-03, MW-16-04 and MW-16-05 on the southwestern and southern part of the FAB. These wells exhibit artesian conditions, in which potentiometric elevations are significantly above the ground surface (generally 10 to 15 ft above ground surface). Downgradient monitoring wells MW-16-01, MW-16-05 and MW 16-06 range from slightly artesian to not artesian (MW-16-01).

The general flow lines within the uppermost aquifer at the site are to the northeast towards Plum Creek. The average hydraulic gradient to the northeast ranges from 0.002 to 0.0025 foot/foot along the eastern part of the FAB to 0.004 to 0.005 foot/foot in the center and northwestern part of the FAB, with an overall mean of 0.004 foot/foot.

In 2016, A hydraulic conductivity of approximately 1.5E-3 cm/s was measured at CCR monitoring well MW-16-01 using a single well hydraulic conductivity test. In 2021, TRC conducted slug tests at CCR monitoring wells MW-16-02 through MW-16-07 using a modified single well hydraulic conductivity test and hydraulic conductivity ranged from 1.0E-02 cm/s to 4.5E-03 cm/s. Test results are provided in **Appendix A**. The monitoring well construction details are presented in **Appendix B.**

2.4 Summary of Data Used for Site Characterization

Data from many investigations were used to characterize the subsurface stratigraphy and soil characteristics for the site. Historical investigations included the 1970s, 1990s, and 2016 all of which are included in the initial ALD Application [1]. Data from Geosyntec's 2020 ALD Investigation were used to augment the previous data sets. In total, these investigations included 57 borings, 95 CPTs, and seven CCR monitoring wells. **Figure 2-1** provides investigation locations.

Boring logs for the initial design in the 1970s through the 1990s, 2016, and 2020 field investigations are provided in **Appendices C** through **F**, respectively. These investigations were conducted within the FAB (prior to excavation in the 1970s), and outside of the FAB embankment and an extensive investigation through the embankment conducted by Geosyntec in 2020 (as described in Section 2.5).

Field testing included pocket penetrometer tests on fine-grained soils, slug tests for the monitoring wells screened in the uppermost aquifer, and pore pressure dissipation tests (PPDs) at CPT locations. Lab testing included grain size distributions, Atterberg limits, water content, dry and/or total unit weight, specific gravity, and hydraulic conductivity testing. Type of tests, standards and number of tests are summarized in **Table 2-1**. Laboratory test results are provided in **Appendices G** through **J** for the 1970s, 1990s, 2016, and 2020 laboratory studies, respectively.

It is Geosyntec's opinion that the combined data for the site are sufficient to capture the variability that may exist in soil conditions.

2.5 ALD-Specific Site Investigation Details

The scope of work for the ALD-Specific Site Investigation (SI) was completed in December 2020 and included drilling and sampling and advancing a CPT probe through the embankment and native soils.

The purpose of the fieldwork was to obtain nominally undisturbed samples for hydraulic conductivity testing and to augment the existing data set to characterize the alternate liner materials in accordance with the CCR Rule. Extensive previous investigations from the initial design in the 1970s to the present are discussed in Section 2.4.

Investigations were conducted at 200-ft intervals at the top of the embankment from elevation 615 ft down to 75 ft bgs to an approximate elevation of 540 ft. The nearest surface water body is Plum Creek located north of the FAB; groundwater flows towards Plum Creek. The investigation extends down to 20 ft below the bottom of Plum Creek, which is at an approximate elevation of 562 ft.

The following sections provide a summary of the fieldwork completed during the SI.

2.5.1 Cone Penetrometer Tests

Ninety-five CPTs were completed atop the embankment in 200 ft intervals to characterize FAB embankment and native soils. The CPT locations are provided in **Figure 2-1**. CPTs were advanced from the ground surface to refusal or down to approximately 75 ft bgs. Pore pressure dissipation (PPD) tests were conducted to estimate in-situ hydraulic conductivity at select depths; at a minimum, these tests were conducted at the elevation near where undisturbed samples were collected for laboratory hydraulic conductivity testing.

In total, 70 dissipation tests were completed at CPTs advanced on top of the embankment; however, only six locations were used for calculating hydraulic conductivity because equilibrium pore pressure was not achieved due to the long wait-time associated with the fine-grained soils. Hydraulic conductivity values ranged between 1.66E-07 cm/s and 3.29E-08 cm/s. Results are summarized in **Table 2-2**. CPT logs are provided in **Appendix K1**, and PPD tests are provided in **Appendix K2**.

2.5.2 Sonic Drilling

In December 2020, nine soil borings were advanced at the site to evaluate the subsurface geology, collect undisturbed samples for hydraulic conductivity testing, and collect additional soil samples

for characterization of native soils and the embankment. Soil samples were collected continuously in 2 to 10-foot sections from the ground surface to the termination of the soil boring. Geosyntec staff were present to log each boring and describe the soil samples in accordance with the Unified Soil Classification System (USCS).

Shelby tubes were collected from the FAB embankment soils, and native soils at approximately 20-ft intervals from each of the sonic borings in accordance with ASTM D1587 [4]; for hard soil samples where Shelby tube sampling was not feasible, samples were collected with a Pitcher barrel sampler in accordance with ASTM D6519 [5]. The soil borings were advanced to depths of approximately 75 ft-bgs to characterize the embankment and native soils. Sonic drilling locations are provided in **Figure 2-1.** Boring logs are provided in **Appendix F**. Soil stratigraphy is discussed in Section 2.6.

2.5.3 Laboratory Testing

A suite of index testing and hydraulic conductivity testing was conducted on select soil samples. One hundred thirty-one soil samples were collected from nine borings for hydraulic conductivity testing from depths between 5 ft and 75 ft to capture soils conditions ranging from stiff to very stiff soils. Details of hydraulic conductivity testing are provided in Section 3.

Index testing included:

- 131 Moisture Content tests (ASTM D2216)
- 8 Specific Gravity tests (ASTM D854)
- 75 Grain Size Mechanical Sieve tests (ASTM D6913)
- 8 Grain Size Hydrometer tests (ASTM D7928)
- 75 Atterberg Limits tests (ASTM D4318)

Note that these tests quantities are included in **Table 2-1**. Test results are provided in **Appendix J**.

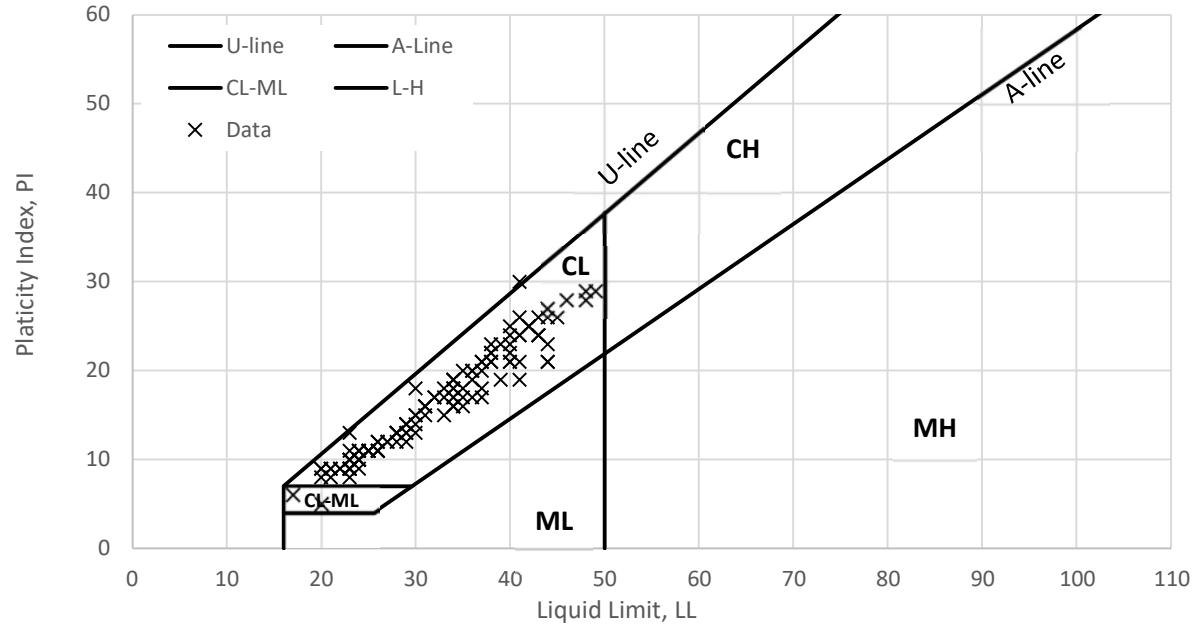
2.6 Conceptual Site Model

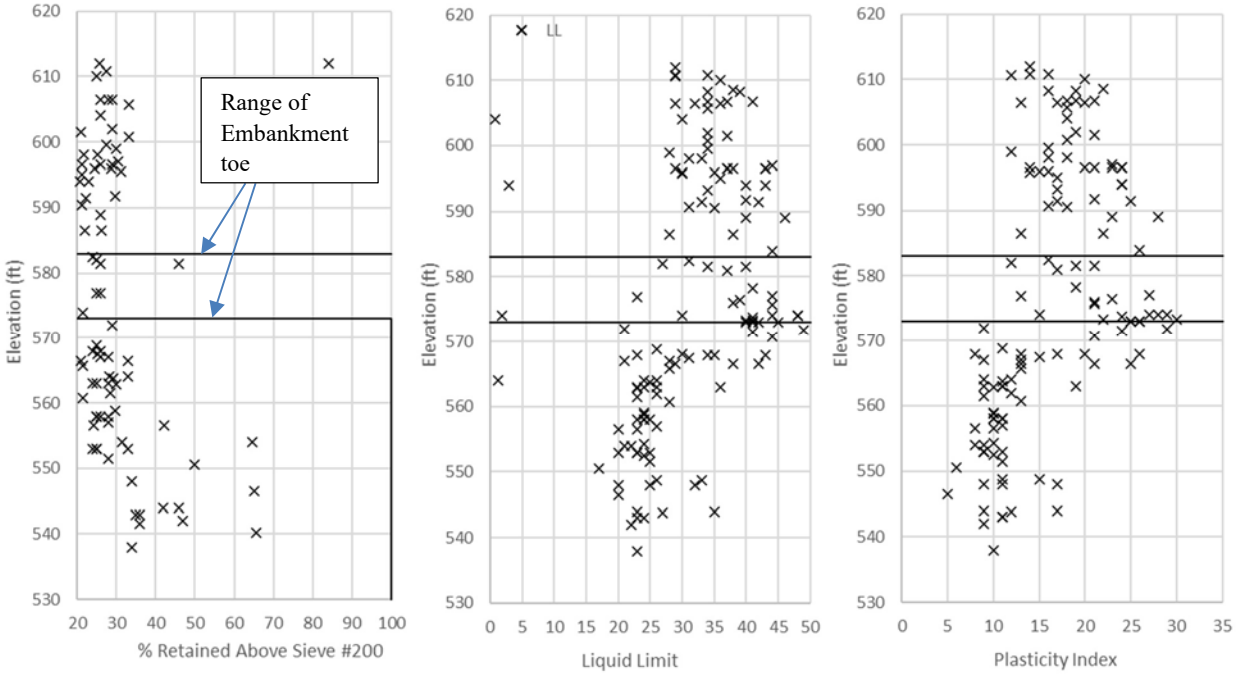
A comprehensive Conceptual Site Model (CSM) was developed from all the data and an EVS model was developed for the site. Based on the EVS model, the overall CSM of the Site lithology is relatively consistent with a low hydraulic conductivity clay-rich glacial deposits with non-interconnected sand seams. Within the FAB CCR unit, the uppermost aquifer includes the bedrock and overlying transition zone. The uppermost aquifer is assumed to extend from the top of the

transitional unit to the base of the bedrock. Since it is a fractured bedrock aquifer, it is unknown the vertical extent of fractures, so it is assumed the entire bedrock beneath the FAB is fractured.

Cross-sections (**Figures 2-2** through **2-7**) were created from the EVS model and analyzed to determine the various changes in lithology across the site. Upon review of the transects, the lithology beneath the FAB consists of (from atop the embankment:) (1) lean clay, (2) sandy lean clay, (3) transitional unit, and (4) bedrock. These units are consistent with historical reports and TRC's November 2020, Initial Application for Alternate Liner Demonstration [1]; however, the naming of the units has been updated. Previous soil descriptions identify the main clay unit underlying the FAB CCR unit as a "silty clay". However, upon review of geotechnical analysis (including Atterberg limits, moisture content, and grain size analysis) it is clear, that according to USCS descriptors, the soil is classified as a "sandy lean clay" as shown in the summary graph below which includes data from the 2020 investigation.

USCS Soil Classification of 2020 Geotechnical Data





A second discrepancy is the identification of the transitional unit that was included in the descriptors since there appears to be some variance directly atop the bedrock. The transitional unit was encountered below the sandy lean clay and atop the bedrock and mainly consists of weathered

bedrock and clay mixed with gravel, sand and silt. The uppermost aquifer was identified as the top of the transitional unit; it includes the transitional unit and bedrock. The lithology directly underlying the FAB consist of the following:

- (1) Lean clay – This unit represents the compacted lean clay (i.e. embankment) and native lean clay soils immediately below the embankment; it consists of soils that are generally classified as lean clay with sand (i.e. percent retained above sieve #200 is ≤30%); in few cases, it is classified as sandy lean clay (i.e. percent retained above sieve #200 is ≥30%). Hereafter the embankment is referred to as lean clay which is approximately 40-ft thick to an approximate elevation of 573 ft. This unit consists of mainly compacted stiff clay and minimal sand seams. The embankment soils were sourced from the native lean clays.

- (2) Sandy lean clay – This unit is encountered directly beneath the FAB ranges from 14 to 34 ft thick with an average thickness of 21 ft, increasing thickness from south to north and consists of low plasticity clay. There were minimal observed sand lenses and they do not appear to be interconnected. Based on the CPT dissipation data, the hydraulic conductivity values ranged between 1.66E-07 cm/s and 3.29E-08 cm/s for native soils. These values are consistent with TRC's 2018 Natural Clay Liner Equivalency Evaluation Report [1] and are adequate hydraulic conductivity values to be considered a low hydraulic conductivity unit.

- (3) Uppermost Aquifer Unit - The weathered bedrock and mixed clays with sand, silt and gravel is referred to as the transitional unit and it sits atop the bedrock. The uppermost aquifer unit begins at the top of the transition unit and originates in the underlying fractured bedrock. The aquifer within the bedrock exhibits artesian conditions. At its thinnest section, the FAB has approximately 14 ft of clay-rich soil separating the bottom of the FAB from the uppermost aquifer. It is assumed the uppermost aquifer unit extends from the top of the transitional unit to the base of the bedrock which can extend to approximately 300 ft bgs [6].

3. POTENTIAL FOR INFILTRATION

The CCR Rule requires:

§257.71(d)(ii)(B) Potential for infiltration. A characterization of the potential for infiltration through any soil-based liner components and/or naturally occurring soil that control release and transport of leachate. All samples collected in the field for measurement of saturated hydraulic conductivity must be sent to a certified laboratory for analysis under controlled conditions and analyzed using recognized and generally accepted methodology. Facilities must document how the selected method is designed to simulate on-site conditions. The owner or operator must also provide documentation of the following as part of this line of evidence:

> *(1) The location, number, depth, and spacing of samples relied upon is supported by the data collected in paragraph (d)(1)(ii)(A) of this section and is sufficient to capture the variability of saturated hydraulic conductivity for the soil-based liner components and/or naturally occurring soil;*
>
> *(2) The liquid used to pre-hydrate the samples and measure long-term hydraulic conductivity reflects the pH and major ion composition of the CCR surface impoundment porewater;*
>
> *(3) That samples intended to represent the hydraulic conductivity of naturally occurring soils (i.e., not mechanically compacted) are handled in a manner that will ensure the macrostructure of the soil is not disturbed during collection, transport, or analysis; and*
>
> *(4) Any test for hydraulic conductivity relied upon includes, in addition to other relevant termination criteria specified by the method, criteria that equilibrium has been achieved between the inflow and outflow, within acceptable tolerance limits, for both electrical conductivity and pH.*

3.1 Soil Sample and Site-Specific Water Details

3.1.1 Soil Samples for Hydraulic Conductivity Testing

Sixteen soil samples were collected for hydraulic conductivity testing. Considering the extent of existing field investigation data, including CPTs, earlier borings, Geosyntec believes that the collected samples are sufficient to capture the variability of hydraulic conductivity in natural soils and the embankment.

3.1.2 Site-Specific Water Testing and Results

Site-specific water samples were collected from five open standpipe wells screened in CCR for geochemical analyses to assess the representative composition of an "aggressive" solution for use in the compatibility portion of the hydraulic conductivity testing. Samples were filtered through a 0.45-micron filter to evaluate dissolved concentrations. Site-specific water samples were tested for CCR Rule Appendix III and Appendix IV parameters as well as additional major cations (sodium, magnesium, potassium), anions (total alkalinity), iron, and manganese.

All water samples were found to be basic, with pH values ranging from 9.73 to 11.8 SU. Total dissolved solids (TDS) concentrations ranged from 390 to 1600 mg/L, although four of the five samples were found to have TDS concentrations < 1000 mg/L, which is defined by the United States Geological Survey (USGS) as "freshwater". Major ion compositions of these samples are illustrated on the Piper diagram in **Figure 3-1**. Three of the five samples suggest that the anion composition of the basin water is predominantly alkalinity, with variable contributions of sulfate. The cation composition is highly variable, with a range of calcium and monovalent cation (potassium and sodium) proportions and very little magnesium.

The analytical results are provided in **Appendix L** and tabulated in **Table 3-1**. Results were used to calculate the total ionic strength for each sample. Total ionic strength is a measure of the combined ion concentrations in a solution and can represent the salinity of a sample. Total ionic strength was calculated for each sample using geochemical modeling software Geochemist's Workbench (GWB) v12.0.4. The GWB thermodynamic dataset 'thermo.com.V8.R6_.tdat' was used for the calculations to incorporate all tested parameters. Analytical results for each parameter were input into GWB in units of milligrams per liter (mg/L) and the ionic strength of each sample was calculated in units of molality (m). All samples contained similar ionic strength values (0.0124 m to 0.0311 m) with the exception of PZ-2, which contained an ionic strength of 0.0723 m. The PZ-2 sample is considered to be the more aggressive solution and was used for the compatibility testing as described in Section 3.2.

3.2 Hydraulic Conductivity Testing Procedure and Termination Criteria

Sixteen soil samples were tested for hydraulic conductivity, *k* using deionized water in accordance with ASTM D5084 [7] to establish a baseline *k* reading. Then, eight of the samples exhibiting high and low *k* values were selected for compatibility testing in accordance with ASTM D7100 [8] using site-specific water. The use of ASTM D7100 is discussed in the preamble of the CCR Rule and identified to be appropriate by USEPA.

ASTM D7100 termination criteria require the following conditions:

- The ratio of outflow to inflow is between 0.75 and 1.25. The hydraulic conductivity is considered steady if four or more consecutive hydraulic conductivity measurements fall within ±25 % of the mean value for hydraulic conductivity, $k \geq$ 3E-8 cm/s or within ±50 % for $k <$ 1E-8 cm/s, and a plot or tabulation of the hydraulic conductivity versus time shows no significant upward or downward trend;

- At least two pore volumes (PV) of flow have passed through the sample; and

- pH and electrical conductivity of effluent are within 10% of that for the influent with no significant increasing or decreasing trends

3.3 Hydraulic Conductivity Test Results and Assessment

The results are provided in **Appendix M** as of August 20, 2021, and summarized in **Table 3-2**. The table provides sample ID, the start date for testing, amount of flow passed through a sample for a given duration of time, hydraulic conductivity values, and projected date for completing 2 PV of flow.

In addition, a set of figures was created for each sample providing an insight into the progression of:

- PV of flow with time.

- hydraulic conductivity with time.

- hydraulic conductivity with PV;

- pH of inflow and outflow with time; and

- Electrical conductivity (EC) with time.

The progression of different parameters is provided from **Figure 3-2** through **3-41**.

Overall, the hydraulic conductivity, *k* value of samples range between 3.5E-09 and 1.4E-08 (cm/s). The amount of PV of flow that has passed through the samples ranges from 0.5 to 3.3. As of August 20, 2021, three of the samples have reached the 2 PV criterion. The remaining samples are projected to reach 2 PV between September 2021 and March 2023; this is based on linear extrapolations between the PV that has passed through the sample at known dates and assumes *k* stays essentially constant, which is the current case.

Overall, the PV of flow is progressing steadily towards the 2 PV criterion. Hydraulic conductivity values are generally stable and can be considered steady. pH values are provided in **Table 3-3.** In

general, the average pH of inflow ranges from 12.7 to 12.8, and the average pH of outflow ranges from 8.3 to 8.6. The pH values of outflow are not within the 10 percent of inflow; they are projected to meet the termination criterion between July 2022 and November 2023. These dates are based on the convergence of linear extrapolations of the data.

EC values are provided in **Table 3-4.** In general, the average EC of inflow ranges from 4,523 to 4,840, and the average EC of outflow ranges from 1,126 to 2,060. The EC values of outflow are not within the 10 percent of inflow. Data is scattered such that the date for termination criteria is not predictable.

Table 3-5 summarizes if a sample has reached the termination criterion for PV, pH, EC, and the approximate projected date for reaching the termination criteria. As summarized in the table, samples have not reached all the termination criteria. The projected termination dates are based on the latest extrapolated date from PV and pH criteria. An accurate termination date cannot be predicted due to variation in EC.

The results do not include inflow vs outflow data. the inflow was maintained constant to provide a more stable hydraulic gradient across the sample, more accurate estimation of *k*, faster testing, and more control in the testing procedure. It is Geosyntec's opinion that the inflow/outflow criterion would be reached by the same time the other criteria are reached.

4. FATE AND TRANSPORT MODEL ANALYSES

The CCR Rule requires:

§257.71(d)(ii) (C) Mathematical model to estimate the potential for releases. Owners or operators must incorporate the data collected for paragraphs (d)(1)(ii)(A) and (d)(1)(ii)(B) of this section into a mathematical model to calculate the potential groundwater concentrations that may result in downgradient wells as a result of the impoundment. Facilities must also, where available, incorporate the national-scale data on constituent concentrations and behavior provided by the existing risk record. Application of the model must account for the full range of site current and potential future conditions at and around the site to ensure that high-end groundwater concentrations have been effectively characterized. All the data and assumptions incorporated into the model must be documented and justified.

> *(1) The models relied upon in this paragraph (d)(1)(ii)(C) must be well- established and validated, with documentation that can be made available for public review.*
>
> *(2) The owner or operator must use the models to demonstrate that, for each constituent in appendix IV of this part, there is no reasonable probability that the peak groundwater concentration that may result from releases to groundwater from the CCR surface impoundment throughout its active life will exceed the groundwater protection standard at the waste boundary.*
>
> *(3) The demonstration must include the peak groundwater concentrations modeled for all constituents in appendix IV of this part attributed both to the impoundment in isolation and in addition to background.*

4.1 Introduction

A fate and transport model analysis has been performed to evaluate whether the peak groundwater concentrations that may result from releases to the groundwater from the FAB exceeds the GWPS at the waste boundary throughout its active life.

The model considers flow of CCR pore water Constituents of Concern (COC) migrating through the sandy lean clay down to the top of the uppermost aquifer (top of transition zone). The model does not consider additional migration of COC horizontally to the waste management boundary. If considered, the horizontal groundwater flux would considerably reduce the concentrations of the COC; consequently, the model presents a conservative assessment. As discussed later in Section 4.6.1 the results of the model predict COC concentrations that are very low such that there is no reasonable probability that water from FAB will cause releases to groundwater throughout its active life that will exceed the groundwater protection standard at the solid waste boundary.

4.2 Groundwater Protection Standards

Groundwater samples from TRC's 2016 and 2017 sampling events were tested for Appendix IV COCs and represent eight rounds of background groundwater data. The data were used to calculate site-specific background levels (Background) for Appendix IV COCs. **Appendix N** provides the memorandum describing the statistical calculations.

To develop GWPS for the ALD assessment, the federal Maximum Contaminant Level (MCL), Regional Screening Levels, and Background (whichever is higher) were evaluated and the highest value was selected as the GWPS in accordance with the CCR Rule. Where MCL are not available Regional Screening Levels were used. The ALD assessment GWPS are provided in **Table 4-1.**

4.3 Consideration of Background Groundwater Concentrations

The background groundwater concentrations have been considered and are a factor when developing GWPS as discussed in the previous subsection (Section 4.2). At the FAB, naturally occurring background groundwater concentrations are generally much lower than the GWPS. The predicted groundwater concentrations and peak groundwater background concentrations are further discussed in Section 4.6.1.

4.4 Leachate Quality Results

Porewater (i.e., leachate) quality samples from the FAB were collected in December of 2020 and January of 2021; samples were analyzed for Appendix IV by ALS Environmental in Holland, MI. Analytical results were compared for each parameter and the highest leachate concentration was used as the established concentration of the constituent (C_o) when calculating the predicted groundwater concentrations (PGC_t). The leachate quality data are summarized in **Table 4-2**.

In addition to the site-specific leachate concentrations, 90th percentile concentrations from the 2014 EPA study [9] were considered in the analysis. This data is summarized in **Table 4-2**.

4.5 Fate and Transport Model

4.5.1 Analysis Model

A one-dimensional fate and transport model was performed to further understand the potential for contaminant transport from the FAB to the uppermost aquifer. The model was developed with a contaminant transport process through the sandy lean clay layer under the FAB. Contaminant transport processes are discussed in Section 4.5.2.1.

The modeling program POLLUTE [10] was selected for the one-dimensional fate and transport evaluation. The data input for POLLUTE acquires all the input parameters, performs calculations

for individual transport processes, and then uses the semi-analytical solution for the various transportation process (see Section 4.4.2) to yield predicted concentrations at the various specified times and distances.

Model setup and inputs are discussed in detail in the following sections and are summarized via layers in **Figure 4-1**.

4.5.2 Proposed Mathematical and Associated Computer Model

4.5.2.1 *Mathematical Model*

The potential transport mechanisms that may occur at the FAB for the modeled layer include advection, mechanical dispersion and diffusion. For porous media, these transport mechanisms can be represented by the following one-dimensional flow equation [11]:

Equation No. 1:
$$n\frac{\delta c}{\delta t} = nD\frac{\delta^2 c}{\delta z^2} - V_\alpha \frac{\delta c}{\delta z} - \rho K_d \frac{\delta c}{\delta t} - n\lambda c$$

Where:

c = concentration at any point

D = coefficient of hydrodynamic dispersion in the vertical direction

n = porosity of the geologic layer

V_α = Darcy velocity in the vertical direction

K_d = distribution coefficient

ρ = dry density of soil

λ= decay constant of the contaminant species

t = time

POLLUTE assumes that the transport phenomena are governed by Equation No. 1

4.5.2.2 *Predicted Groundwater Concentrations*

This model uses an initial concentration value of one (1), which represents a unit concentration of any constituent in the leachate. The results from the model can thus be used as a prediction factor for estimating the future concentration of any COC in groundwater. Multiplying the output prediction factor by the initial leachate concentration returns the predicted groundwater

concentration at the end of the model run. The following equation (Equation No. 2) illustrates this concept:

Equation No. 2: $PGC_t = PF_t * C_o$

Where:

PGC_t =predicted groundwater concentration after t years.

PF_t = prediction factored after t years, which is the output of the model.

C_o = established leachate concentration of the COC.

4.5.3 Fate and Transport Model Inputs

4.5.3.1 *Initial Leachate or Source Concentration*

The initial leachate concentration input value used was unity (1). This value is unitless because it represents unit leachate concentration of any given constituent. Therefore, the model results represent a fraction of the initial leachate concentration for any constituent.

4.5.3.2 *Number of Layers and Layer Thickness*

One layer was modeled at the site: the sandy lean clay layer. At the FAB, the sandy lean clay layer has an average thickness of 20.7 ft. The average thickness of the layer was derived from an isopach map generated by subtracting the surface representing the bottom of the layer from the surface representing the top of the layer and averaging the difference over the extent of the footprint of the FAB; model documentation for the average thickness can be found in **Appendix O**.

POLLUTE also allows layers to be subdivided into sublayers, which allows the predicted concentration distribution within a layer to be calculated. The sandy lean clay layer was divided into 10 sublayers at the FAB.

4.5.3.3 *Modeling Period*

The model was run for an operating period of 67 years. This modeling period captures the amount of time elapsed from 1975, when operations started, to 2041, when the Landfill is planned to be closed.

4.5.3.4 *Talbot Parameters*

POLLUTE uses a Laplace transform to find the solution to the advection-dispersion equation. The numerical inversion of the Laplace transform depends on the Talbot parameters. The model

provides default values for the parameters or they can be selected by the user. The default Talbot parameter were used in this demonstration [12].

4.5.3.5 *Boundary Conditions*

POLLUTE allows the user to select between multiple upper and lower boundary conditions. The top boundary condition typically represents the bottom of CCR unit as a potential source. The top boundary can be specified as either zero flux, constant concentration, or finite mass. A constant concentration was assumed as it results in conservative model results since it assumes that the leachate quality will remain constant at the maximum measured values over time.

The lower boundary can be specified as either zero flux, constant concentration, fixed outflow, or infinite thickness. For this model, an infinite thickness lower boundary was used; thus, the model output is a prediction factor of contaminant concentration in groundwater at the interface between the sandy lean clay layer and the underlying uppermost aquifer (the transition zone overlying the limestone bedrock).

4.5.3.6 *Darcy Vertical Velocity*

POLLUTE requires a Darcy velocity to be input for the model. The Darcy velocity was calculated for the FAB using a vertical gradient and the vertical hydraulic conductivity of the sandy lean clay layer. The vertical gradient was calculated using hydrogeologic data from the uppermost aquifer and the elevation of the typical operation water level in the FAB. These parameters were chosen to produce a conservative value for the Darcy velocity. Darcy velocity value of 6.08E-3 m/year was calculated for the FAB as provided in **Appendix O**. The hydraulic conductivity value used for the calculation of Darcy velocity is the average (geometric mean) of historical and current lab testing program for the vertical hydraulic conductivity of sandy lean clay.

4.5.3.7 *Hydrodynamic Dispersion Coefficient*

The vertical coefficient of hydrodynamic dispersion is a required input for each layer within the POLLUTE model. The hydrodynamic dispersion coefficient is calculated using Equation No. 3:

Equation No. 3: $D = D^* + av$

Where:

D = the hydrodynamic dispersion coefficient (m^2/year);

D* = the effective diffusion coefficient (m^2/year).

a = the dispersivity (m);

v = the groundwater seepage velocity (m/year).

For this demonstration, the coefficient of hydrodynamic dispersion value (D) of 0.19 m^2/year was input into the model. This value was based on the effective diffusion coefficient (D*) for chloride (0.19 m2/yr), as calculated by Rowe et al. [13]. The coefficient of chloride was chosen as it is considered to have a high capacity for diffusion compared to other constituents of interest, this is a conservative constituent to model among the COC.

The second part of Equation 3, (av) is related to dispersion. Rowe et al. [9]. Discusses when the seepage velocity (6.08E-3 m/year) is low (i.e., clay soils), diffusion will control the parameter hydrodynamic dispersion (D) and dispersion is negligible.

4.5.3.8 *Effective Porosity and Density Input*

The average porosity of each model layer was estimated using laboratory data. An average of 24 percent porosity was estimated for the modeled sandy lean clay layer.

Based on empirical data provided by Sara (1994) [14], the laboratory porosity data was converted to effective porosities. An effective porosity value of 19 percent was used for the modeled sandy lean clay layer.

Density values from laboratory testing were also used to determine a suitable POLLUTE model input. The average density of 1,919 kg/m^3 (119.8 pcf) was obtained from the available data.

4.5.3.9 *Adsorption Coefficient and Degradation*

Adsorption and degradation of constituents can play a significant role in the impedance of contaminant migration in the subsurface. Within POLLUTE, the adsorption coefficient simulates the impedance of constituents or sorption of containments in the modeled layers, while degradation simulates the breakdown of contaminants over time. Adsorption and degradation are assumed to be zero for the baseline model, which is conservative. Adsorption for Molybdenum was considered for the sensitivity analysis including; the minimum vertical flow path, extended time, increased Darcy velocity, the minimum effective porosity, and the high coefficient of hydrodynamic dispersion. For these sensitivity analyses, an adsorption coefficient of 0.0082 m3/kg was used based on [15]. More on sensitivity analyses are provided in Section 4.6.2.

4.6 Fate and Transport Analysis Results and Evaluation

4.6.1 Fate and Transport Baseline Model Results

The modeling was performed to evaluate predicted groundwater quality based on the hydrogeology of the site. The baseline model calculated a PF_t of 6.97E-3. With both the C_o and

PF_t established, the PGC_t (i.e., predicted concentration) was calculated and compared to established GWPS for the FAB and presented in **Table 4-3**. As provided in the table, the predicted groundwater quality results, both for site-specific leachate and the 90th percentile concentrations from the 2014 EPA study [9] are below the GWPS levels. In addition, the predicted concentrations were added to the highest concentrations that were measured in 2016-2017 groundwater sampling events and compared to the GWPS. The combined results from predicted concentrations and the highest measured concentrations are below the GWPS (see **Table 4-3**). Therefore, no impacts to groundwater above GWPS are predicted over the duration of FAB's active life.

The driving mechanism for the transport is chemical diffusion because the advective flow would take more than 130 years for a water molecule to travel from the bottom of FAB to the uppermost aquifer. **Appendix O** provides calculations for the time of travel.

The baseline model outputs for the FAB are included in **Appendix P**.

4.6.2 Sensitivity Analysis

Many of the model inputs are specific to the site. Given the potential for sampling bias, uncertainty, and natural variation, a sensitivity analysis was conducted to evaluate the impact on the variation of the model inputs. The analysis focused on changes to the model output, or PF_t, given a variation to a single model input as discussed in the following sections. A summary of the sensitivity analyses model input values is provided in **Table 4-4**. The resulting PF_t, from each sensitivity analysis was compared to a threshold prediction value, $PF_{threshold}$. The $PF_{threshold}$ value represents the PF_t at which impacts to groundwater are predicted for Appendix IV COCs at the top of the uppermost aquifer under the CCR unit; the threshold value is 1.06E-2 for the FAB. $PF_{threshold}$ is calculated using the Equation No. 4:

Equation No. 4: $$PF_{threshold} = \min\left\{\frac{GWPS_1}{C_1}, \frac{GWPS_2}{C_2}, \ldots, \frac{GWPS_i}{C_i}, \ldots, \frac{GWPS_n}{C_n}\right\}$$

Where:

$PF_{threshold}$ = Threshold Prediction Factor

$GWPS_i$ = Groundwater Protection Standard for Constituent 'i'

C_i = Maximum porewater concentration of the COC 'i'

4.6.2.1 *Darcy Velocity*

A sensitivity analysis was completed to evaluate the impact of Darcy velocity. A Darcy velocity double the baseline value, which is 1.22E-02 m/year was used as input to the sensitivity analysis.

4.6.2.2 *Coefficient of Hydrodynamic Dispersion*

Model sensitivity to the coefficient of hydrodynamic dispersion was evaluated by increasing and decreasing the input value by 25%. The initial input value was derived from testing completed by Rowe et al., 2004) [13], and thus a 25% increase and decrease are considered a satisfactory variation for sensitivity analysis.

4.6.2.3 *Porosity and Effective Porosity*

Model sensitivity to the porosity and effective porosity was evaluated by increasing and decreasing the input value by the minimum and maximum range of values calculated from the laboratory results, which are 14 percent and 31 percent, respectively. Model sensitivity to the porosity and effective porosity was evaluated by increasing and decreasing the input value by the minimum and maximum range of values calculated from the laboratory results, which are 14 percent and 31 percent, respectively.

4.6.2.4 *Layer Thickness*

The isopach map was used to calculate the maximum and minimum thickness for the sandy lean clay layer (see **Appendix O**). Using the minimum and maximum thickness values as inputs, two additional models were run for FAB to evaluate model sensitivities to layer thickness; in each model, only the thickness variable was changed.

4.6.2.5 *Modeling Period*

The modeling period used was 67 years (the "baseline"). To further evaluate the impact of modeling runtime on the resultant PF_t, one model was run with a modeling period of 97 years to capture post-closure care time period.

4.6.2.6 *Sensitivity Results*

Additional fate and transport model runs were completed to evaluate model sensitivities to changing model inputs. The resulting PF_t, from each sensitivity analysis was compared to a threshold prediction value, $PF_{threshold}$. As shown in **Table 4-5,** using more conservative model input parameters resulted in PF_t values ranging from 7.18E-50 to 1.96E-3, all of which are less than the threshold value. Thus, this sensitivity analysis demonstrates that the FAB is not predicted to impact groundwater quality based on conditions more conservative than the baseline scenario. The sensitivity modeling results are presented in **Table 4-5** whereas the model outputs are included in **Appendix P**.

4.6.3 Reliability of Computer Model

The computer-based transport model used for this analysis is based on rigorous and proven analytical solutions to the advection-dispersion equation for layered deposits. These equations were derived with the intent of modeling the physical and chemical transport of contaminants from waste impoundments. Widespread use, comprehensive documentation, and abundant publications (Talbot, 1979 [12]; Rowe, 1987 [16]; Rowe and Booker, 1987 [17]; Rowe, 1988 [11]; and Rowe and Booker, 1989 [18]) lend to the versatility of this modeling approach for assessing groundwater impacts. The outputs obtained from models conducted in POLLUTE can be compared to those obtained using other approaches to solving the advection-dispersion equation.

4.6.4 Degree of Conservativeness in Model Results

Input parameters for the baseline models were based on site-specific data whenever possible. When not possible, input values were derived from an understanding of the site and relevant peer-reviewed literature. If a high degree of uncertainty was present, conservative input values were selected. A summary of the various conservative assumptions is listed below:

- The maximum measured leachate (i.e., porewater) concentration for each constituent was used for the fate and transport model prediction table;
- Constant leachate concentration or a constant mass was used for the entire modeling period. A specific mass could have been assumed for modeling purposes which would have resulted in decreased leachate concentrations over time but to be conservative the model assumed constant leachate concentration over time;
- Adsorption can significantly reduce the concentrations of metal constituents as they move through soils, especially clays, which would retard or slow down the migration. The baseline model and about half of the sensitivity analyses, the model assumed no adsorption would occur over time;
- Degradation of leachate (input values) through the either biologic or chemical process was assumed not to occur during the modeling period. By assuming no degradation, the model overestimated the predicted groundwater quality over time; and
- The CCR Rule requires compliance at the waste boundary. The analysis only considers vertical flow from the bottom of FAB to the top of the uppermost aquifer; the analysis does not consider a 2-D flow towards the waste boundary, which would further lower the predicted concentration levels for COCs.

5. SUMMARY

This Preliminary ALD has been prepared to assess if the FAB meets the ALD requirements per the CCR Rule. The data included comprehensive field and laboratory investigation data collected from the 1970s to 2020. The 2020 field and laboratory investigation studies were conducted specifically to augment the existing data and to address the CCR Rule requirements. The data were integrated into an EVS model to create a comprehensive CSM to understand the FAB lithology beneath the CCR unit and establish the basis for the Fate and Transport analysis. The EVS model was relatively consistent with historic representations of the geology associated with the FAB.

Site-specific water was collected from different wells screened in CCR and tested to assess which had the more aggressive water. Water from PZ-2 was deemed to be more aggressive and used for compatibility testing to estimate the impacts on the hydraulic conductivity of soil samples. The testing program is still underway.

A comprehensive subsurface stratigraphy model was created using the augmented data set and processing it through the EVS. Following, Fate and Transport analysis was conducted with PZ-2 chemistry data to assess whether there is a reasonable probability that water from the FAB may result in releases to groundwater throughout its active life that will exceed the GWPS at the waste boundary.

The Fate and Transport analysis was conducted for the operating time period of 67 years ("baseline"), which captures the amount of time elapsed from 1975, when CCR unit operations started, to 2041, when the existing Landfill is planned to be closed.

The analysis considered different contaminant transport mechanisms including, advection, dispersion, and diffusion. The analysis indicates that advective flow would take more than 130 years for a water molecule to travel from the bottom of FAB to the uppermost aquifer. Therefore, the analyses results indicate that, due to the low permeability nature of the in-situ unconsolidated materials, chemical diffusion is the dominant transport mechanism as opposed to advection or seepage flow. Consequently, the current hydraulic conductivity testing described in Section 3 is sufficient to characterize hydraulic conductivity and demonstrate the performance of the alternate liner system as it relates to advection or seepage flow. It is highly unlikely that running the samples until they achieve termination criteria would change the outcome of this study, and therefore, the tests do not need to extend until November 2023.

In addition, the Fate and Transport analysis was augmented with a sensitivity analysis to account for sampling bias, uncertainty, and natural variation in site-specific inputs. Predicted groundwater concentrations for both the baseline and sensitivity analyses are below GWPS. The analyses results show that there is no reasonable probability that water from the FAB will cause releases to

groundwater that will exceed the GWPS at the waste boundary over the projected active life of the CCR unit.

6. CERTIFICATION

CCR Unit: DTE Electric Company; Monroe Power Plant, Fly Ash Basin (FAB)

I, Omer Bozok, being a Registered Professional Engineer in good standing in the State of Michigan, do hereby certify in accordance with the CCR Rule, to the best of my knowledge, information, and belief, that the information contained in this plan has been prepared in accordance with the accepted practice of engineering and that the FAB meets the requirements of the Alternative Liner Demonstration per the CCR Rule.

Omer Bozok
Printed Name

November 30, 2021
Signature Date

6201062700 Michigan June 4, 2024
Registration Number State Expiration Date

Affix Seal

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TABLES

Table 2-1 – Field and Lab Testing Summary

Test	Current ASTM	Number Used in Characterization
Pocket Penetrometer	WK27337	418
Slug Test	D4044	8
Grain Size Distribution	D6913	124
Atterberg Limits	D4318	136
Water Content	D2216	754
Unit Weight	D7263	352
Specific Gravity	D854	34
Hydraulic Conductivity	D5084/D7100	6/33
Cone Penetration Test	D3441	95

Table 2-2 – Dissipation Tests Results

CPT ID	Lithology Unit	Test Elevation (ft)	Hydraulic Conductivity (cm/s)
CPT20-028	Native	564.9	6.98E-07
CPT20-028	Native	559.9	2.77E-08
CPT20-048	Native	565.0	1.84E-07
CPT20-048	Native	559.9	2.41E-08
CPT20-130	Native	565.0	1.66E-07
CPT20-136	Native	549.1	3.29E-08

Table 3-1 – Ionic Strength of Filtered Pore Water

Sample ID	Units	PZ-1	PZ-2	PZ-3	PZ-4	PZ-5
Alkalinity, Total (as CaCO3)	mg/L	460	1400	580	170	130
Antimony	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.0092
Arsenic	mg/L	0.0158	0.0129	0.0079	0.218	0.058
Barium	mg/L	4.6	1.2	2.8	0.189	0.207
Beryllium	mg/L	0.00222	0.00224	0.004	0.00244	0.004
Boron	mg/L	11	8.9	6.3	4.9	24
Cadmium	mg/L	0.00217	0.004	0.004	0.0022	0.00169
Calcium	mg/L	230	74	187	111	550
Chloride	mg/L	48	32	34	37	26
Chromium	mg/L	0.0067	0.0082	0.0066	0.0075	0.01
Cobalt	mg/L	0.00569	0.00268	0.0055	0.0059	0.00534
Fluoride	mg/L	3.6	23	1.2	0.83	0.4
Iron	mg/L	0.62	0.95	0.51	0.77	0.21
Lead	mg/L	0.0062	0.0072	0.00593	0.0073	0.01

Lithium	mg/L	0.034	0.0135	0.032	0.77	0.0106
Magnesium	mg/L	0.42	1.04	0.4	0.46	1.34
Manganese	mg/L	0.01	0.0101	0.01	0.0105	0.01
Mercury	mg/L	0.0004 U	0.0004 U	0.0004 U	0.0004 U	0.0004 U
Molybdenum	mg/L	2.4	3.9	0.39	3.9	19.2
Potassium	mg/L	39	430	116	124	6.8
Selenium	mg/L	0.093	0.2	0.09	0.056	0.0193
Sodium	mg/L	78	1050	183	97	3.3
Sulfate	mg/L	11	67	27	140	530
Thallium	mg/L	0.01	0.00141	0.00057	0.00531	0.00048
Ionic Strength	**molal (m)**	**0.0135**	**0.0723**	**0.0203**	**0.0124**	**0.0311**

Notes:

U - Analyzed but not detected above the method detection limit. The method detection limit is shown.

Table 3-2 – Hydraulic Conductivity Test Results Summary

ID	Date	Days After Injection	Permeability (cm/s)	Pore Volumes Passed After Injection	Days to Target Pore Volume	Date of Target PV Reached
B2-ST-1 (20-22')	2/19/2021	0	5.9E-09	0.0000		
	8/20/2021	182	5.4E-09	1.0116	178	2/13/2022
B4-ST-2 (40-42')	2/26/2021	7	3.6E-09	0.0176		
	8/20/2021	182	3.5E-09	0.4894	560	3/3/2023
B4-ST-4 (70-72.5')	2/26/2021	7	1.4E-08	0.1220		
	8/20/2021	182	1.1E-08	2.7318	Complete	7/2/2021
B6-ST-1 (25-27')	2/19/2021	0	9.7E-09	0.0000		
	8/20/2021	182	7.6E-09	1.2755	103	12/1/2021
B6-ST-3 (55-57.5')	2/19/2021	0	1.2E-08	0.0000		
	8/20/2021	182	9.8E-09	1.8601	14	9/2/2021
B6-ST-4 (65-67.5')	2/26/2021	7	1.3E-08	0.1209		
	8/20/2021	182	1.0E-08	2.5584	Complete	7/12/2021
B9-ST-2 (40-42')	2/19/2021	0	1.1E-08	0.0000		
	8/20/2021	182	1.1E-08	1.8013	20	9/9/2021
B9-ST-3 (55-57')	3/19/2021	28	1.7E-08	0.5500		
	8/20/2021	182	1.4E-08	3.3033	Complete	6/10/2021

Table 3-3 – Summary of pH Results

Sample ID	Parameter	pH Inflow	pH Outflow	Is pH of outflow within termination boundaries?	Approximate Projected Termination Date
B2-ST-1 (20-22')	Min	12.3	8.2	No	11/2/2023
	Max	12.9	8.9		
	Average	12.7	8.5		
B4-ST-2 (40-42')	Min	12.4	8.2	No	3/29/2023
	Max	12.9	8.6		
	Average	12.7	8.5		
B5-ST-4 (70-72.5')	Min	12.3	8.0	No	5/4/2023
	Max	13.1	8.9		
	Average	12.7	8.6		
B6-ST-1 (25-27')	Min	12.4	8.2	No	12/5/2022
	Max	13.2	8.9		
	Average	12.8	8.5		
B6-ST-3 (55-57.5')	Min	12.4	8.0	No	7/28/2022
	Max	13.0	8.9		
	Average	12.7	8.5		
B6-ST-4(65.67.5')	Min	12.3	7.8	No	11/1/2022
	Max	13.0	8.7		
	Average	12.7	8.3		
B9-ST-2(40-42')	Min	12.3	7.9	No	10/10/2022
	Max	13.0	9.0		
	Average	12.7	8.6		
B9-ST-3(55-57')	Min	12.2	7.9	No	6/14/2023
	Max	13.2	9.0		
	Average	12.7	8.5		

Table 3-4 – Summary of Electrical Conductivity Results

Sample ID	Parameter	EC Inflow (µs/cm)	EC Outflow (µs/cm)	Is EC of outflow within termination boundaries?	Approximate Projected Termination Date
B2-ST-1 (20-22')	Min	4300	1434	No	N/A
	Max	4800	3000		
	Average	4553	2059		
B4-ST-2 (40-42')	Min	4840	1126	No	N/A
	Max	4840	1126		
	Average	4840	1126		
B5-ST-4 (70-72.5')	Min	4120	1082	No	N/A
	Max	5230	1534		
	Average	4650	1211		
B6-ST-1 (25-27')	Min	4370	1000	No	N/A
	Max	5040	1614		
	Average	4735	1384		
B6-ST-3 (55-57.5')	Min	4350	1128	No	N/A
	Max	4900	1683		
	Average	4730	1342		
B6-ST-4(65.67.5')	Min	3970	963	No	N/A
	Max	5090	1708		
	Average	4522	1201		
B9-ST-2(40-42')	Min	4380	1025	No	N/A
	Max	4940	1796		
	Average	4692	1232		
B9-ST-3(55-57')	Min	4230	885	No	N/A
	Max	5080	2430		
	Average	4811	1378		

Table 3-5 – Sample Condition as it Relates to Termination Criteria

	Termination Criterion Reached				
Sample ID	Pore Volumes Passed, PV	pH	Electrical Conductivity, EC	Approximate Projected Termination Date	Date Based On
B2-ST-1 (20-22')	No	No	No	11/2/2023	pH
B4-ST-2 (40-42')	No	No	No	3/29/2023	pH
B4-ST-4 (70-72.5')	Yes	No	No	5/15/2023	pH
B6-ST-1 (25-27')	No	No	No	12/5/2022	pH
B6-ST-3 (55-57.5')	No	No	No	7/28/2022	pH
B6-ST-4(65.67.5')	Yes	No	No	11/1/2022	pH
B9-ST-2(40-42')	No	No	No	10/10/2022	pH
B9-ST-3(55-57')	Yes	No	No	3/19/2023	pH

Table 4-1 – Groundwater Protection Standards

Constituents	Unit	GWPS Selection	MCL/RSL	MW-16-01		MW-16-02		MW-16-03		MW-16-04		MW-16-05		MW-16-06		MW-16-07	
				UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS
Antimony	mg/L	MCL	6.0E-03	2.1E-03	**6.0E-03**	2.0E-03	**6.0E-03**	2.0E-03	**6.0E-03**	2.0E-03	**6.0E-03**	2.0E-03	**6.0E-03**	2.0E-03	**6.0E-03**	2.0E-03	**6.0E-03**
Arsenic	mg/L	MCL	1.0E-02	5.0E-03	**1.0E-02**	5.0E-03	**1.0E-02**	5.0E-03	**1.0E-02**	5.0E-03	**1.0E-02**	5.0E-03	**1.0E-02**	5.0E-03	**1.0E-02**	5.0E-03	**1.0E-02**
Barium	mg/L	MCL	2.0E+00	2.2E-02	**2.0E+00**	1.0E-02	**2.0E+00**	2.1E-02	**2.0E+00**	1.3E-02	**2.0E+00**	1.8E-02	**2.0E+00**	3.4E-02	**2.0E+00**	1.0E-02	**2.0E+00**
Beryllium	mg/L	MCL	4.0E-03	1.0E-03	**4.0E-03**	1.0E-03	**4.0E-03**	1.0E-03	**4.0E-03**	1.0E-03	**4.0E-03**	1.0E-03	**4.0E-03**	1.0E-03	**4.0E-03**	1.0E-03	**4.0E-03**
Cadmium	mg/L	MCL	5.0E-03	1.0E-03	**5.0E-03**	1.0E-03	**5.0E-03**	1.0E-03	**5.0E-03**	1.0E-03	**5.0E-03**	1.0E-03	**5.0E-03**	1.0E-03	**5.0E-03**	1.0E-03	**5.0E-03**
Chromium	mg/L	MCL	1.0E-01	2.0E-03	**1.0E-01**	2.0E-03	**1.0E-01**	3.1E-03	**1.0E-01**	2.0E-03	**1.0E-01**	2.0E-03	**1.0E-01**	2.0E-03	**1.0E-01**	2.0E-03	**1.0E-01**
Cobalt	mg/L	RSL	6.0E-03	1.0E-03	**6.0E-03**	1.0E-03	**6.0E-03**	1.0E-03	**6.0E-03**	1.0E-03	**6.0E-03**	1.0E-03	**6.0E-03**	1.6E-03	**6.0E-03**	1.0E-03	**6.0E-03**
Fluoride	mg/L	MCL	4.0E+00	1.8E+00	**4.0E+00**	1.8E+00	**4.0E+00**	1.7E+00	**4.0E+00**	1.1E+00	**4.0E+00**	1.7E+00	**4.0E+00**	1.8E+00	**4.0E+00**	1.8E+00	**4.0E+00**
Lead	mg/L	RSL	1.5E-02	1.0E-03	**1.5E-02**	1.0E-03	**1.5E-02**	2.5E-03	**1.5E-02**	1.0E-03	**1.5E-02**	1.0E-03	**1.5E-02**	1.1E-03	**1.5E-02**	1.0E-03	**1.5E-02**
Lithium	mg/L	Background or RSL	4.0E-02	9.2E-02	**9.2E-02**	1.2E-01	**1.2E-01**	1.3E-01	**1.3E-01**	2.3E-02	**4.0E-02**	5.0E-02	**5.0E-02**	1.0E-01	**1.0E-01**	4.3E-02	**4.3E-02**
Mercury	mg/L	MCL	2.0E-03	2.0E-04	**2.0E-03**	2.0E-04	**2.0E-03**	2.0E-04	**2.0E-03**	2.0E-04	**2.0E-03**	2.0E-04	**2.0E-03**	2.0E-04	**2.0E-03**	2.0E-04	**2.0E-03**
Molybdenum	mg/L	RSL	1.0E-01	1.0E-02	**1.0E-01**	1.0E-02	**1.0E-01**	1.0E-02	**1.0E-01**	1.0E-02	**1.0E-01**	1.0E-02	**1.0E-01**	1.0E-02	**1.0E-01**	1.0E-02	**1.0E-01**
Radium-226/228	pCi/L	MCL	5.0E+00	1.3E+00	**5.0E+00**	4.0E+00	**5.0E+00**	3.0E+00	**5.0E+00**	1.2E+00	**5.0E+00**	2.7E+00	**5.0E+00**	1.1E+00	**5.0E+00**	1.4E+00	**5.0E+00**
Selenium	mg/L	MCL	5.0E-02	5.0E-03	**5.0E-02**	5.0E-03	**5.0E-02**	5.0E-03	**5.0E-02**	5.0E-03	**5.0E-02**	5.0E-03	**5.0E-02**	5.0E-03	**5.0E-02**	5.0E-03	**5.0E-02**
Thallium	mg/L	MCL	2.0E-03	1.0E-03	**2.0E-03**	1.0E-03	**2.0E-03**	1.0E-03	**2.0E-03**	1.0E-03	**2.0E-03**	1.0E-03	**2.0E-03**	1.0E-03	**2.0E-03**	1.0E-03	**2.0E-03**

Notes:

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.

ug/L = micrograms per liter

mg/L = milligrams per liter

pCi/L = picocuries per liter

Table 4-2 –Baseline Fate and Transport Results

	Constituents	Units	Maximum Observed Concentration	90th Percentile Concentration	Prediction Factor	Predicted Groundwater Quality at Top of Uppermost Aquifer		Most Conservative GWPS	Outcome - Site (Pass/Fail)	Outcome - 90th Percentile (Pass/Fail)
						FAB	90th Percentile			
Appendix IV	Antimony*	mg/L	5.0E-03	4.0E-02	7.0E-03	3.5E-05	2.8E-04	6.0E-03	PASS	PASS
	Arsenic	mg/L	1.1E-01	7.8E-01	7.0E-03	7.7E-04	5.4E-03	1.0E-02	PASS	PASS
	Barium	mg/L	2.1E+00	2.1E-01	7.0E-03	1.5E-02	1.5E-03	2.0E+00	PASS	PASS
	Beryllium*	mg/L	2.0E-03	1.0E-03	7.0E-03	1.4E-05	7.0E-06	4.0E-03	PASS	PASS
	Cadmium*	mg/L	2.0E-03	6.0E-02	7.0E-03	1.4E-05	4.2E-04	5.0E-03	PASS	PASS
	Chromium	mg/L	7.8E-03	2.0E-01	7.0E-03	5.4E-05	1.4E-03	1.0E-01	PASS	PASS
	Cobalt	mg/L	2.6E-03	5.0E-02	7.0E-03	1.8E-05	3.5E-04	6.0E-03	PASS	PASS
	Fluoride	mg/L	2.4E+01	2.1E+01	7.0E-03	1.7E-01	1.5E-01	4.0E+00	PASS	PASS
	Lead	mg/L	5.3E-03	1.0E-01	7.0E-03	3.7E-05	7.0E-04	1.5E-02	PASS	PASS
	Lithium	mg/L	3.6E-01	4.5E-01	7.0E-03	2.5E-03	3.1E-03	4.0E-02	PASS	PASS
	Mercury*	mg/L	2.0E-04	7.0E-06	7.0E-03	1.4E-06	4.9E-08	2.0E-03	PASS	PASS
	Molybdenum	mg/L	9.4E+00	7.1E+00	7.0E-03	6.6E-02	4.9E-02	1.0E-01	PASS	PASS
	Combined Radium	pCi/L	1.9E+00	-	7.0E-03	1.3E-02	-	5.0E+00	PASS	NA
	Selenium	mg/L	8.5E-02	3.2E-01	7.0E-03	5.9E-04	2.2E-03	5.0E-02	PASS	PASS
	Thallium	mg/L	7.5E-04	3.0E-03	7.0E-03	5.2E-06	2.1E-05	2.0E-03	PASS	PASS

Notes:

* = Laboratory RL is used here; all analyses were below the RL.

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.

ug/L = micrograms per liter

mg/L = milligrams per liter

pCi/L = picocuries per liter

Table 4-3 - MW-16-01
Background and Maximum Predicted Concentrations Compared against GWPS

Constituent	Unit	GWPS Selection	MW-16-01				
			Data				
			Maximum Observed Concentration (A)	Maximum Predicted Concentration (B)	Combined Concentration (A+B)	GWPS	Pass/Fail
Antimony	mg/L	MCL	2.1E-03	2.0E-06	2.1E-03	6.0E-03	**Pass**
Arsenic	mg/L	MCL	5.0E-03	4.4E-05	5.0E-03	1.0E-02	**Pass**
Barium	mg/L	MCL	2.3E-02	8.4E-04	2.4E-02	2.0	**Pass**
Beryllium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	4.0E-03	**Pass**
Cadmium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	5.0E-03	**Pass**
Chromium	mg/L	MCL	2.0E-03	3.1E-06	2.0E-03	0.10	**Pass**
Cobalt	mg/L	RSL	1.0E-03	1.0E-06	1.0E-03	6.0E-03	**Pass**
Fluoride	mg/L	MCL	1.80	9.6E-03	1.81	4.0	**Pass**
Lead	mg/L	RSL	1.0E-03	2.1E-06	1.0E-03	1.5E-02	**Pass**
Lithium	mg/L	Background	7.8E-02	1.4E-04	7.8E-02	9.2E-02	**Pass**
Mercury	mg/L	MCL	2.0E-04	8.0E-08	2.0E-04	2.0E-03	**Pass**
Molybdenum	mg/L	RSL	1.0E-02	3.8E-03	1.4E-02	0.10	**Pass**
Radium-226/228	pCi/L	MCL	8.5E-04	7.6E-04	1.6E-03	5.0E-03	**Pass**
Selenium	mg/L	MCL	5.0E-03	3.4E-05	5.0E-03	5.0E-02	**Pass**
Thallium	mg/L	MCL	1.0E-03	3.0E-07	1.0E-03	2.0E-03	**Pass**

Notes:
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
RSL - Regional Screening Level from 83 FR 36435.
UTL - Upper Tolerance Limit (95%) of the background data set.
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 4-3 - MW-16-02
Background and Predicted Concentrations Compared against GWPS

Constituent	Unit	GWPS Selection	MW-16-02				
			Data				
			Maximum Observed Concentration (A)	Maximum Predicted Concentration (B)	Combined Concentration (A+B)	GWPS	Pass/Fail
Antimony	mg/L	MCL	2.0E-03	2.0E-06	2.0E-03	6.0E-03	**Pass**
Arsenic	mg/L	MCL	5.0E-03	4.4E-05	5.0E-03	1.0E-02	**Pass**
Barium	mg/L	MCL	9.0E-03	8.4E-04	9.8E-03	2.0E+00	**Pass**
Beryllium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	4.0E-03	**Pass**
Cadmium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	5.0E-03	**Pass**
Chromium	mg/L	MCL	2.0E-03	3.1E-06	2.0E-03	1.0E-01	**Pass**
Cobalt	mg/L	RSL	1.0E-03	1.0E-06	1.0E-03	6.0E-03	**Pass**
Fluoride	mg/L	MCL	1.70	9.6E-03	1.71	4.00	**Pass**
Lead	mg/L	RSL	1.0E-03	2.1E-06	1.0E-03	1.5E-02	**Pass**
Lithium	mg/L	Background	1.1E-01	1.4E-04	1.1E-01	1.2E-01	**Pass**
Mercury	mg/L	MCL	2.0E-04	8.0E-08	2.0E-04	2.0E-03	**Pass**
Molybdenum	mg/L	RSL	1.0E-02	3.8E-03	1.4E-02	1.0E-01	**Pass**
Radium-226/228	pCi/L	MCL	3.3E-03	7.6E-04	4.1E-03	5.0E-03	**Pass**
Selenium	mg/L	MCL	5.0E-03	3.4E-05	5.0E-03	5.0E-02	**Pass**
Thallium	mg/L	MCL	1.0E-03	3.0E-07	1.0E-03	2.0E-03	**Pass**

Notes:
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
RSL - Regional Screening Level from 83 FR 36435.
UTL - Upper Tolerance Limit (95%) of the background data set.
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 4-3 - MW-16-03
Background and Predicted Concentrations Compared against GWPS

Constituent	Unit	GWPS Selection	MW-16-03				
			Data				
			Maximum Observed Concentration (A)	Maximum Predicted Concentration (B)	Combined Concentration (A+B)	GWPS	Pass/Fail
Antimony	mg/L	MCL	2.0E-03	2.0E-06	2.0E-03	6.0E-03	**Pass**
Arsenic	mg/L	MCL	5.0E-03	4.4E-05	5.0E-03	1.0E-02	**Pass**
Barium	mg/L	MCL	2.1E-02	8.4E-04	2.2E-02	2.0E+00	**Pass**
Beryllium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	4.0E-03	**Pass**
Cadmium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	5.0E-03	**Pass**
Chromium	mg/L	MCL	3.1E-03	3.1E-06	3.1E-03	1.0E-01	**Pass**
Cobalt	mg/L	RSL	1.0E-03	1.0E-06	1.0E-03	6.0E-03	**Pass**
Fluoride	mg/L	MCL	1.60	9.6E-03	1.6E+00	4.0E+00	**Pass**
Lead	mg/L	RSL	2.5E-03	2.1E-06	2.5E-03	1.5E-02	**Pass**
Lithium	mg/L	Background	1.2E-01	1.4E-04	1.2E-01	1.3E-01	**Pass**
Mercury	mg/L	MCL	2.0E-04	8.0E-08	2.0E-04	2.0E-03	**Pass**
Molybdenum	mg/L	RSL	1.0E-02	3.8E-03	1.4E-02	1.0E-01	**Pass**
Radium-226/228	pCi/L	MCL	5.8E-04	7.6E-04	1.3E-03	5.0E-03	**Pass**
Selenium	mg/L	MCL	5.0E-03	3.4E-05	5.0E-03	5.0E-02	**Pass**
Thallium	mg/L	MCL	1.0E-03	3.0E-07	1.0E-03	2.0E-03	**Pass**

Notes:
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
RSL - Regional Screening Level from 83 FR 36435.
UTL - Upper Tolerance Limit (95%) of the background data set.
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 4-3 - MW-16-04
Background and Predicted Concentrations Compared against GWPS

Constituent	Unit	GWPS Selection	MW-16-04				
			Data				
			Maximum Observed Concentration (A)	Maximum Predicted Concentration (B)	Combined Concentration (A+B)	GWPS	Pass/Fail
Antimony	0	MCL	2.0E-03	2.0E-06	2.0E-03	6.0E-03	**Pass**
Arsenic	GWPS	MCL	5.0E-03	4.4E-05	5.0E-03	1.0E-02	**Pass**
Barium	6	MCL	1.1E-02	8.4E-04	1.2E-02	2.0E+00	**Pass**
Beryllium	10	MCL	1.0E-03	8.0E-07	1.0E-03	4.0E-03	**Pass**
Cadmium	2000	MCL	1.0E-03	8.0E-07	1.0E-03	5.0E-03	**Pass**
Chromium	4	MCL	2.0E-03	3.1E-06	2.0E-03	1.0E-01	**Pass**
Cobalt	5	RSL	1.0E-03	1.0E-06	1.0E-03	6.0E-03	**Pass**
Fluoride	100	MCL	1.10	9.6E-03	1.1E+00	4.0E+00	**Pass**
Lead	6	RSL	1.0E-03	2.1E-06	1.0E-03	1.5E-02	**Pass**
Lithium	4	RSL	2.1E-02	1.4E-04	2.1E-02	4.0E-02	**Pass**
Mercury	15	MCL	2.0E-04	8.0E-08	2.0E-04	2.0E-03	**Pass**
Molybdenum	40	RSL	1.0E-02	3.8E-03	1.4E-02	1.0E-01	**Pass**
Radium-226/228	pCi/L	MCL	9.7E-04	7.6E-04	1.7E-03	5.0E-03	**Pass**
Selenium	100	MCL	5.0E-03	3.4E-05	5.0E-03	5.0E-02	**Pass**
Thallium	5	MCL	1.0E-03	3.0E-07	1.0E-03	2.0E-03	**Pass**

Notes:
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
RSL - Regional Screening Level from 83 FR 36435.
UTL - Upper Tolerance Limit (95%) of the background data set.
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 4-3 - MW-16-05
Background and Predicted Concentrations Compared against GWPS

Constituent	Unit	GWPS Selection	MW-16-05				
			Data				
			Maximum Observed Concentration (A)	Maximum Predicted Concentration (B)	Combined Concentration (A+B)	GWPS	Pass/Fail
Antimony	mg/L	MCL	2.0E-03	2.0E-06	2.0E-03	6.0E-03	**Pass**
Arsenic	mg/L	MCL	5.0E-03	4.4E-05	5.0E-03	1.0E-02	**Pass**
Barium	mg/L	MCL	1.4E-02	8.4E-04	1.5E-02	2.0E+00	**Pass**
Beryllium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	4.0E-03	**Pass**
Cadmium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	5.0E-03	**Pass**
Chromium	mg/L	MCL	2.0E-03	3.1E-06	2.0E-03	1.0E-01	**Pass**
Cobalt	mg/L	RSL	1.0E-03	1.0E-06	1.0E-03	6.0E-03	**Pass**
Fluoride	mg/L	MCL	1.60	9.6E-03	1.6E+00	4.0E+00	**Pass**
Lead	mg/L	RSL	1.0E-03	2.1E-06	1.0E-03	1.5E-02	**Pass**
Lithium	mg/L	Background	4.7E-02	1.4E-04	4.7E-02	5.0E-02	**Pass**
Mercury	mg/L	MCL	2.0E-04	8.0E-08	2.0E-04	2.0E-03	**Pass**
Molybdenum	mg/L	RSL	1.0E-02	3.8E-03	1.4E-02	1.0E-01	**Pass**
Radium-226/228	pCi/L	MCL	2.3E-03	7.6E-04	3.0E-03	5.0E-03	**Pass**
Selenium	mg/L	MCL	5.0E-03	3.4E-05	5.0E-03	5.0E-02	**Pass**
Thallium	mg/L	MCL	1.0E-03	3.0E-07	1.0E-03	2.0E-03	**Pass**

Notes:

MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.

RSL - Regional Screening Level from 83 FR 36435.

UTL - Upper Tolerance Limit (95%) of the background data set.

GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.

ug/L = micrograms per liter
mg/L = milligrams per liter

Table 4-3 - MW-16-06
Background and Predicted Concentrations Compared against GWPS

Constituent	Unit	GWPS Selection	MW-16-06				
			Data				
			Maximum Observed Concentration (A)	Maximum Predicted Concentration (B)	Combined Concentration (A+B)	GWPS	Pass/Fail
Antimony	mg/L	MCL	2.0E-03	2.0E-06	2.0E-03	6.0E-03	**Pass**
Arsenic	mg/L	MCL	5.0E-03	4.4E-05	5.0E-03	1.0E-02	**Pass**
Barium	mg/L	MCL	3.4E-02	8.4E-04	3.5E-02	2.0E+00	**Pass**
Beryllium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	4.0E-03	**Pass**
Cadmium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	5.0E-03	**Pass**
Chromium	mg/L	MCL	2.0E-03	3.1E-06	2.0E-03	1.0E-01	**Pass**
Cobalt	mg/L	RSL	1.6E-03	1.0E-06	1.6E-03	6.0E-03	**Pass**
Fluoride	mg/L	MCL	1.70	9.6E-03	1.7E+00	4.0E+00	**Pass**
Lead	mg/L	RSL	1.1E-03	2.1E-06	1.1E-03	1.5E-02	**Pass**
Lithium	mg/L	Background	9.4E-02	1.4E-04	9.4E-02	1.0E-01	**Pass**
Mercury	mg/L	MCL	2.0E-04	8.0E-08	2.0E-04	2.0E-03	**Pass**
Molybdenum	mg/L	RSL	1.0E-02	3.8E-03	1.4E-02	1.0E-01	**Pass**
Radium-226/228	pCi/L	MCL	9.2E-04	7.6E-04	1.7E-03	5.0E-03	**Pass**
Selenium	mg/L	MCL	5.0E-03	3.4E-05	5.0E-03	5.0E-02	**Pass**
Thallium	mg/L	MCL	1.0E-03	3.0E-07	1.0E-03	2.0E-03	**Pass**

Notes:
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
RSL - Regional Screening Level from 83 FR 36435.
UTL - Upper Tolerance Limit (95%) of the background data set.
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 4-3 - MW-16-07
Background and Predicted Concentrations Compared against GWPS

Constituent	Unit	GWPS Selection	MW-16-07				
			Data				
			Maximum Observed Concentration (A)	Maximum Predicted Concentration (B)	Combined Concentration (A+B)	GWPS	Pass/Fail
Antimony	mg/L	MCL	2.0E-03	2.0E-06	2.0E-03	6.0E-03	**Pass**
Arsenic	mg/L	MCL	5.0E-03	4.4E-05	5.0E-03	1.0E-02	**Pass**
Barium	mg/L	MCL	9.4E-03	8.4E-04	1.0E-02	2.0E+00	**Pass**
Beryllium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	4.0E-03	**Pass**
Cadmium	mg/L	MCL	1.0E-03	8.0E-07	1.0E-03	5.0E-03	**Pass**
Chromium	mg/L	MCL	2.0E-03	3.1E-06	2.0E-03	1.0E-01	**Pass**
Cobalt	mg/L	RSL	1.0E-03	1.0E-06	1.0E-03	6.0E-03	**Pass**
Fluoride	mg/L	MCL	1.70	9.6E-03	1.7E+00	4.0E+00	**Pass**
Lead	mg/L	RSL	1.0E-03	2.1E-06	1.0E-03	1.5E-02	**Pass**
Lithium	mg/L	Background	3.9E-02	1.4E-04	3.9E-02	4.3E-02	**Pass**
Mercury	mg/L	MCL	2.0E-04	8.0E-08	2.0E-04	2.0E-03	**Pass**
Molybdenum	mg/L	RSL	1.0E-02	3.8E-03	1.4E-02	1.0E-01	**Pass**
Radium-226/228	pCi/L	MCL	1.1E-03	7.6E-04	1.9E-03	5.0E-03	**Pass**
Selenium	mg/L	MCL	5.0E-03	3.4E-05	5.0E-03	5.0E-02	**Pass**
Thallium	mg/L	MCL	1.0E-03	3.0E-07	1.0E-03	2.0E-03	**Pass**

Notes:
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
RSL - Regional Screening Level from 83 FR 36435.
UTL - Upper Tolerance Limit (95%) of the background data set.
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 4-4 – Sensitivity Analysis Model Inputs

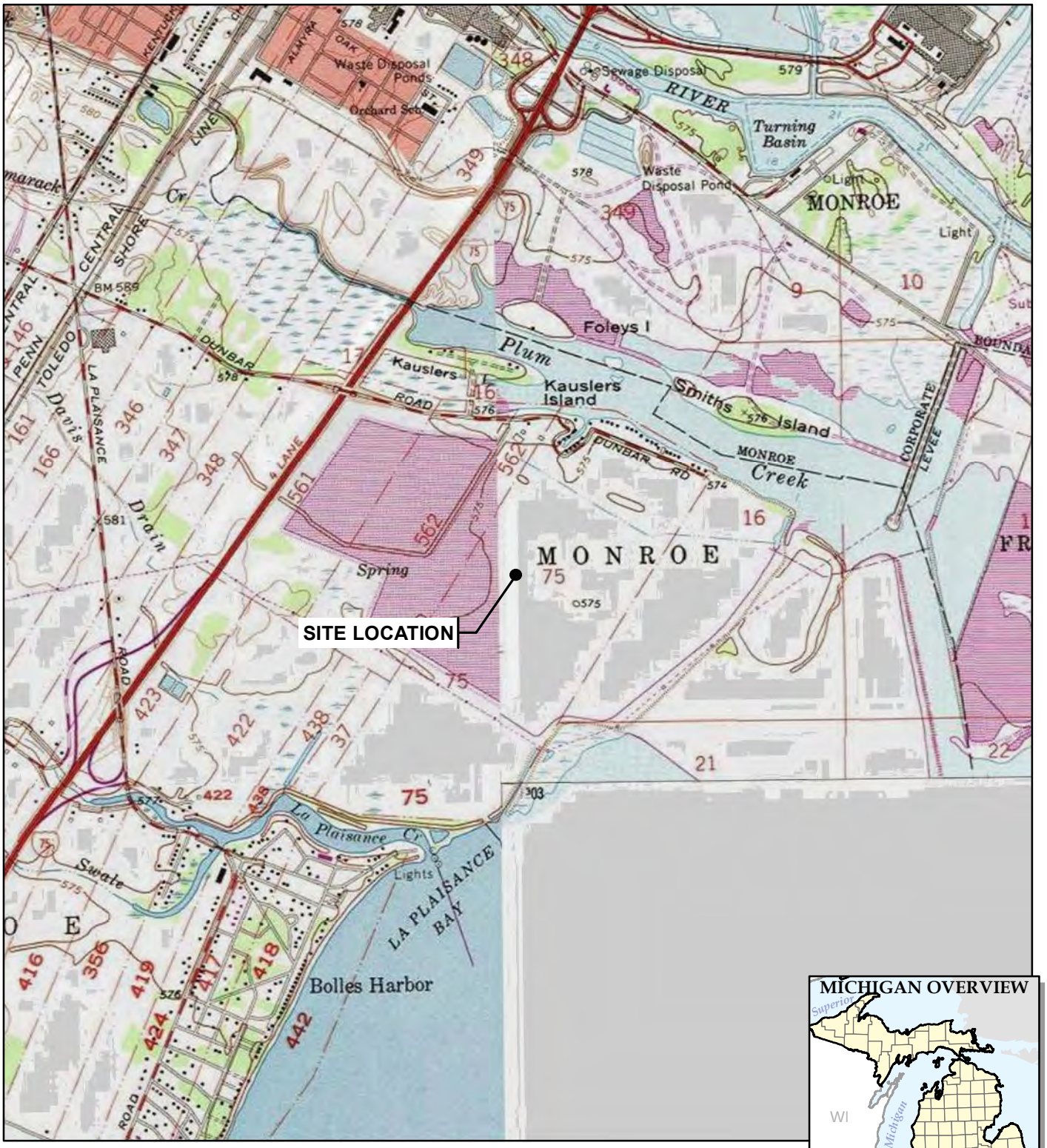
	Baseline	**Sensitivity Analysis**		**Baseline**	**Sensitivity Analysis**	**Baseline**	**Sensitivity Analysis**		**Baseline**	**Sensitivity Analysis**		**Baseline**	**Sensitivity Analysis**		**Baseline**	**Sensitivity Analysis**	**Baseline**	**Sensitivity Analysis**
Layer Properties	Thickness (m)	Max Thickness (m)	Min Thickness (m)	Dv (m/yr)	Dv (m/yr) Doubled	CoHD	CoHD +25%	CoHD -25%	Total Porosity	Max Porosity	Min Porosity	Effective Porosity	Eff. Porosity Max	Eff. Porosity Min	Modeling Period (years)	Modeling Period (years)	Kd (m3/kg)	Kd Molybdenum (m3/kg)
Sandy Lean Clay	6.31	10.42	4.33	6.08E-03	1.22E-02	0.019	0.024	0.014	0.24	0.38	0.17	0.19	0.31	0.14	67	97	0	0.0082

Dv = Vertical Darcy Velocity

Table 4-5 – Sensitivity Analysis Results Prediction Factors

Monroe Ash Basin Sensitivity Analysis			
Model Name	**Description**	**Prediction Factor**	**Passing?***
Monroe_Baseline	Baseline model for the Bottom Ash Basins.	6.97E-03	YES
Monroe_ExtendedRun_Kd	Model runtime was extended from 67 years to 97 years; distribution coefficient applied for Molybdenum.	3.64E-46	YES
Monroe_DoubleDarcy_Kd	Darcy velocity value was doubled; distribution coefficient applied for Molybdenum.	4.97E-48**	YES
Monroe_CoHD_High_Kd	Coefficient of Hydrodynamic Dispersion was increased by 25%. Distribution coefficient applied for Molybdenum.	7.18E-50	YES
Monroe_CoHD_Low	Coefficient of Hydrodynamic Dispersion was decreased by 25%.	1.96E-03	YES
Monroe_Porosity_High	Used the highest effective porosity; derived from data in project database.	1.47E-03	YES
Monroe_Porosity_Low_Kd	Used the lowest effective porosity; derived from data in project database. Distribution coefficient applied for Molybdenum.	3.09E-45**	YES
Monroe_Thick	Used thickest interval seen in project model; derived from project EVS model.	1.91E-07	YES
Monroe_Thin_Kd	Used thinnest interval seen in project model; distribution coefficient applied for Molybdenum.	1.60E-37	YES

* Indicates value less that $PF_{threshold}$, as discussed in Section 4.6.2.
** This sensitivity model run did not come to full convergence, because the prediction factor was below 10^{-50}. Therefore, the lowest calculated prediction factor was reported.



BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES.

N

1 " = 2,000 '
1:24,000

0 2,000 4,000
FEET

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
www.trccompanies.com
TRC - GIS

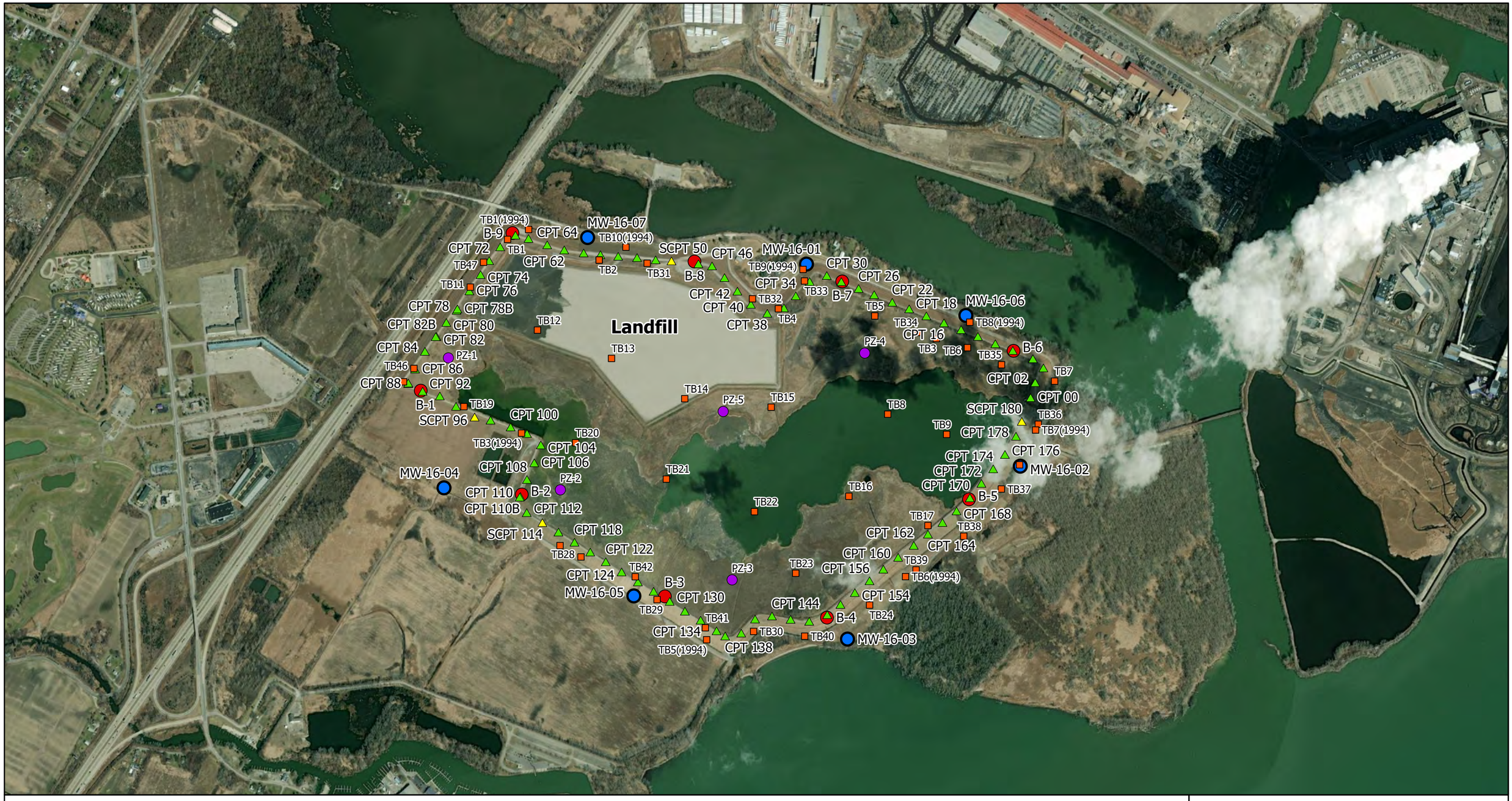
PROJECT:
DTE ELECTRIC COMPANY
MONROE POWER PLANT
FLY ASH BASIN AND VERTICAL EXTENSION LANDFILL
7955 EAST DUNBAR ROAD
MONROE, MICHIGAN

TITLE:
SITE LOCATION MAP

DRAWN BY:	S.MAJOR
CHECKED BY:	B. YELEN
APPROVED BY:	V. BUENING
DATE:	JANUARY 2020
PROJ. NO.:	320511.0001
FILE:	320511-0001-008SLM-MPP-Fig01.mxd

FIGURE 1

E:\DTE\CCR_Sites\2017_265996\320511-0001-008SLM-MPP-Fig01.mxd -- Saved By: MVAPHIADIS on 1/28/2020, 11:58:35 AM



Boring Locations

- Boring - Geosyntec
- CPT - Geosyntec
- MW - TRC
- Seismic and CPT
- Pre-2000 Borings
- Piezometer - Geosyntec

N

Note: For clarity purposes, not all CPT IDs are provided.

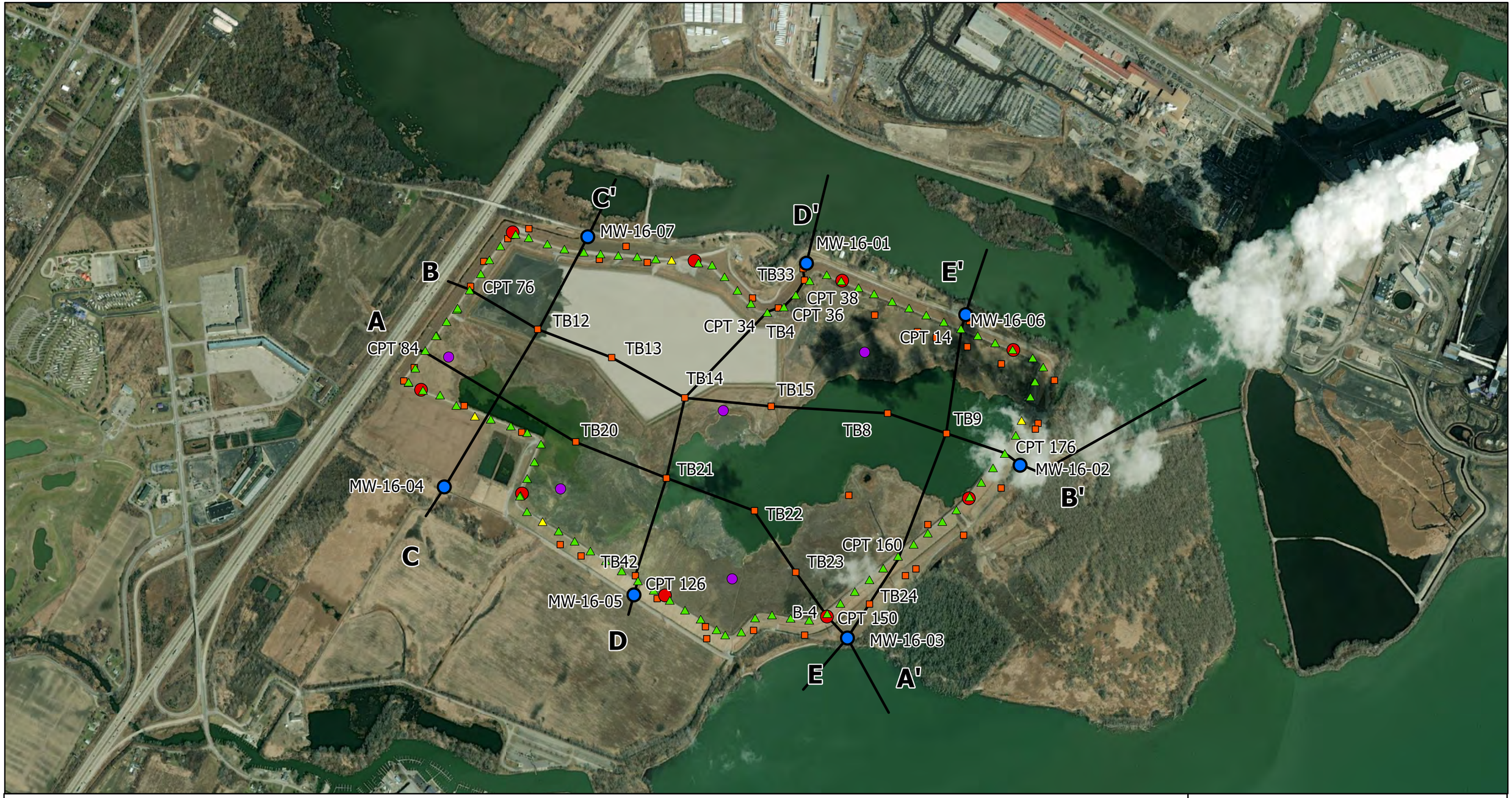
0 500 1,000 2,000 3,000 4,000 Feet

Field Investigation Locations
Monroe Power Plant Fly Ash Basin (FAB)
Monroe, MI

Geosyntec consultants

GLP8014 | November 2021

Figure 2-1



Boring Locations

- Boring - Geosyntec
- CPT - Geosyntec
- MW - TRC
- Seismic and CPT
- Boring - Pre-construction Borings
- Piezometer - Geosyntec

0 500 1,000 2,000 3,000 4,000 Feet

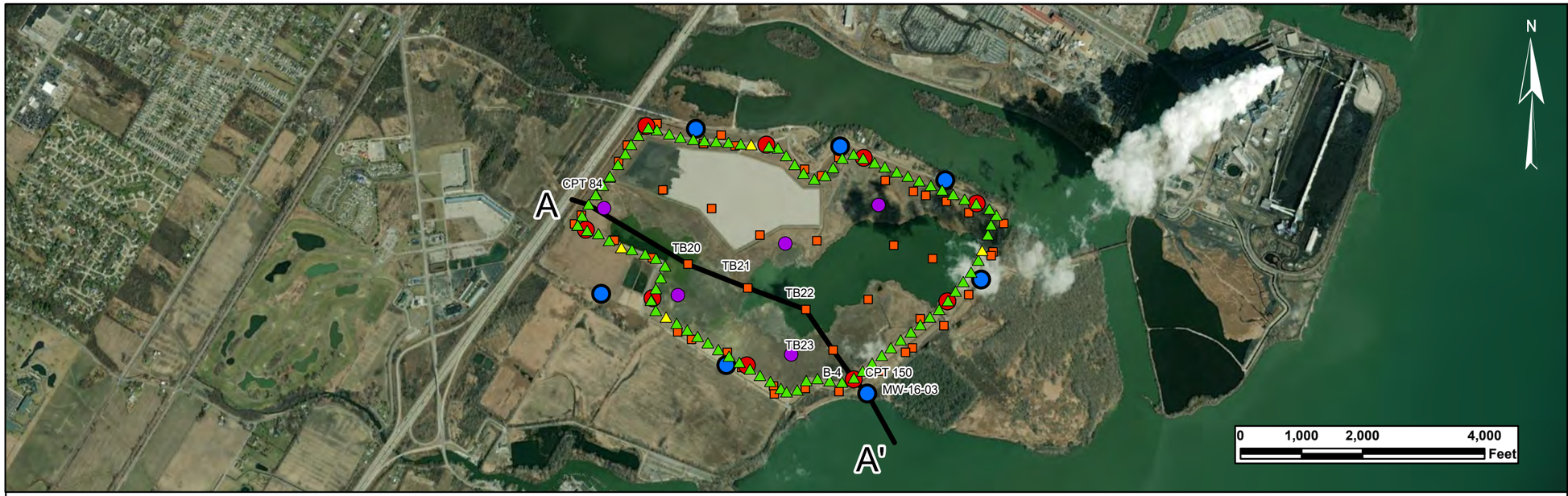
N

Cross Section Locations
Monroe Power Plant Fly Ash Basin (FAB)
Monroe, MI

Geosyntec consultants

GLP8014 | November 2021

Figure 2-2



Legend

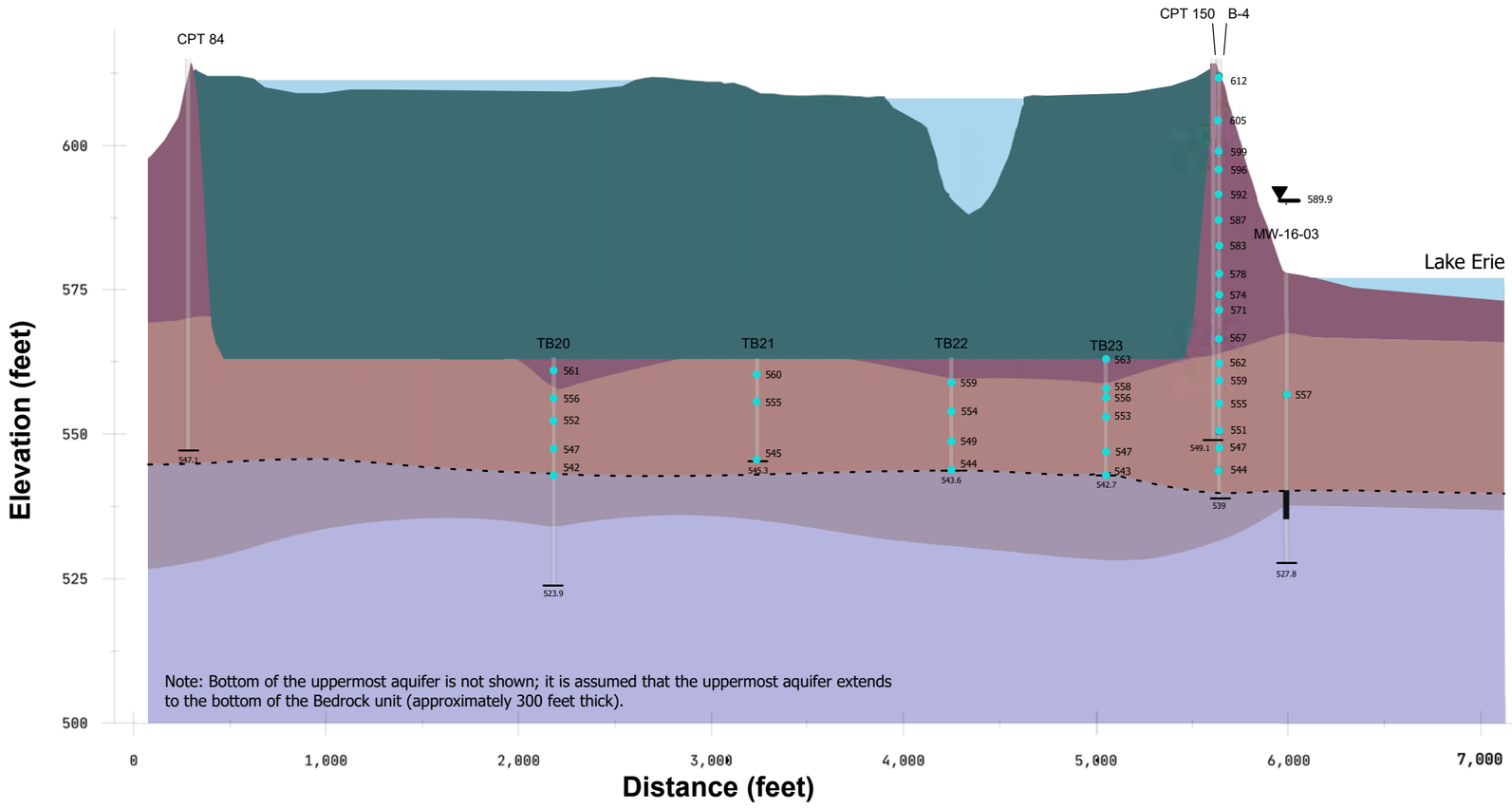
Boring Locations

- Boring - Geosyntec
- CPT - Geosyntec
- MW - TRC
- Seismic and CPT
- Pre-2000 Borings
- Piezometer - Geosyntec

Service Layer Credits: Google Earth
Imagery dated 03/24/2019

Fly Ash Basin Extent

A — A'



Note: Bottom of the uppermost aquifer is not shown; it is assumed that the uppermost aquifer extends to the bottom of the Bedrock unit (approximately 300 feet thick).

Legend

- Geotechnical Sample Elevation
- End of Investigation Elevation
- Water Elevation in Upper Most Aquifer
- Well Screen Interval
- Top of Uppermost Aquifer Unit

Lithology

- Ponded Water
- Fly Ash
- Lean Clay
- Sandy Lean Clay
- Transition Zone
- Bedrock

Notes
All Pre-construction borings have been truncated at 563 feet within the Ash Basin.
Vertical Scale: 1-inch = 25-feet
Horizontal Scale: 1-inch = 750-feet
Elevations are in Average Mean Sea Level

Cross Section A - A'
Monroe Power Plant Flyash Basin (FAB)
Monroe, MI

Geosyntec consultants

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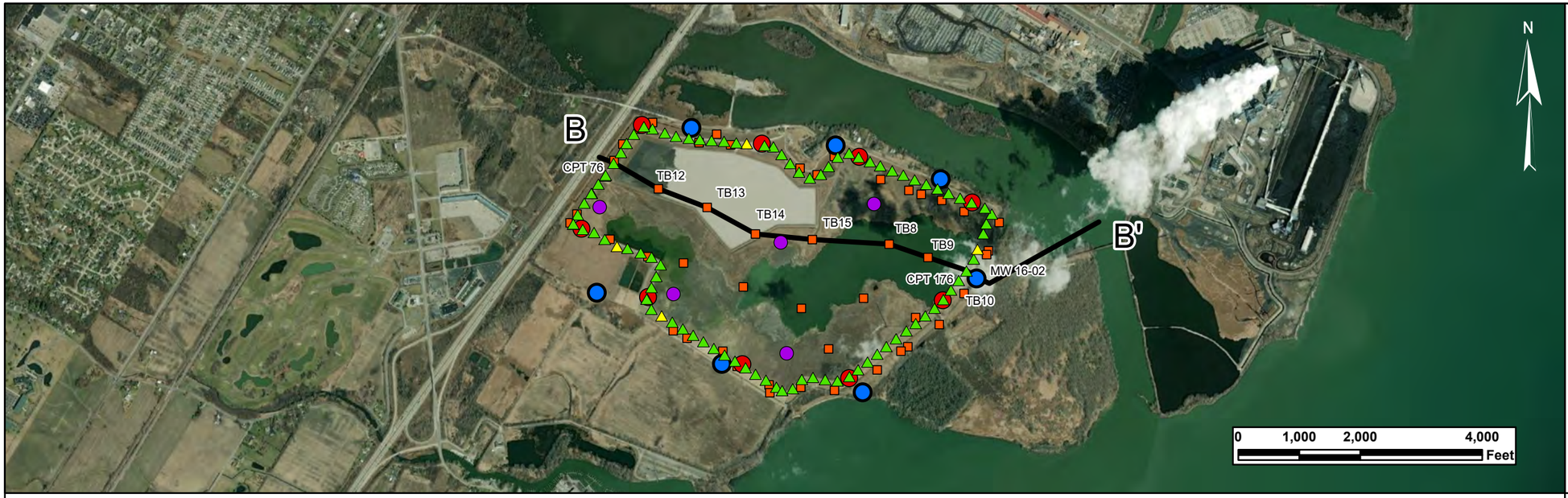
Figure 2-3



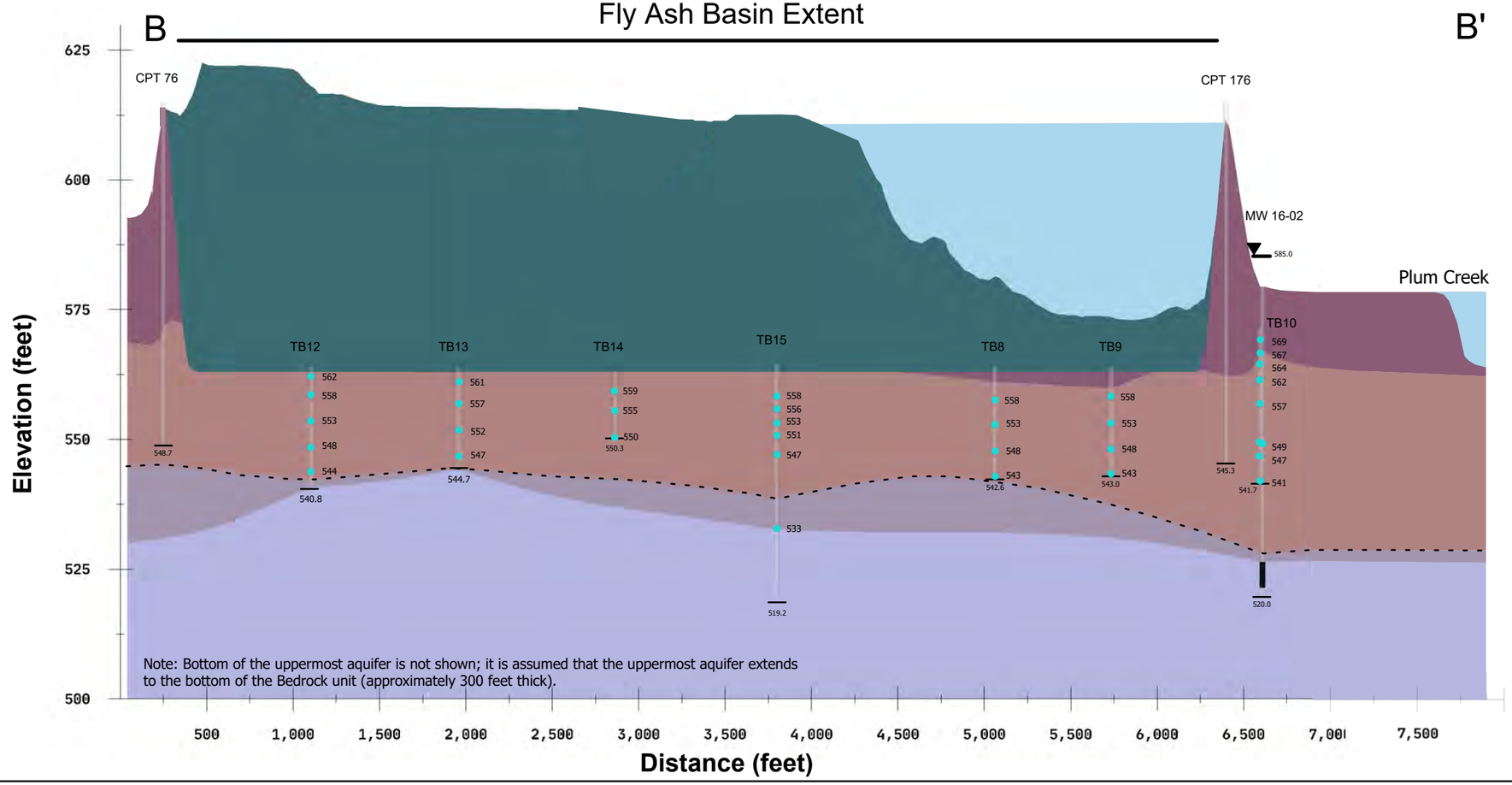
Legend

Boring Locations

- Boring - Geosyntec
- CPT - Geosyntec
- MW - TRC
- Seismic and CPT
- Pre-2000 Borings
- Piezometer - Geosyntec

Service Layer Credits: Google Earth
Imagery dated 03/24/2019

Fly Ash Basin Extent



Legend

- Geotechnical Sample Elevation
- End of Investigation Elevation
- Water Elevation in Upper Most Aquifer
- Well Screen Interval
- Top of Uppermost Aquifer Unit

Lithology

- Ponded Water
- Fly Ash
- Lean Clay
- Sandy Lean Clay
- Transition Zone
- Bedrock

Notes
All Pre-construction borings have been truncated at 563 feet within the Ash Basin.
Vertical Scale: 1-inch = 25-feet
Horizontal Scale: 1-inch = 750-feet
Elevations are in Average Mean Sea Level

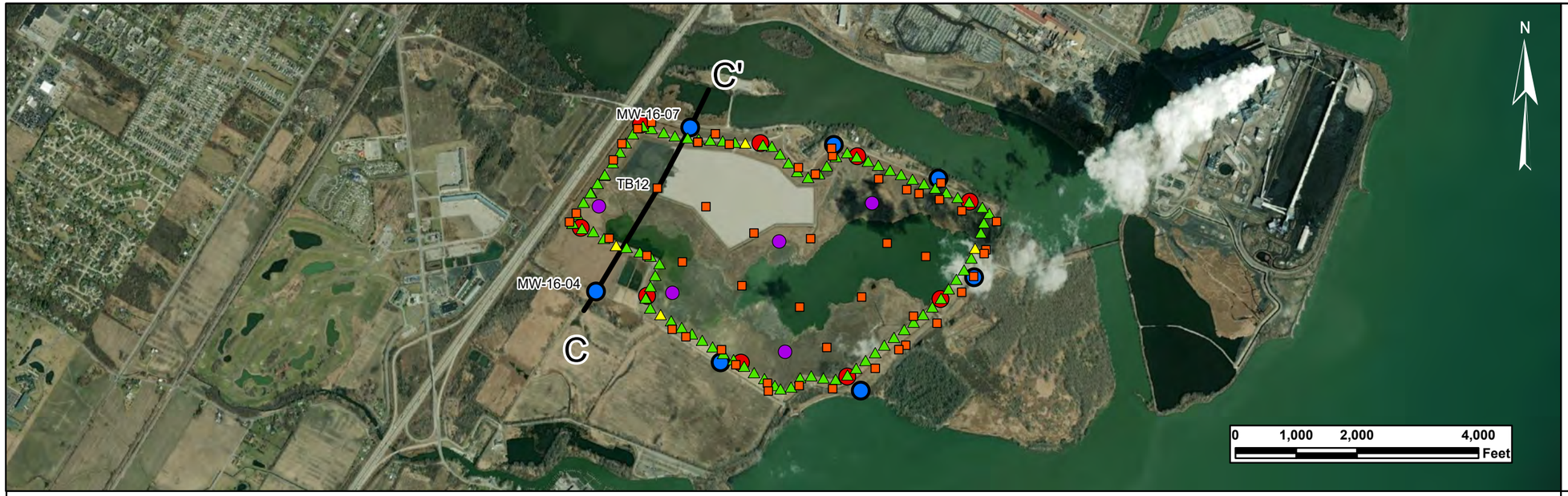
Cross Section B - B'
Monroe Power Plant Fly Ash Basin (FAB)
Monroe, MI

Geosyntec consultants

Figure 2-4

GLP8014 | November 2021

G:\CWP\GLP8014 - Monroe Ash Basin Beneficial Reuse and Geotech Investigation\500 - Technical\GIS\Monroe_Sections\Monroe_Sections_YW.aprx 11/22/2021 9:22 AM



Legend

Boring Locations

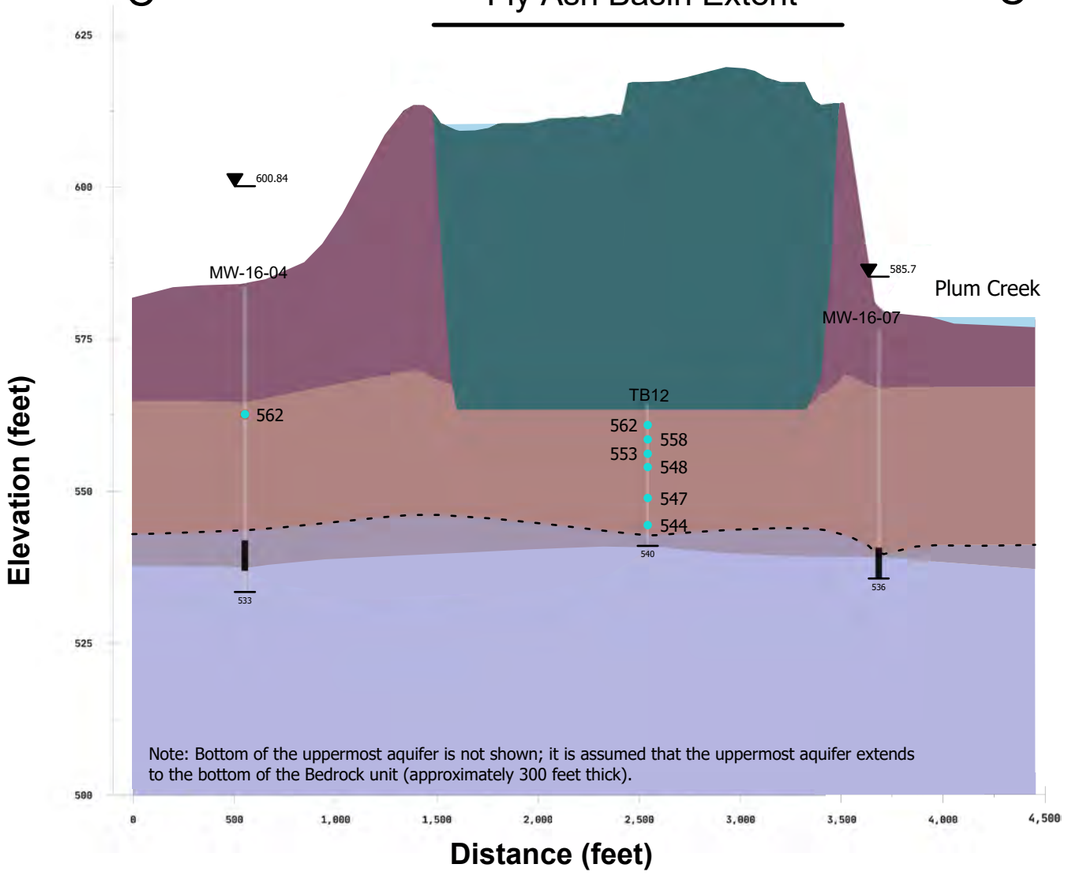
- Boring - Geosyntec
- CPT - Geosyntec
- MW - TRC
- Seismic and CPT
- Pre-2000 Borings
- Piezometer - Geosyntec

Service Layer Credits: Google Earth
Imagery dated 03/24/2019

Fly Ash Basin Extent

C

C'



Legend

- Geotechnical Sample Elevation
- End of Investigation Elevation
- Water Elevation in Upper Most Aquifer
- Well Screen Interval
- Top of Uppermost Aquifer Unit

Lithology

- Ponded Water
- Fly Ash
- Lean Clay
- Sandy Lean Clay
- Transition Zone
- Bedrock

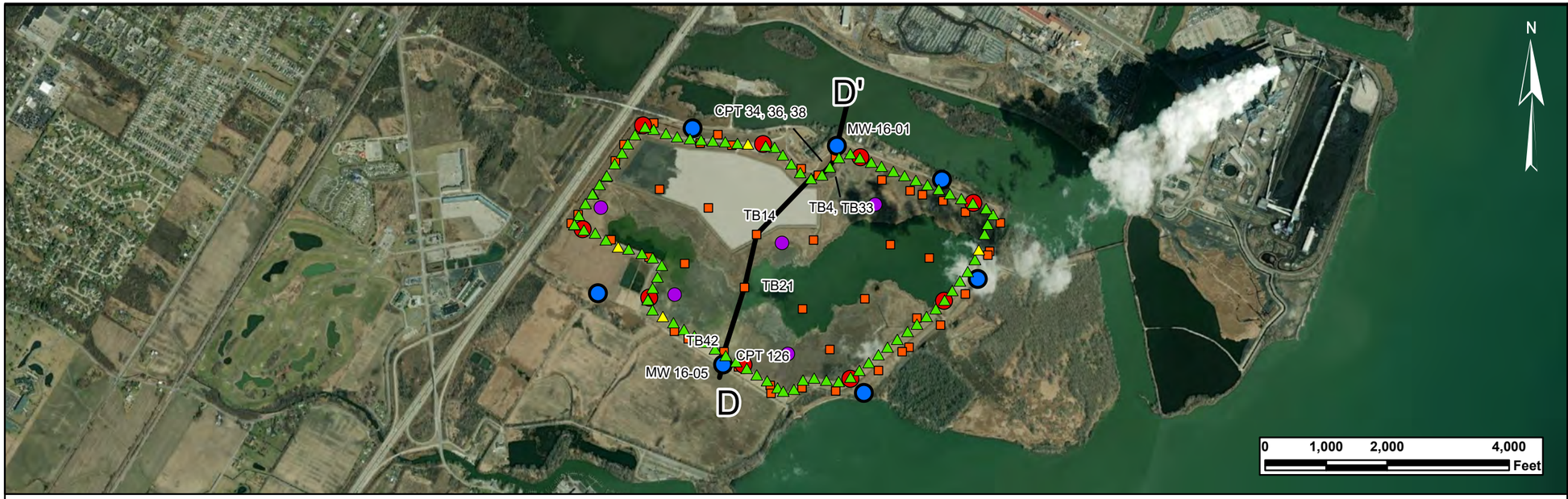
Notes
All Pre-construction borings have been truncated at 563 feet within the Ash Basin.
Vertical Scale: 1-inch = 25-feet
Horizontal Scale: 1-inch = 750-feet
Elevations are in Average Mean Sea Level

Cross Section C - C'
Monroe Power Plant Flyash Basin (FAB)
Monroe, MI

Geosyntec consultants

Figure 2-5

GLP8014 | November 2021



Legend

Boring Locations

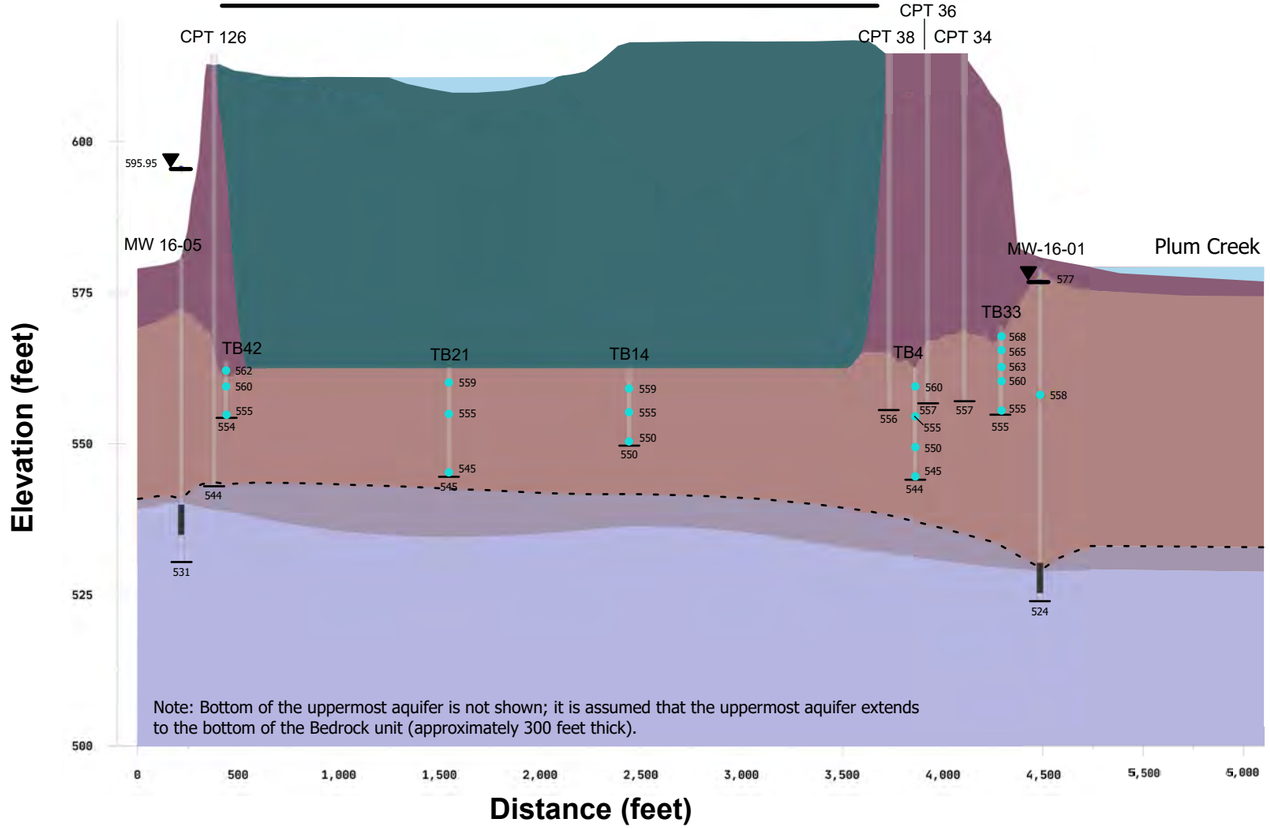
- Boring - Geosyntec
- CPT - Geosyntec
- MW - TRC
- Seismic and CPT
- Pre-2000 Borings
- Piezometer - Geosyntec

Service Layer Credits: Google Earth
Imagery dated 03/24/2019

D

Fly Ash Basin Extent

D'



Legend

- Geotechnical Sample Elevation
- End of Investigation Elevation
- Water Elevation in Upper Most Aquifer
- Well Screen Interval
- Top of Uppermost Aquifer Unit

Lithology

- Ponded Water
- Fly Ash
- Lean Clay
- Sandy Lean Clay
- Transition Zone
- Bedrock

Notes
All Pre-construction borings have been truncated at 563 feet within the Ash Basin.
Vertical Scale: 1-inch = 25-feet
Horizontal Scale: 1-inch = 750-feet
Elevations are in Average Mean Sea Level

Cross Section D - D'
Monroe Power Plant Flyash Basin (FAB)
Monroe, MI

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Figure 2-6

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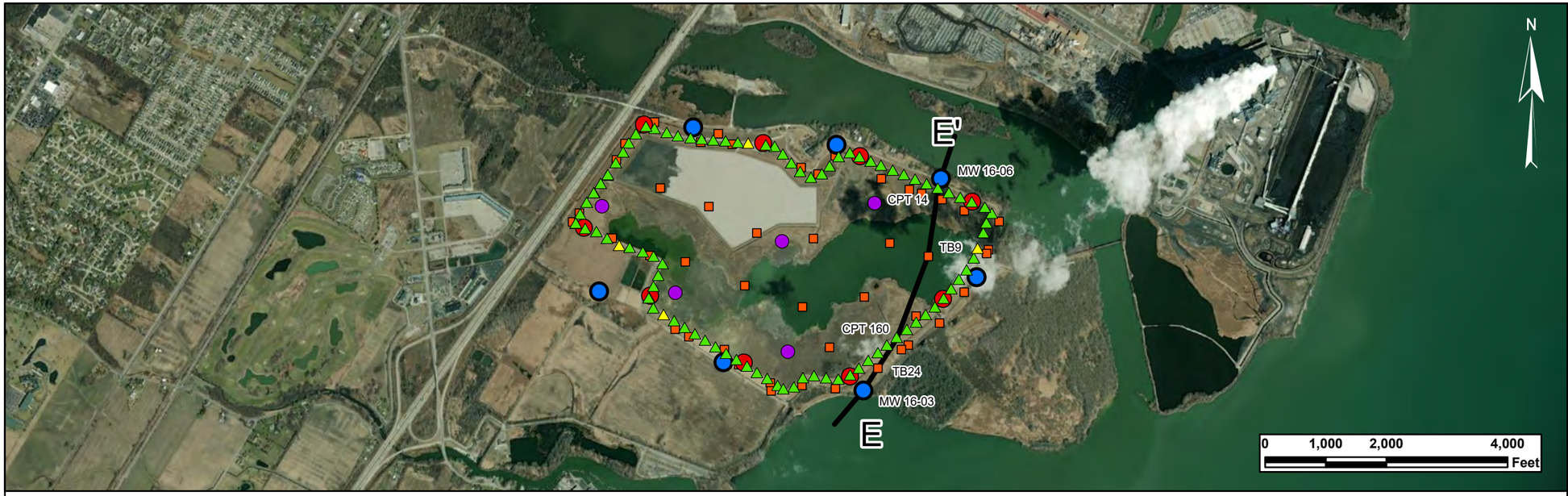


Legend

Boring Locations

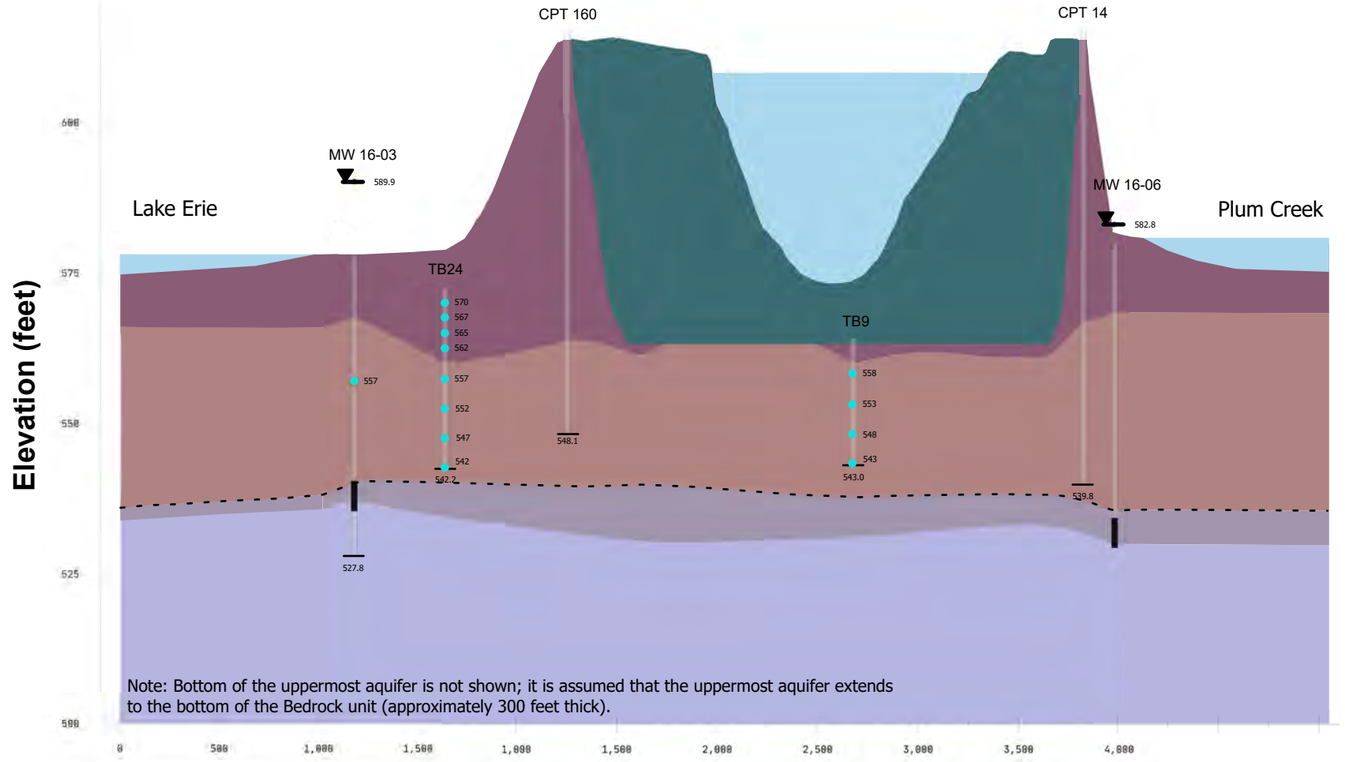
- Boring - Geosyntec
- CPT - Geosyntec
- MW - TRC
- Seismic and CPT
- Pre-2000 Borings
- Piezometer - Geosyntec

Service Layer Credits: Google Earth
Imagery dated 03/24/2019

E

Fly Ash Basin Extent

E'



Legend

- Geotechnical Sample Elevation
- End of Investigation Elevation
- Water Elevation in Upper Most Aquifer
- Well Screen Interval
- - - Top of Uppermost Aquifer Unit

Lithology

- Ponded Water
- Fly Ash
- Lean Clay
- Sandy Lean Clay
- Transition Zone
- Bedrock

Notes
All Pre-construction borings have been truncated at 563 feet within the Ash Basin.
Vertical Scale: 1-inch = 25-feet
Horizontal Scale: 1-inch = 750-feet
Elevations are in Average Mean Sea Level

Cross Section E - E'
Monroe Power Plant Flyash Basin (FAB)
Monroe, MI

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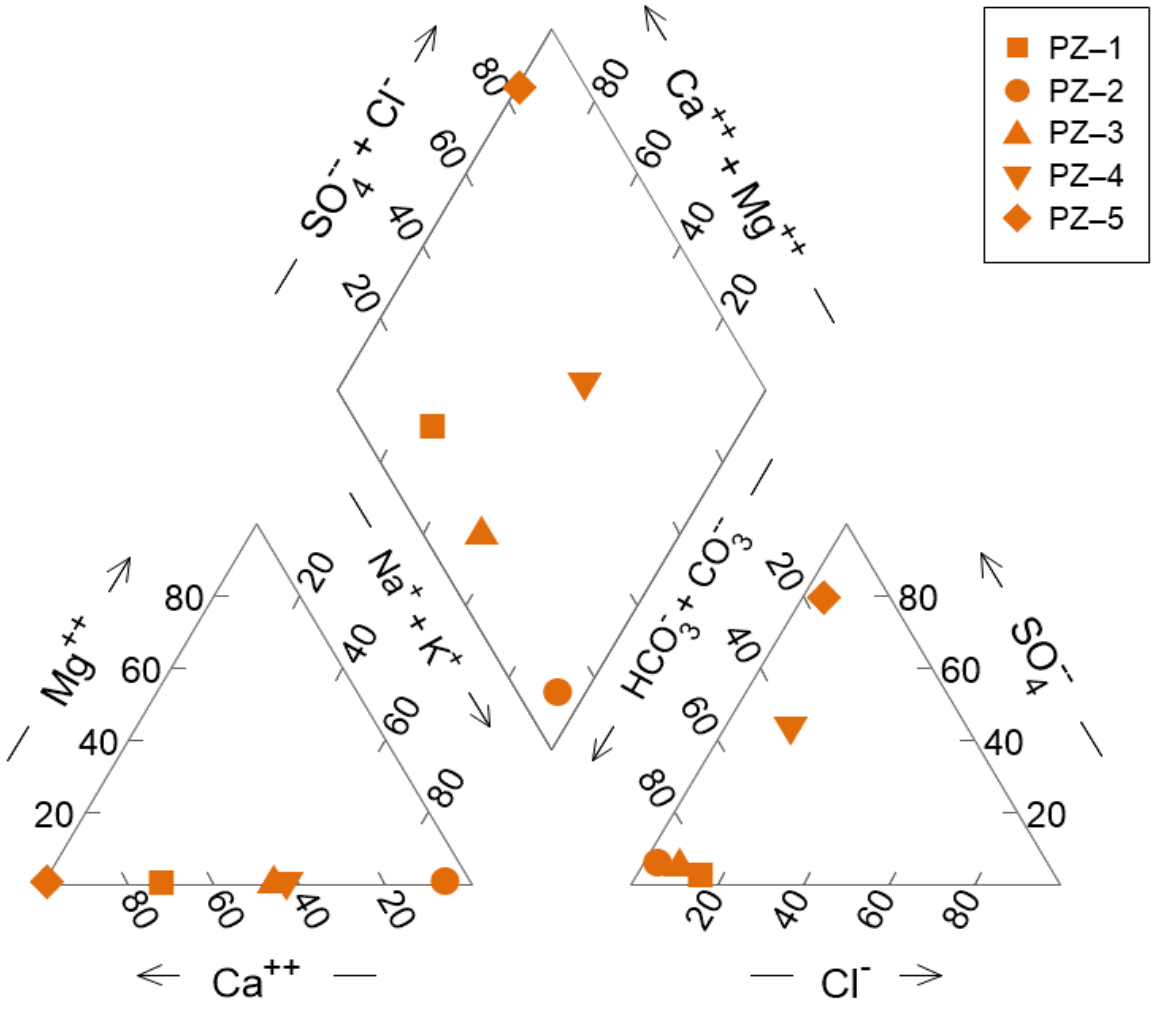
Figure 2-7

GLP8014 | November 2021



Note:
Results are shown in the relative percentage of milliequivalents per kilogram (meq/kg).

Filtered Piezometer Sample Piper Diagram

Monroe Power Plant Fly Ash Basin (FAB)
Monroe, MI

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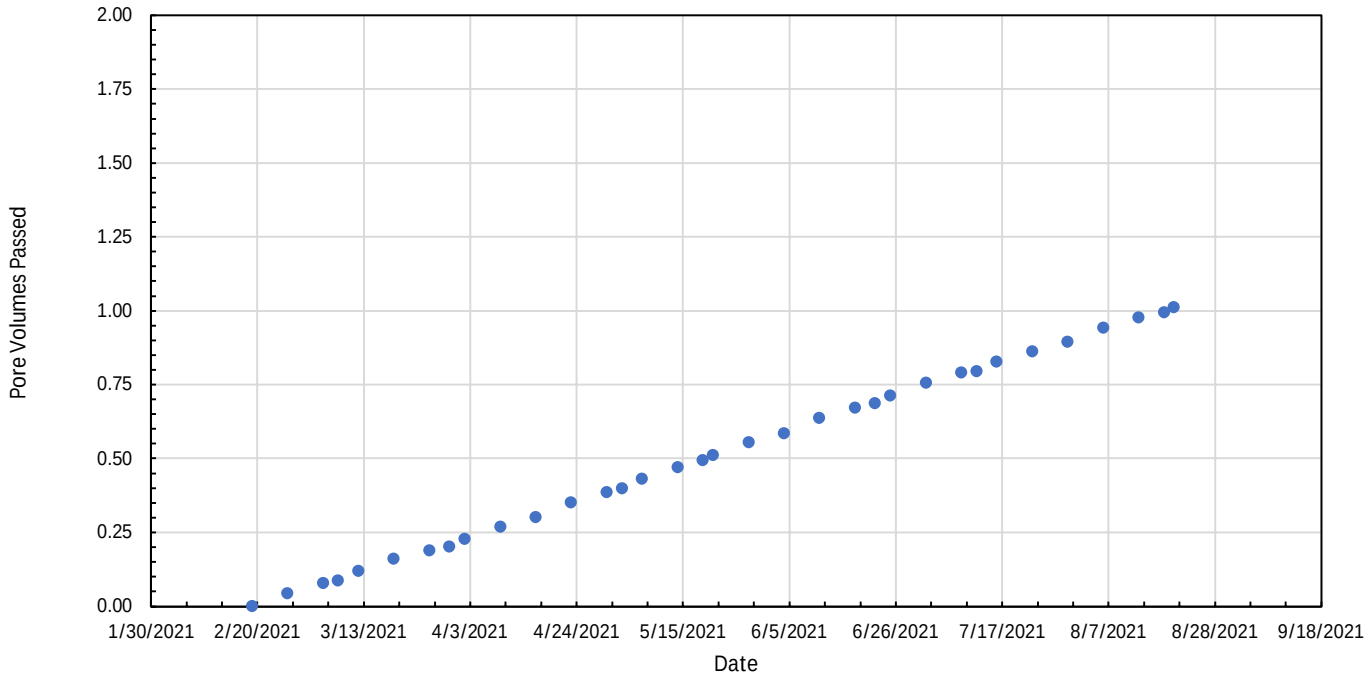
Figure 3-1

GLP8014 | August 2021

H:\[Figure 3-1 Piper Diagram.xlsx]



B2-ST-1 (20-22 ft bgs) PV of Flow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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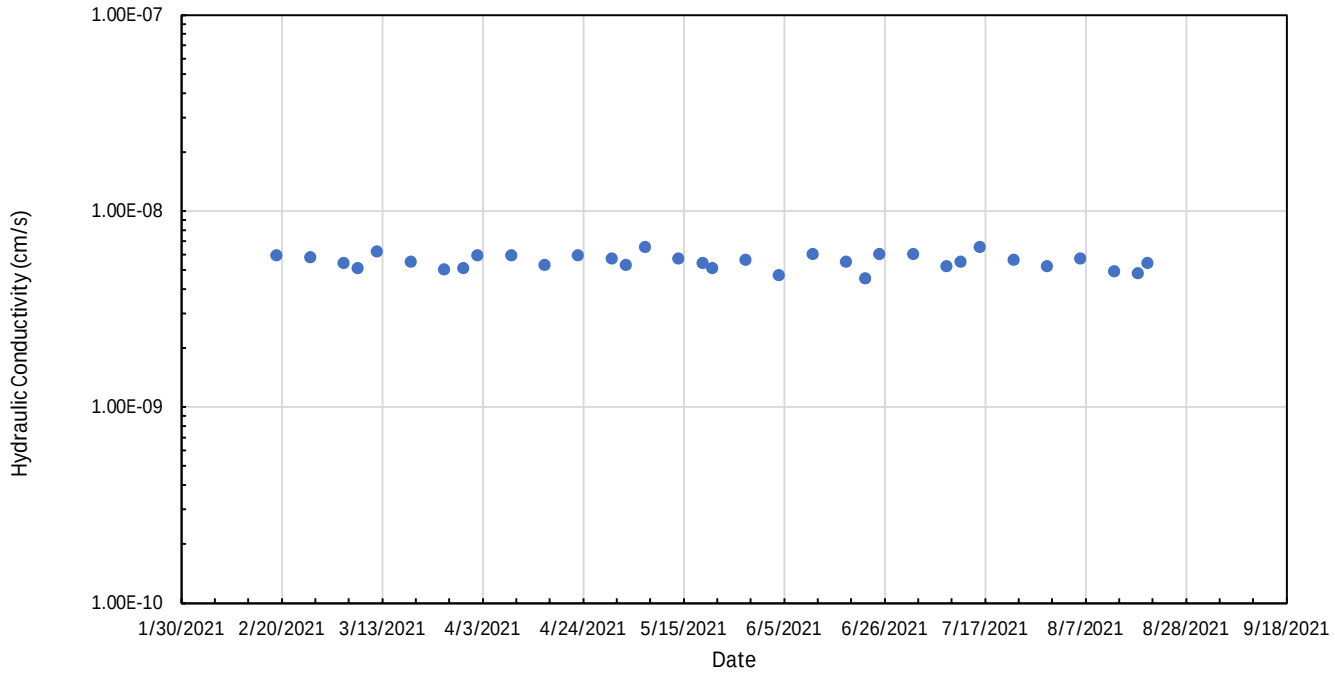
Figure 3-2



B2-ST-1 (20-22 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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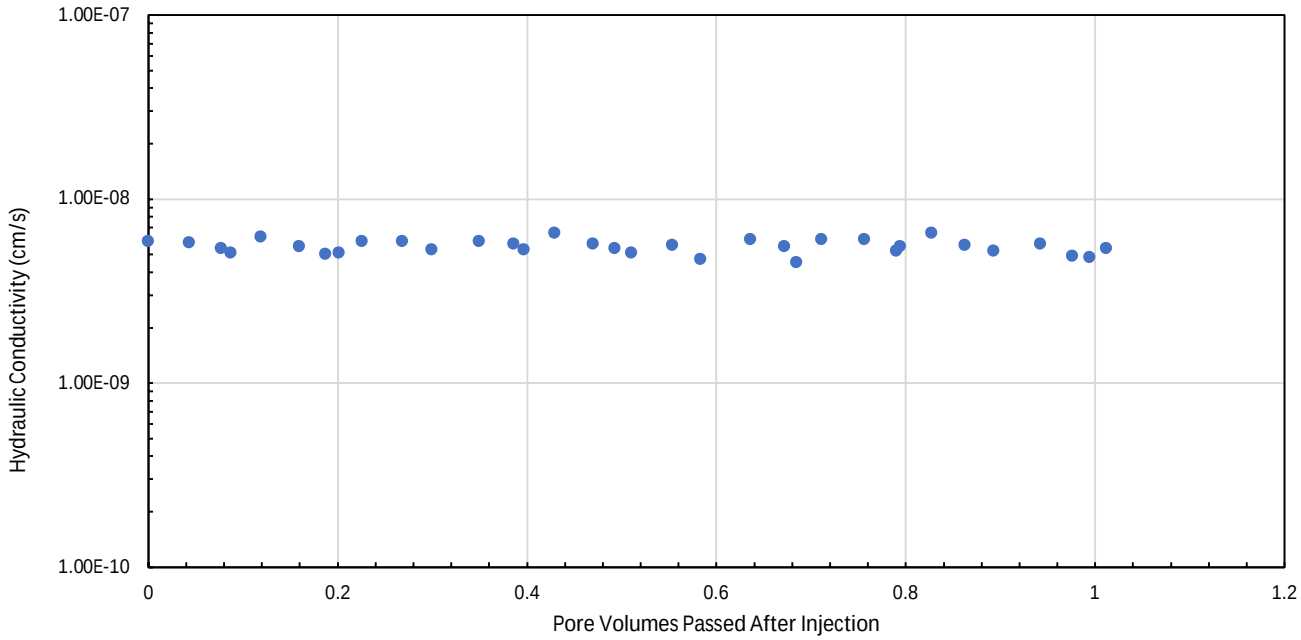
Figure 3-3



B2-ST-1 (20-22 ft bgs) Hydraulic Conductivity with PV

MONROE POWER PLANT
MONROE, MICHIGAN

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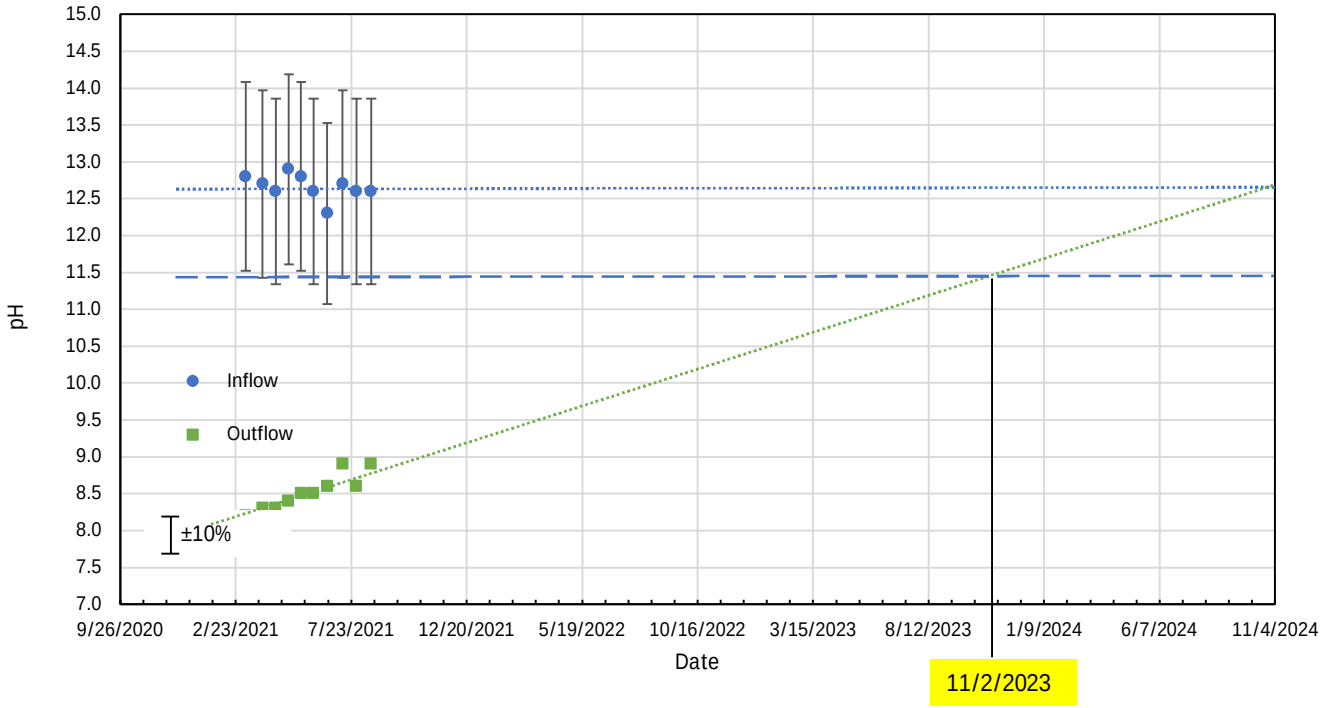
Figure 3-4



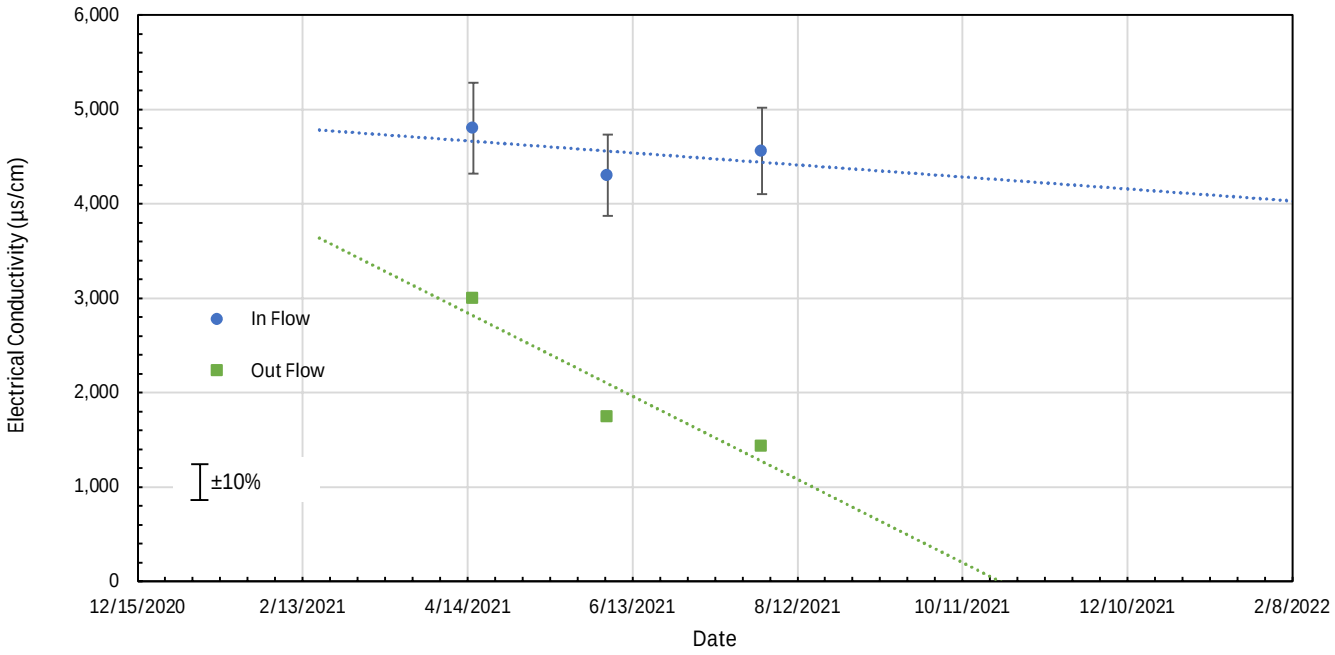
B2-ST-1 (20-22 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

Geosyntec consultants

Ann Arbor, MI | September 2021

Figure 3-5



B2-ST-1 (20-22 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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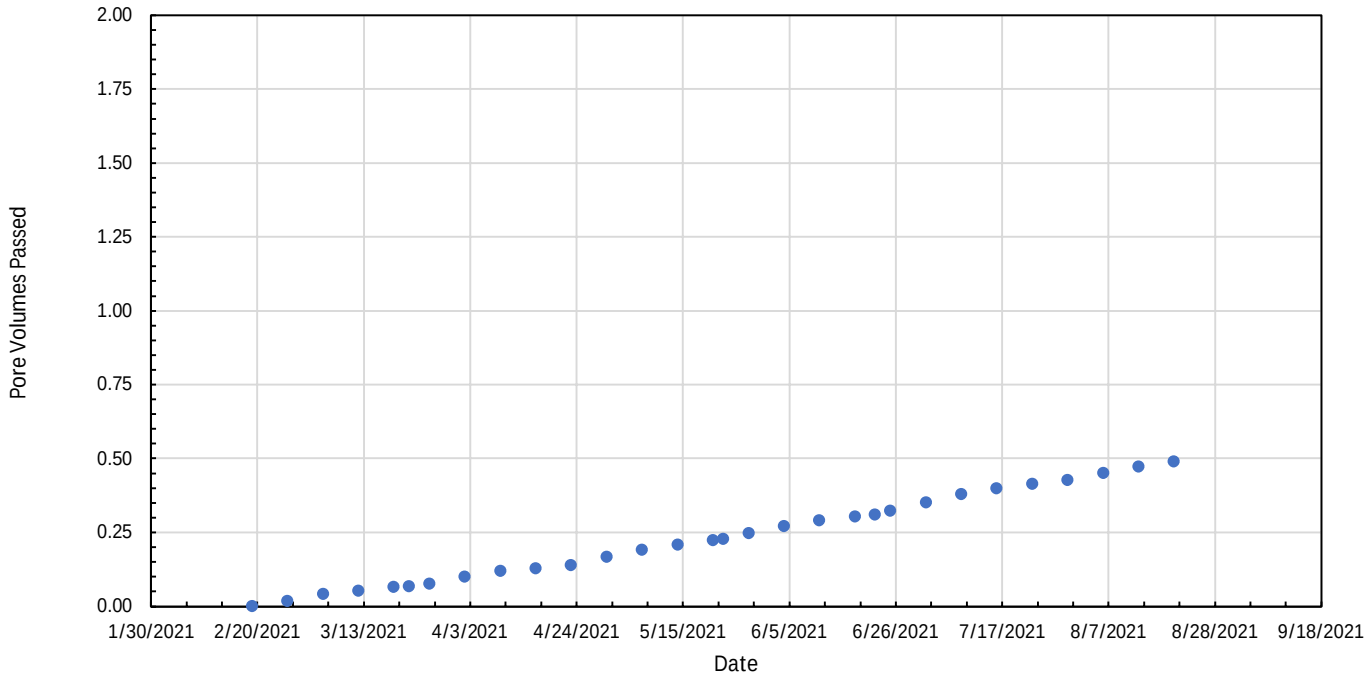
Ann Arbor, MI | September 2021

Figure 3-6



B4-ST-2 (40-42 ft bgs) PV of Flow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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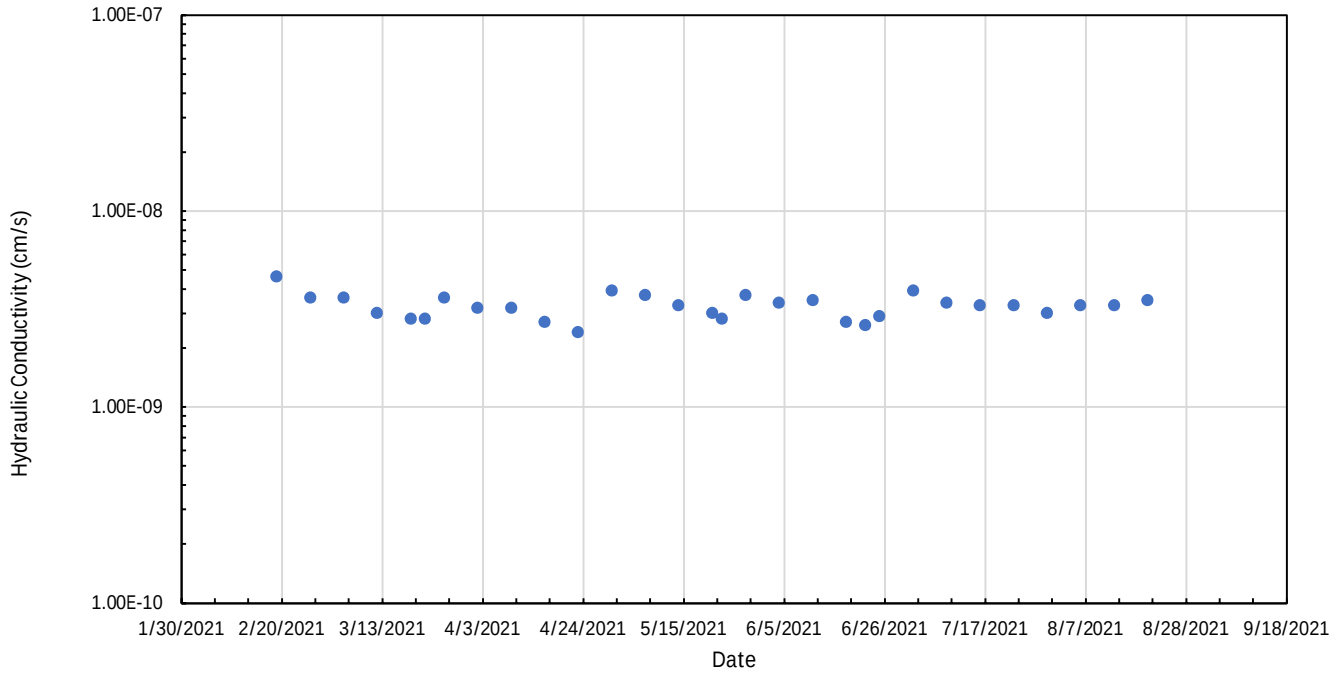
Ann Arbor, MI | September 2021

Figure 3-7



B4-ST-2 (40-42 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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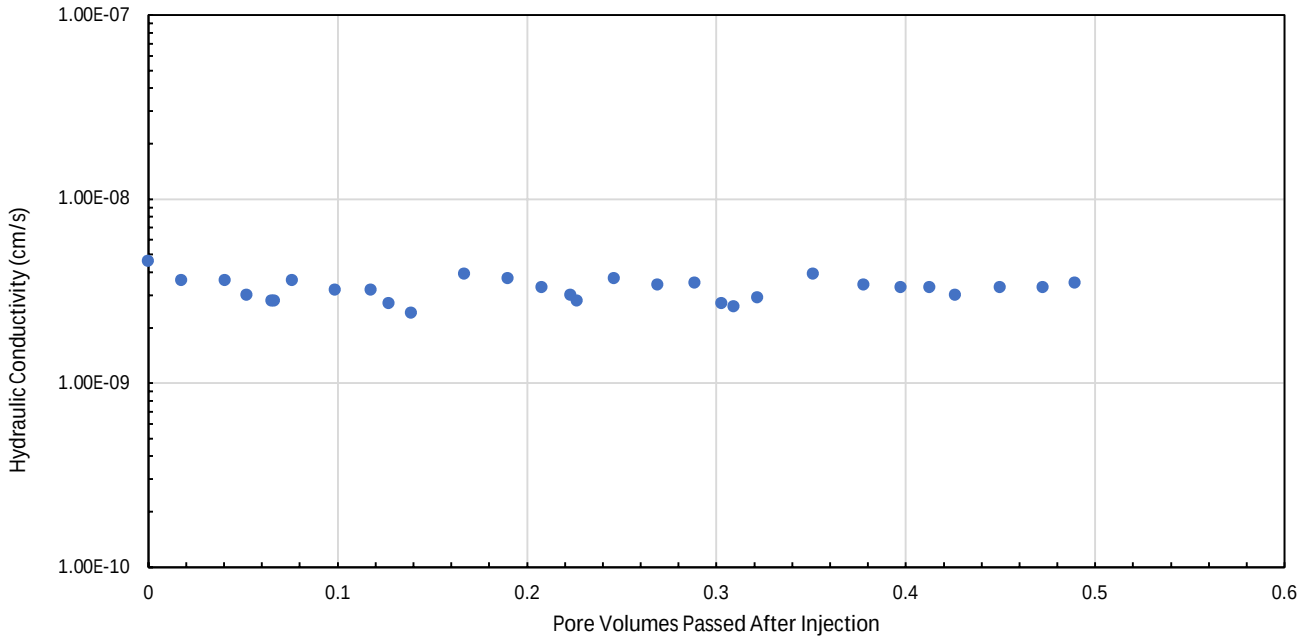
Figure 3-8



B4-ST-2 (40-42 ft bgs) Hydraulic Conductivity with PV

MONROE POWER PLANT
MONROE, MICHIGAN

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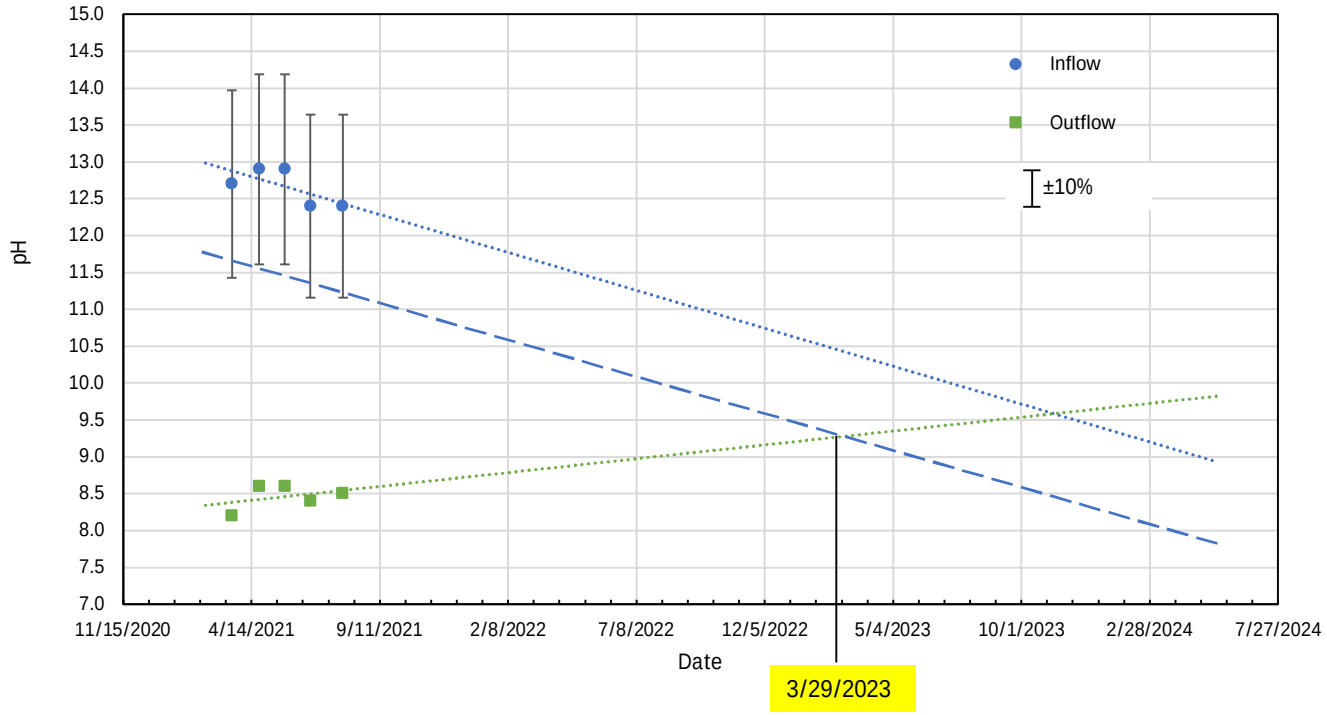
Figure 3-9



B4-ST-2 (40-42 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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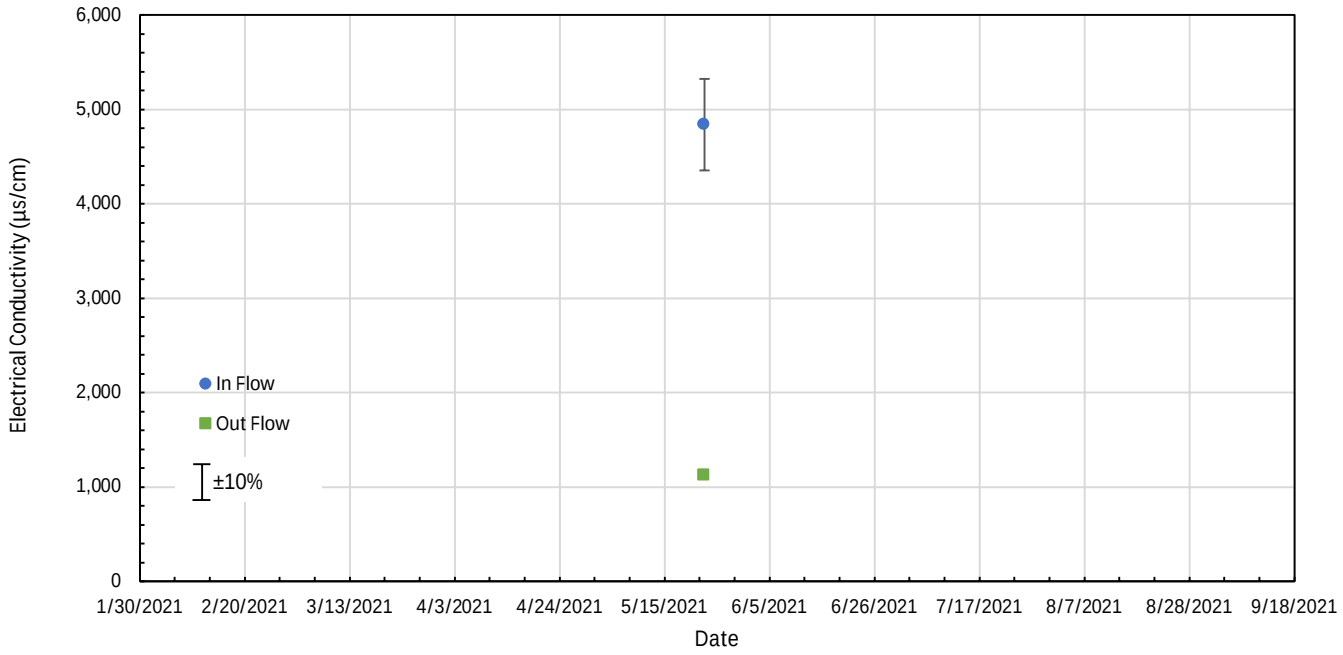
Figure 3-10



B4-ST-2 (40-42 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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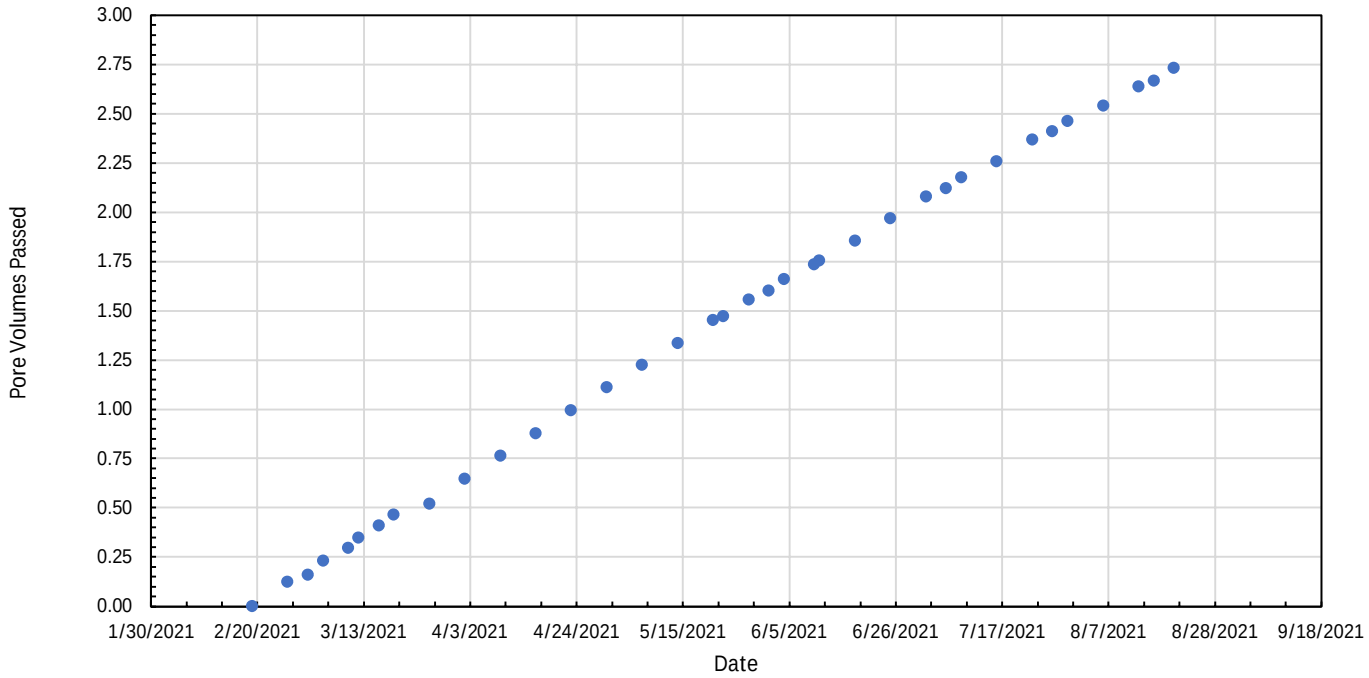
Figure 3-11



B4-ST-4 (70-72.5 ft bgs) PV of Flow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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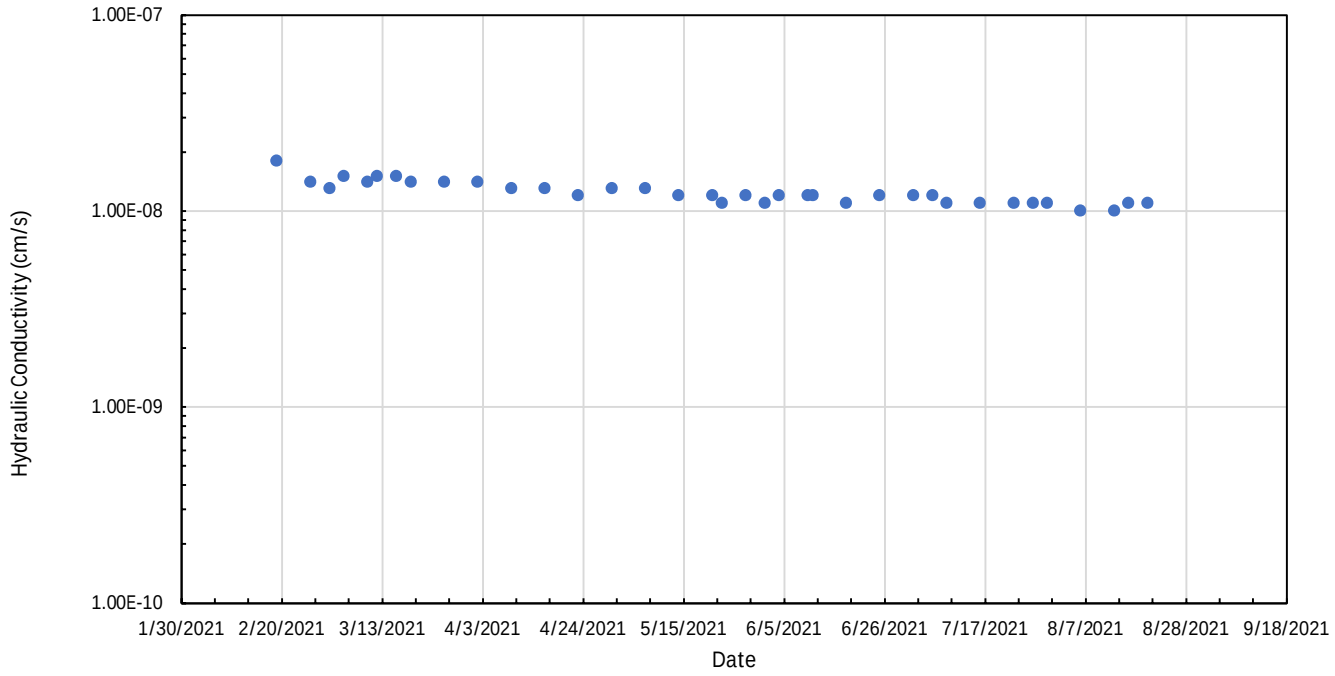
Figure 3-12



B4-ST-4 (70-72.5 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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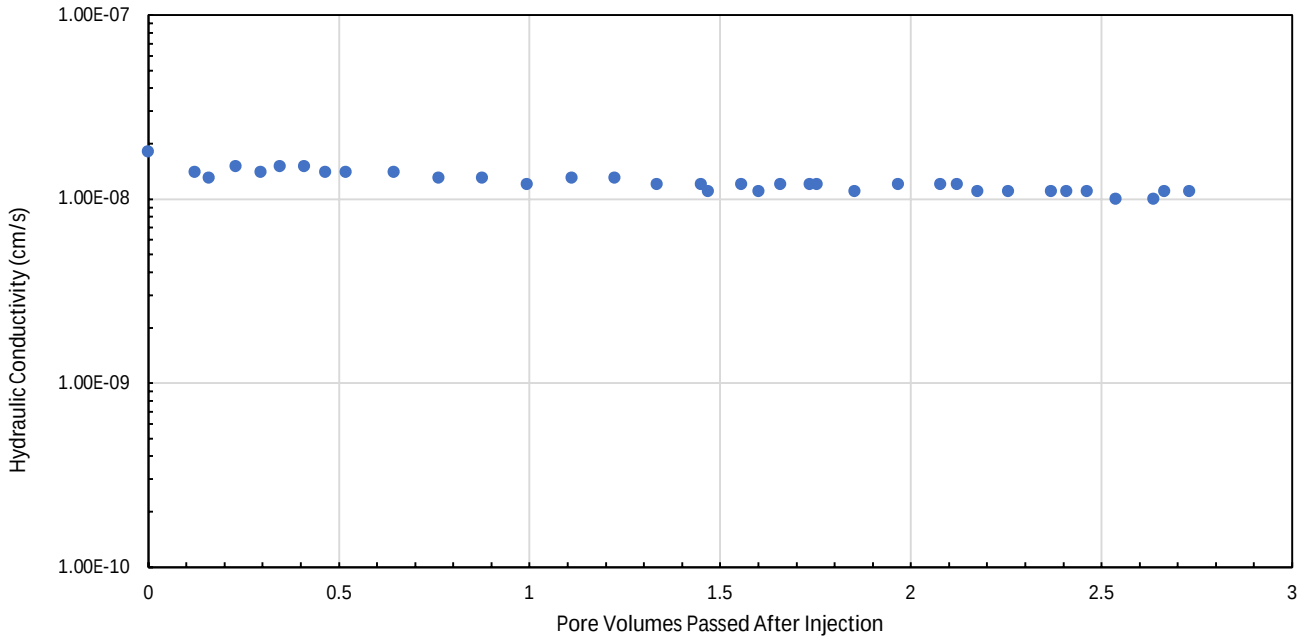
Figure 3-13



B4-ST-4 (70-72.5 ft bgs) Hydraulic Conductivity with PV

MONROE POWER PLANT
MONROE, MICHIGAN

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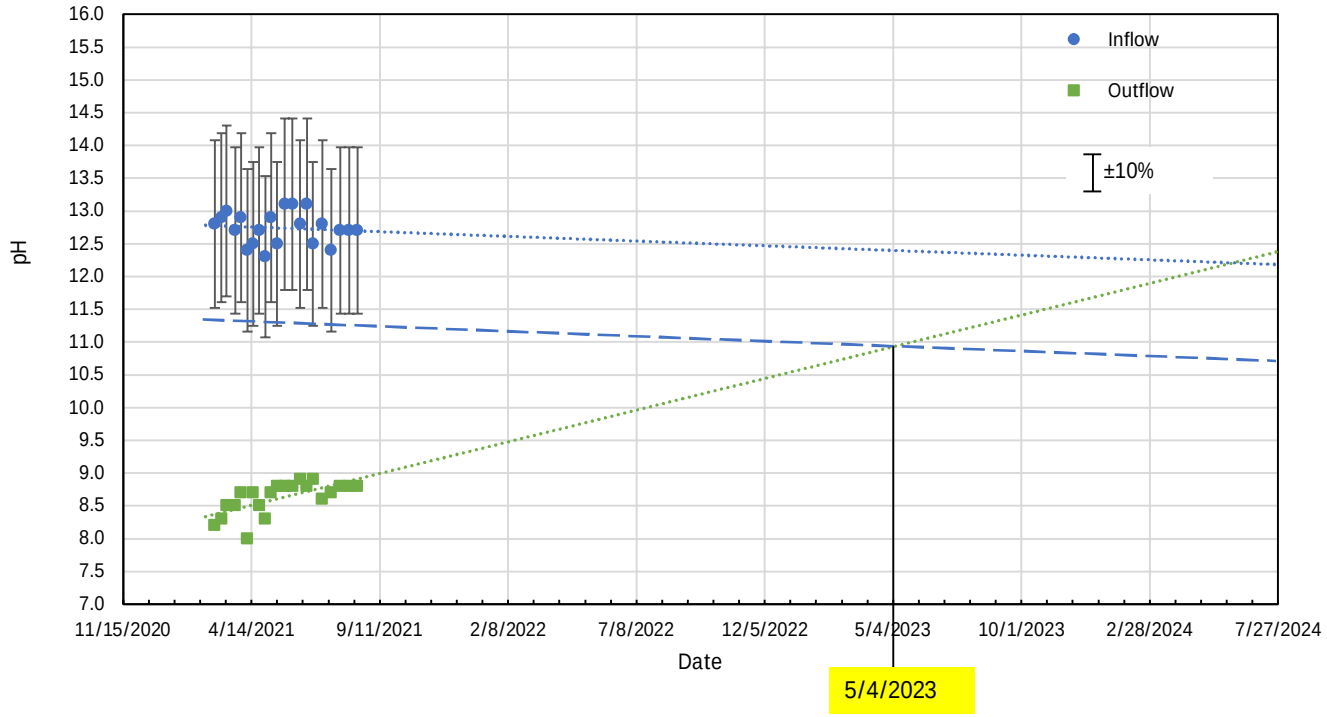
Figure 3-14



B4-ST-4 (70-72.5 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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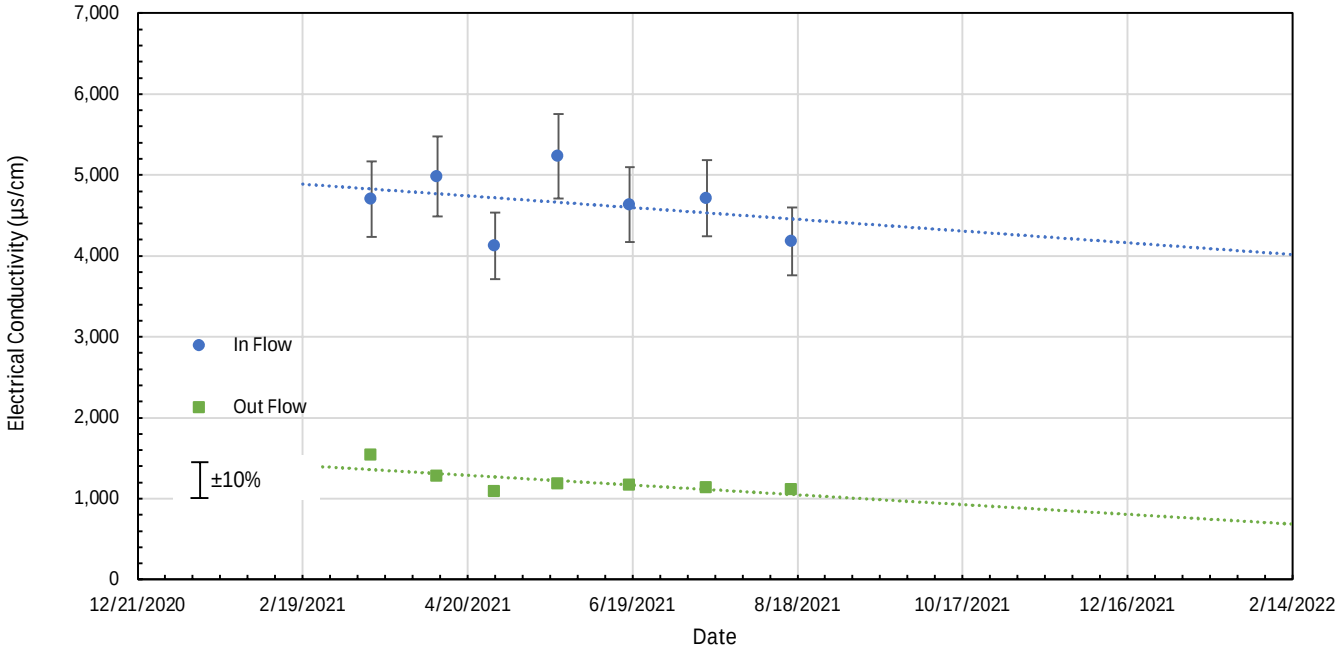
Figure 3-15



B4-ST-4 (70-72.5 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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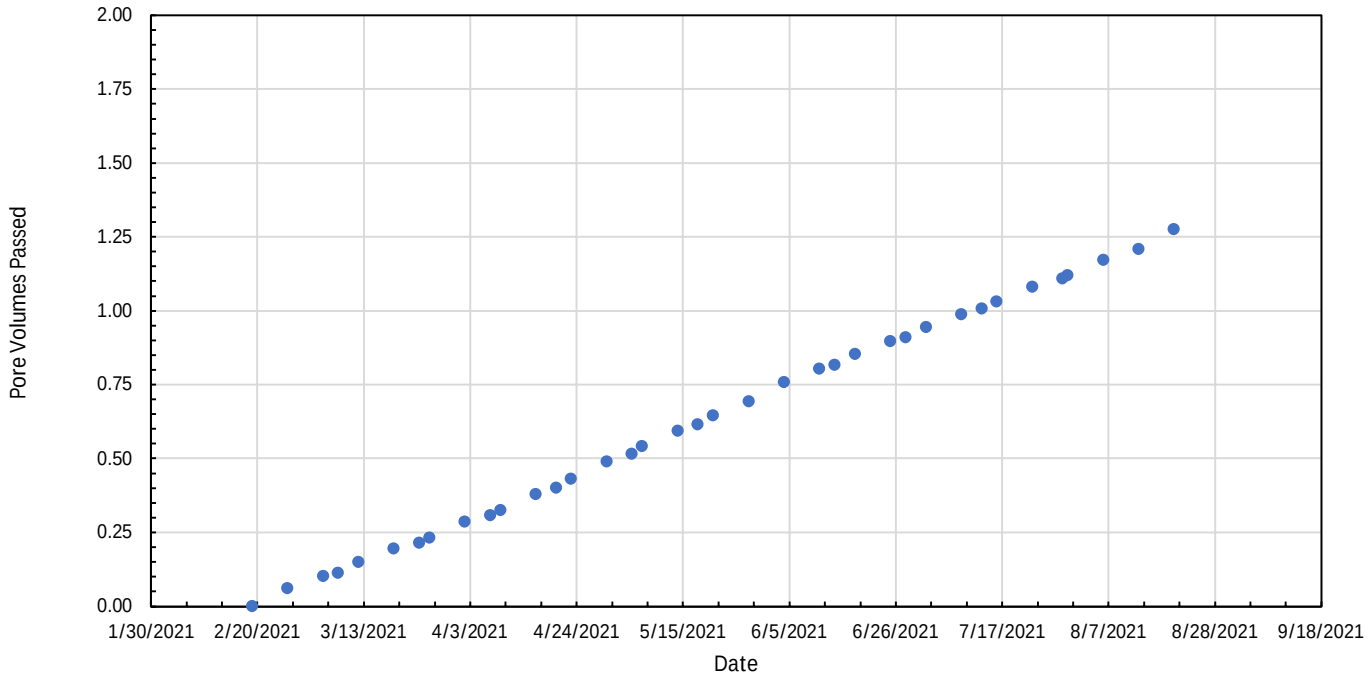
Figure 3-16



B6-ST-1 (25-27 ft bgs) PV of Flow with Time

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MONROE, MICHIGAN

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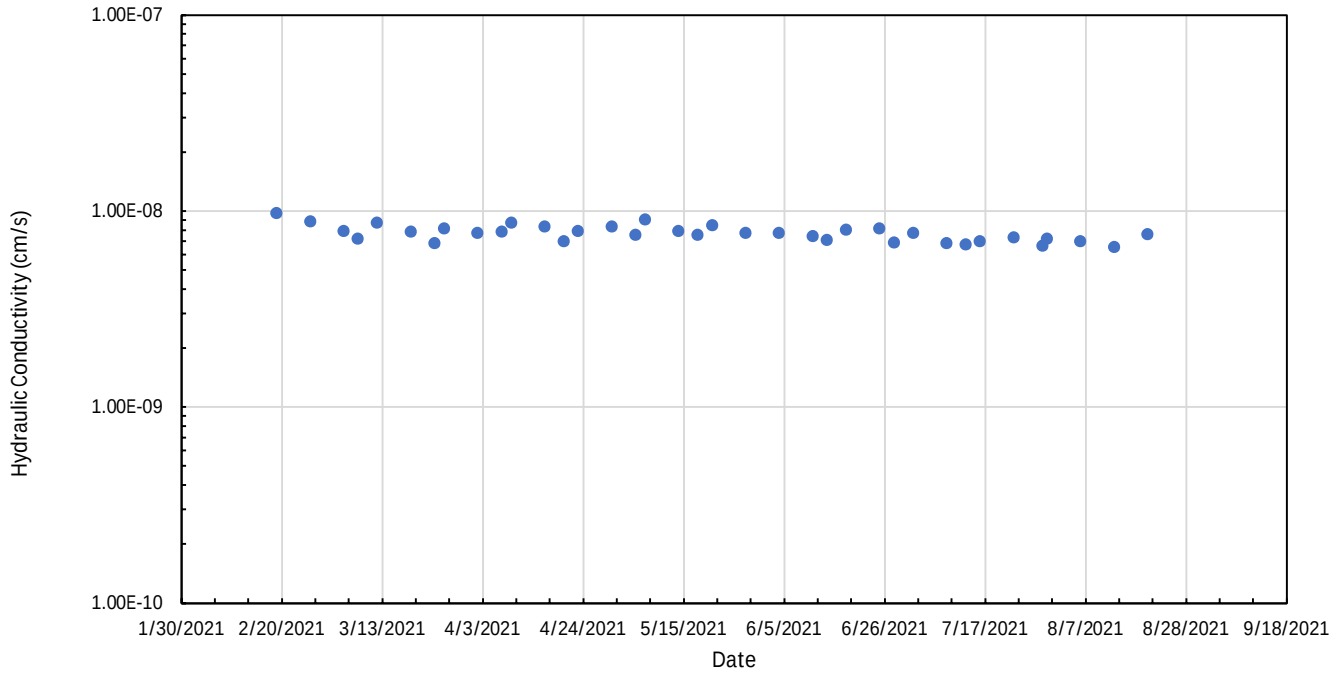
Figure 3-17



B6-ST-1 (25-27 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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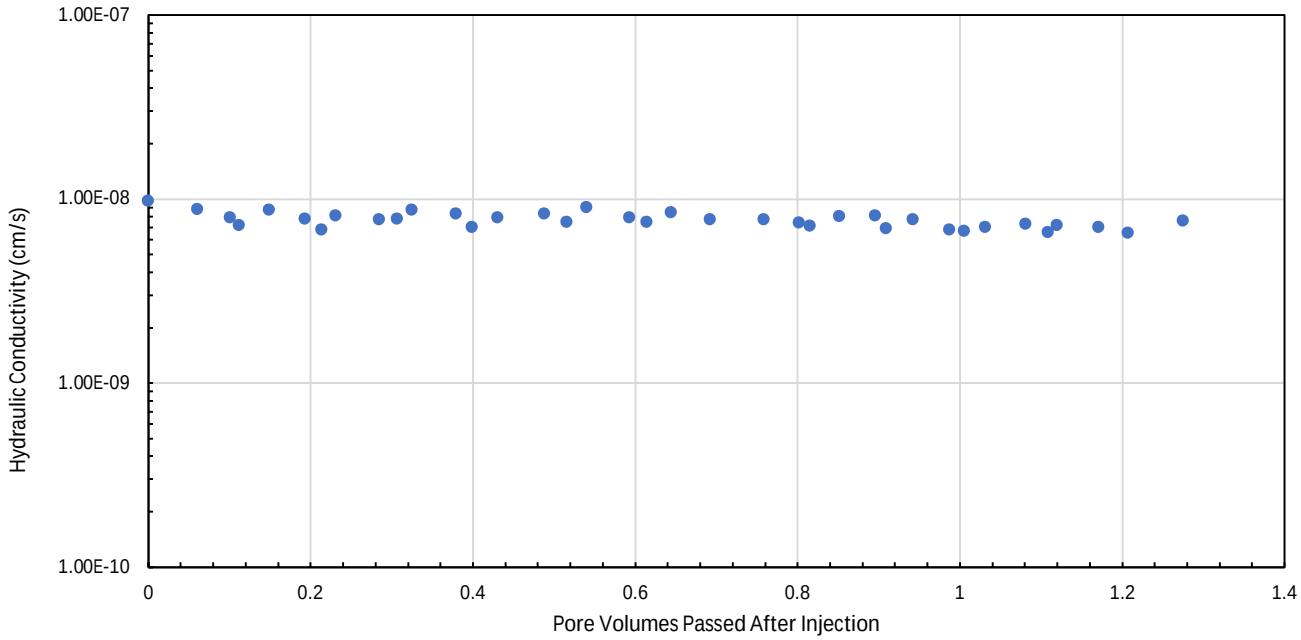
Figure 3-18



B6-ST-1 (25-27 ft bgs) Hydraulic Conductivity with PV

MONROE POWER PLANT
MONROE, MICHIGAN

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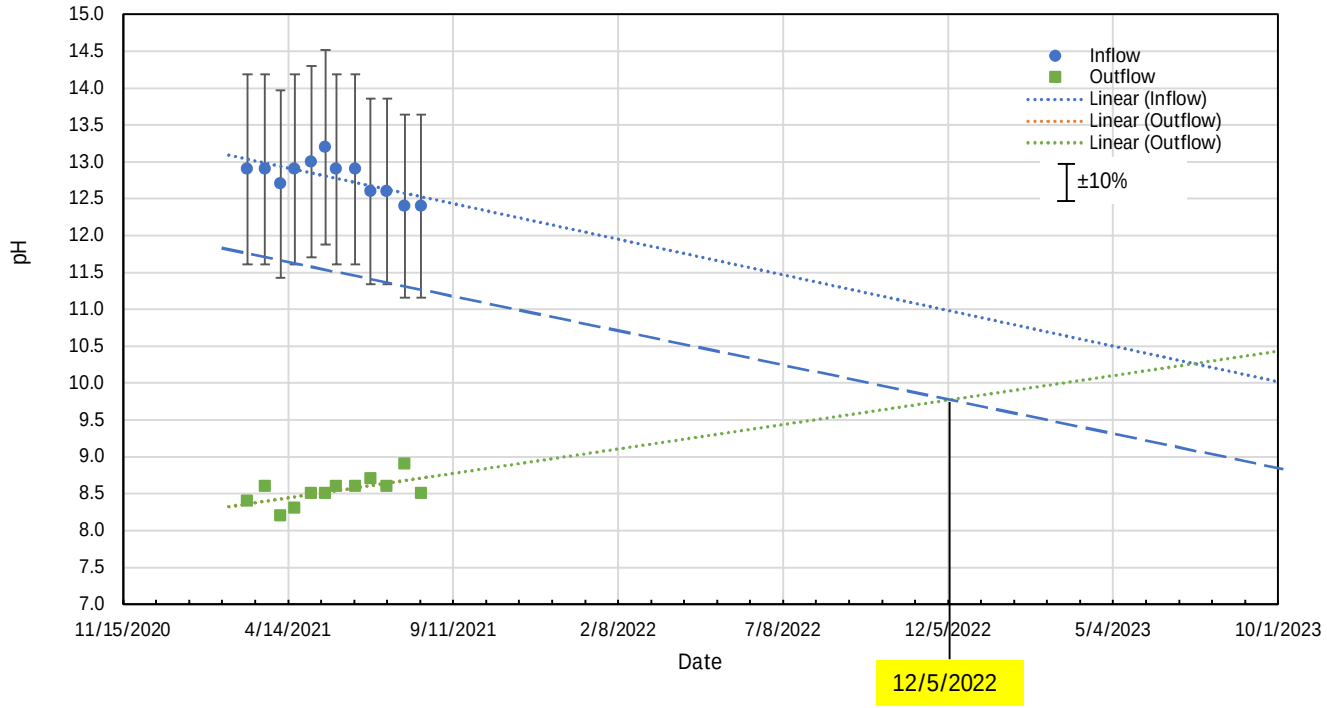
Figure 3-19



B6-ST-1 (25-27 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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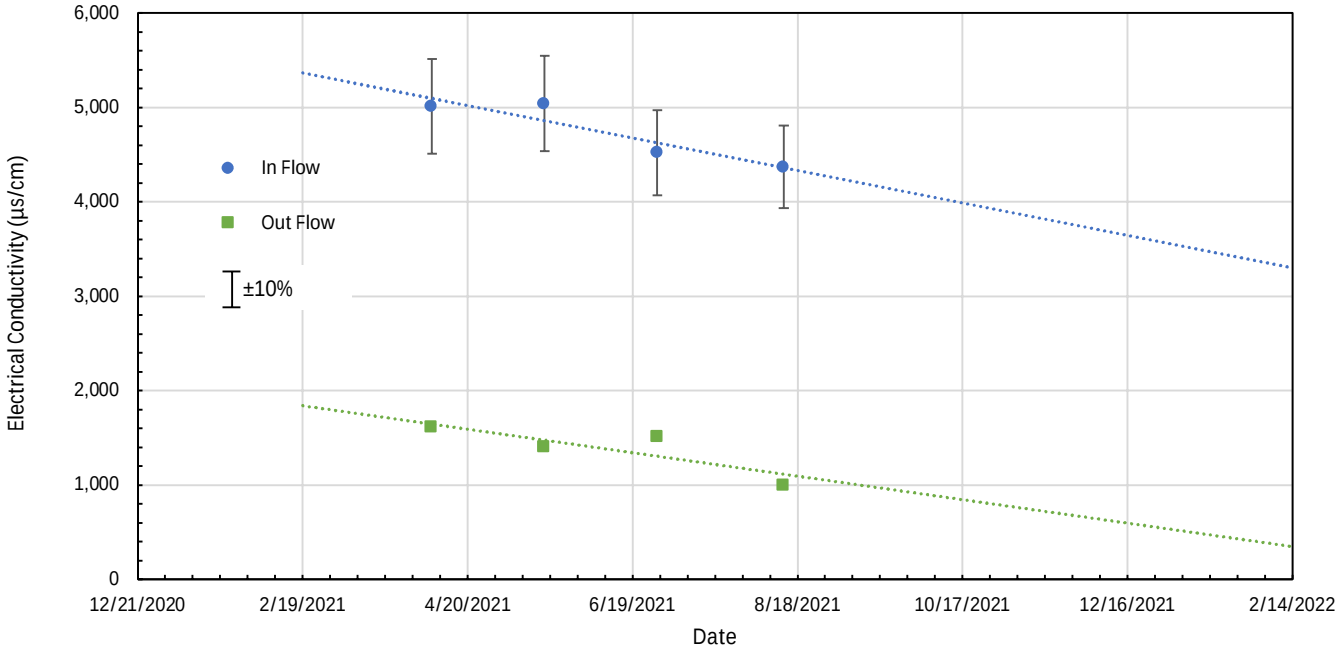
Figure 3-20



B6-ST-1 (25-27 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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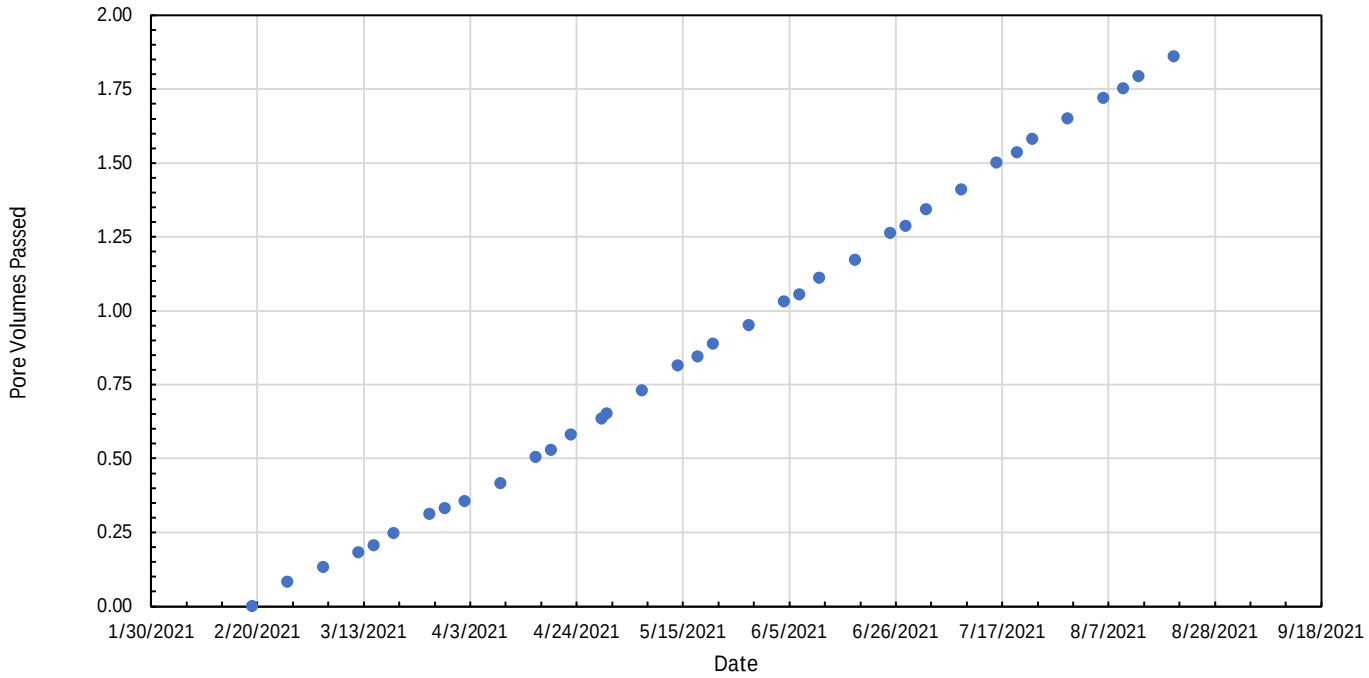
Figure 3-21



B6-ST-3 (55-57.5 ft bgs) PV of Flow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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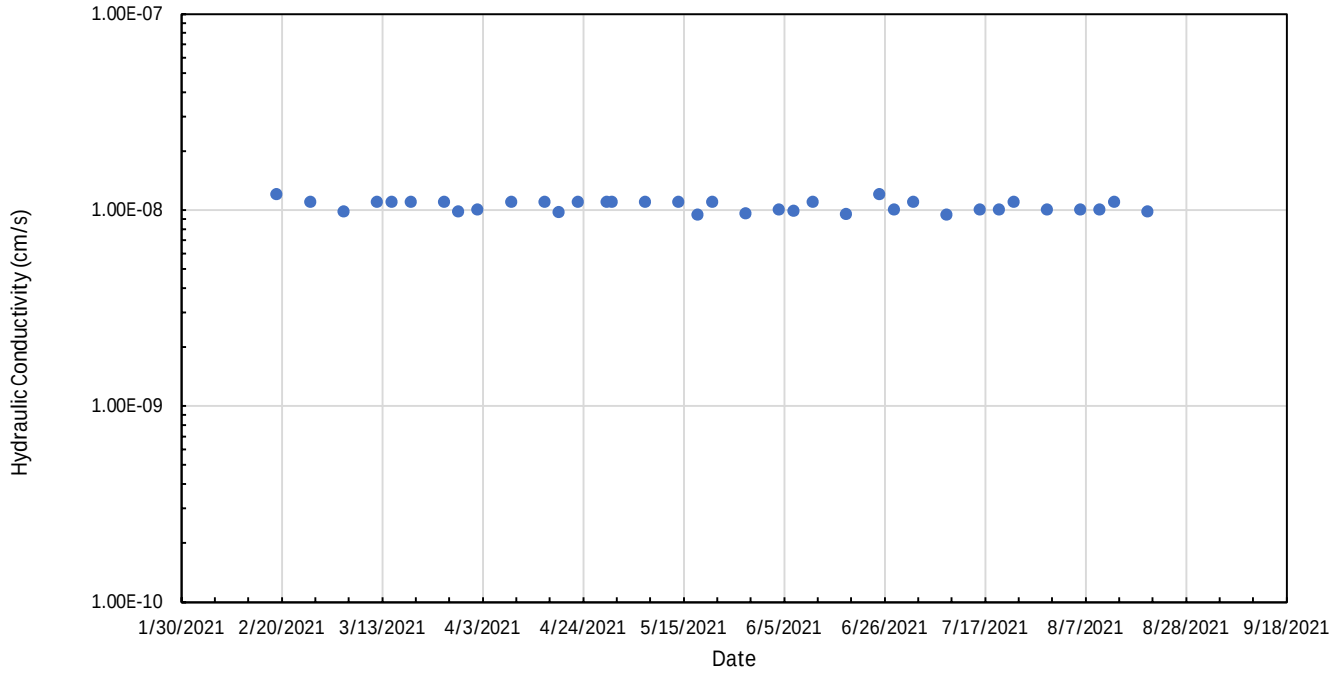
Figure 3-22



B6-ST-3 (55-57.5 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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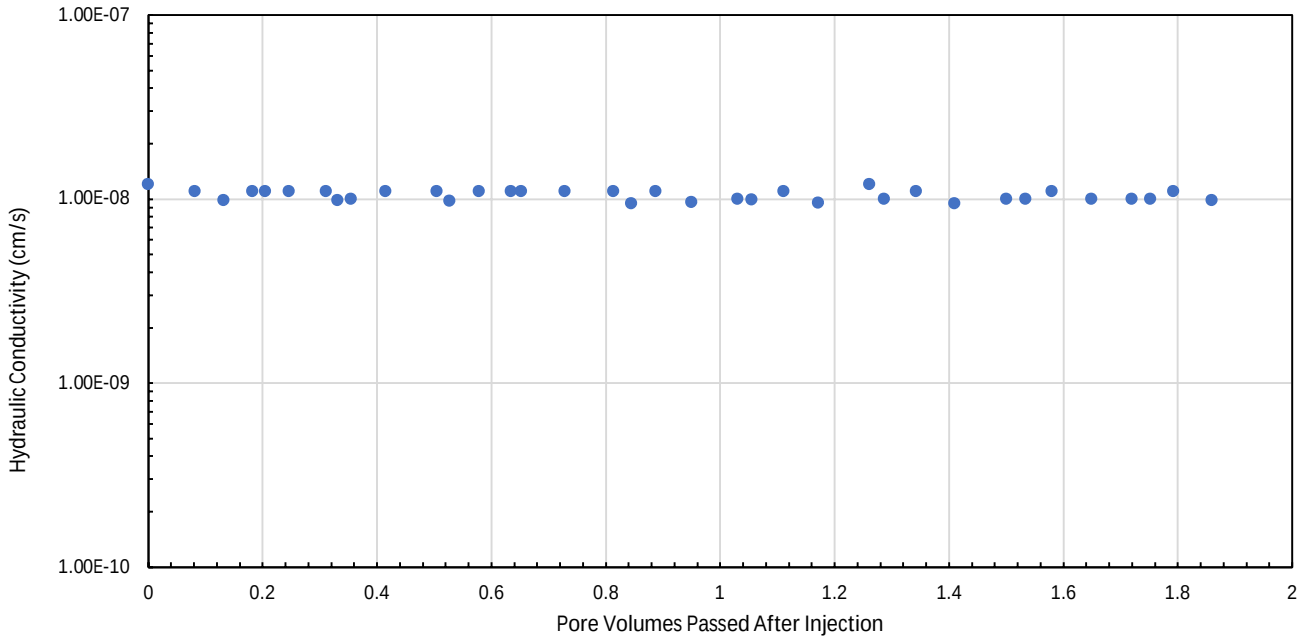
Figure 3-23



B6-ST-3 (55-57.5 ft bgs) Hydraulic Conductivity with PV

MONROE POWER PLANT
MONROE, MICHIGAN

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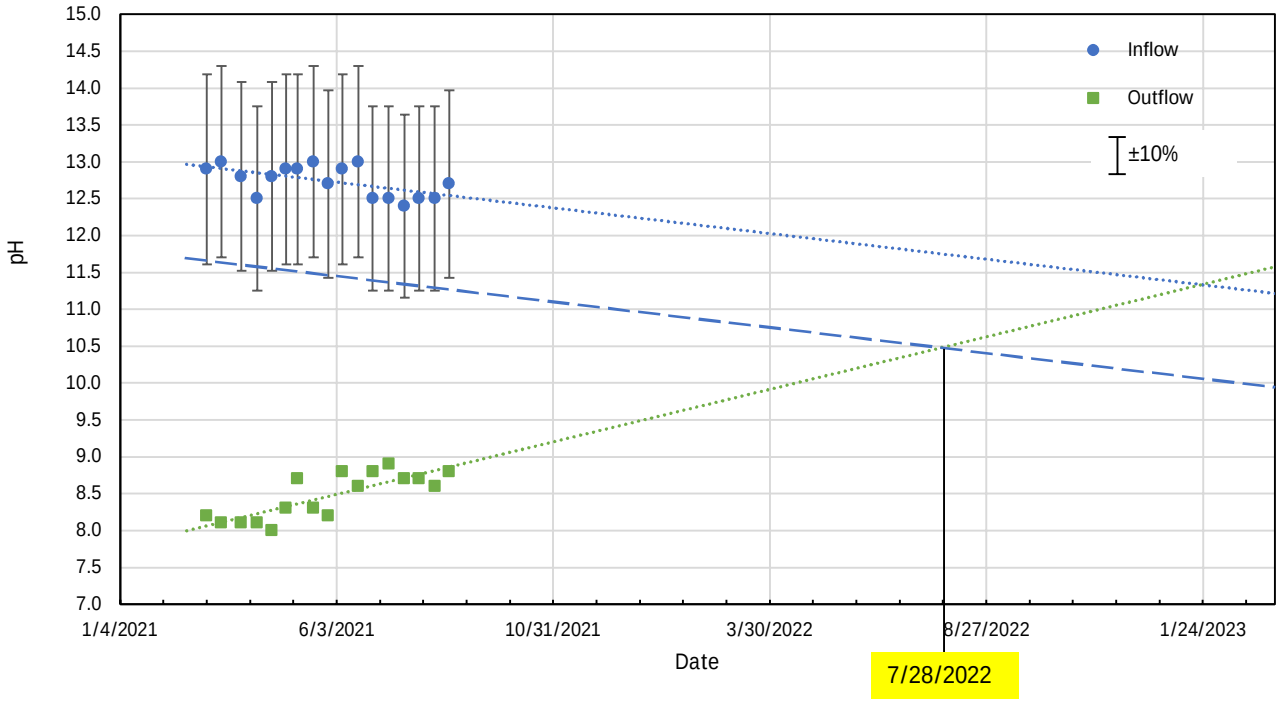
Figure 3-24



B6-ST-3 (55-57.5 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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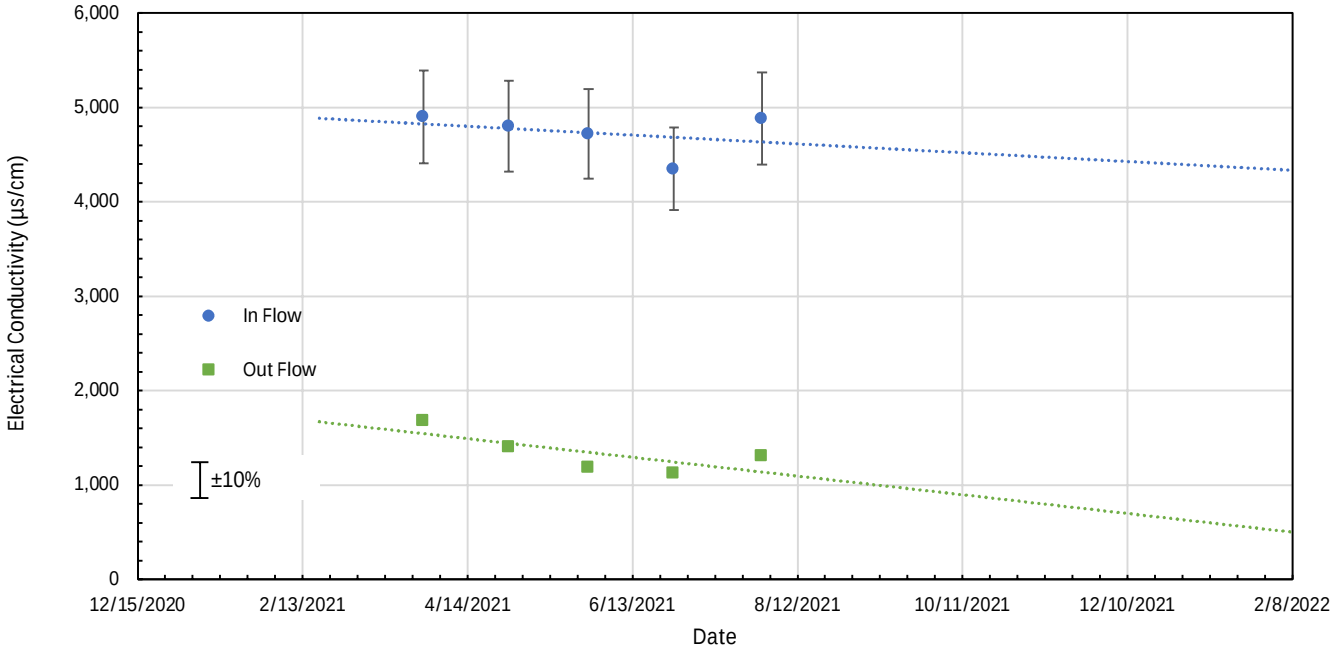
Figure 3-25



B6-ST-3 (55-57.5 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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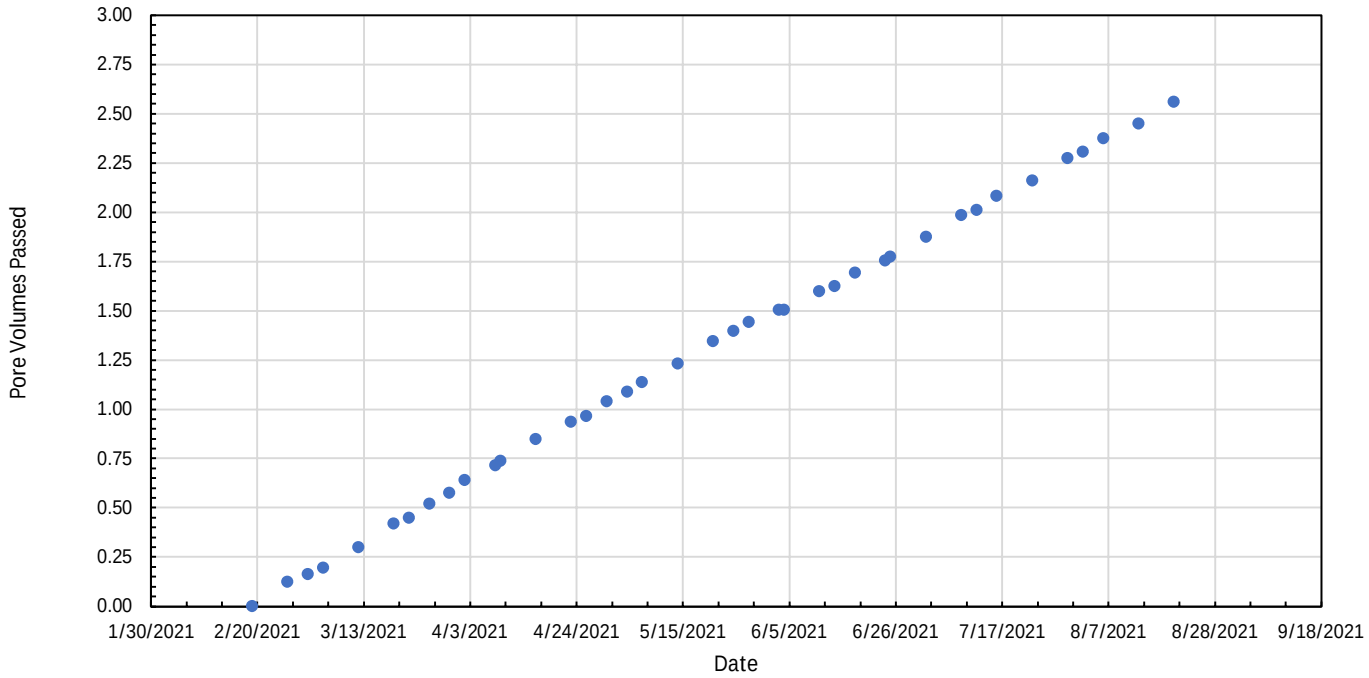
Figure 3-26



B6-ST-4 (65-67.5 ft bgs) PV of Flow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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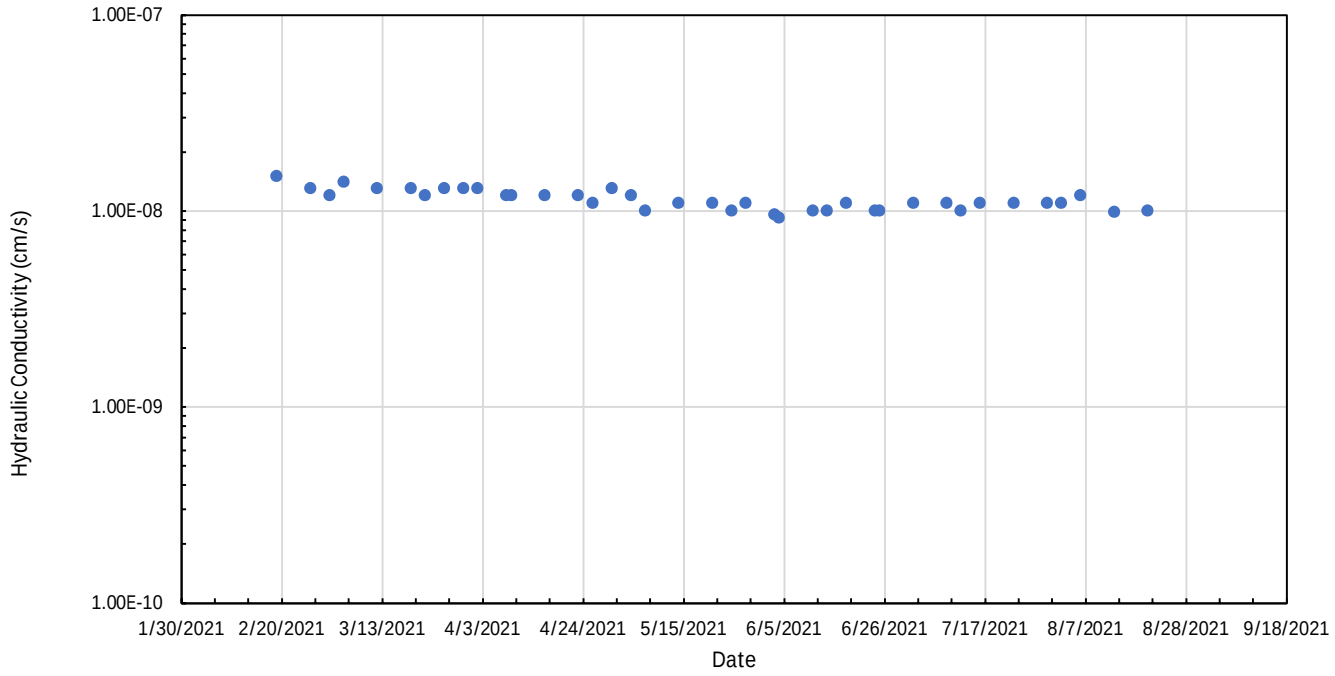
Figure 3-27



B6-ST-4 (65-67.5 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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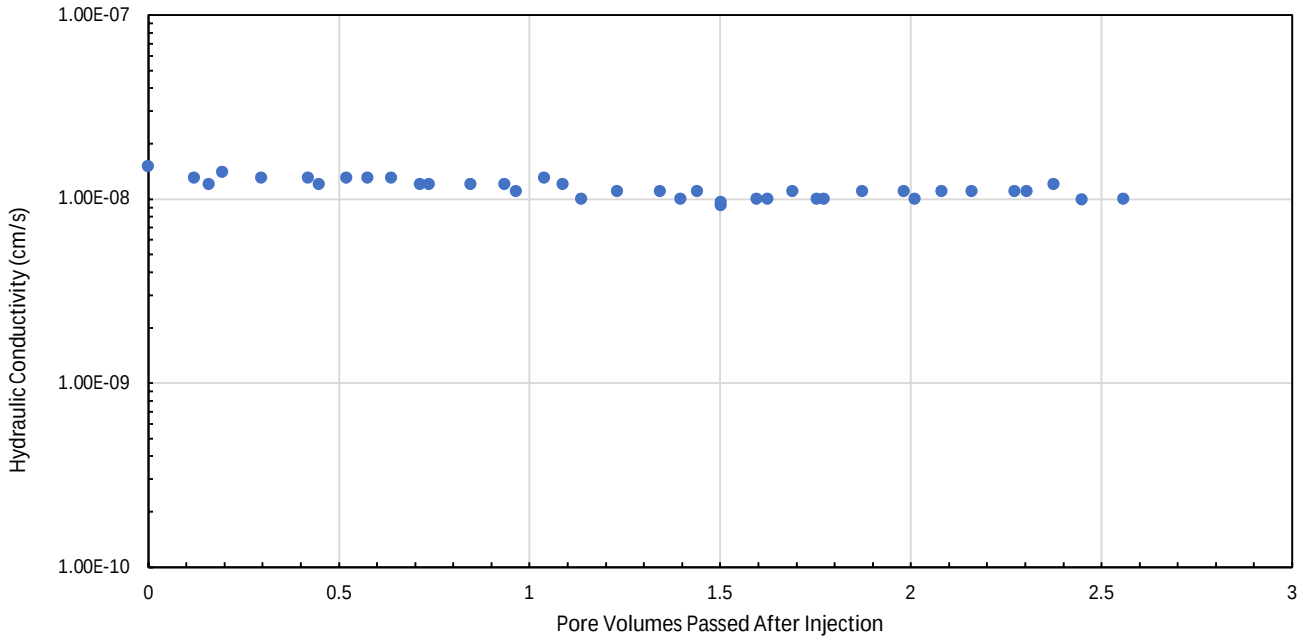
Figure 3-28



B6-ST-4 (65-67.5 ft bgs) Hydraulic Conductivity with PV

MONROE POWER PLANT
MONROE, MICHIGAN

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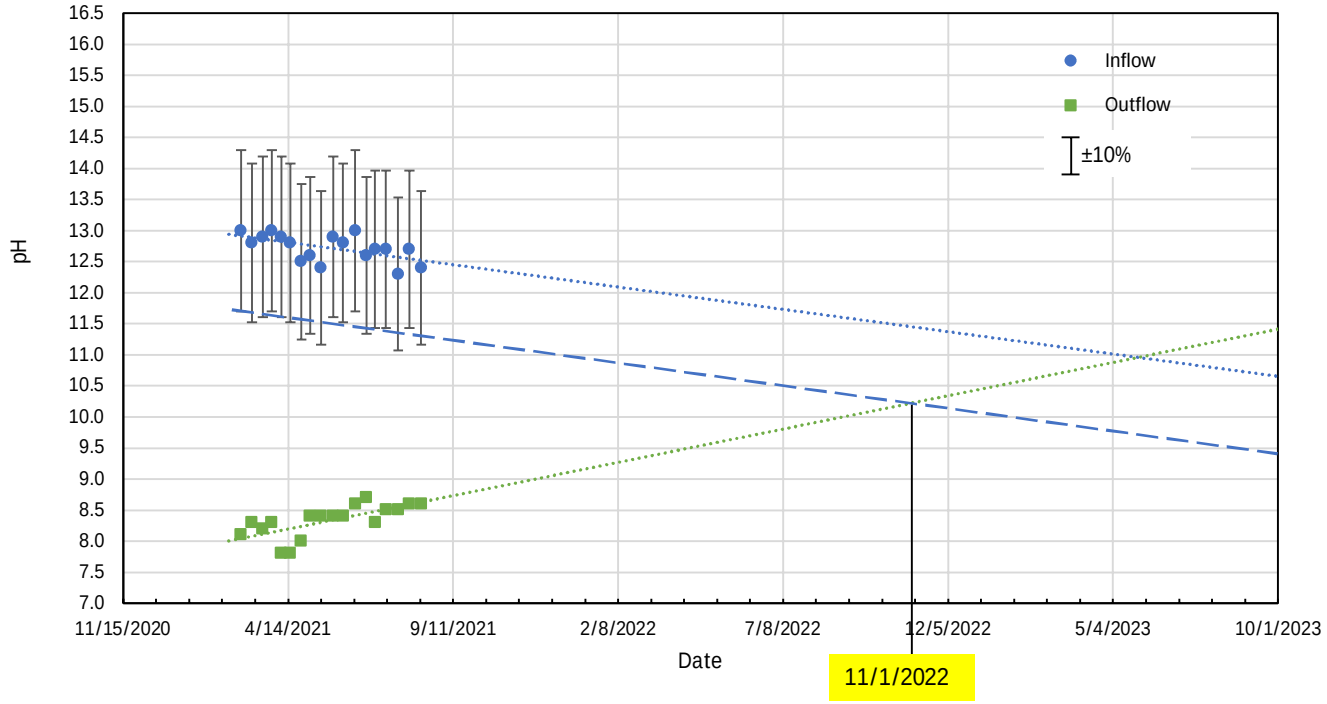
Figure 3-29



B6-ST-4 (65-67.5 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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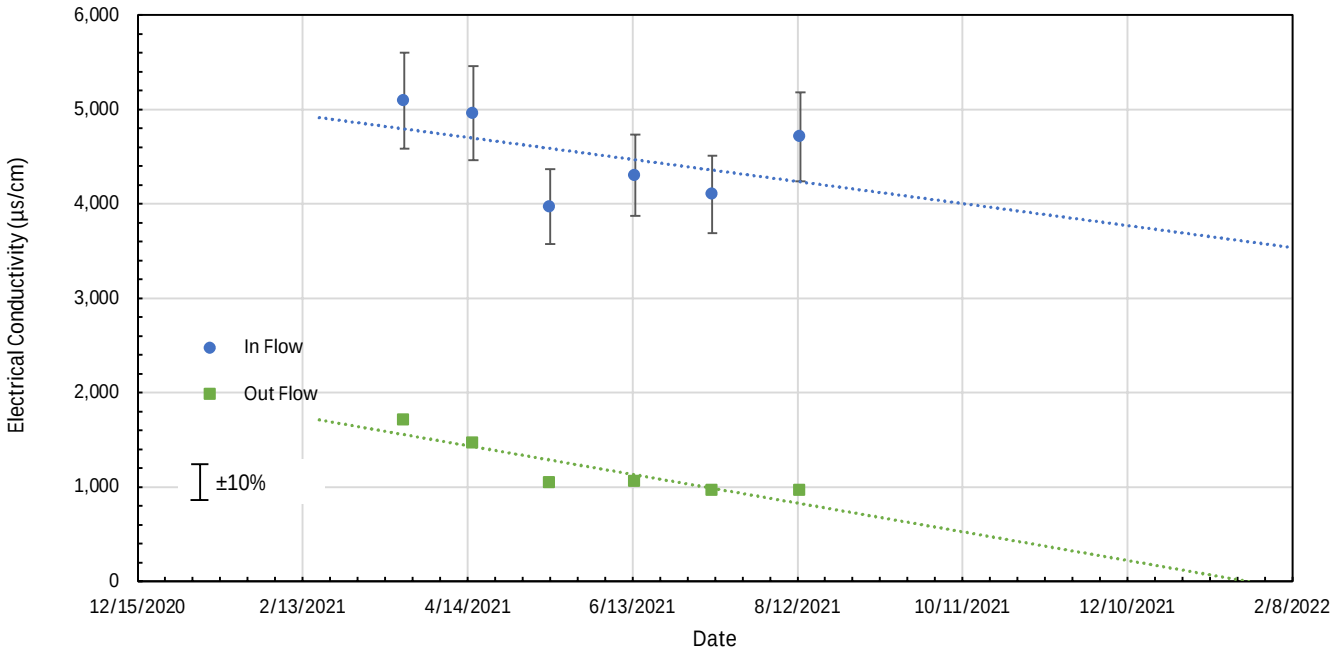
Figure 3-30



B6-ST-4 (65-67.5 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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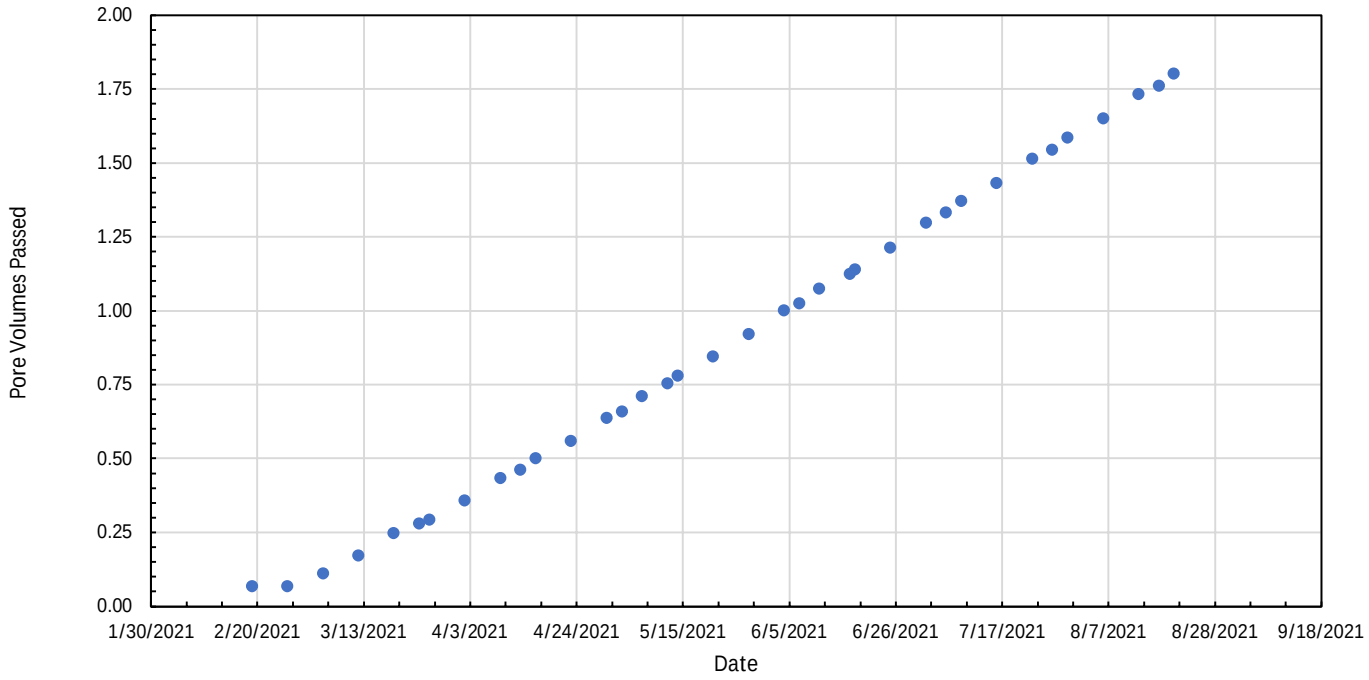
Figure 3-31



B9-ST-2 (40-42 ft bgs) PV of Flow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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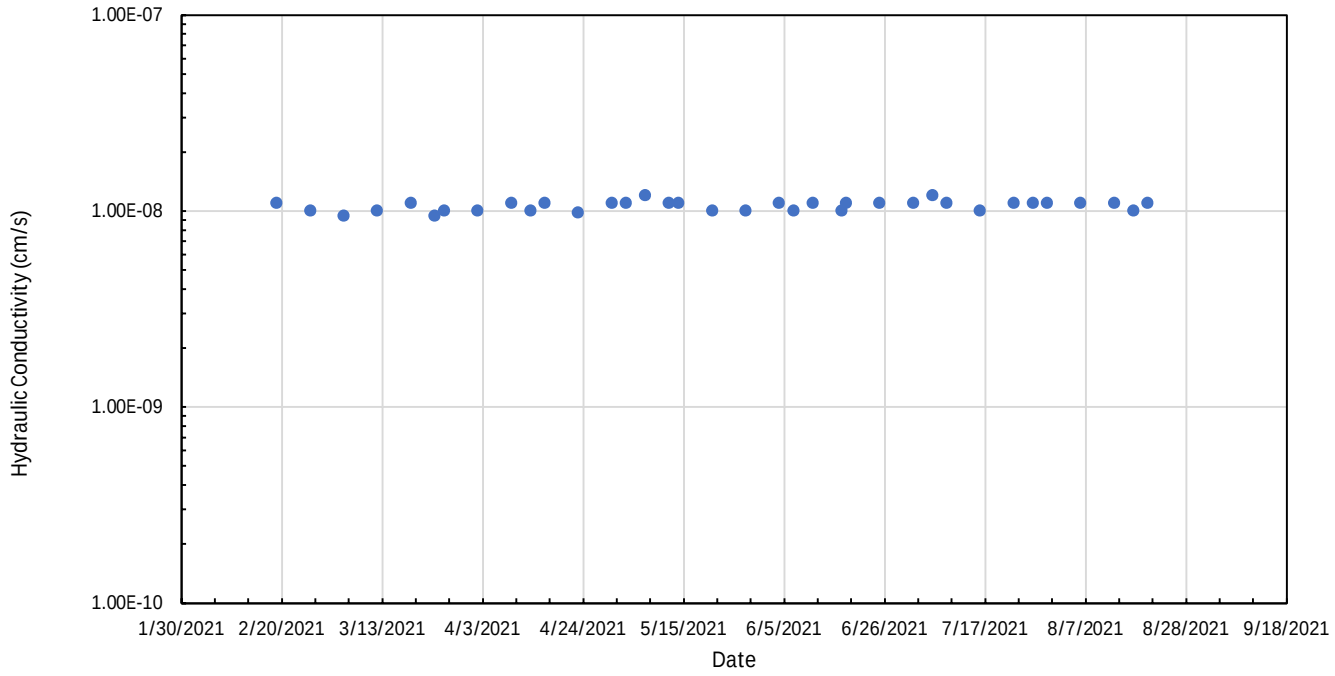
Figure 3-32



B9-ST-2 (40-42 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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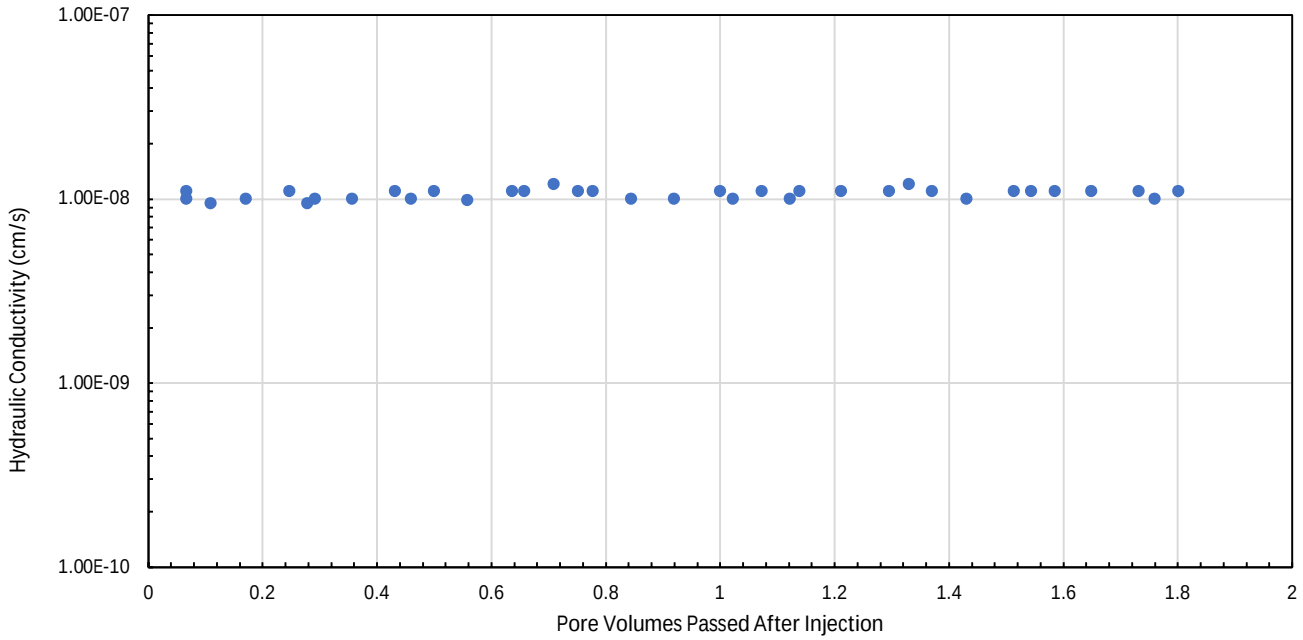
Figure 3-33



B9-ST-2 (40-42 ft bgs) Hydraulic Conductivity with PV

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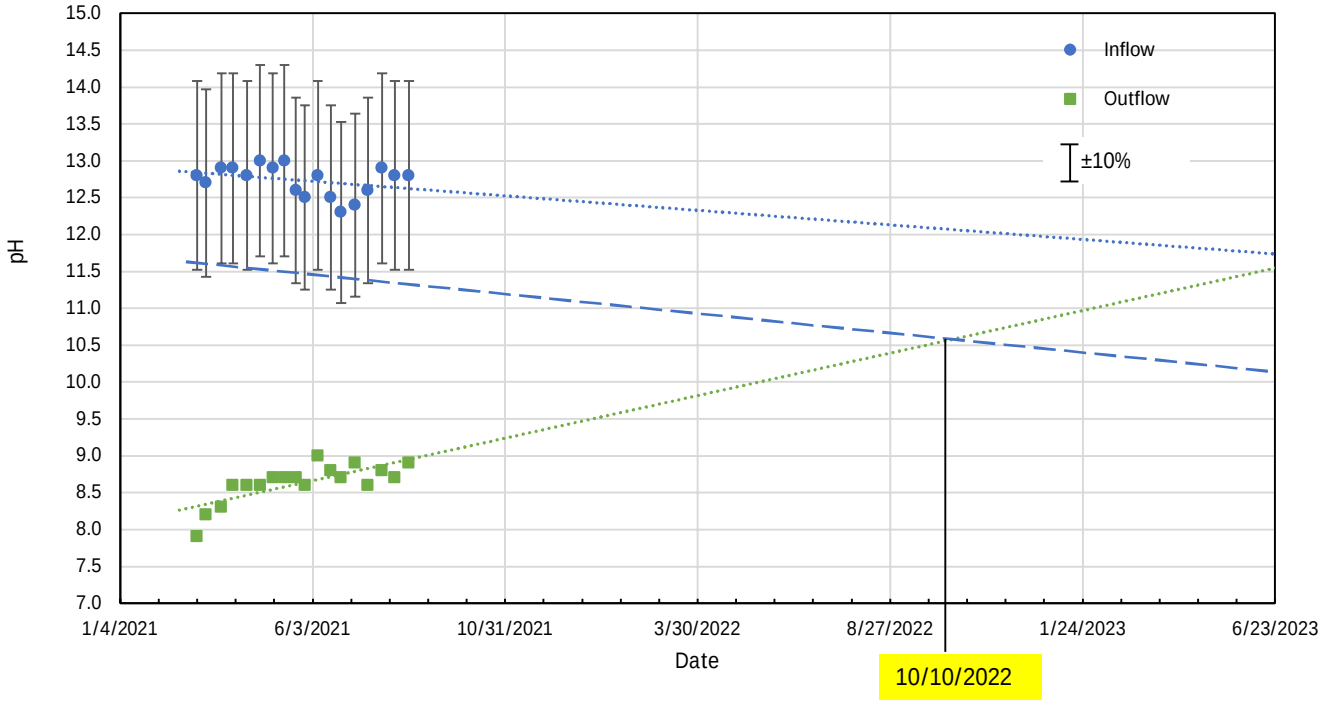
Figure 3-34



B9-ST-2 (40-42 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
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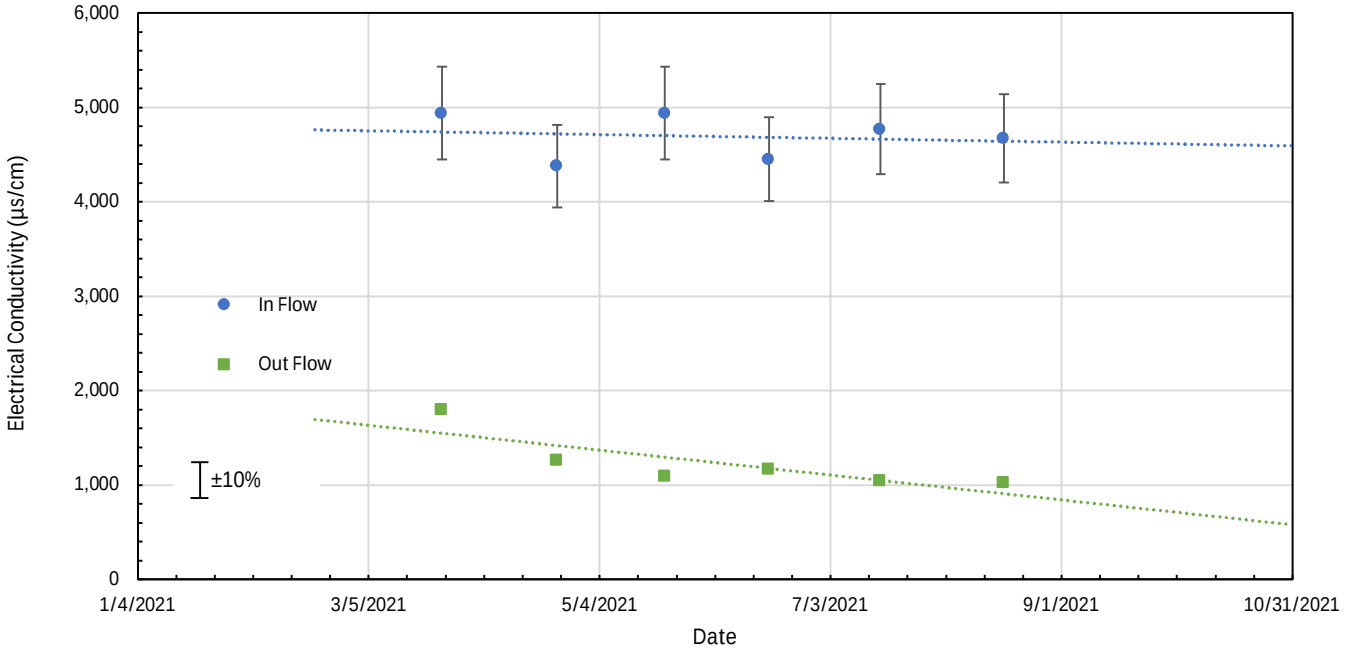
Figure 3-35



B9-ST-2 (40-42 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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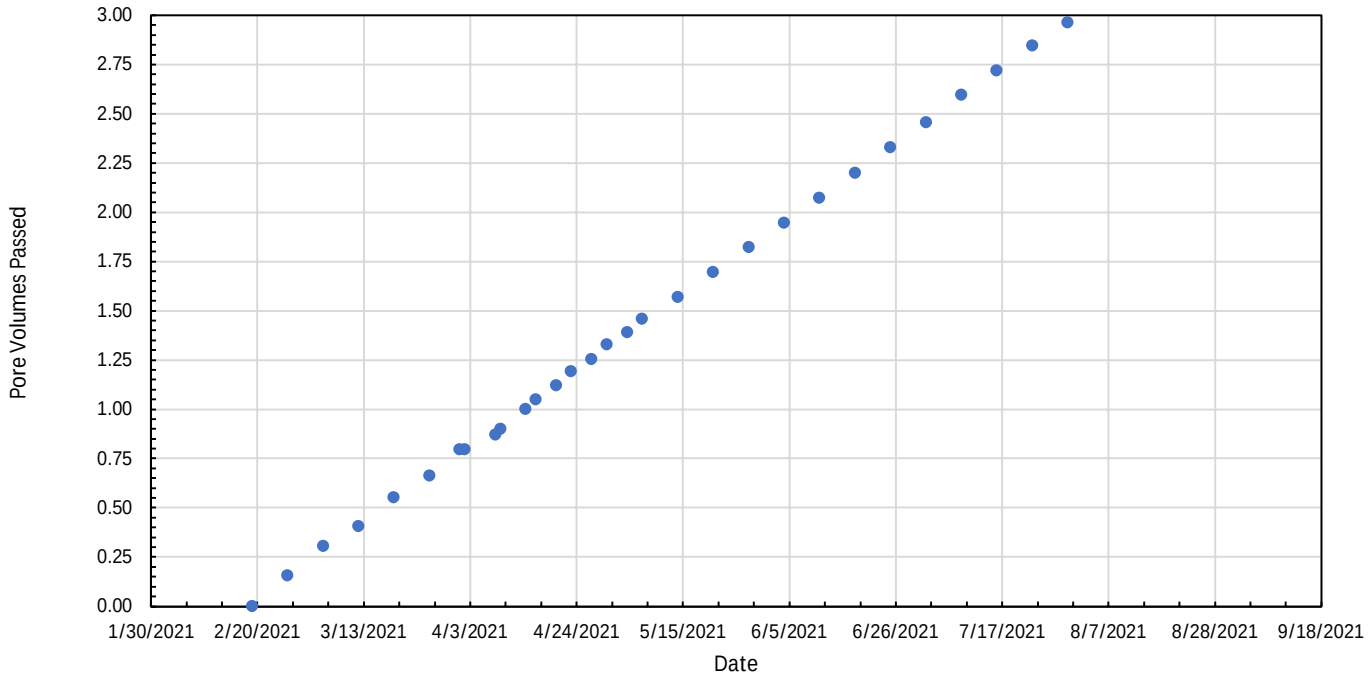
Figure 3-36



B9-ST-3 (55-57 ft bgs) PV of Flow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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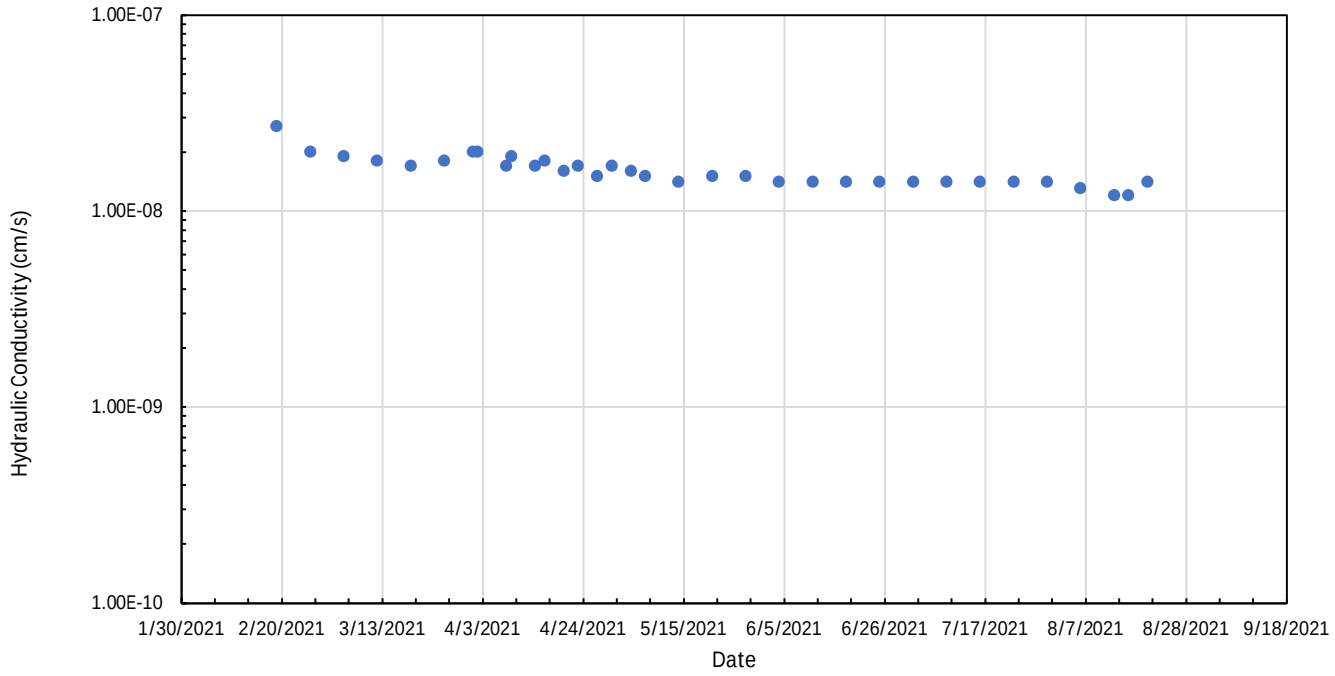
Figure 3-37



B9-ST-3 (55-57 ft bgs) Hydraulic Conductivity with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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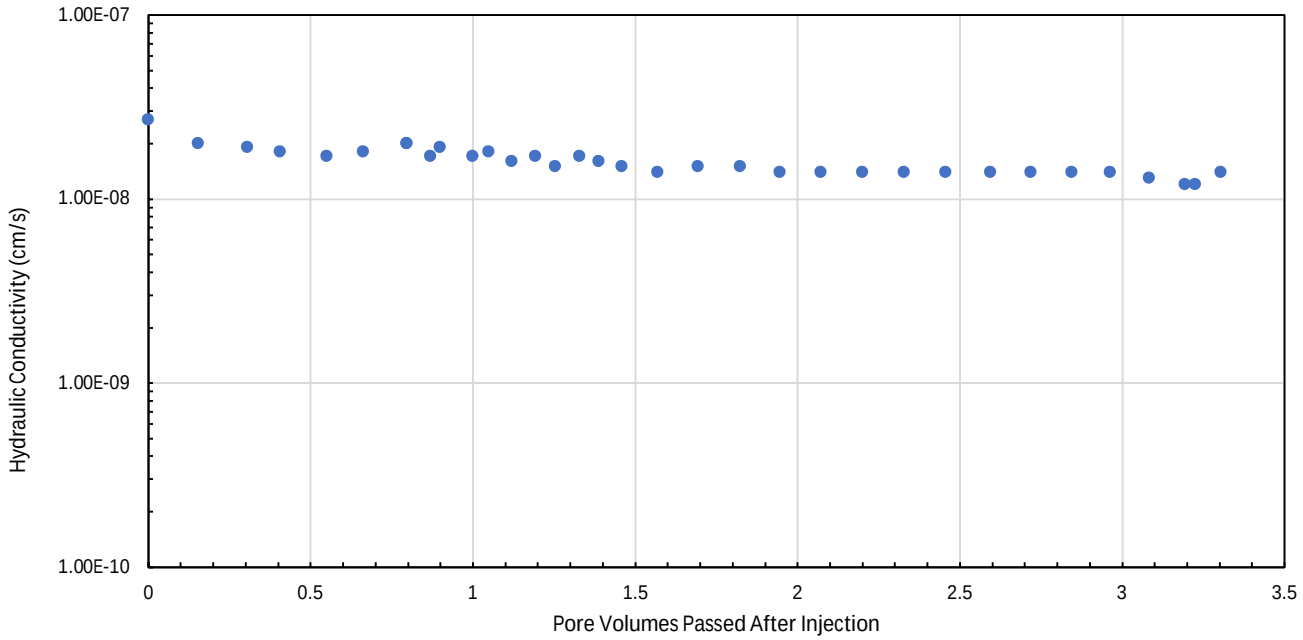
Figure 3-38



B9-ST-3 (55-57 ft bgs) Hydraulic Conductivity with PV

MONROE POWER PLANT
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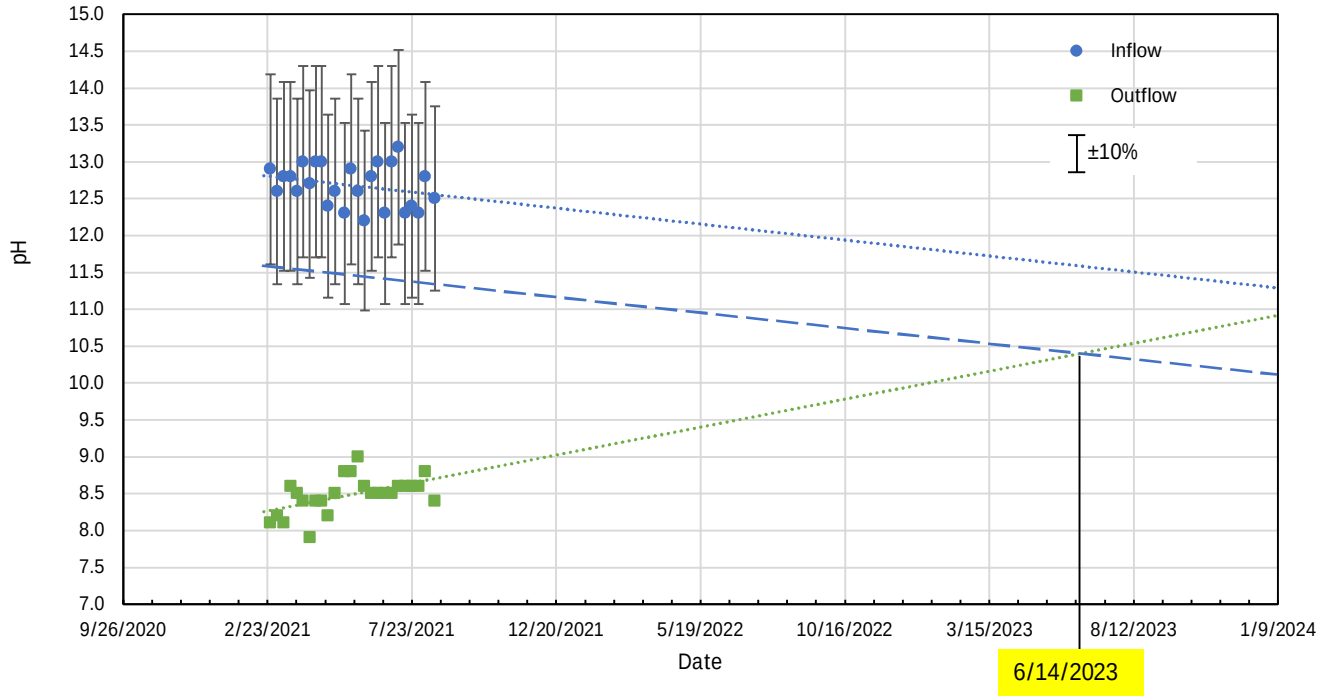
Figure 3-39



B9-ST-3 (55-57 ft bgs) pH of Inflow and Outflow with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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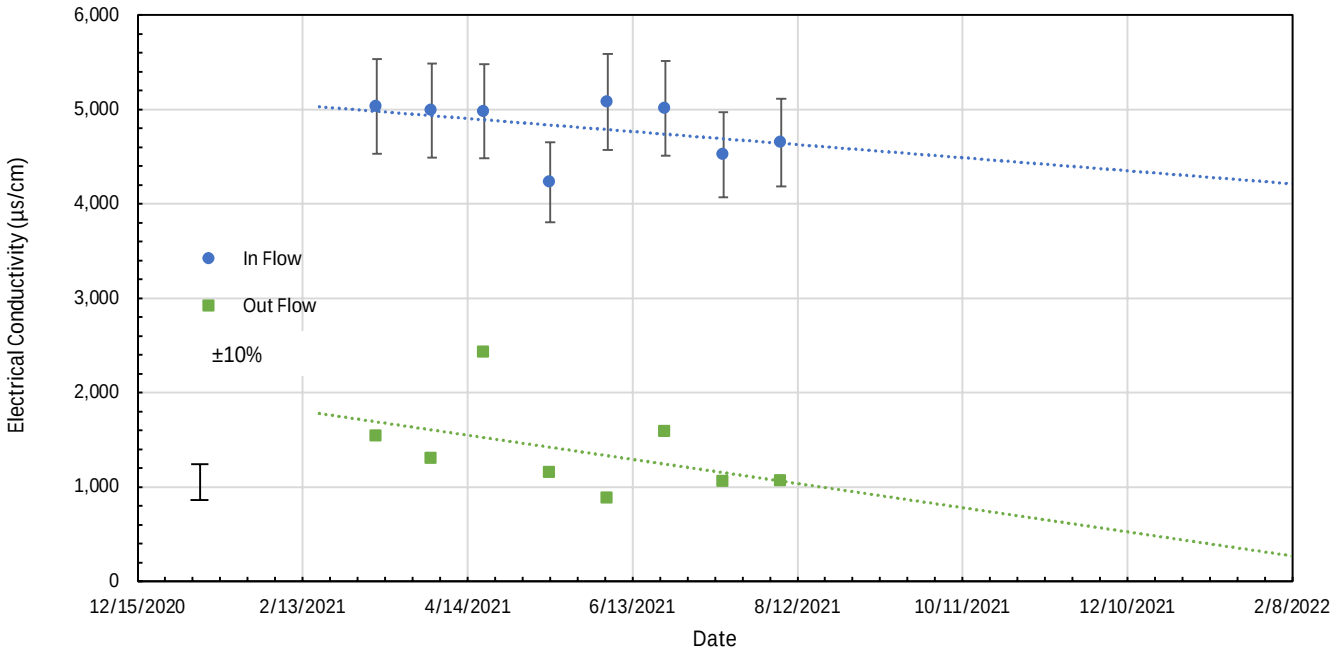
Figure 3-40



B9-ST-3 (55-57 ft bgs) Electrical Conductivity (EC) with Time

MONROE POWER PLANT
MONROE, MICHIGAN

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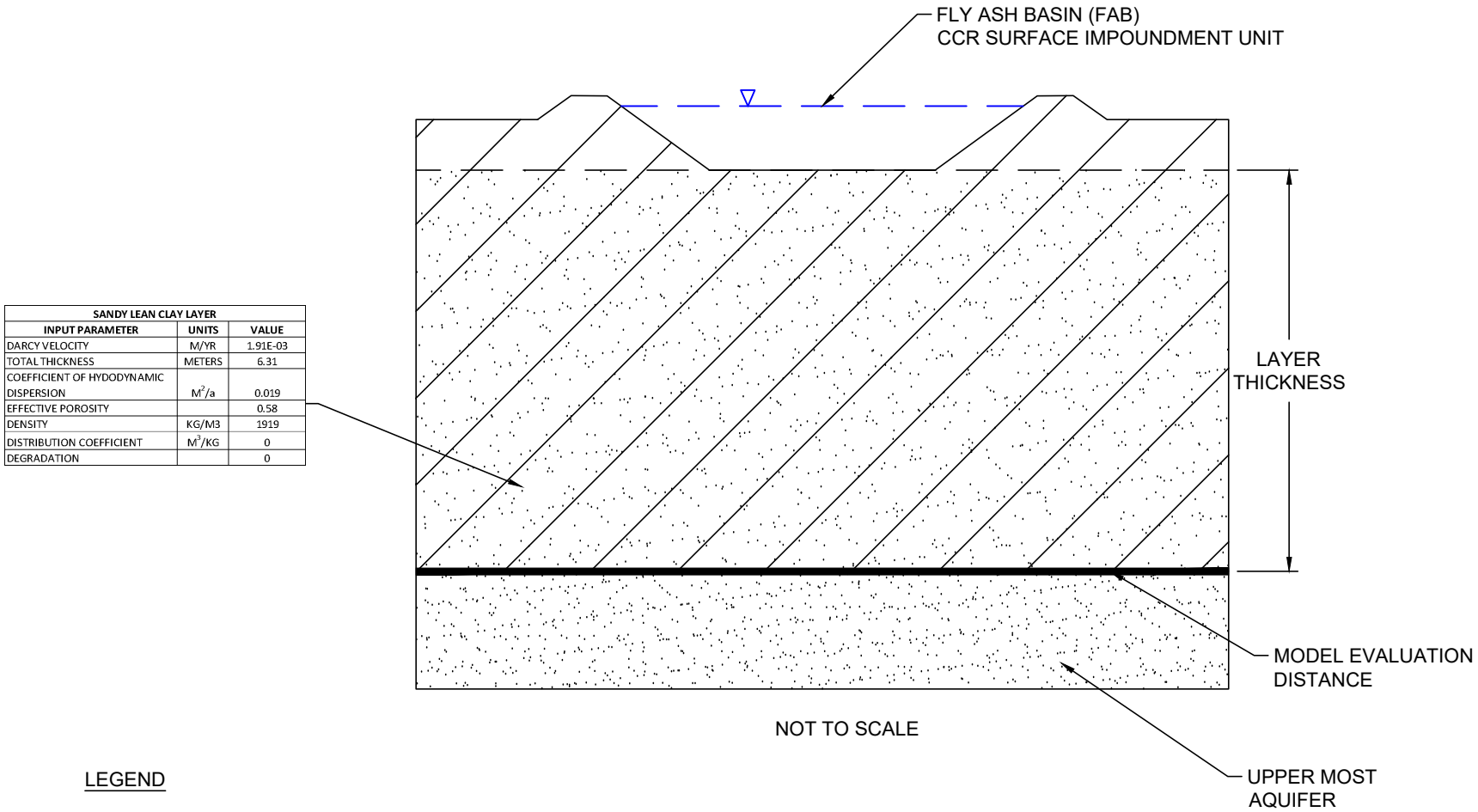
Figure 3-41



SANDY LEAN CLAY LAYER		
INPUT PARAMETER	UNITS	VALUE
DARCY VELOCITY	M/YR	1.91E-03
TOTAL THICKNESS	METERS	6.31
COEFFICIENT OF HYDODYNAMIC DISPERSION	M^2/a	0.019
EFFECTIVE POROSITY		0.58
DENSITY	KG/M3	1919
DISTRIBUTION COEFFICIENT	M^3/KG	0
DEGRADATION		0

LEGEND

LEAN CLAY UNIT

SANDY LEAN CLAY UNIT

UPPER MOST AQUIFER (TRANSITION ZONE)

FIGURE 4-1
FATE AND TRANSPORT
CONCEPTUAL MODEL
MONROE ALD - FAB

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FIGURE 4-1

PROJECT NO: GLP8014 | OCTOBER 2021

O:\DWG\DT\EBELLE RIVER ALD\FT MODEL - FAB - Last Saved by: MKatelieva on 10/29/21

APPENDIX A – MONITORING WELL SLUG TEST RESULTS

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2016 Slug Test Results

Hydraulic Conductivity Results

DTE Electric Company Monroe Power Plant Fly Ash Basin

Monroe, Michigan

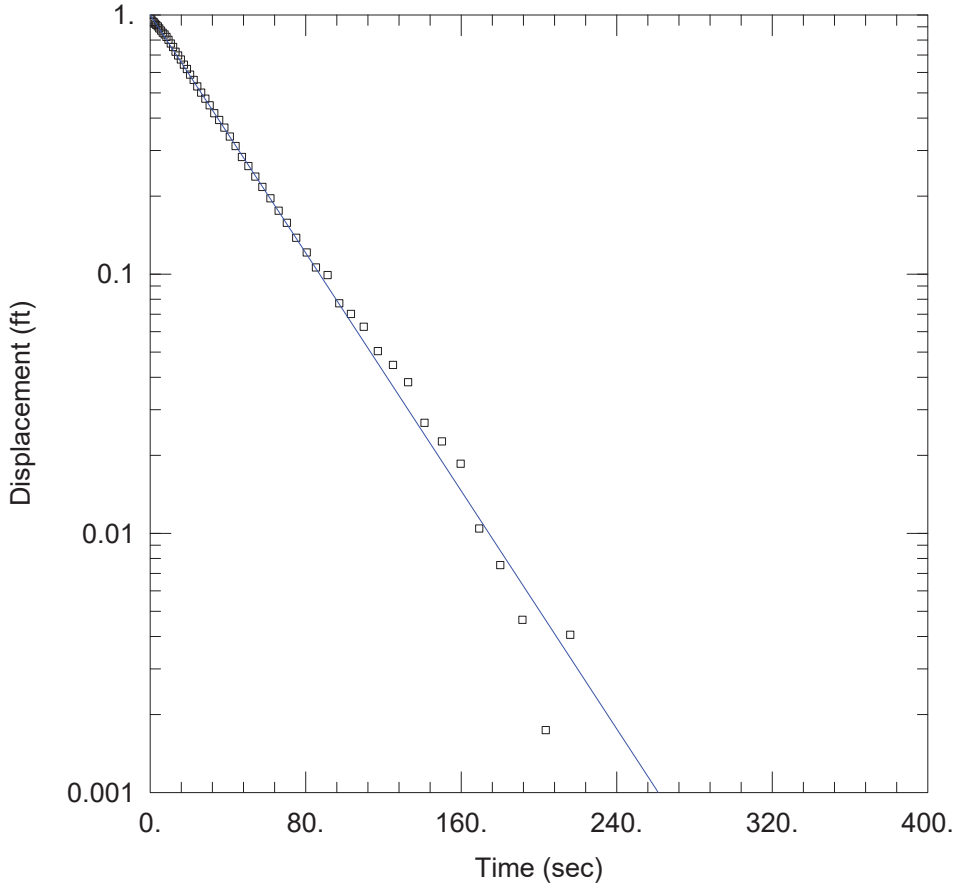
Test Location ID	Date Performed	Test Type	Hydraulic Conductivity (K)	
			cm/sec	ft/day
MW-16-01	3/1/2016	Falling Head	1.91E-03	5.403
		Rising Head	1.08E-03	3.053
		Average	**1.49E-03**	**4.228**

Conversion:

$$\frac{1\text{ cm}}{1\text{ sec}} \times \frac{86{,}400\text{ sec}}{1\text{ day}} \times \frac{1\text{ ft}}{30.48\text{ cm}} = 2.83\text{E+}03 \quad \frac{\text{ft}}{}$$

Notes:

Slug test results calculated using the Bower-Rice (1976) Solution.



FALLING HEAD SLUG TEST

Data Set: P:\...\MW-16-01 IN.aqt
Date: 11/27/17 Time: 14:21:09

PROJECT INFORMATION

Company: TRC Environmental Corporation
Client: DTE MFAB CCR
Project: 231828.0001.0000
Location: Monroe, MI
Test Well: MW-16-01
Test Date: 3/2/16

AQUIFER DATA

Saturated Thickness: 7. ft Anisotropy Ratio (Kz/Kr): 1.

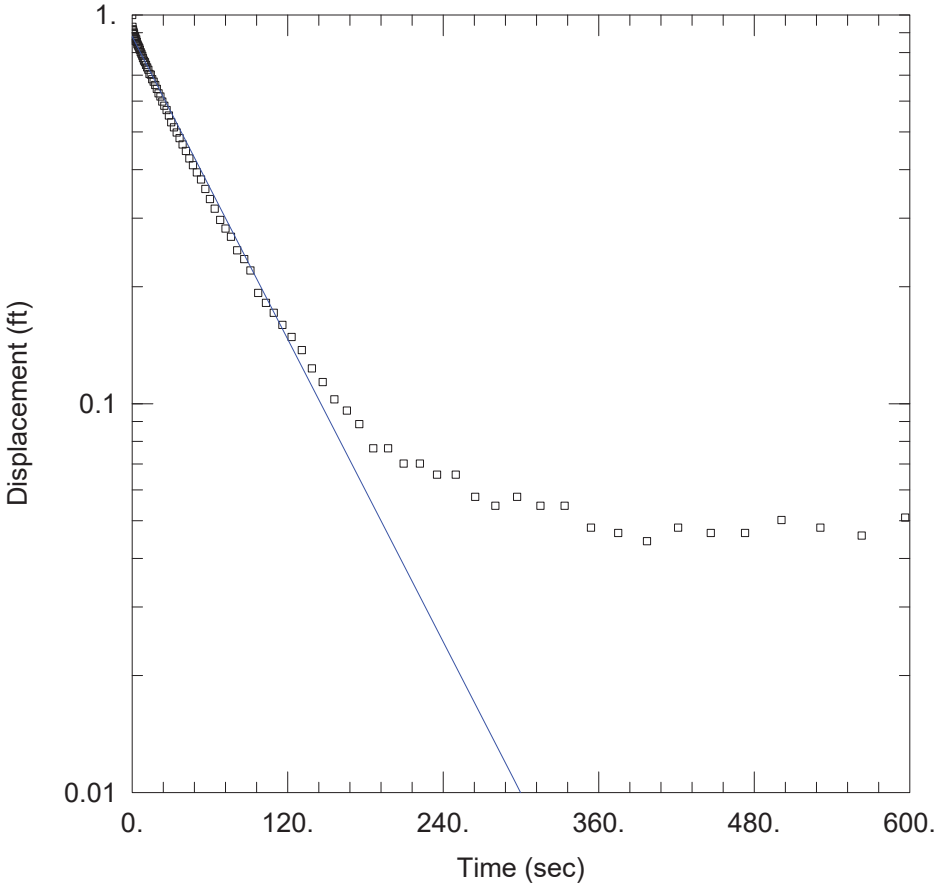
WELL DATA (MW-16-01)

Initial Displacement: 1.724 ft
Total Well Penetration Depth: 53.21 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 48.77 ft
Screen Length: 5. ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.001906 cm/sec y0 = 1.725 ft



RISING HEAD SLUG TEST

Data Set: P:\...\MW-16-01 OUT.aqt
Date: 11/27/17 Time: 14:23:00

PROJECT INFORMATION

Company: TRC Environmental Corporation
Client: DTE MFAB CCR
Project: 231828.0001.0000
Location: Monroe, MI
Test Well: MW-16-01
Test Date: 3/2/16

AQUIFER DATA

Saturated Thickness: 7. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-16-01)

Initial Displacement: 1.354 ft
Total Well Penetration Depth: 53.21 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 48.77 ft
Screen Length: 5. ft
Well Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.001077 cm/sec y0 = 1.191 ft

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2021 Slug Test Results

2021 Hydraulic Conductivity Results Summary
DTE Electric Company Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill
7955 East Dunbar Road, Monroe, Michigan

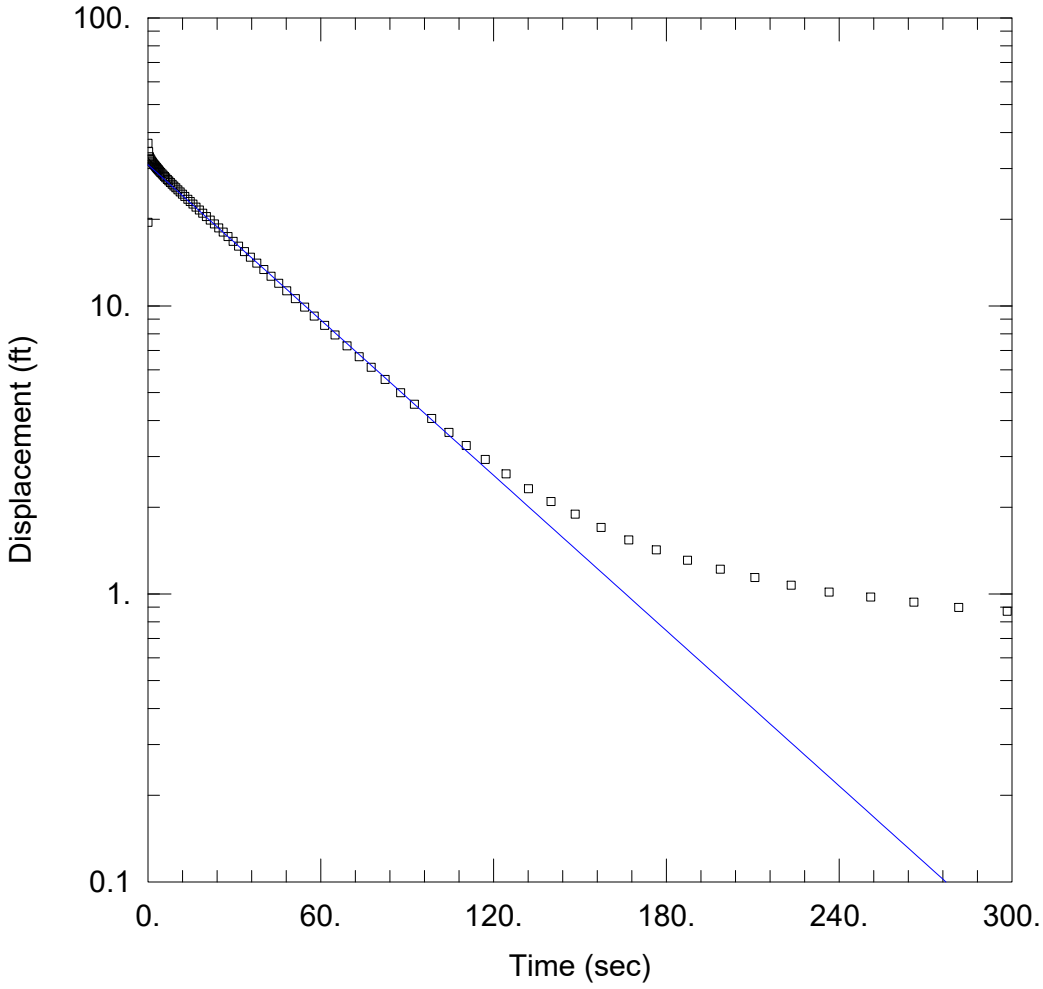
Slug Test	WC (ft)	K (cm/s)	K (ft/d)	Comment/K Geometric mean (cm/s)	K Geometric Mean (ft/d)
MW-16-02 Test 1	63	NA	NA	Not a good match, use tests 2 and 3	NA
MW-16-02 Test 2	63	2.5E-03	7.0	2.6E-03	7.4
MW-16-02 Test 3	63	2.7E-03	7.8		
MW-16-03 Test 1	55	4.3E-03	12.2	4.5E-03	12.9
MW-16-03 Test 2	55	4.4E-03	12.5		
MW-16-03 Test 3	55	4.9E-03	14.0		
MW-16-04 Test 1	63	3.9E-02	110.9	3.5E-02	99.6
MW-16-04 Test 2	63	3.4E-02	95.5		
MW-16-04 Test 3	63	3.3E-02	93.3		
MW-16-05 Test 1	60	9.9E-03	28.1	1.0E-02	28.4
MW-16-05 Test 2	60	1.0E-02	28.5		
MW-16-05 Test 3	60	1.0E-02	28.7		
MW-16-06 Test 1	53	3.8E-03	10.7	3.3E-03	9.5
MW-16-06 Test 2	53	3.4E-03	9.5		
MW-16-06 Test 3	53	2.9E-03	8.3		
MW-16-07 Test 1	50	3.5E-03	9.9	4.1E-03	11.7
MW-16-07 Test 2	50	4.4E-03	12.5		
MW-16-07 Test 3	50	4.5E-03	12.9		

K = Hydraulic Conductivity

NA = Not applicable

WC = water column height in well

A pneumatic air slug was utilized to complete slug tests in these artesian free flowing wells in September 2021.



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-02 test 1.aqt
Date: 10/29/21 Time: 13:27:14

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-02
Test Date: 9/22/2021

AQUIFER DATA

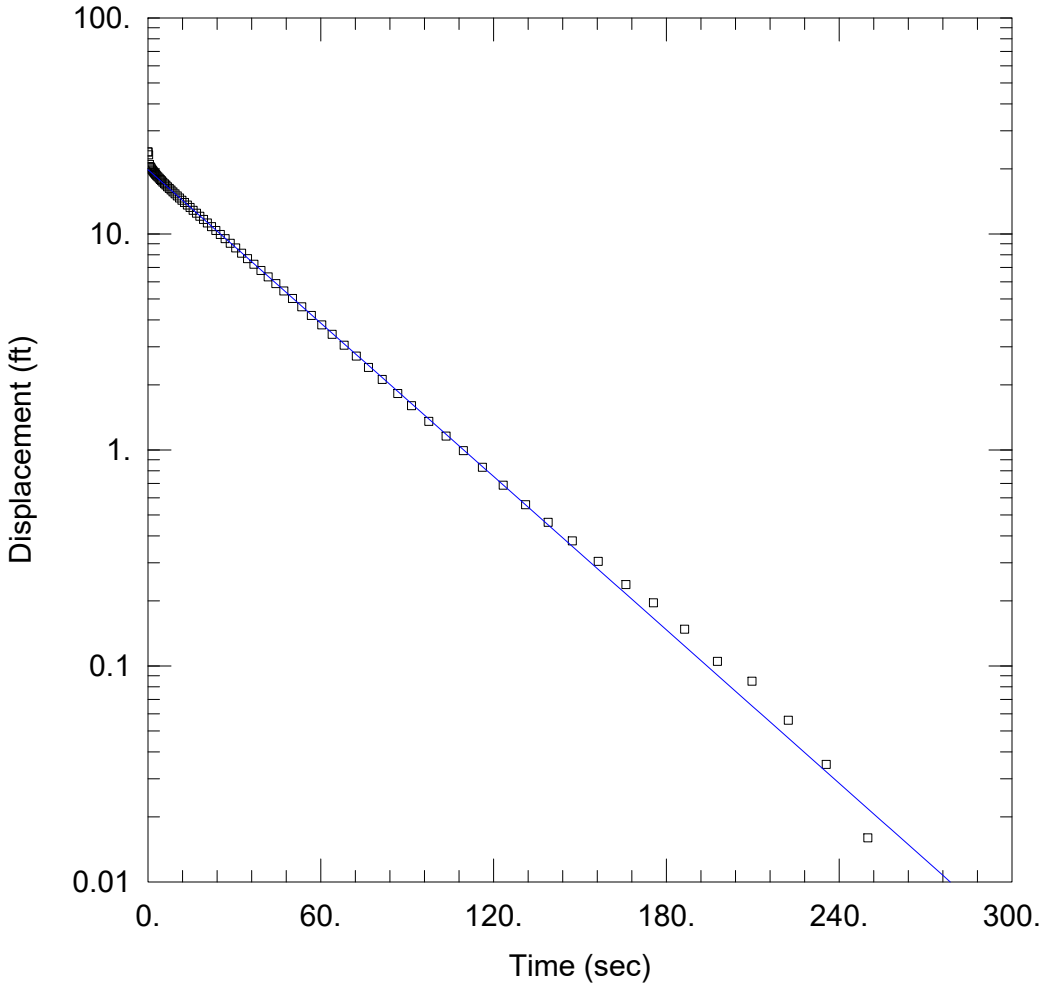
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-02)

Initial Displacement: 19.52 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 63. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.001862 cm/sec
y0 = 30.93 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-02 test 2.aqt
Date: 10/29/21 Time: 13:30:29

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-02
Test Date: 9/22/2021

AQUIFER DATA

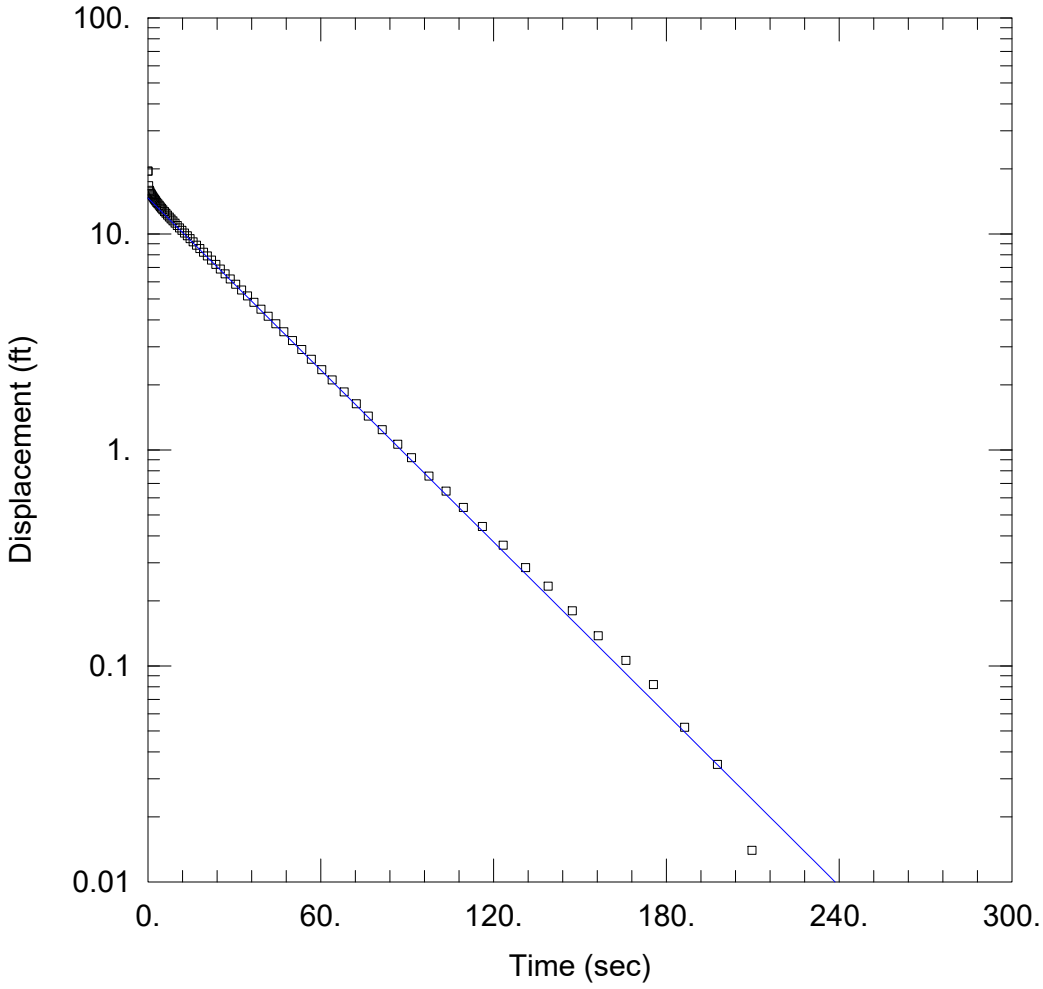
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-02)

Initial Displacement: 23.98 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 63. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.002452 cm/sec
y0 = 19.83 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-02 test 3.aqt
Date: 10/29/21 Time: 13:29:03

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-02
Test Date: 9/22/2021

AQUIFER DATA

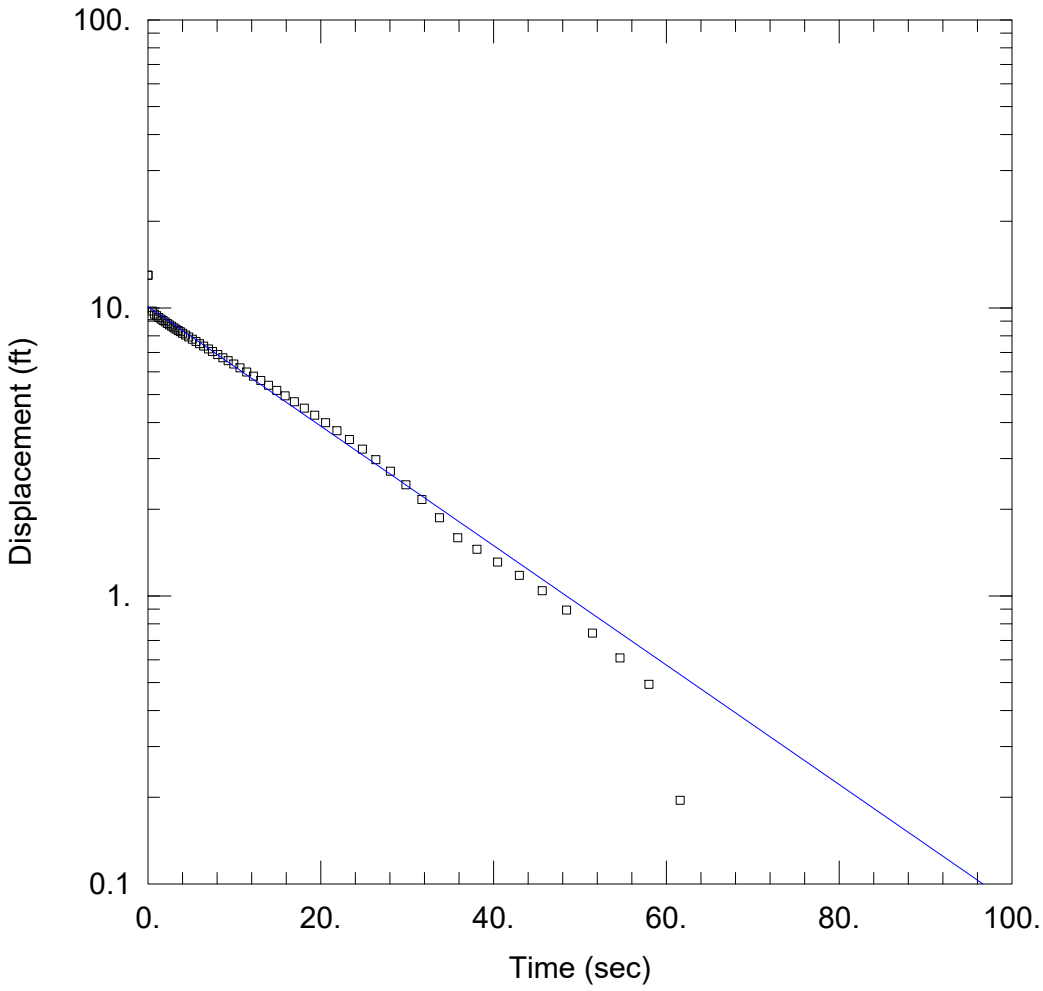
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-02)

Initial Displacement: 19.52 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 63. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.002749 cm/sec
y0 = 14.65 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-03 test 1.aqt
Date: 10/29/21 Time: 13:34:12

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-03
Test Date: 9/22/2021

AQUIFER DATA

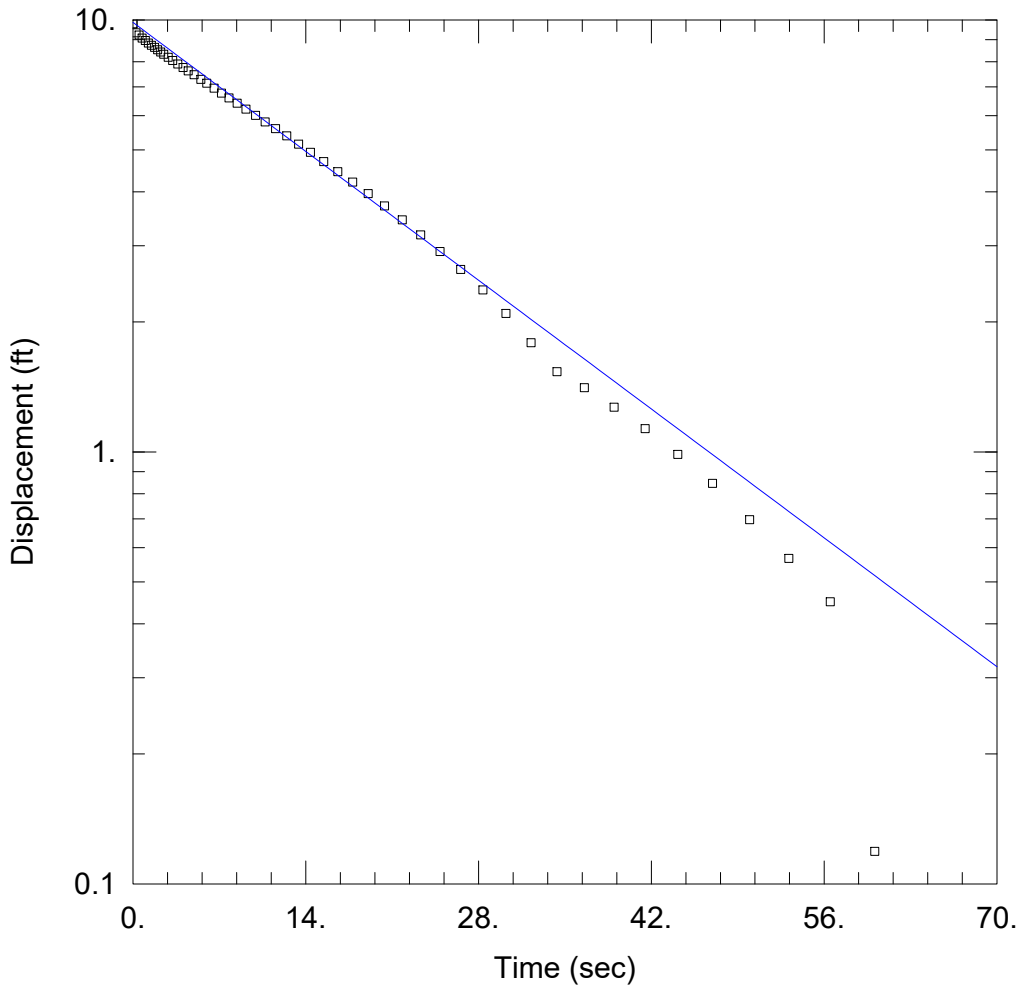
Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-03)

Initial Displacement: 12.99 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 55. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.004296 cm/sec
y0 = 10.1 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-03 test 2.aqt
Date: 10/29/21 Time: 13:36:40

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-03
Test Date: 9/22/2021

AQUIFER DATA

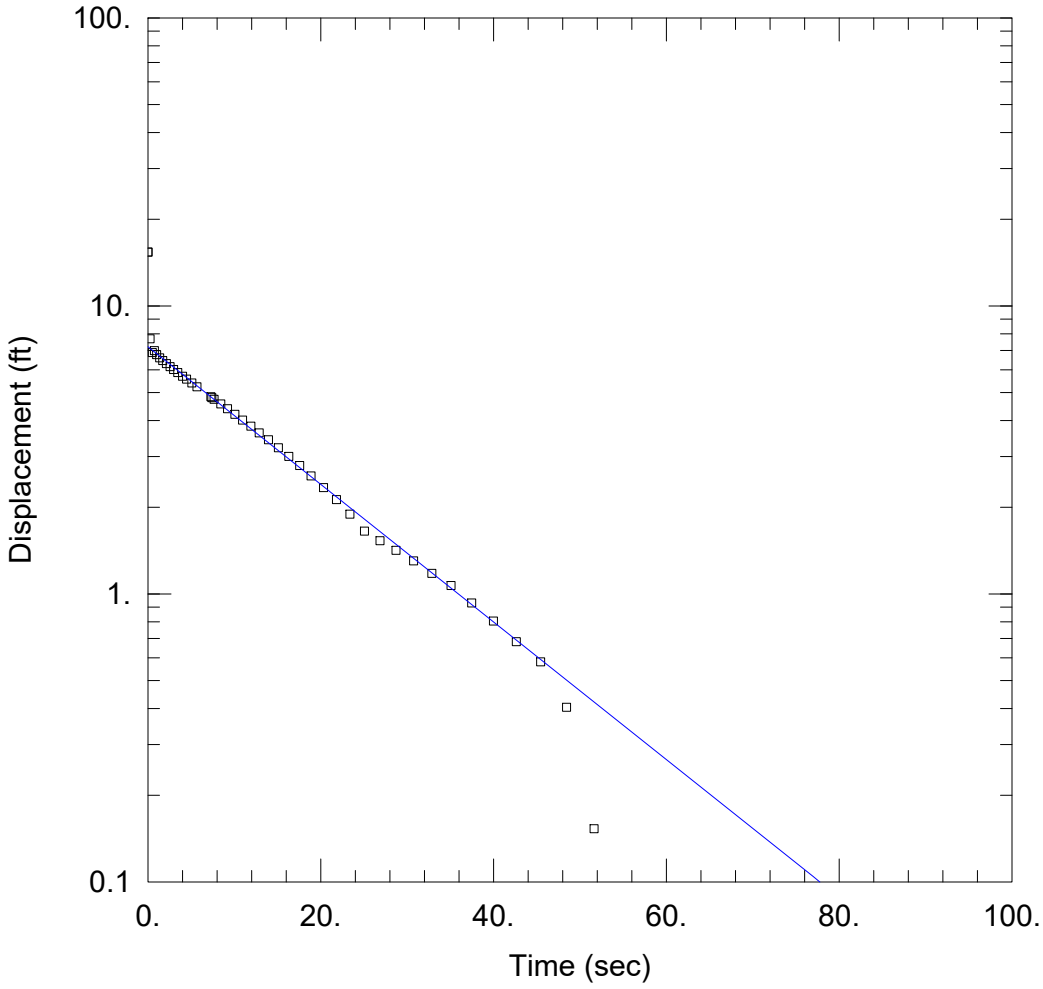
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-03)

Initial Displacement: 9.789 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 55. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.004413 cm/sec
y0 = 9.867 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-03 test 3.aqt
Date: 10/29/21 Time: 13:38:09

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-03
Test Date: 9/22/2021

AQUIFER DATA

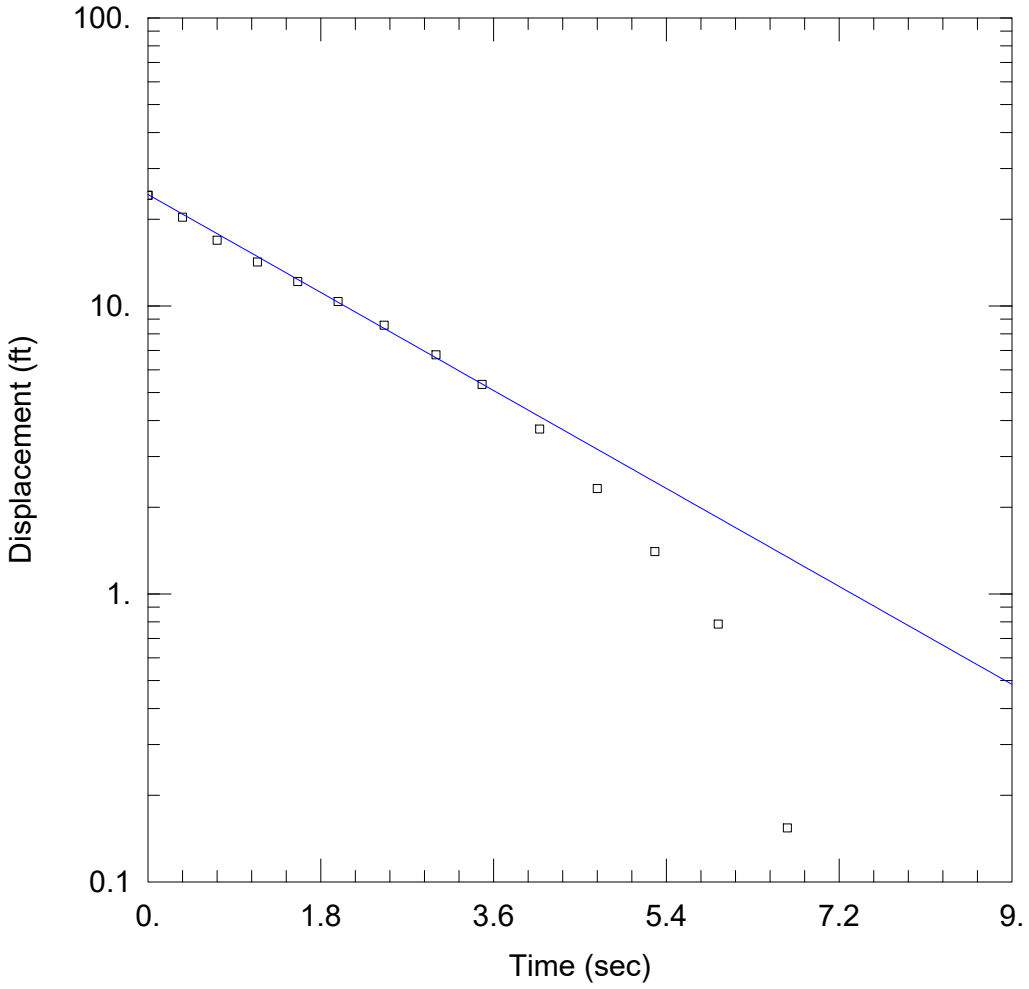
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-03)

Initial Displacement: 15.37 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 55. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.004948 cm/sec
y0 = 7.209 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-04 test 1.aqt
Date: 10/29/21 Time: 14:05:30

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-04
Test Date: 9/22/2021

AQUIFER DATA

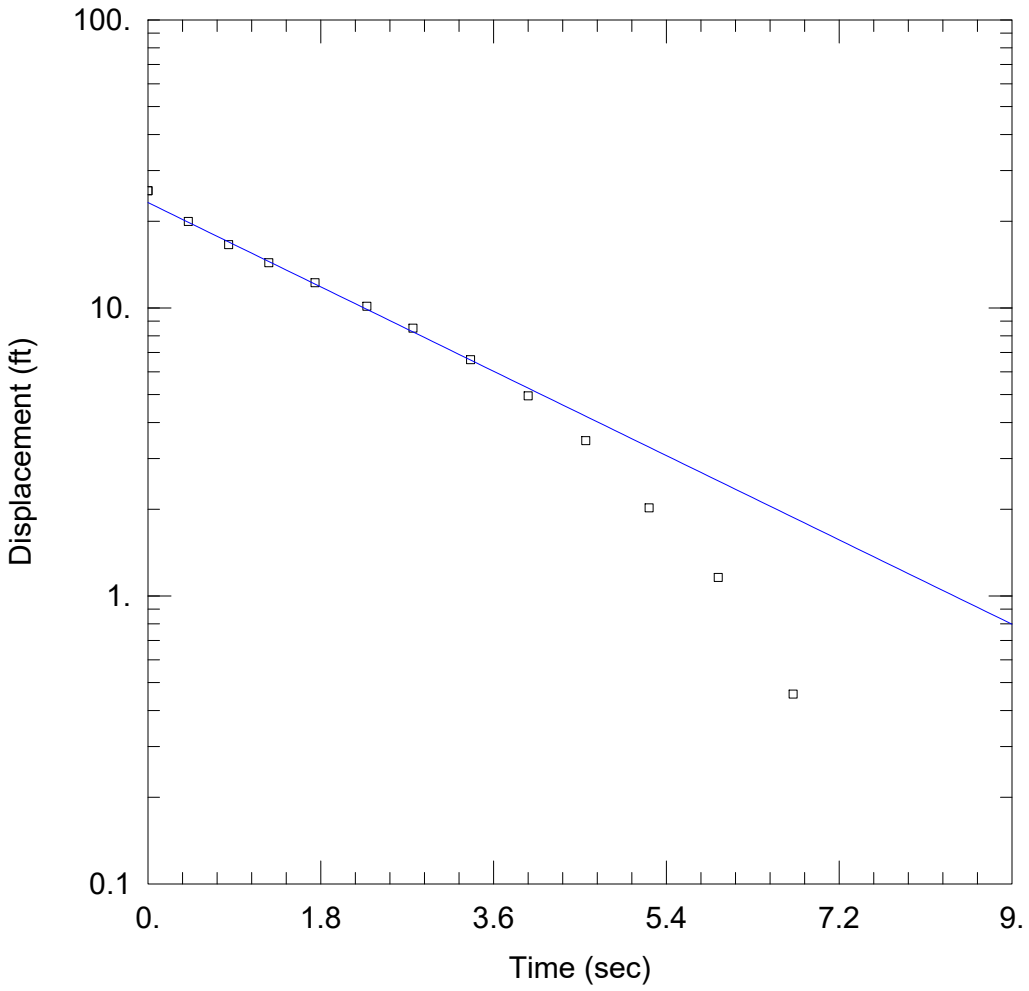
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-04)

Initial Displacement: 24.21 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 63. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.03914 cm/sec
y0 = 24.37 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-04 test 2.aqt
Date: 10/29/21 Time: 14:07:50

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-04
Test Date: 9/22/2021

AQUIFER DATA

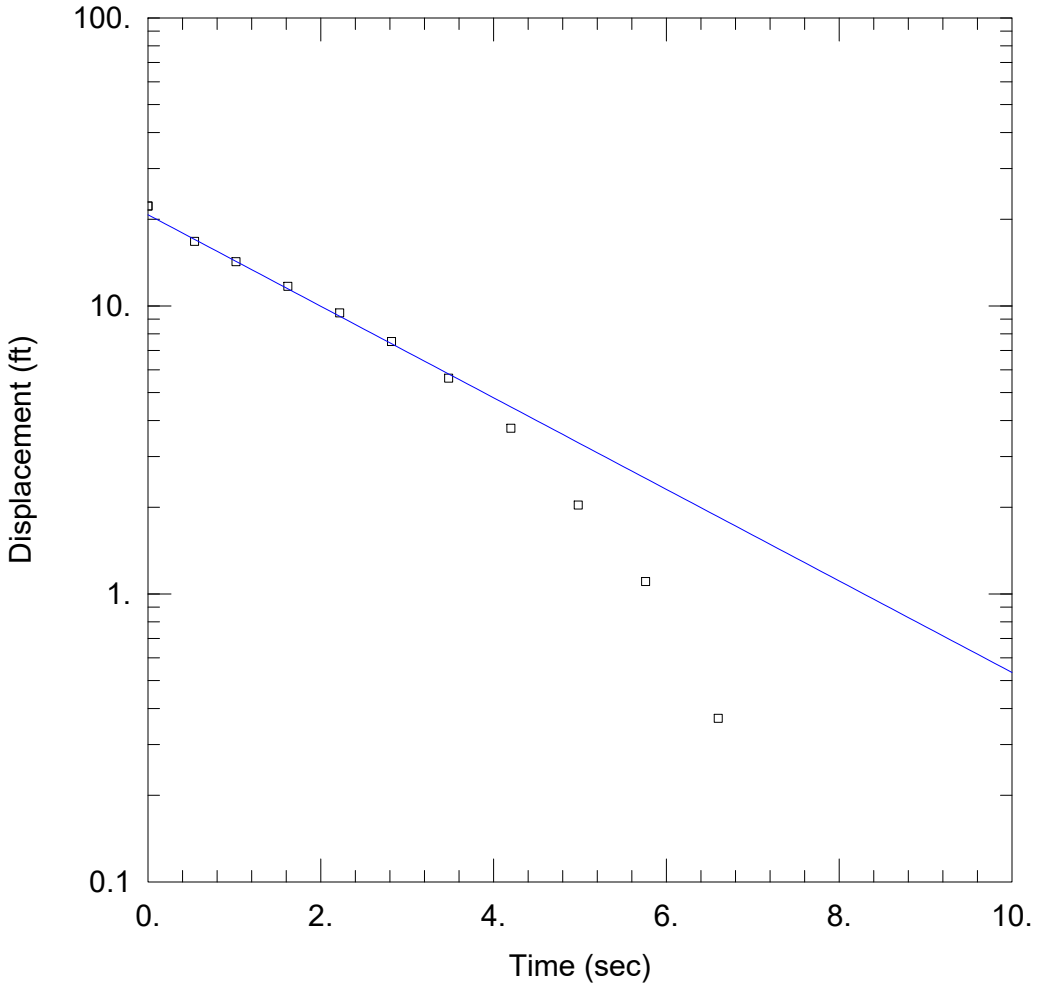
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-04)

Initial Displacement: 25.52 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 63. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.03369 cm/sec
y0 = 23.21 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-04 test 3.aqt
Date: 10/29/21 Time: 14:11:31

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-04
Test Date: 9/22/2021

AQUIFER DATA

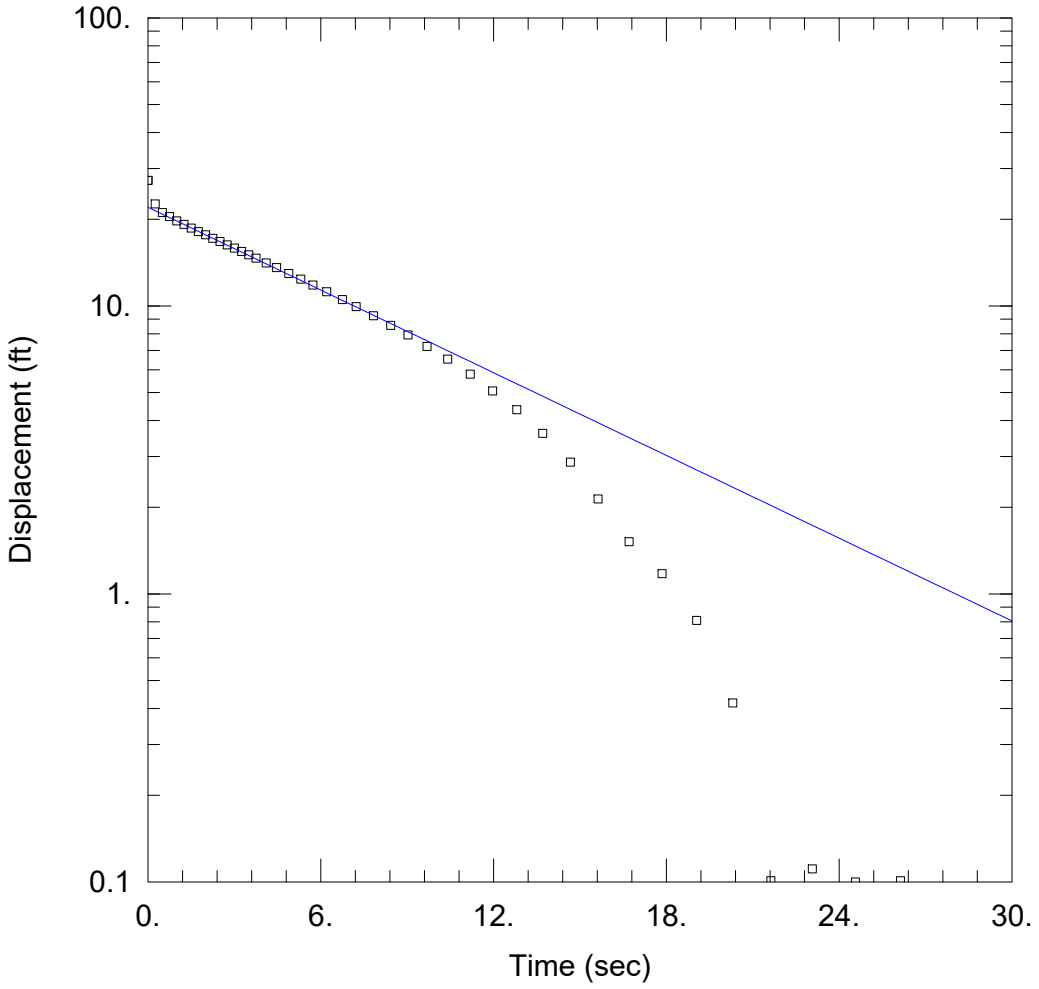
Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-04)

Initial Displacement: 22.22 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 63. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.03291 cm/sec
y0 = 20.73 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-05 test 1.aqt
Date: 10/29/21 Time: 14:16:43

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-05
Test Date: 9/22/2021

AQUIFER DATA

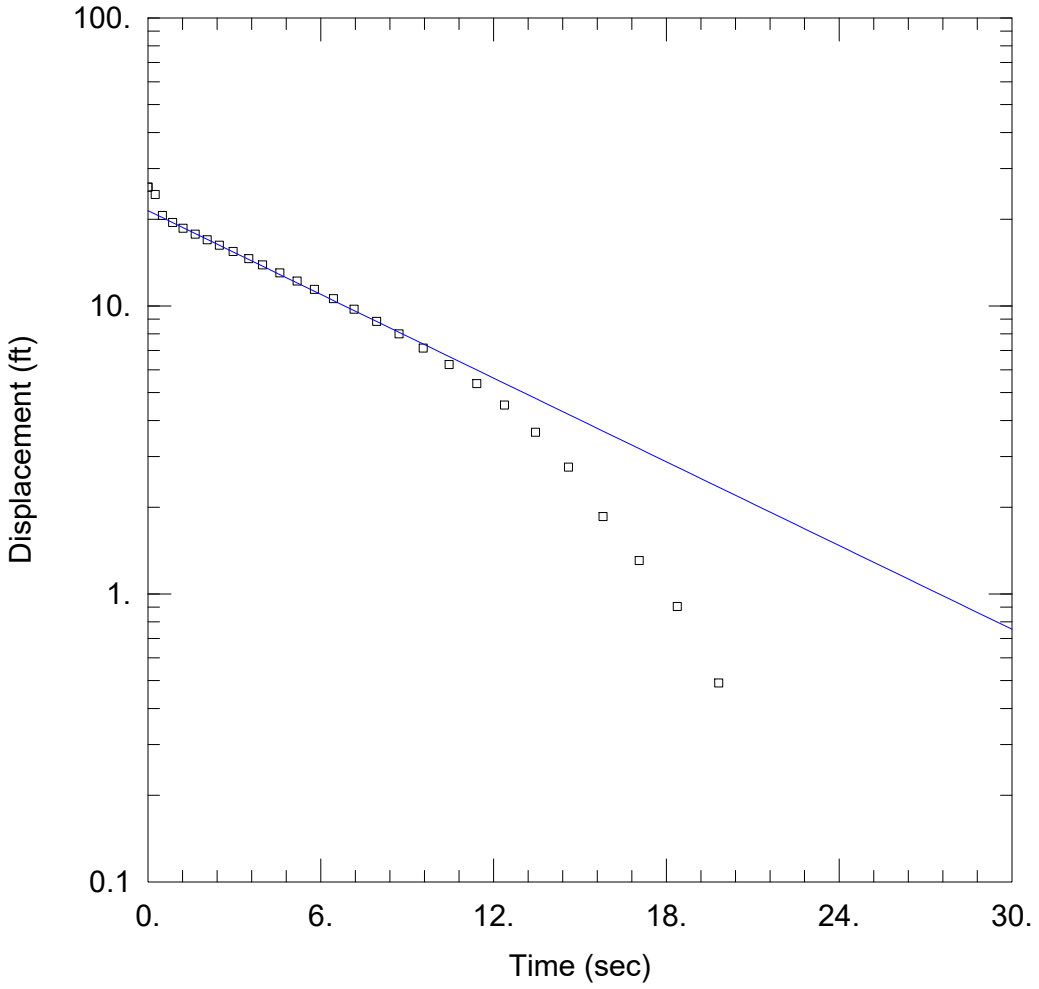
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-05)

Initial Displacement: 27.27 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 60. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.009917 cm/sec
y0 = 22.01 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-05 test 2.aqt
Date: 10/29/21 Time: 14:18:42

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-05
Test Date: 9/22/2021

AQUIFER DATA

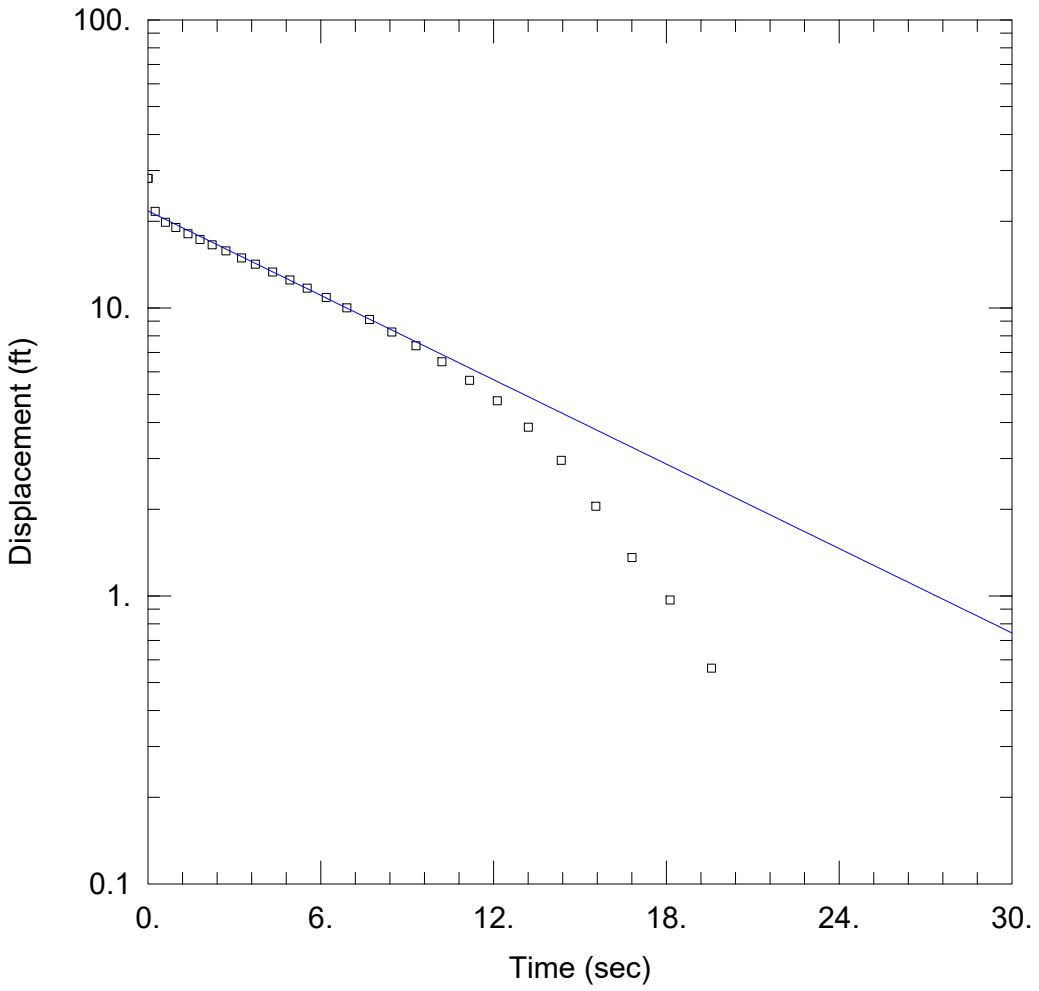
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-05)

Initial Displacement: 25.85 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 60. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.01004 cm/sec
y0 = 21.42 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-05 test 3.aqt
Date: 10/29/21 Time: 14:20:26

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-05
Test Date: 9/22/2021

AQUIFER DATA

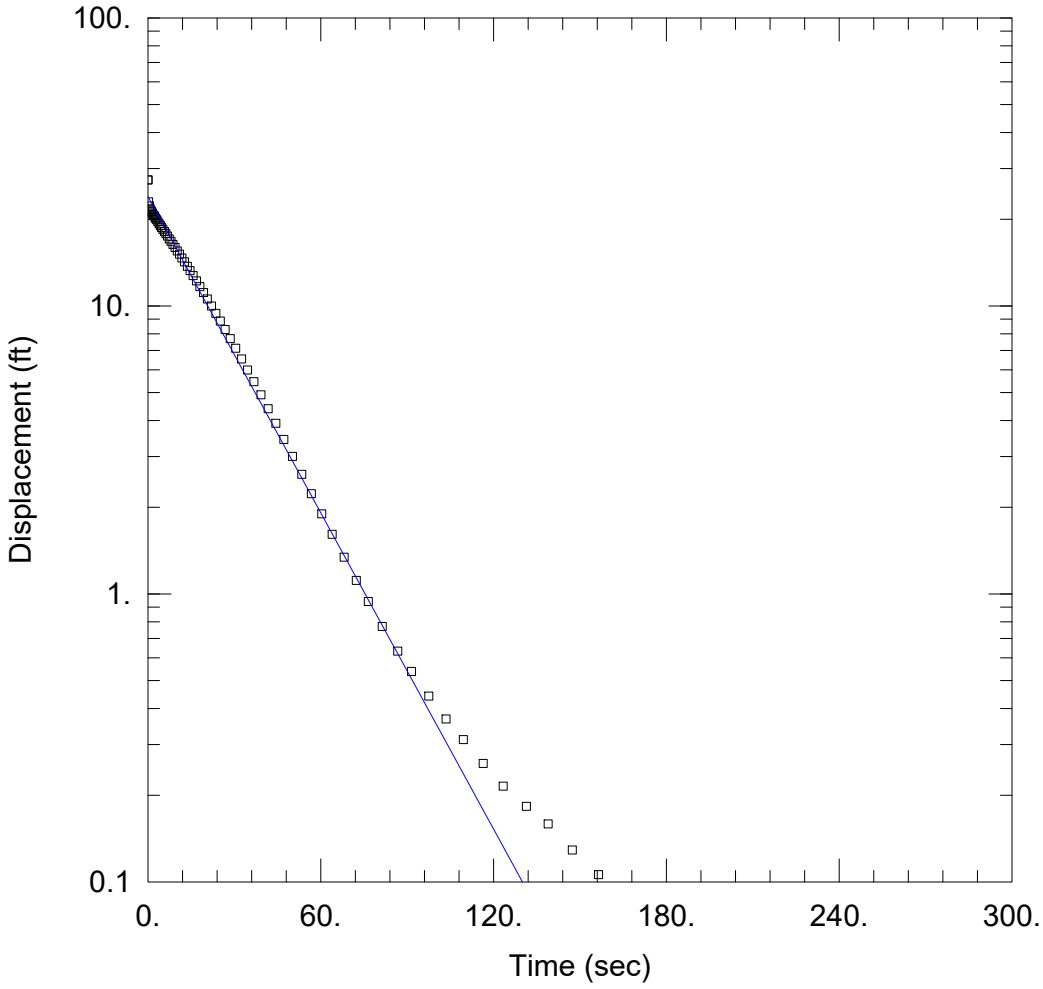
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-05)

Initial Displacement: 28.15 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 60. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.01012 cm/sec
y0 = 21.72 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-06 test 1.aqt
Date: 10/29/21 Time: 14:25:42

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-06
Test Date: 9/22/2021

AQUIFER DATA

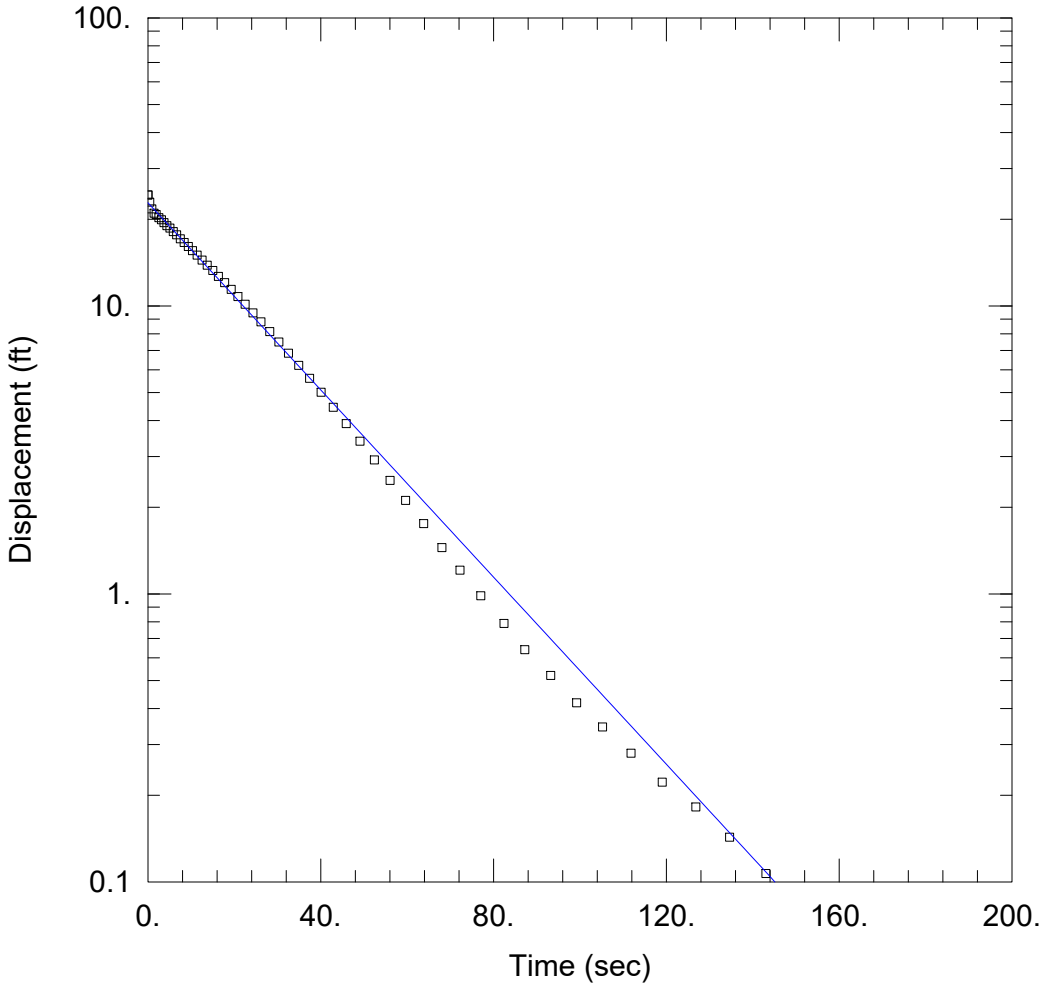
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-06)

Initial Displacement: 27.37 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 53. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.003791 cm/sec
y0 = 23.95 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-06 test 2.aqt
Date: 10/29/21 Time: 14:27:18

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-06
Test Date: 9/22/2021

AQUIFER DATA

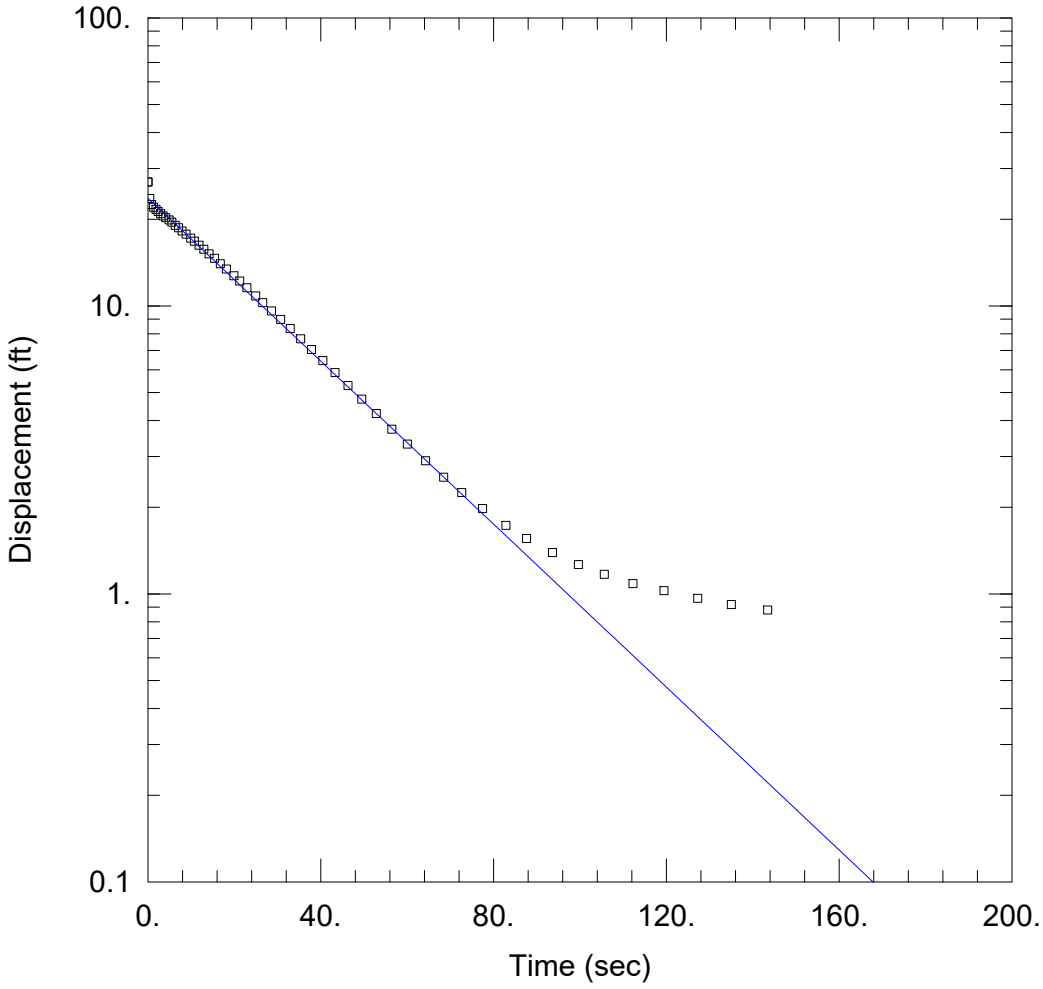
Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-06)

Initial Displacement: 24.27 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 53. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.003365 cm/sec
y0 = 22.8 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-06 test 3.aqt
Date: 10/29/21 Time: 14:29:09

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-06
Test Date: 9/22/2021

AQUIFER DATA

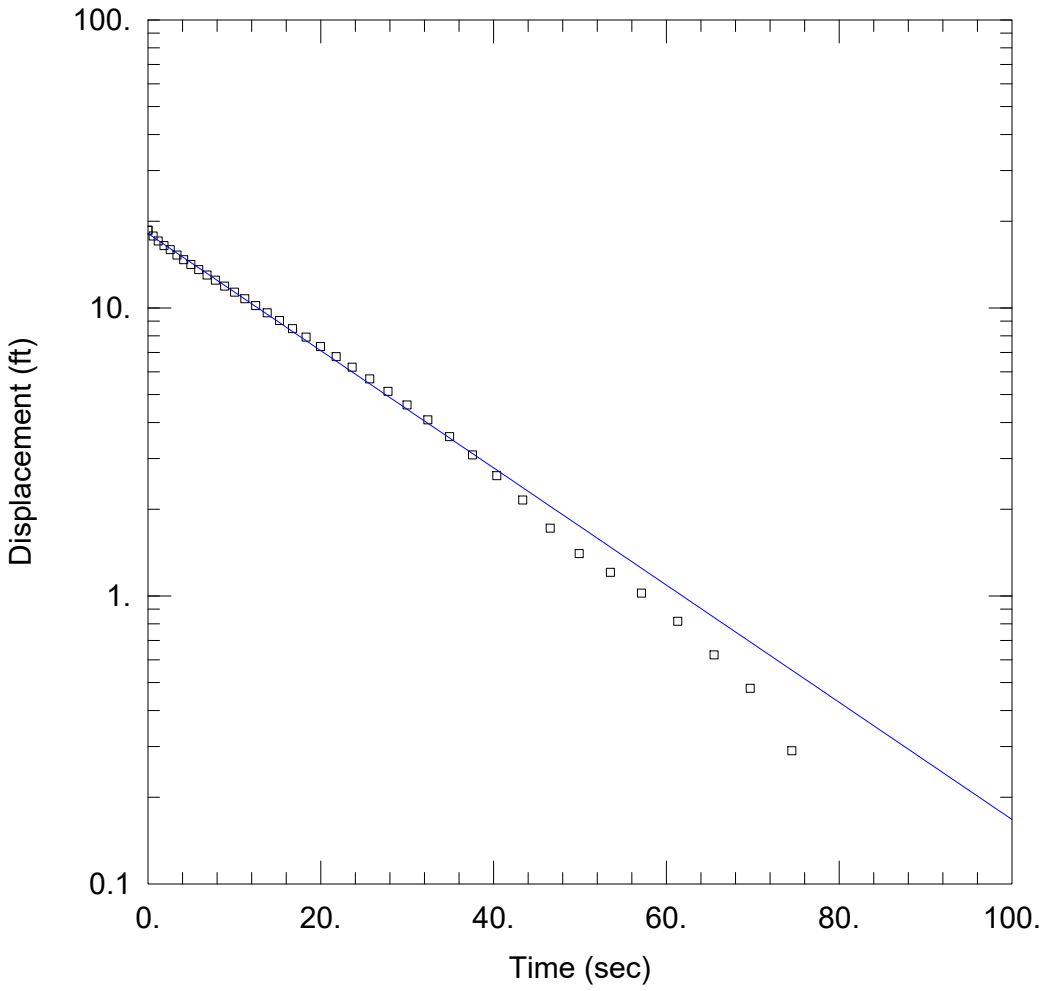
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-06)

Initial Displacement: 26.94 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.0861 ft
Static Water Column Height: 53. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.00293 cm/sec
y0 = 23.65 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-07 test 1.aqt
Date: 10/29/21 Time: 14:33:05

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-07
Test Date: 9/22/2021

AQUIFER DATA

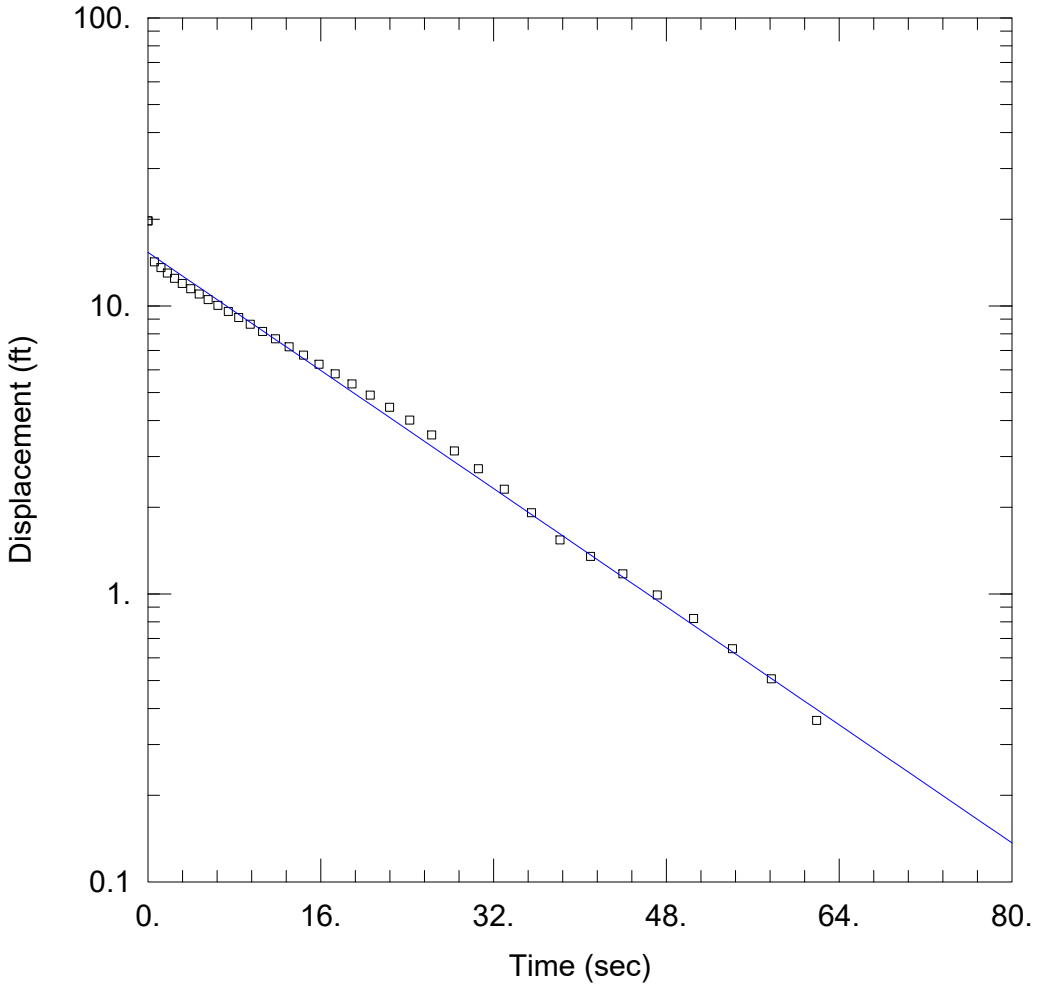
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-07)

Initial Displacement: 18.61 ft
Total Well Penetration Depth: 18.5 ft
Casing Radius: 0.0861 ft
Static Water Column Height: 50. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.003492 cm/sec
y0 = 18.14 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-07 test 2.aqt
Date: 10/29/21 Time: 14:36:35

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-07
Test Date: 9/22/2021

AQUIFER DATA

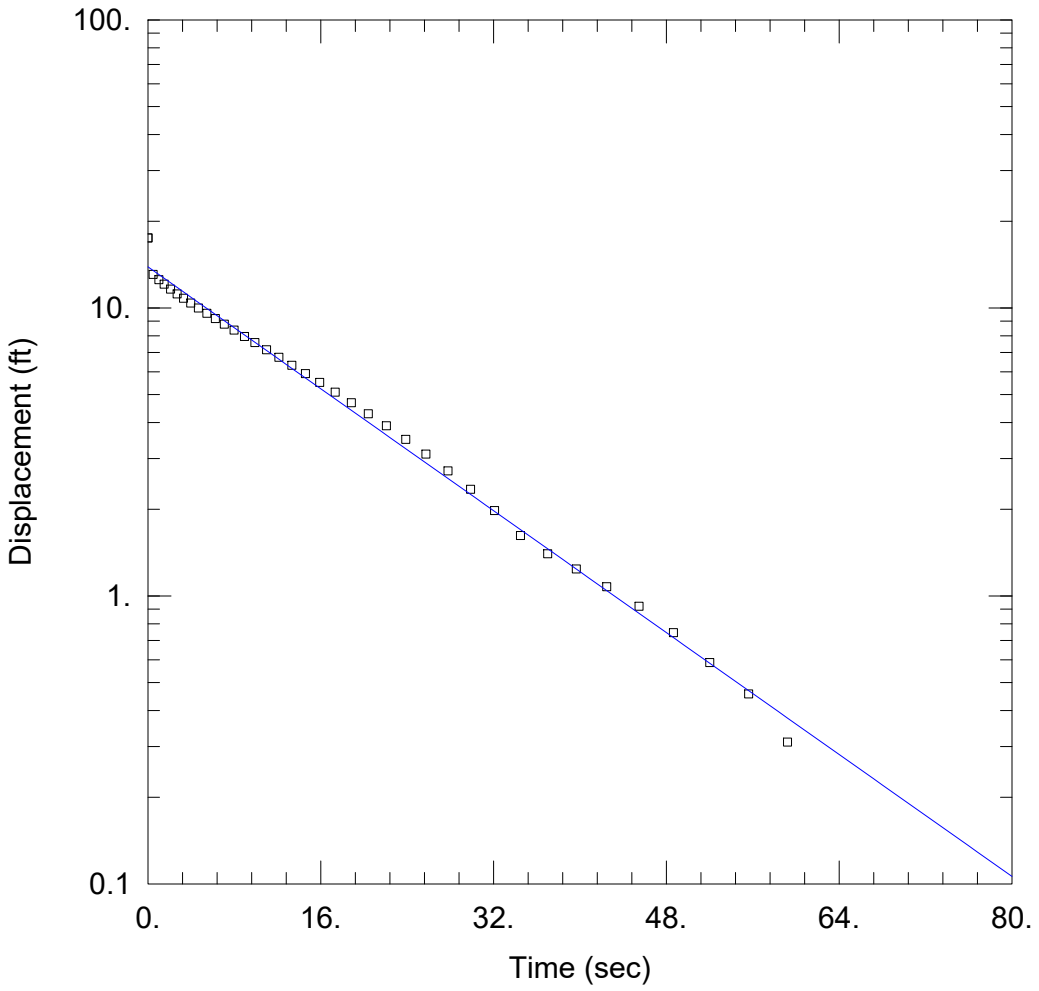
Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-07)

Initial Displacement: 19.73 ft
Total Well Penetration Depth: 18.5 ft
Casing Radius: 0.0861 ft
Static Water Column Height: 50. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.004398 cm/sec
y0 = 15.34 ft



WELL TEST ANALYSIS

Data Set: P:_Vision\DTE\2021 Slug Tests\Monroe FAB\MW-16-07 test 3.aqt
Date: 10/29/21 Time: 14:34:43

PROJECT INFORMATION

Company: TRC
Client: DTE
Location: Monroe FAB
Test Well: MW-16-07
Test Date: 9/22/2021

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA (MW-16-07)

Initial Displacement: 17.51 ft
Total Well Penetration Depth: 18.5 ft
Casing Radius: 0.0861 ft
Static Water Column Height: 50. ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

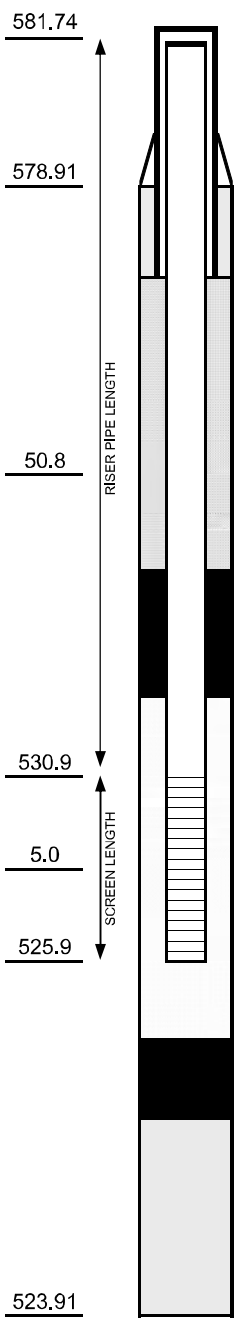
Aquifer Model: Confined
Solution Method: Hvorslev
K = 0.004539 cm/sec
y0 = 13.88 ft

APPENDIX B – MONITORING WELL CONSTRUCTION DIAGRAMS

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: DTE EC: MFAB CCR MW Installation		WELL ID:	**MW-16-01**
PROJ. NO: 231828.0001	DATE INSTALLED: 2/17/2016 INSTALLED BY: J. REED		CHECKED BY: C. Scieszka

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)



ELEVATION	DEPTH	
581.74	2.8	TOP OF CASING
578.91	0.0	GROUND SURFACE
	1.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL: GROUT SLURRY
		GROUT/BACKFILL METHOD: TREMIE
50.8		
	39.5	GROUT
		BENTONITE SEAL MATERIAL: PELLETS
	44.0	BENTONITE SEAL
530.9	48.0	TOP OF SCREEN
		FILTER PACK MATERIAL: MEDIUM, WASHED SAND
5.0		
525.9	53.0	BOTTOM OF SCREEN
	53.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL: WASHED SAND
523.91	55.0	HOLE BOTTOM

NOTES:

CASING AND SCREEN DETAILS

TYPE OF RISER: 2-INCH PVC

PIPE SCHEDULE: 40

PIPE JOINTS: THREADED O-RINGS

SCREEN TYPE: 2-INCH PVC

SCR. SLOT SIZE: 0.01-INCH

BOREHOLE DIAMETER: 6 IN. FROM 0 TO 55 FT.
____ IN. FROM ____ TO ____ FT.

SURF. CASING DIAMETER: ____ IN. FROM ____ TO ____ FT.
____ IN. FROM ____ TO ____ FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: SURGE AND PUMP

TIME DEVELOPING: 50 MINUTES

WATER REMOVED: 100 GALLONS

WATER ADDED: 0 GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: VERY TURBID

COLOR BEFORE: DARK GRAY

CLARITY AFTER: CLEAR

COLOR AFTER: NONE

ODOR (IF PRESENT): NONE

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	–	T/PVC	–	–
DTB AFTER DEVELOPING:	57.30	T/PVC	2/19/2016	11:00
SWL BEFORE DEVELOPING:	4.69	T/PVC	2/19/2016	10:00
SWL AFTER DEVELOPING:	4.80	T/PVC	3/17/2016	8:45
OTHER SWL:		T/PVC		
OTHER SWL:		T/PVC		

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: 3120

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: DTE EC: MFAB CCR MW Installation		WELL ID:	**MW-16-02**
PROJ. NO: 231828.0001	DATE INSTALLED: 2/18/2016 INSTALLED BY: J. REED		CHECKED BY: C. Scieszka

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
581.81	2.4	TOP OF CASING
579.44	0.0	GROUND SURFACE
	1.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL
		CEMENT/GROUT SLURRY
		GROUT/BACKFILL METHOD
55.4		TREMIE
	40.0	GROUT
		BENTONITE SEAL MATERIAL
		PELLETS
	44.0	BENTONITE SEAL
526.4	53.0	TOP OF SCREEN
		FILTER PACK MATERIAL
5.0		MEDIUM, WASHED SAND
521.4	58.0	BOTTOM OF SCREEN
	60.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL
		WASHED SAND
519.44	60.0	HOLE BOTTOM

RISER PIPE LENGTH

SCREEN LENGTH

NOTES:
ARTESIAN MONITORING WELL

CASING AND SCREEN DETAILS

TYPE OF RISER: 2-INCH PVC

PIPE SCHEDULE: 40

PIPE JOINTS: THREADED O-RINGS

SCREEN TYPE: 2-INCH PVC

SCR. SLOT SIZE: 0.01-INCH

BOREHOLE DIAMETER: 6 IN. FROM 0 TO 60 FT.
____ IN. FROM ____ TO ____ FT.

SURF. CASING DIAMETER: ____ IN. FROM ____ TO ____ FT.
____ IN. FROM ____ TO ____ FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: ARTESIAN WELL

TIME DEVELOPING: 24 HOURS

WATER REMOVED: 2,880 GALLONS

WATER ADDED: 0 GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: SLIGHTLY CLOUDY TO CLOUDY

COLOR BEFORE: LIGHT GRAY

CLARITY AFTER: CLEAR

COLOR AFTER: NONE

ODOR (IF PRESENT): NONE

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	–	T/PVC	–	–
DTB AFTER DEVELOPING:	61.03	T/PVC	3/17/2016	9:30
SWL BEFORE DEVELOPING:	–	T/PVC	–	–
SWL AFTER DEVELOPING:	2.42	ATOC	3/17/2016	9:30
OTHER SWL:		T/PVC		
OTHER SWL:		T/PVC		

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

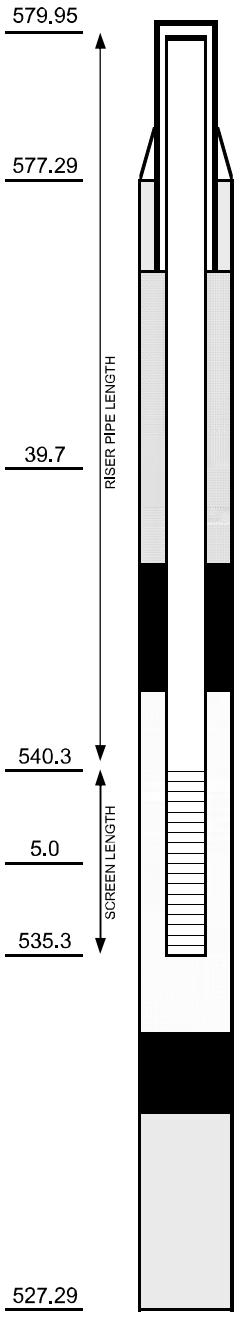
PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: 3120

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: DTE EC: MFAB CCR MW Installation		WELL ID:	**MW-16-03**
PROJ. NO: 231828.0001	DATE INSTALLED: 2/16/2016 INSTALLED BY: J. REED		CHECKED BY: C. Scieszka

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)
579.95	2.7 TOP OF CASING
577.29	0.0 GROUND SURFACE
	1.0 CEMENT SURFACE PLUG
	GROUT/BACKFILL MATERIAL: CEMENT/GROUT SLURRY
	GROUT/BACKFILL METHOD: TREMIE
39.7	28.0 GROUT
	BENTONITE SEAL MATERIAL: PELLETS
	32.0 BENTONITE SEAL
540.3	37.0 TOP OF SCREEN
	FILTER PACK MATERIAL: PEA STONE
5.0	
535.3	42.0 BOTTOM OF SCREEN
	50.0 BOTTOM OF FILTER PACK
	NA BENTONITE PLUG
	BACKFILL MATERIAL: WASHED SAND
527.29	50.0 HOLE BOTTOM



NOTES:
ARTESIAN MONITORING WELL

CASING AND SCREEN DETAILS

TYPE OF RISER: 2-INCH PVC

PIPE SCHEDULE: 40

PIPE JOINTS: THREADED O-RINGS

SCREEN TYPE: 2-INCH PVC

SCR. SLOT SIZE: 0.01-INCH

BOREHOLE DIAMETER: 6 IN. FROM 0 TO 50 FT.
____ IN. FROM ____ TO ____ FT.

SURF. CASING DIAMETER: ____ IN. FROM ____ TO ____ FT.
____ IN. FROM ____ TO ____ FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: ARTESIAN WELL

TIME DEVELOPING: 16 HOURS

WATER REMOVED: 7,200 GALLONS

WATER ADDED: 0 GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: VERY TURBID

COLOR BEFORE: DARK GRAY

CLARITY AFTER: CLEAR

COLOR AFTER: NONE

ODOR (IF PRESENT): SULFUR

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	–	T/PVC	–	–
DTB AFTER DEVELOPING:	44.65	T/PVC	3/17/2016	9:25
SWL BEFORE DEVELOPING:	–	T/PVC	–	–
SWL AFTER DEVELOPING:	11.20	ATOC	3/17/2016	9:25
OTHER SWL:		T/PVC		
OTHER SWL:		T/PVC		

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

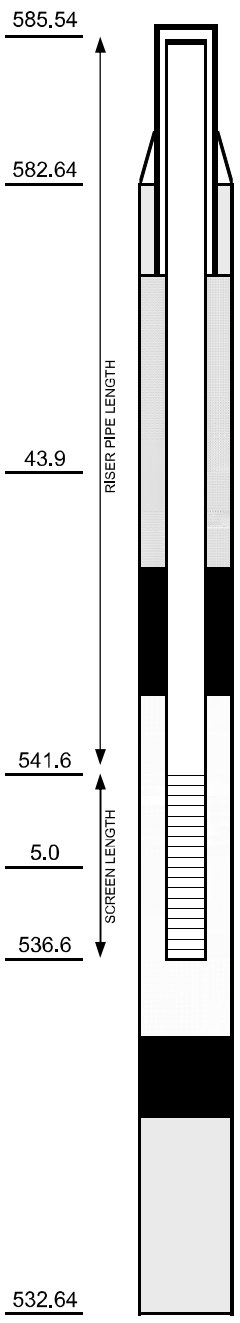
PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: 3120

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: DTE EC: MFAB CCR MW Installation		WELL ID:	**MW-16-04**
PROJ. NO: 231828.0001	DATE INSTALLED: 2/15/2016 INSTALLED BY: C. Scieszka		CHECKED BY: C. Scieszka

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
585.54	2.9	TOP OF CASING
582.64	0.0	GROUND SURFACE
	1.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL: CEMENT/GROUT SLURRY
		GROUT/BACKFILL METHOD: TREMIE
43.9		RISER PIPE LENGTH
	32.0	GROUT
		BENTONITE SEAL MATERIAL: PELLETS
	36.0	BENTONITE SEAL
541.6	41.0	TOP OF SCREEN
5.0		SCREEN LENGTH
		FILTER PACK MATERIAL: PEA STONE
536.6	46.0	BOTTOM OF SCREEN
	50.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL: WASHED SAND
532.64	50.0	HOLE BOTTOM



NOTES:
ARTESIAN MONITORING WELL

CASING AND SCREEN DETAILS

TYPE OF RISER: 2-INCH PVC

PIPE SCHEDULE: 40

PIPE JOINTS: THREADED O-RINGS

SCREEN TYPE: 2-INCH PVC

SCR. SLOT SIZE: 0.01-INCH

BOREHOLE DIAMETER: 6 IN. FROM 0 TO 50 FT.
____ IN. FROM ____ TO ____ FT.

SURF. CASING DIAMETER: ____ IN. FROM ____ TO ____ FT.
____ IN. FROM ____ TO ____ FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: ARTESIAN WELL

TIME DEVELOPING: 16 HOURS

WATER REMOVED: 28,900 GALLONS

WATER ADDED: 0 GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: VERY TURBID

COLOR BEFORE: DARK GRAY

CLARITY AFTER: CLEAR

COLOR AFTER: NONE

ODOR (IF PRESENT): SULFUR

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	–	T/PVC	–	–
DTB AFTER DEVELOPING:	49.45	T/PVC	3/17/2016	10:15
SWL BEFORE DEVELOPING:	–	T/PVC	–	–
SWL AFTER DEVELOPING:	16.50	ATOC	3/17/2016	10:15
OTHER SWL:		T/PVC		
OTHER SWL:		T/PVC		

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

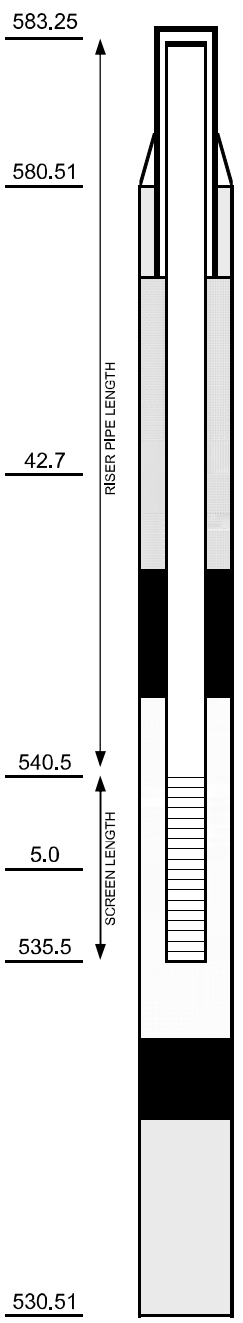
PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: 3120

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: DTE EC: MFAB CCR MW Installation		WELL ID:	**MW-16-05**
PROJ. NO: 231828.0001	DATE INSTALLED: 4/13/2016 INSTALLED BY: J. REED		CHECKED BY: C. Scieszka

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)



ELEVATION	DEPTH	
583.25	2.7	TOP OF CASING
580.51	0.0	GROUND SURFACE
	1.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL: CEMENT/GROUT SLURRY
		GROUT/BACKFILL METHOD: TREMIE
42.7		
	33.0	GROUT
		BENTONITE SEAL MATERIAL: PELLETS
	35.0	BENTONITE SEAL
540.5	40.0	TOP OF SCREEN
		FILTER PACK MATERIAL: PEA STONE
5.0		
535.5	45.0	BOTTOM OF SCREEN
	45.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL: PEA STONE
530.51	50.0	HOLE BOTTOM

NOTES:

CASING AND SCREEN DETAILS

TYPE OF RISER: 2-INCH PVC

PIPE SCHEDULE: 40

PIPE JOINTS: THREADED O-RINGS

SCREEN TYPE: 2-INCH PVC

SCR. SLOT SIZE: 0.01-INCH

BOREHOLE DIAMETER: 6 IN. FROM 0 TO 50 FT.
____ IN. FROM ____ TO ____ FT.

SURF. CASING DIAMETER: ____ IN. FROM ____ TO ____ FT.
____ IN. FROM ____ TO ____ FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: ARTESIAN WELL

TIME DEVELOPING: 12 HOURS

WATER REMOVED: 120 GALLONS

WATER ADDED: 0 GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: SLIGHTLY CLOUDY

COLOR BEFORE: VERY LIGHT GRAY

CLARITY AFTER: CLEAR

COLOR AFTER: NONE

ODOR (IF PRESENT): VERY SLIGHT TO NONE SULFUR

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	–	T/PVC	–	–
DTB AFTER DEVELOPING:	–	T/PVC	–	–
SWL BEFORE DEVELOPING:	–	T/PVC	–	–
SWL AFTER DEVELOPING:	14.00	ATOC	5/5/2016	12:47
OTHER SWL:		T/PVC		
OTHER SWL:		T/PVC		

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

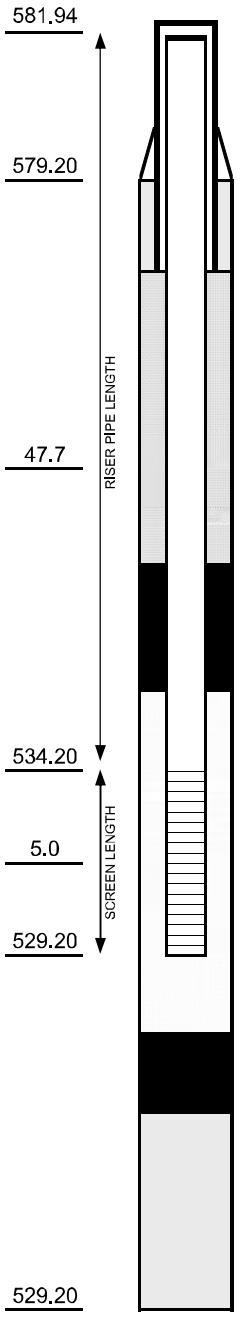
PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: 3120

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: DTE EC: MFAB CCR MW Installation		WELL ID:	**MW-16-06**
PROJ. NO: 231828.0001	DATE INSTALLED: 4/13/2016 INSTALLED BY: J. REED		CHECKED BY: C. Scieszka

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
581.94	2.7	TOP OF CASING
579.20	0.0	GROUND SURFACE
	1.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL: CEMENT/GROUT SLURRY
		GROUT/BACKFILL METHOD: TREMIE
47.7		RISER PIPE LENGTH
	38.0	GROUT
		BENTONITE SEAL MATERIAL: PELLETS
	40.0	BENTONITE SEAL
534.20	45.0	TOP OF SCREEN
5.0		SCREEN LENGTH
		FILTER PACK MATERIAL: PEA STONE
529.20	50.0	BOTTOM OF SCREEN
	50.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL: NA
529.20	50.0	HOLE BOTTOM



NOTES:

CASING AND SCREEN DETAILS

TYPE OF RISER: 2-INCH PVC

PIPE SCHEDULE: 40

PIPE JOINTS: THREADED O-RINGS

SCREEN TYPE: 2-INCH PVC

SCR. SLOT SIZE: 0.01-INCH

BOREHOLE DIAMETER: 6 IN. FROM 0 TO 50 FT.
____ IN. FROM ____ TO ____ FT.

SURF. CASING DIAMETER: ____ IN. FROM ____ TO ____ FT.
____ IN. FROM ____ TO ____ FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: ARTESIAN WELL

TIME DEVELOPING: 24 HOURS

WATER REMOVED: 240-250 GALLONS

WATER ADDED: 0 GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: SLIGHTLY CLOUDY

COLOR BEFORE: SLIGHTLY LIGHT GRAY

CLARITY AFTER: CLEAR

COLOR AFTER: NONE

ODOR (IF PRESENT): NONE

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	–	T/PVC	–	–
DTB AFTER DEVELOPING:	–	T/PVC	–	–
SWL BEFORE DEVELOPING:	–	T/PVC	–	–
SWL AFTER DEVELOPING:	0.75	ATOC	5/5/2016	9:30
OTHER SWL:		T/PVC		
OTHER SWL:		T/PVC		

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: 3120

WELL CONSTRUCTION DIAGRAM

PROJ. NAME: DTE EC: MFAB CCR MW Installation		WELL ID:	**MW-16-07**
PROJ. NO: 231828.0001	DATE INSTALLED: 4/14/2016 INSTALLED BY: J. REED		CHECKED BY: C. Scieszka

ELEVATION (BENCHMARK: USGS)	DEPTH BELOW OR ABOVE GROUND SURFACE (FEET)	
578.40	3.0	TOP OF CASING
575.41	0.0	GROUND SURFACE
	1.0	CEMENT SURFACE PLUG
		GROUT/BACKFILL MATERIAL: CEMENT/GROUT SLURRY
		GROUT/BACKFILL METHOD: TREMIE
38.0		RISER PIPE LENGTH
	27.0	GROUT
		BENTONITE SEAL MATERIAL: PELLETS
	30.0	BENTONITE SEAL
540.4	35.0	TOP OF SCREEN
5.0		SCREEN LENGTH
		FILTER PACK MATERIAL: PEA STONE
535.4	40.0	BOTTOM OF SCREEN
	40.0	BOTTOM OF FILTER PACK
	NA	BENTONITE PLUG
		BACKFILL MATERIAL: NA
535.41	40.0	HOLE BOTTOM

NOTES:

CASING AND SCREEN DETAILS

TYPE OF RISER: 2-INCH PVC

PIPE SCHEDULE: 40

PIPE JOINTS: THREADED O-RINGS

SCREEN TYPE: 2-INCH PVC

SCR. SLOT SIZE: 0.01-INCH

BOREHOLE DIAMETER: 6 IN. FROM 0 TO 40 FT.
____ IN. FROM ____ TO ____ FT.

SURF. CASING DIAMETER: ____ IN. FROM ____ TO ____ FT.
____ IN. FROM ____ TO ____ FT.

WELL DEVELOPMENT

DEVELOPMENT METHOD: ARTESIAN WELL

TIME DEVELOPING: 24 HOURS

WATER REMOVED: 240 GALLONS

WATER ADDED: 0 GALLONS

WATER CLARITY BEFORE / AFTER DEVELOPMENT

CLARITY BEFORE: SLIGHTLY CLOUDY

COLOR BEFORE: SLIGHTLY LIGHT GRAY

CLARITY AFTER: CLEAR

COLOR AFTER: NONE

ODOR (IF PRESENT): NONE

WATER LEVEL SUMMARY

MEASUREMENT (FEET)			DATE	TIME
DTB BEFORE DEVELOPING:	–	T/PVC	–	–
DTB AFTER DEVELOPING:	–	T/PVC	–	–
SWL BEFORE DEVELOPING:	–	T/PVC	–	–
SWL AFTER DEVELOPING:	8.80	ATOC	5/5/2016	10:44
OTHER SWL:	.	T/PVC		
OTHER SWL:		T/PVC		

PROTECTIVE CASING DETAILS

PERMANENT, LEGIBLE WELL LABEL ADDED? ☑ YES ☐ NO

PROTECTIVE COVER AND LOCK INSTALLED? ☑ YES ☐ NO

LOCK KEY NUMBER: 3120

APPENDIX C - 1970’s BORING LOGS

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 577.0 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL; Soft Dk. Brn. SEMI-ORG. SILTY CLAY. 0'6"

V. Stiff Brown & Gray VERY SILTY CLAY, w/Some Fine Sand, Traces of Gravel. 4'0"

V. Stiff Brown & Gray SILTY CLAY, w/Sand Pockets, Traces of Gravel. 6'6"

Hard Mottled Brown F. SANDY SILTY CLAY, w/Some Gravel. 9'6"

560

Stiff Gray SILTY CLAY, w/Some Sand, Traces of Gravel.

23'6"

Hd. Gr. SILTY CLAY, w/Some Sand & Grav. 23'11"

550

Compact Gray FINE SAND. Moist. 24'3"

V. Hard Gray V.F. SANDY SILTY CLAY, Very Gravelly in Some Zones, Generally Gravelly, w/Rock Fragments. (GLACIAL TILL).

540

Top of Rock, EL. 531.0 ±

530

Hd. Lt. Gray Broken LIMESTONE BRECCIA. 46'0"

Soft Light Gray to Brown V. Fragmented LIMESTONE, w/Seams of Hard Limestone. 47'9"

Hd. Lt. Gr. to Brn. Mod. Fragmented DOLOMITIC LIMESTONE, w/Zone Med. Hard Shale. 51'9"

520

Med. Hard. Gr. Mod. Fragmented LIMESTONE. 55'9"

56'9"

Hole dry augered to d=34'; 46' 9" of 3-inch casing used after auger.

* Encountered artesian water; See Note

Hole grouted w/2 bags cement; no water flow during final inspection on Sept. 9, 1970

See Test Boring Location Plan

LOCATION: N-4350; W-1100

TOTAL DEPTH: 56'9"

BORING STARTED: July 15, 1970

BORING COMPLETED: July 16, 1970

INSPECTOR: J.O. Wanzeck (S&FA)

DRILLER: B. Singleton

CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole at indicated number of hours after completion of boring; 46'9 feet of casing in place. Artesian

* PENETRATION: Number of blows required to drive 2" inch O.D. soil sampler 6 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

SOIL CORE [illegible]: NX (2 1/8")

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100 Ne

10
13
21
25
17
17
18
111 B/3" 84
123
111 B/4" 222
168 165
100 B/3" 43/6"

Rock Core Rec. = 78%

Rock Core Rec. = 65%

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water — Air

6720 2448
1162 7680
728 2160
7440
1050 6816
6288 6768
4080 5280
7248
1332
12060
11040

"NX" ROCK CORING

Lost approx. 40 gallons drill water

Lose approx. 70 gallons drill water

0 20 40 60 80 100

% RECOVERY

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used through LS-7; 2.00" O.D. Heavy wall sampler used below.

NOTE: Artesian water encountered at d=38'6" (El. 538.5); head rose to 1'10" above ground.
Upon completion, w/46'9" casing in place, artesian water was flowing 1'10" above ground at 15 gpm, with strong sulphur odor.
Artesian head was 6 ft. above ground 2 hrs. after completion, and static.

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	574.5	V.Stiff	17.8	109.4
LS-2	5.0	572.0	V.Stiff	17.4	114.2
LS-3	7.5	569.5	Hard	12.1	127.4
LS-4	10.0	567.0	Hard	12.0	127.8
LS-5	12.5	564.5	Stiff	11.9	136.7
LS-6	15.0	562.0	Stiff	12.3	129.4
LS-7	20.0	557.0	Hard	12.4	133.7
BS-8	23.8	553.2	Hard		
LS-8	25.3	551.7	V.Hard	11.4	127.9
LS-9	30.0	547.0	V.Hard	8.3	136.5
BS-11	34.0	543.0	V.Hard		
BS-12	39.3	537.5	V.Hard		
BS-13	44.3	532.7	V.Hard		
	46.8	530.2			
Core Run No.1	51.8	525.2			
No.2	56.8	520.2			

MON 169

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 1 TB1

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 574.1 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL; Dark SANDY CLAY. Damp. 10½"

Medium Brown SILTY CLAY, w/Trace Coarse Sand & Gravel. Damp. 6'0"

Hard Mottled Brown SILTY CLAY, w/Some Coarse Sand & Fine Gravel. 19'0"

V.Stiff to Hard Gray SILTY CLAY, w/Some Fine Gravel. (GLACIAL TILL) 23'6"

Hard Gray SILTY CLAY, (GLACIAL TILL) w/Some Coarse Sand & Gravel. 27'9"

Gr. LIMESTONE CHIPS, w/Some Silt & Clay. 30'0"

* Hole dry augered to full depth. 5'0" of 4-in. casing used. Hole grouted with 3 bags cement.

* Encountered artesian water at flow of 0.3 gpm. Static artesian head reached at 1'2" above ground surface, and remained static for one hour.

No water flow during final inspection on Sept. 9, 1970

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0	20	40	60	80	100	Ne
						9
						13
						35
						28
						17
						31
						41
						200 B/6"

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water — Air

Short Sample

6240 2808 11280 9600 7200 9600 9600 14400 7680 13440 15600

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f
LS-1	2.5	571.6	Firm to Stiff	22.1	104.1
LS-2	5.0	569.1	Hard	13.0	124.8
LS-3	7.5	566.6	V.Hard	10.8	128.9
LS-4	10.0	564.1	Hard to V.Hard	11.4	128.2
LS-5	15.0	559.1	V.Hard	10.9	127.4
LS-6	20.0	554.1	Hard	11.3	--
LS-7	25.0	549.1	V.Hard	10.7	130.6
BS-8	30.0	544.1	Limestone Fragments		

MDN 170

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

** 1.75" O.D. Michigan Liner Sample used through LS-7; 2.00" O.D. Heavy wall sampler used for BS-8

See Test Boring Location Plan

LOCATION: N-4500; W-100

TOTAL DEPTH: 30'0"

BORING STARTED: August 6, 1970

BORING COMPLETED: August 6, 1970

INSPECTOR: J.O.Wanzeck (S&FA)

DRILLER: J.Corbin

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 5'0" feet of casing in place. Artesian

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler ◎ inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

SFA FORM E-7

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 2 TB2

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 575.9 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

530

520

TOPSOIL; Brn. SEMI-ORGANIC F. SANDY SILT. 1'6"

V. Stiff to Hard Mtld. Brown SILTY CLAY, w/Some Sand, Little Gravel. (Partially Fill?) 6'0"

V. Stiff to Hard Brown & Gray SILTY CLAY, w/Little Sand, Sl. Trace of Gravel. 15'3"

V. Hard Gray (w/Some Brown to d=15'0") SILTY CLAY, w/Traces of Sand & Gravel. 25'0"

V. Hard Dark Gray F. SANDY SILTY CLAY, Gravelly, w/Many Rock Fragments. (GLACIAL TILL.)

* TOP OF ROCK 32'0"

Hard Lt. Brn. Med. Fragmented DOLOMITIC LIMESTONE. Fractures close. 39'9"

Hd. Lt. Gr.-Brn. V. Fragmented LIMESTONE. Fracts close from El. 535.45 to El. 534.10 42'0"

Soft Gray Weathered SHALE, w/Med. Hd. Zone from El. 533.90 to El. 532.30 47'1"

37'0" NX casing used.

* Encountered ground water; water level after 30-min. and 60-min. remained steady at d=8'3" (El. 567.6).

Upon completion of coring, water level rose to d=1'2" (El. 574.7), but dropped to d=8'3" (El. 567.6) during grouting.

Hole grouted with cement in rock phase and bentonite in soil phase.

No water flow during final inspection on Sept. 9, 1970

See Test Boring Location Plan

LOCATION: N-4800; E-900

TOTAL DEPTH: 47'1"

BORING STARTED: July 23, 1970

BORING COMPLETED: July 24, 1970

INSPECTOR: J. O. Wanzeck & B. W. Behrman (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 37'0" feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 6 inches, using 140 lb. weight with 30 inch free fall.

ROCK CORE DIAMETER: NX (2 1/8")

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

Ne

10 12 22 26 39 34 128 167 300 4/6" X

Rock Core Rec. = 52%

Rock Core Rec. = 100%

Rock Core Rec. = 28%

10 30 50 70 90

Ne = Evaluated Blows/Foot.

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids

Water

Air

Part Fill.

V. High % Gravel

"NX" ROCK CORING

0 20 40 60 80 100

% RECOVERY

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT. (BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used through LS-4; 2.00" O.D. Heavy wall sampler used below

SOIL SAMPLE DATA

Lab & Field So. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	573.4	Part Fill; V. Stiff	16.6	113.5
LS-2	5.0	570.9	V. Stiff to Hard	21.2	108.9
LS-3	7.5	568.4	V. Stiff	23.4	104.5
LS-4	10.0	565.9	Hard	15.4	119.7
LS-5	15.0	560.9	V. Hard	12.2	125.8
LS-6	20.0	555.9	V. Hard	11.8	128.3
LS-7	24.5	551.4	V. Hard	8.1	136.6
LS-8	29.5	546.4	V. Hard	13.5	123.8
LS-9	33.5	542.4	V. Hard	8.4	---
	37.0	538.9			
Core Run No. 1	41.5	535.4			
No. 2	43.6	532.3			
No. 3	47.1	528.8			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 171

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 3 TB3

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

SFA FORM 7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 573.2 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL; Dark SANDY CLAY. Damp. 7"

Plastic to Firm Brn.& Gr.Mtld.SILTY CLAY, w/Trace Very Fine Sand. Damp. 5'6"

V.Stiff Brown w/Gray Mottling SILTY CLAY, w/Trace of Very Fine Sand. Moist. 8'6"

V.Stiff Brown w/Gray SILTY CLAY, w/Trace Very Fine Sand & Few Pebbles. Damp. 14'0"

Firm Gray SILTY CLAY, w/Some Fine Sand. Damp. 18'9"

Compact Gray VERY FINE SAND, w/Some Silt. Damp. 23'0"

Hard Gray SILTY CLAY, w/Trace Very Fine Sand & Gravel. Damp. * (GLACIAL TILL) 30'8"

* Ground water encountered

Water level in 1 hr. at El.562.9

Hole grouted with 3 bags of bentonite.

No water flow during final inspection on Sept. 9, 1970

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0	20	40	60	80	100	Ne
●						7
●						13
●						27
●						29
●						16
	●					50
		●				47
			●			59

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

Approx. Solids | Water

Short Sample

No Tests; VF Sand

4800 1548 8640 8640 7200 8256 12000 13200

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT. (BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	570.7	Plastic to Firm	21.3	107.6
LS-2	5.0	568.2	Hard	20.7	108.0
LS-3	7.0	566.2	V.Hard	12.4	126.1
LS-4	10.0	563.2	Hard to V.Hard	13.8	121.3
LS-5	15.0	558.2	Firm to Stiff	12.3	126.6
LS-6	20.0	553.2	Compact VF Sand	17.5	111.6
LS-7	25.0	548.2	V.Hard	10.7	131.2
BS-8	30.0	543.2	Limestone Fragments W/Slt&Cly		

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MDN 172

See Test Boring Location Plan

LOCATION: N-4700; E-1900

TOTAL DEPTH: 30'0"

BORING STARTED: August 5, 1970

BORING COMPLETED: August 5, 1970

INSPECTOR: J.O.Wanzeck (S&FA)

DRILLER: J. Corbin

CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole of indicated number of hours after completion of boring; ____ feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler ⊚ inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used through LS-4; 2.00" O.D. Heavy wall sampler used below.

SFA FORM C-7

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 4 TB4

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 8-7-71	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 572.9 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL; Dk.Brn.SEMI-ORGANIC SANDY CLAY.

Firm to Stiff Brown & Gray SILTY CLAY, w/Some Fine Sand, Traces of Gravel.

6'0"

*Hard Mottled Brown SILTY CLAY, w/Some Sand, Traces of Gravel.

9'0"

560

Very Stiff to Hard Gray SILTY CLAY, w/Some Fine Sand, Traces of Gravel. (GLACIAL TILL?)

550

32'6"

Very Hard Gray V.F. SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL)

540

Hard to Very Hard Dk.Gr.F.SANDY SILTY CLAY, Gravelly, w/Many Rock Fragments. (GLACIAL TILL)

TOP OF ROCK:

530

Refusal w/Gear Bit; Set NX casing. 43'6"

Med.Hd.Lt.Brown Fragmented LIMESTONE, w/Few Shale partings & Zone Dolomitic Limestone. Fractures moderately close.

520

Soft Dark Gray SHALE. 53'6"

* Encountered ground water; water level rose to Elev.568.2 in 1-hour; drove 10' of 4" casing.

10'of 4"in.casing & 43'6" NX casing used.

510

NOTE: No artesian flow encountered in rock; hole grouted immediately upon completion w/3 bags of cement. No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

	Ne
	7
	8
	19
	24
	22
	28
	31
	60
	141
2oo 5/5	
2oo 5/2"	
Rock Core Rec.= 97%	
Rock Core Rec.=100%	

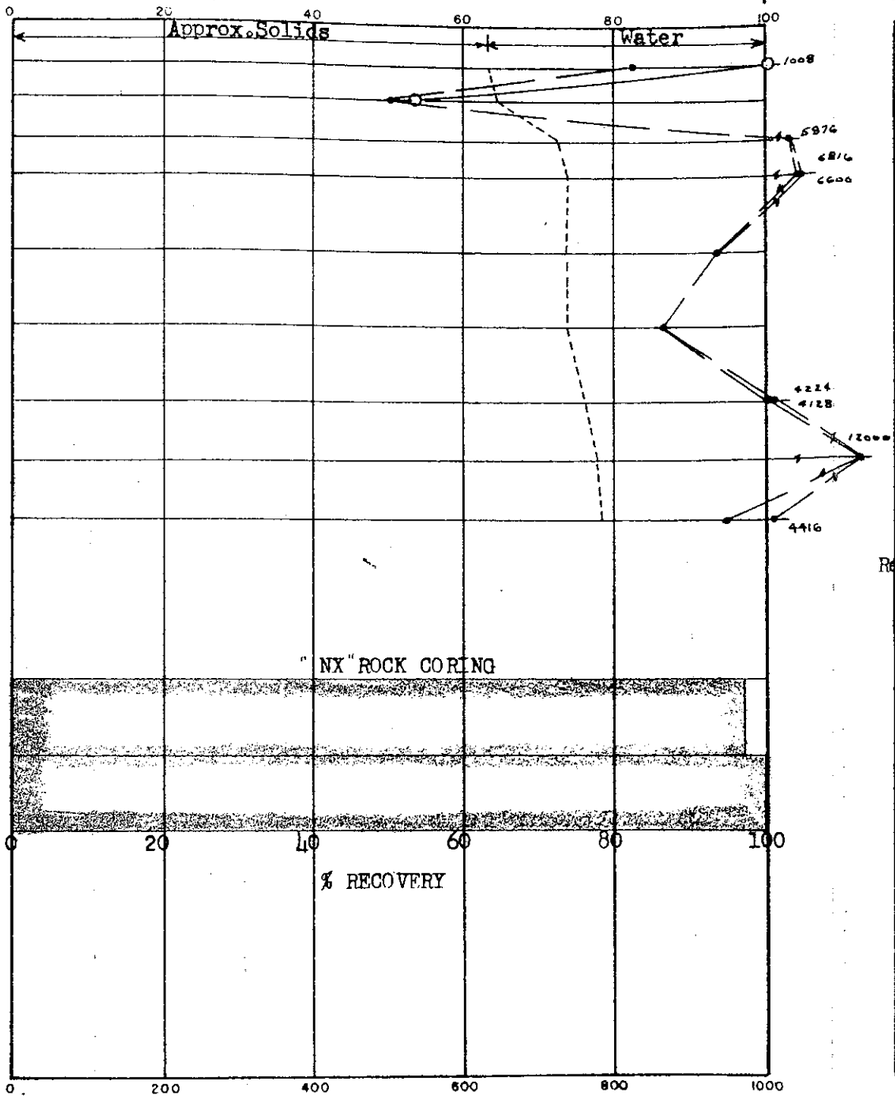
10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx.Solids ← → Water



0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Density
LS-1	2.5	570.4	Stiff	21.8	106.5
LS-2	5.0	567.9	Firm	20.6	10[illegible] 5
LS-3	7.5	565.4	Hard	13.9	122 5
LS-4	10.0	562.9	Hard	13.0	124.1
LS-5	15.0	557.9	Hard	13.3	123.9
LS-6	20.0	552.9	V.Stiff	12.4	124.1
LS-7	25.0	547.9	V.Stiff	10.3	128.4
LS-8	29.0	543.9	V.Hard	9.5	
LS-9	33.0	539.9	Hard	10.4	132.6
No Recovery	37.3	535.6			
No Rec.	40.2	532.7			
	43.5	529.4			
Core Run No.1	48.5	524.4			
No.2	53.5	519.4			

* Laboratory consistency based upon visual examination [illegible] independent of field evaluation and strength determined by laboratory test.

LOCATION: N-5000; E-2900

TOTAL DEPTH: 53'6"

BORING STARTED: July 31, 1970

BORING COMPLETED: Aug. 3, 1970

INSPECTOR: J.O.Wanzeck (S&FA)

DRILLER: D.T.Corbin

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; —— feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler ** inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: NX (2⅛")

** 1.75" O.D. Michigan Liner Sampler used through LS-7; 2.00" O.D. Heavy wall sampler used below.

MON 173

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 5 TB5

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: [illegible] | DATE: 10-20-70 | JOB NO. 128-A

SFA FORM E-7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 571.9 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL: Bk.Brn.SEMI-ORGANIC SANDY CLAY. 9"

V.Stiff to Hard Brown & Gray SILTY CLAY, w/Few Sand Pockets, Traces of Gravel. 6'6"

560 Hard Mottled Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 15'6"

* Hard to V. Hard Gray F. SANDY SILTY CLAY, w/Some Coarse Sand, Gravel & Rock Fragments. (GLACIAL TILL)

550

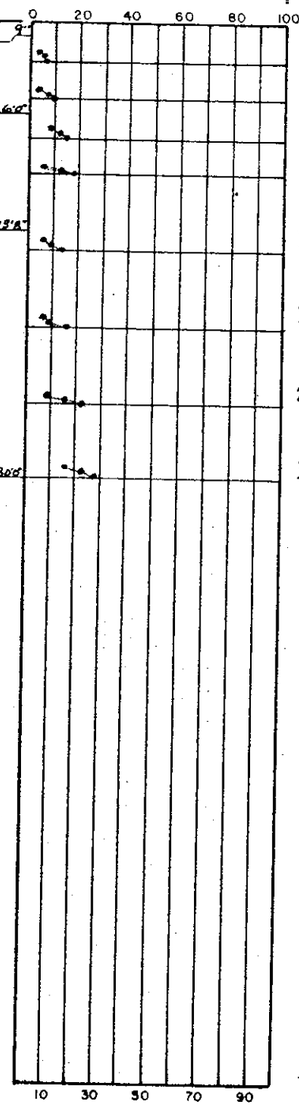
540 30'0"

* Encountered ground water, ground water at El.547.8 upon completion, rose to El.555.9 and seeped out; dropped to El.550.1 in 1-hr.

Hole dry augered; no casing used.
Hole grouted w/2 bags of cement & 1 bag of bentonite; no water flow during final inspection on Sept. 9, 1970.

PENETRATION *

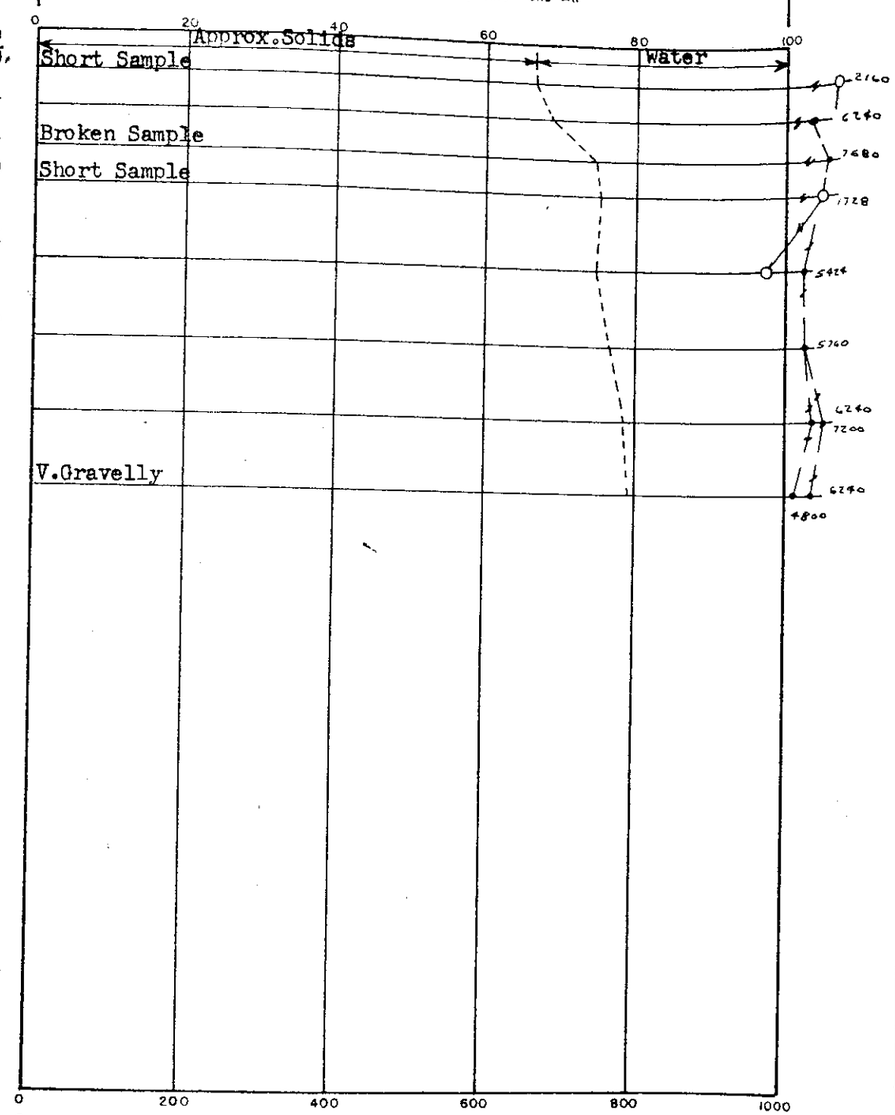
Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



Ne
10
11
21
20
16
16
26
38

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f
LS-1	2.5	569.4	V.Stiff to Hard	19.1	112.2
LS-2	5.0	566.9	V.Stiff	16.0	116.3
LS-3	7.5	564.4	Hard	13.0	125.6
LS-4	10.0	561.9	Hard	12.4	126.6
LS-5	15.0	556.9	Hard	11.9	126.2
LS-6	20.0	551.9	Hard	11.0	128.4
LS-7	25.0	546.9	V.Hard	10.6	132.0
LS-8	30.0	541.9	Hard	9.8	132.3

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-5100; E-3900
TOTAL DEPTH: 30'0"

BORING STARTED: August 11, 1970
BORING COMPLETED: August 11, 1970

INSPECTOR: J.O.Wanzeck (S&FA)
DRILLER: D.T.Corbin
CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 1.75 inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

MDN 174

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 6 TB6

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 10-26-70 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 569.9 Ft. (IGLD Datum)

ELEVATION IN FEET

560

TOPSOIL; Dk. Brn. SEMI-ORG. V. SANDY CLAY. 1'-4"

Stiff Brown & Gray SILTY CLAY, w/Some Fine Sand, Traces of Gravel. 5'-6"

550

Stiff to V. Stiff Mtld. Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 12'-6"

V. Stiff Gray SILTY CLAY, w/Some Sand & Gravel. (GLACIAL TILL?) 22'-6"

540

V. Hard Gray FINE SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL) 36'-0"

530

V. Hard Dark Gray FINE SANDY SILTY CLAY, w/Many Rock Fragments. (GLACIAL TILL)

TOP OF ROCK:

Refusal w/Gear Bit; Set NX casing 43'-4"

520

Soft to Medium Hard Lt. Brn. V. Fragmented DOLOMITIC LIMESTONE & LIMESTONE. Fractures Close to Mod. Close. 53'-4"

510

10' of 4-in. casing set with hole at d=29 ft.

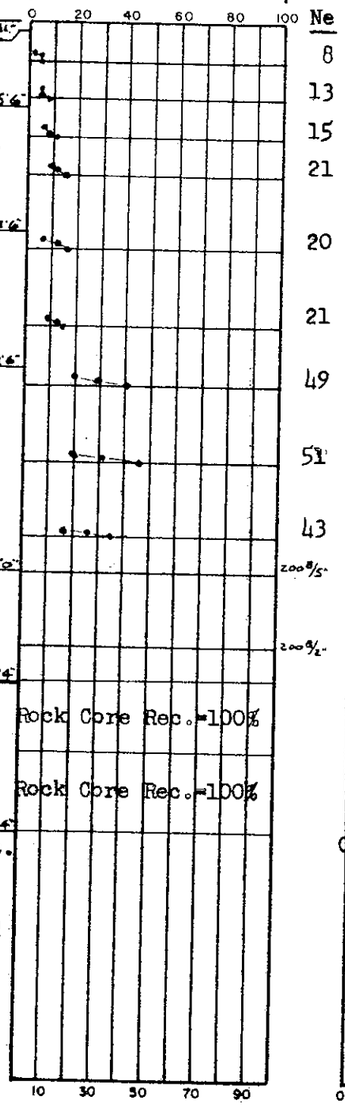
Artesian water noted upon completion of rock coring, w/flow of 50 gpm; static head established at 4.2 ft. above ground surface (El. 574.1)

Hole was grouted w/3bags of cement.

No water flow during final inspection on Sept. 9, 1970.

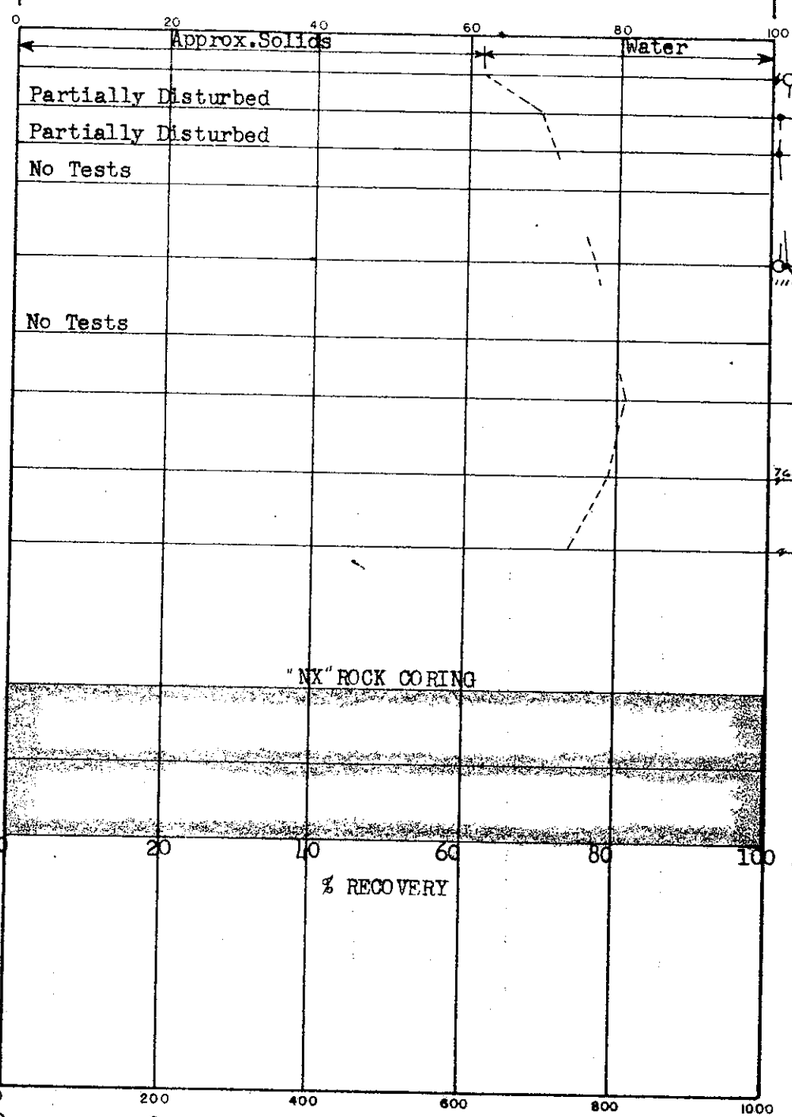
PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	567.4	V.Stiff	22.9	104.4
LS-2	5.0	564.9	Stiff	16.2	117.1
LS-3	7.5	562.4	Stiff	14.8	120.2
LS-4	10.0	559.9	V.Stiff	--	--
LS-5	15.0	554.9	V.Stiff	11.3	129.4
LS-6	20.0	549.9	V.Stiff	--	--
LS-7	24.0	545.9	V.Hard	8.8	136.5
LS-8	29.0	540.9	V.Hard	9.6	132.9
LS-9	34.0	535.9	Hard	12.7	123.9
BS-10	36.3	533.6	Rock Frags		
BS-11	41.2	528.7	Rock Frags w/Hd.Clay		
	43.3	526.6			
Core Run No.1	48.3	521.6			
No.2	53.3	516.6			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

LOCATION: See Test Boring Location Plan
N-5100; E-4900

TOTAL DEPTH: 53'4"

BORING STARTED: August 4, 1970

BORING COMPLETED: August 5, 1970

INSPECTOR: J.O.Wanzeck (S&FA)

DRILLER: D.T.Corbin

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 30 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: NX (2-1/8")

** 1.75" O.D. Michigan Liner Sampler used through LS-6; 2.00" O.D. Heavy wall sampler used below.

SFA FORM 1-7

MON 175

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 7 TB7

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 10-30-70 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 571.1 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL; Dk. Brn. SEMI-ORG. F. SANDY CLAY.

Medium Mtld. Brown SILTY CLAY, w/Trace of Sand, Slight Traces Gravel. 5'6"

Firm Mtld. Brown SILTY CLAY, w/Traces of Sand. 8'0"

560

V. Stiff Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 11'6"

Firm to Stiff Gray SILTY CLAY, w/Some Sand, Traces of Gravel.

550

21'0"

V. Stiff to Hard Dk. Gr. FINE SANDY SILTY CLAY w/Some Gravel & Rock Fragments. (GLACIAL TILL)

540

30'0"

Hole dry augered, dry upon completion.

Hole grouted w/1 bag cement & 1 bag bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0	20	40	60	80	100	Ne
8"						4
						5
						8
						23
						9
						13
						18
						25

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids ← → Water

No Tests

No Tests

No Tests

No Tests

No Tests

No Tests

5520

6240

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	568.6	Medium	29.4	93.0
LS-2	5.0	566.1	Medium	--	--
LS-3	7.5	563.6	Firm	--	--
LS-4	10.0	561.1	V.Stiff	--	--
LS-5	15.0	556.1	Firm	--	--
LS-6	20.0	551.1	V.Stiff	--	--
LS-7	25.0	546.1	V.Stiff	--	--
LS-8	30.0	541.1	Hard	10.2	131.8

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 176

See Test Boring Location Plan

LOCATION: N-4100; E-3400

TOTAL DEPTH: 30'0"

BORING STARTED: August 10, 1970

BORING COMPLETED: August 10, 1970

INSPECTOR: B.W.Behrman (S&FA)

DRILLER: B.Singleton

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; ____ feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall.

Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used through LS-7; 2.00" O.D. Heavy wall sampler used below.

SFA FORM E-7

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 8 TB 8

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 10-30-70	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 571.5 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — TOPSOIL; Dk. Brn. SEMI-ORG. F. SANDY CLAY. (10")

Firm to Stiff Brown & Gray SILTY CLAY, w/Some Sand, Traces of Gravel. (8'6")

560 — Stiff Brown SILTY CLAY, w/Little Sand, Few Sand Pockets, Traces of Gravel. (13'3")

Stiff Gray SILTY CLAY, w/Some Sand, Few Sand Partings, Little to Some Gravel. (23'6")

550 — Hard to V. Hard Dk. Gr. F. SANDY SILTY CLAY, * w/Some Gravel & Rock Fragments. (GLACIAL TILL) (30'0")

540

Hole dry augered.

* Encountered ground water (slight).

Hole grouted w/2 bags of cement.

No Water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100 Ne

10"	6
	8
8'6"	12
	14
13'3"	13
	12
23'6"	22
30'0"	100

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids ← | → Water

No Tests	6
No Tests	8
No Tests	12
No Tests	14
No Tests	13
No Tests -- Disturbed Sample	12
	22
	100

5850

14400

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f
LS-1	2.5	569.0	Firm	--	--
LS-2	5.0	566.5	Firm	--	--
LS-3	7.5	564.0	Stiff	--	--
LS-4	10.0	561.5	Stiff	--	--
LS-5	15.0	556.5	Stiff	--	--
LS-6	20.0	551.5	Stiff	--	--
LS-7	25.0	546.5	Hard	9.9	132.9
LS-8	30.0	541.5	V. Hard	9.8	130.6

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-4100; E-4150

TOTAL DEPTH: 30'0"

BORING STARTED: August 12, 1970

BORING COMPLETED: August 12, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: D.T. Corbin

CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: NONE

** 1.75" O.D. Michigan Liner Sampler used through LS-7; 2.00" O.D. Heavy wall sampler used below.

MON 177

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 9 TB 9

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 10-26-70	JOB NO. 128-A

SFA FORM 1-7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 570.2 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL; Dk.Brn.SEMI-ORG.F.SANDY CLAY, 4"

Stiff to V.Stiff Brown & Gray SILTY CLAY, w/Some Sand, Traces of Gravel. 5'9"

560

V.Stiff Brown SILTY CLAY, w/Some Fine Sand, Traces of Gravel. 9'5"

Stiff to Hard Gray FINE SANDY SILTY CLAY, w/Some Gravel & Few Rock Fragments. (GLACIAL TILL, in lower elevation)

550

28'0"

540

* V.Hard Dk.Gray F.SANDY SILTY CLAY, w/Some Gravel, Many Rock Fragments, 30'0" (GLACIAL TILL)

Hole dry augered.

* Encountered ground water; water level rose 3" in 1 hour.

Hole grouted w/1 bag cement & 2 bags bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

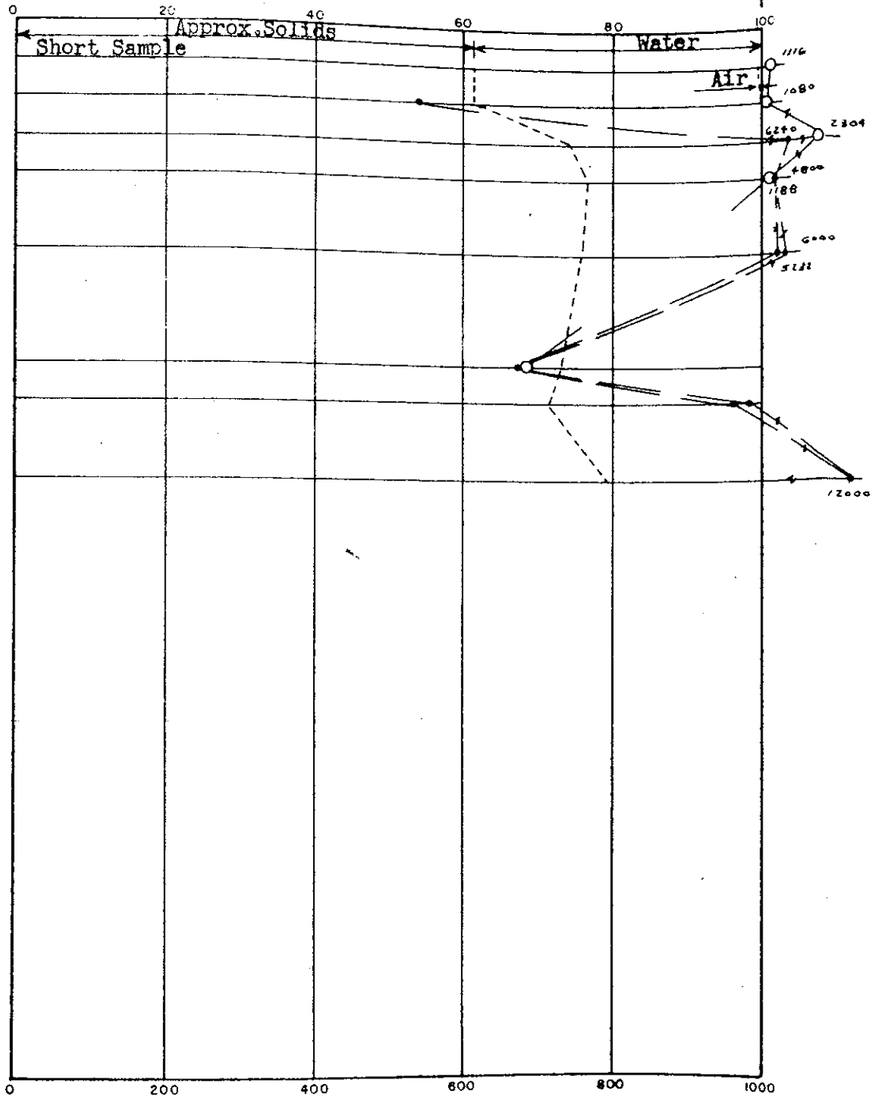
Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0	20	40	60	80	100	Ne
**						5
						6
						15
						20
						11
						15
						16
						20
						73

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f.
LS-1	2.5	567.7	V.Stiff	22.9	103.4
LS-2	5.0	565.2	Stiff to V.Stiff	23.7	103.8
LS-3	7.5	562.7	V.Stiff to Hard	13.4	124.8
LS-4	10.0	560.2	V.Stiff	12.1	127.2
LS-5	15.0	555.2	Hard	12.3	126.5
No Recovery	20.0	550.2			
LS-6	22.5	547.7	Firm to Stiff	14.1	123.1
LS-7	25.0	545.2	Stiff	12.6	120.8
LS-8	30.0	540.2	V.Hard	9.5	134.7

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-4100; E-4800

TOTAL DEPTH: 30'0"

BORING STARTED: August 12, 1970

BORING COMPLETED: August 12, 1970

INSPECTOR: B.W.Behrman (S&FA)

DRILLER: D.T.Corbin

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole of indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used through LS-7; 2.00" O.D. Heavy wall sampler used below.

MON 17B

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 10 TB 10

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 10-20-70 | JOB NO. 128-A

SFA FORM E-7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 577.3 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

Medium Dark Brown SANDY TOPSOIL. 9"

V.Stiff Mtld. Brown & Gray SILTY CLAY, w/Sand Pockets & Tr.Gravel. 9'0"

Stiff to V.Stiff Mottled Brown SILTY CLAY, w/Some Sand & Gravel, Few Sand Pockets. 10'0"

Stiff Gray (w/Some Brown) SILTY CLAY, w/Some Sand, Traces of Gravel. 14'0"

Stiff to V.Stiff Light Gray SILTY CLAY, w/Little Sand, Traces of Fine Gravel. 23'6"

Hard Dark Gray VF SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL) 33'6"

Lt.Gray Broken DOLOMITE.(Roller bit used) 35'2"

Hole dry-augered to d=15'
Used 18'6" of 3" casing.

* Encountered ground water; artesian flow; initial = 4 gpm, after 30 minutes = 4.1 gpm

Artesian head = El.589.5 at completion;
= El.590.4 after 2 hours.

Hole grouted w/3bags of cement & 1 bag dry concrete.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 10 20 40 60 80 100

	Ne
	10
	22
	24
	27
	18
	20
	75
	68
100/5"	

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids | Water

Air

1260 1870 1720 5202 1800 5352 1008 4032 3600 5507 5822 6012 1008

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.
(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f
LS-1	2.5	574.8	V.Stiff	22.0	120.8
LS-2	5.0	572.3	V.Stiff	12.5	125.9
LS-3	7.5	569.8	V.Stiff	12.5	126.0
LS-4	10.0	567.3	V.Stiff	13.5	124.1
LS-5	15.0	562.3	Stiff	12.2	127.2
LS-6	20.0	557.3	Hard	12.4	123.1
LS-7	24.5	552.8	Hard	11.2	132.4
LS-8	30.0	547.3	Hard	10.4	132.7
No Recovery	33.8	543.5			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-3600; W-1350

TOTAL DEPTH: 35'2"

BORING STARTED: July 17, 1970

BORING COMPLETED: July 17, 1970

INSPECTOR: J. O. Wanzeck (S&FA)

DRILLER: B. Singleton

CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole at indicated number of hours after completion of boring; 18.5 feet of casing in place.

* PENETRATION: Number of blows required to drive 1 3/8 inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used through LS-7; 2.00" O.D. Heavy wall sampler used below

SFA FORM E-7

MON 179

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 11 TB 11

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 8-7-71	JOB NO. 129-4

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 575.3 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

530

TOPSOIL: Medium Dk. Brn/Gray SILTY CLAY. 2½"

Hard Brown w/Gray, SILTY CLAY, w/Sand Pockets, Traces of Gravel. 3'6"

V. Stiff Mottled Brown SILTY CLAY, w/Traces of Sand. 6'0"

Hard Mottled Brown SILTY CLAY, w/Little Sand, Traces of Gravel. 8'0"

Hard Gray, w/Some Brown streaks, SILTY CLAY w/Few Sand Pockets, Traces of Gravel. 17'0"

Hard Gray SILTY CLAY, w/Some Sand (frequently in pockets), and Traces of Gravel. 21'9"

V. Hard Gray SILTY CLAY, w/Some Sand & Fine Gravel, Few Rock Fragments. (GLACIAL TILL) 31'6"

Hard Gray VF SANDY SILTY CLAY, w/Some Gravel & Rock Frags. GLACIAL TILL. 34'8"

Gray Broken DOLOMITE/LIMESTONE. 36'8"

8' of NX casing, 10' of 4" casing used.

* Encountered artesian ground water; initial flow = 15 gpm; after 30-min. flow = 14 gpm.

Static head established at d=12'7" (El. 562.7)

Hole grouted w/4 bags of cement.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

Ne Press
11
25
27
24
28
59
66
39

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water — Air

5040 3456 1180 2592 8760 7200 1666 6432 3024 15400 17760 8856 2760

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT. (BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	572.8	Hard	17.5	108.6
LS-2	5.0	570.3	V. Stiff	17.3	110.3
LS-3	7.5	567.8	Hard	12.7	123.8
LS-4	10.0	565.3	Hard	12.4	124.5
LS-5	15.0	560.3	Stiff to Hard	12.1	126.0
LS-6	18.5	556.8	Hard	8.7	133.3
LS-7	23.3	552.0	V. Hard	10.2	132.2
LS-8	28.3	547.0	V. Hard	16.0	116.7
BS-9	33.0	542.3	V. Compact Clayey Silt		

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

LOCATION: See Test Boring Location Plan N-3600; W-600

TOTAL DEPTH: 36'0"

BORING STARTED: July 21, 1970

BORING COMPLETED: July 21, 1970

INSPECTOR: J. C. Wanzeck (S&FA)

DRILLER: J. Corbin

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; ____ feet of casing in place.

* PENETRATION: Number of blows required to drive Artesian ** inch O.D. soil sampler (2) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used through LS-5; 2.00" O.D. Heavy wall sampler used below

MON 180

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 12 TB 12

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 574.2 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL: Dk.Brn.-Gr.SEMI-ORG.SILTY CLAY, 11"

Firm to Stiff Brown & Gray SILTY CLAY, w/Some Sand Pockets, Traces of Gravel. 6'6"

Stiff Light Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 8'0"

V.Stiff Light Brown SILTY CLAY, w/Traces of Gravel. 12'6"

V.Stiff Gray SILTY CLAY, w/Some Sand, Traces of Gravel. 17'6"

V.Hard Gray SILTY CLAY, w/Some Sand, Some Fine Gravel, & Rock Fragments. GLACIAL TILL.

31'4"

Refusal.

10' of 4-in. casing, 7' of NX casing used.

* Ground water encountered (Artesian); flow varied from 15 to 17 gpm.; static head 8'9" (El. 865.4)

Hole grouted upon completion w/8 bags cement; no flow as of Sept. 9, 1970 final inspection.

See Test Boring Location Plan

LOCATION: N-3600; E-400

TOTAL DEPTH: 31'4"

BORING STARTED: July 21, 1970

BORING COMPLETED: July 21, 1970

INSPECTOR: J. O. Wanzeck (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; ____ feet of casing in place.

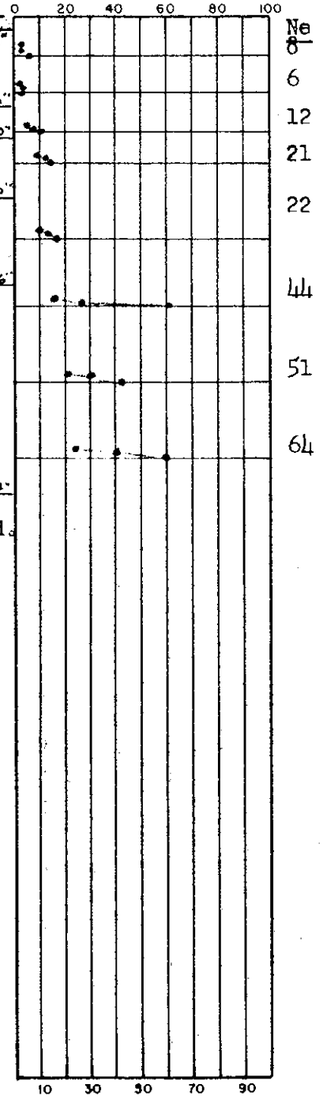
* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler (6) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

S&FA FORM 1-7

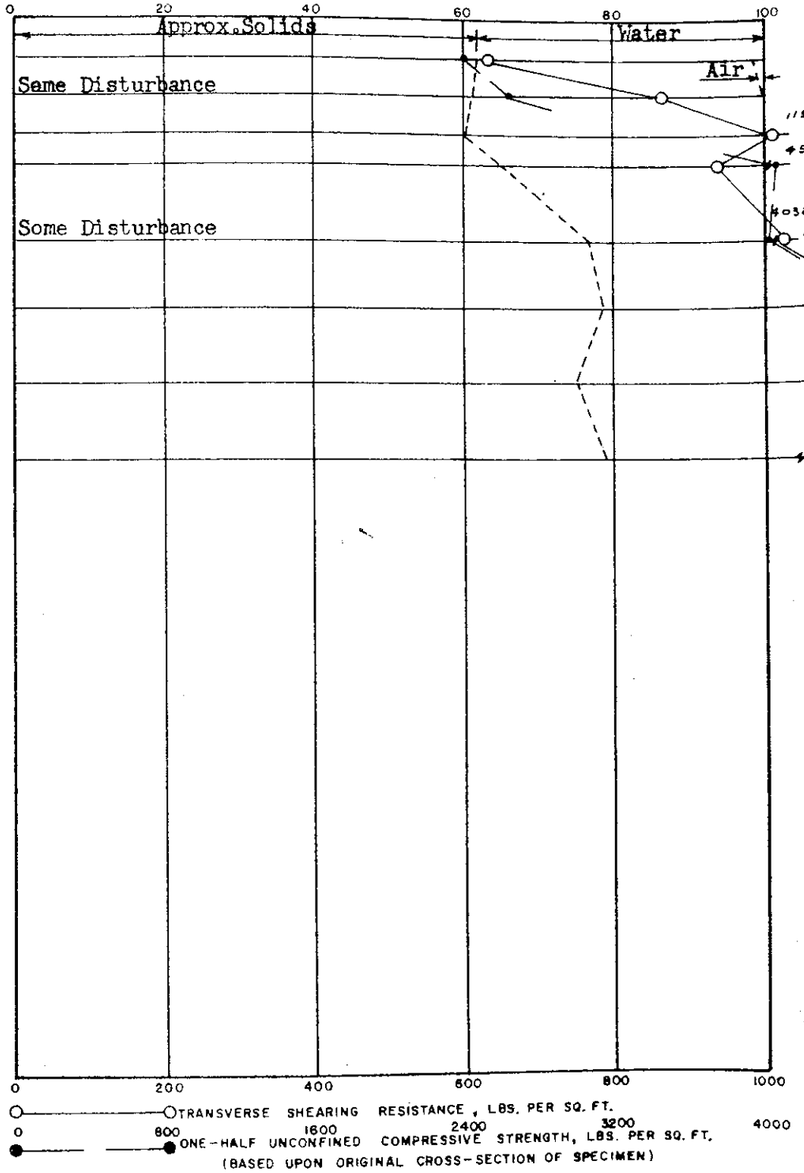
PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



** 1.75" O.D. Michigan Liner Sampler used through LS-4; 2.00" O.D. Heavy wall sampler used below

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f.
LS-1	2.5	571.7	Firm	22.1	103.1
LS-2	5.0	569.2	Firm to Stiff	25.1	102.0
LS-3	7.5	566.7	Stiff	23.0	101.3
LS-4	9.5	564.7	V.Stiff	20.8	109.0
LS-5	14.5	559.7	V.Stiff	12.0	128.6
LS-6	19.0	555.2	V.Hard	12.1	132.6
LS-7	24.0	550.2	V.Hard	11.2	127.4
LS-8	29.0	545.2	V.Hard	8.9	133.9

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 181

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 13 TB 13

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: ____ DATE: 8-7-70 JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 573.8 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL; Dk. Brn.-Gr. SEMI-ORG. V. SILTY CLAY. 1'

Firm to Stiff Mtld. Lt. Brown SILTY CLAY, w/Traces of Sand & Gravel. 3'6"

V. Stiff Mtld. Light Brown SILTY CLAY, w/Traces of Sand & Gravel. 5'6"

Hard Mtld. Light Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 8'6"

Hard Brown SILTY CLAY, w/Silt Lenses, Some Sand, Little Gravel. 11'0"

Stiff to Hard Gray SILTY CLAY, w/Some Sand, Traces of Gravel. 18'6"

V. Hard Gray SILTY CLAY, w/Some Sand & Gravel, Few Rock Fragments. GLACIAL TILL. 25'0"

No ground water encountered.

Hole dry augered full depth; no casing used.

Hole filled w/bentonite slurry immediately upon completion; no flow as of Sept. 9, 1970 final inspection.

See Test Boring Location Plan

LOCATION: N-3600; E-1400

TOTAL DEPTH: 25'0"

BORING STARTED: July 22, 1970

BORING COMPLETED: July 22, 1970

INSPECTOR: J. O. Wanzeck (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole of indicated number of hours after completion of boring; ____ feet of casing in place.

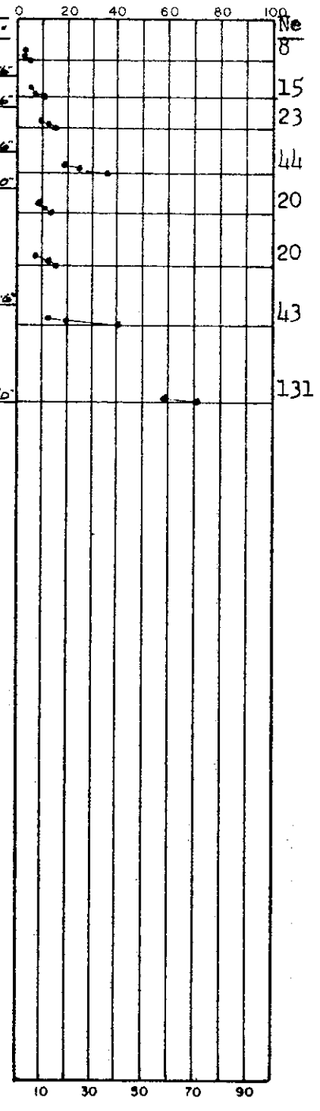
* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot

ROCK CORE DIAMETER: None

SFA FORM S-7

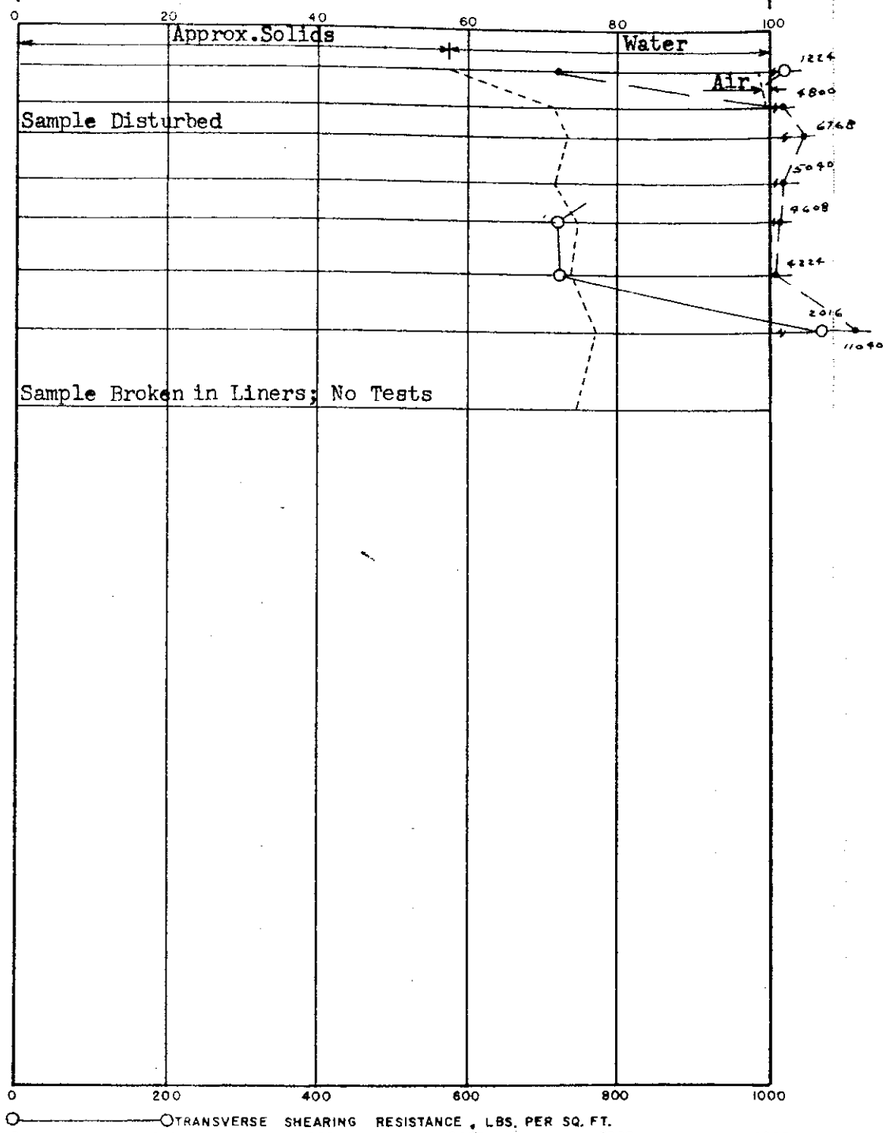
PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



** 1.75" O.D. Michigan Liner Sampler used through LS-3; 2.00" O.D. Heavy wall sampler used below

SOIL SAMPLE DATA

Lab & Field So. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	571.3	Firm to Stiff	25.9	97.7
LS-2	5.0	568.8	V. Stiff	14.8	120.6
LS-3	7.0	566.8	Hard	13.6	123.2
LS-4	10.0	563.8	Hard	14.1	120.9
LS-5	12.5	561.3	Stiff to Hard	11.1	126.5
LS-6	16.0	557.8	Stiff to Hard	12.2	123.2
LS-7	20.0	553.8	V. Hard	9.4	128.0
LS-8	25.0	548.8	V. Hard	8.8	125.8

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 182

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 14 TB 14

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GA-	DATE: 8-7-71	JOB NO. 128-A

A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 571.7 Ft. (IGLD Datum)

EVATION IN FEET

570 — TOPSOIL: Medium DK. Gr. SEMI-ORG. SILTY CLAY. 11½"

Firm Brown & Gray SILTY CLAY, w/Some Sand, Trace of Gravel. 5'6"

V. Stiff Brown SILTY CLAY, w/Some Sand, Trace of Gravel. 8'8"

560 — Firm to Stiff Gray SILTY CLAY, w/Some Sand & Fine Gravel. 13'9"

Med. Compact Gray FINE SAND, w/Lit. Gray 14'3"

Stiff to Hard Gray SILTY CLAY, w/Some Sand & Fine Gravel. 21'0"

550 — Hard Gray V.F. SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL) 34'6"

540 — V. Compact Gray CLAYEY SILT & VF SAND, w/Rock Fragments. (GLACIAL TILL) 40'6"

TOP OF ROCK

530 — Lt. Gray Broken LIMESTONE. (Finger rock bit used) 44'0"

Med. Hd. Dk. Gr. V. Fragmented LIMESTONE, Interbedded w/Soft Shale Partings from El. 525.70 to El. 520.20. Fractures close from El. 526.70 to El. 525.70.

520 — 51'7"

Hd. Lt. Gr.-Brn. V. Fragmented LIMESTONE, 54'0"

Hole dry - augered to d=22'6"
39' of 3-inch casing used.

* Encountered artesian water; water level rose 2 ft. immediately

510 — At completion of boring, artesian water was flowing at approx. 85 gpm 5'5" above ground surface (El. 577.2)

Hole grouted w/2 bags cement & 1 bag bentonite; no water flow during final inspection on Sept. 9, 1970.
See Test Boring Location Plan

LOCATION: N-3600; E-2400

TOTAL DEPTH: 54'0"

BORING STARTED: July 21, 1970

BORING COMPLETED: July 21, 1970

INSPECTOR: B. W. Behrman (S&FA)

DRILLER: B. Singleton

CONTRACTOR: Able Drilling, Inc.

⌯ WATER LEVEL in hole at indicated number of hours after completion of boring; ____ feet of casing in place. Artesian

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler (6) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot

ROCK CORE DIAMETER: NX (2⅛")

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

	Ne
11½"	6
5'6"	8
8'8"	15
13'9"	16
14'3"	19
	20
(Stone)	27
21'0"	86
	60
	64
34'6"	12"/6" x
40'6"	130
44'0"	
Rock Core Rec. = 93%	
51'7"	
Rock Core Rec. = 82%	
54'0"	

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water — Air

1800 10080

9072 6912

10080 6480 8640

"NX" ROCK CORING

No water loss

No water loss

0 20 40 60 80 100

% RECOVERY

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used through LS-5;
2.00" O.D. Heavy wall sampler used below

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	569.2	Firm	26.3	97.5
LS-2	5.0	566.7	Firm to Stiff	28.9	95.8
LS-3	7.5	564.2	Hard	13.1	124.3
LS-4	10.0	561.7	Firm	12.3	124.8
No Recovery	15.0	556.7			
LS-5	17.5	554.2	Stiff to Hard	12.4	123.2
BS-6	20.0	551.7	Compact Clayey Sd.		
LS-6	22.5	549.2	V. Hard	9.2	123.0
LS-7	26.0	545.7	Hard	10.9	126.1
LS-8	31.0	540.7	Stiff	11.2	127.0
BS-10	35.0	536.7	Hard Silty Clay		
BS-11	40.5	531.2	V. Compact Silt		
	44.0	527.7			
Core Run No. 1	48.5	523.2			
No. 2	54.0	517.7			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

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SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 15 TB 15

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 6-7-71	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 570.6 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — TOPSOIL: Med. Dk. Gy. SEMI-ORG. SANDY CLAY, 1½'

Medium to Firm Brown & Gray V. SILTY CLAY, w/Traces of Sand, Gravel & Organic. 7'0"

560 — Stiff Brown V. SILTY CLAY, w/Little Sand, Tr. Gravel & Rock Frags. 9'4"

Firm to Stiff Gray V. SILTY CLAY, w/Little Sand, Tr. Gravel & Rk. Frags (GLACIAL TILL)

550 — Hard Dark Gray V. CLAYEY SILT & VF SAND, w/Traces of C. Sand & Rock Frags. (GLACIAL TILL) 24'0"

540 — * V. Hd. Dk. Gr. CLAYEY SILT. (GLACIAL TILL) 28½" 30'0"

* Encountered Ground Water (V. slight)

Hole dry augered.

Hole grouted w/2 bags of cement and 1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

Ne
6
4
9
25
14
12
24
109

0 20 40 60 80 100

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

No Tests

Not Tested
Not Tested
Not Tested
Not Tested
Not Tested
Not Tested; Broken in Liner
Not Tested

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	568.1	Firm	--	--
LS-2	5.0	565.6	Medium	--	--
LS-3	7.5	563.1	Firm to Stiff	--	--
BS-4	9.1	561.5	Hard	--	--
LS-4	10.0	560.6	Hard		
LS-5	15.0	555.6	Stiff	--	--
LS-6	20.0	550.6	Stiff	--	--
LS-7	25.0	545.6	Hard	--	--
BS-7	30.0	540.6	V. Hard		

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-3100; E-3400

TOTAL DEPTH: 30'0"

BORING STARTED: August 10, 1970

BORING COMPLETED: August 10, 1970

INSPECTOR: M. M. Dragecivic (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 2.00 inch O.D. soil sampler 6 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

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SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 16TB16

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 9-7-70 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 569.8 Ft. (IGLD Datum)

ELEVATION IN FEET

560

550

540

530

520

510

TOPSOIL: Soft Blk. SEMI-ORG. SANDY CLAY. 1'6"

Medium Dk. Gray & Brown V.SILTY CLAY, w/Some Organic Matter 3'6"

V.Soft Brown & Gray VERY SILTY CLAY, w/Traces of Sand. 6'0"

Firm Brown & Gray VERY SILTY CLAY, w/Traces of Sand. 8'6"

V.Stiff Mtld. Brown VERY SILTY CLAY, w/Some Sand, Traces of Gravel. 11'9"

Firm to Stiff Gray VERY SILTY CLAY, w/Some Sand, Traces of Gravel.

ROCK FRAGMENTS, w/SILT & F. SAND 21'6" 22'0"

Hard Dk. Gray V.F. SANDY SILTY CLAY, w/Traces of Gravel & Rock Fragments. (GLACIAL TILL)

33'4"

* V. Compact Dk. Gray SILT & VF SAND, Mixed w/Rock Fragments

TOP OF ROCK, EL.528.3 41'6"

Hard Lt. Brown to Gray DOLOMITIC LIMESTONE; Generally Solid, but V. Fragmented, El.526.8 to El. 526.3. Seven-inch clay layer, El.525.

Rock Core Rec. = 94%

Hard Lt. Gray Thinly Bedded LIMESTONE & DOLOMITIC LIMESTONE, w/Few Shale Partings. Moderately Fractured. 51'6"

Rock Core Rec. = 88%

Rock Core Rec. = 100%

* Encountered artesian water; level rose to 1'10" above ground (El.571.6) See NOTE.

3-inch casing set to d= 41'6"

Hole grouted w/5 bags of cement, 1 bag of dry concrete, & 1 bag of bentonite

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-3100; E-4328

TOTAL DEPTH: 51'6"

BORING STARTED: August 10, 1970

BORING COMPLETED: August 11, 1970

INSPECTOR: J. O. Wanzeck (S&FA)

DRILLER: B. Singleton

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole of indicated number of hours after completion of boring; 41.5 feet of casing in place. Artesian

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler ⓪ inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: NXc (2⅛")

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100 Ne

4
2
8
17
14
13
38
40
121
100/5"

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

4320 4800 800 7200 4800 1224 1728 4320 11040 7200 11520 12000

"NX" ROCK CORING

0 20 40 60 80 100

% RECOVERY

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT. (BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used for LS-1 thru LS-6; 2.00" O.D. Heavy Wall Sampler used for all below LS-6.

NOTE: Artesian water flowed at rate of 2.5 gpm after first core run, with casing 1'8" above ground (El. 571.5)
Artesian water flowed at rate of 5.0 gpm after completion of boring, with casing 1'8" above ground (El. 571.5)

SOIL SAMPLE DATA

Lab & Field So. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f
LS-1	2.5	567.3	Soft-Med. Topsoil	33.3	88.2
LS-2	5.0	564.8	V. Soft	32.9	89.0
LS-3	7.5	562.3	Firm	17.3	115.?
LS-4	10.0	559.8	V.Stiff	13.5	123.5
LS-5	15.0	554.8	Stiff	12.0	125.4
LS-6	20.0	549.8	Firm to Stiff	12.7	126.7
LS-7	25.0	544.8	Hard	10.1	132.6
LS-8	30.0	539.8	Hard	12.3	128.7
BS-8	34.5	535.3	Limestone Fragments		
BS-9	39.5	530.3	Weathered Shale		
	41.5	528.3			
Core No.1	44.3	525.5			
No.2	49.3	520.5			
No.3	51.5	518.3			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

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SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 17 TB17

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 6-7-71	JOB NO 128-A

S&FA FORM 2-7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 575.6 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — TOPSOIL: Brn.-Gr. SEMI-ORGANIC SILTY CLAY. 12"

Stiff to Hard Mtld. Brown SILTY CLAY, w/Some Fine Sand, Traces of Gravel. 6'0"

V.Stiff Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 9'6"

560 — V. Stiff Gray SILTY CLAY, w/Some Sand, Some Fine Gravel.

23'6"

550 — Hard Dark Gray VF SANDY SILTY CLAY, w/Some Gravel, Few Rock Fragments. (GLACIAL TILL)

33'3"

540 — V. Hard Dark Gray VF SANDY SILTY CLAY, w/Some Gravel, Many Rock Fragments. (GLACIAL TILL)

43'6"

530 — V.Compact Dark Gr. CLAYEY SILT & VF SAND, w/Many Rock Fragments. (GLACIAL TILL)

TOP OF ROCK, EL. 524.7 ?

51'8"

520 — Soft Light Gray Broken LIMESTONE, w/Seams Gray Shale.

55'8"

Soft Lt. Gr.-Brn. Fragmented LIMESTONE. Fractures Close.

58'6"

Med.Hard Light Gray Solid LIMESTONE, w/Zones Dolomitic Limestone & Some Shale Seams.

510 — Mod.Fractured LIMESTONE BRECCIA. 64'0"

65'10"

54'10" 3-inch casing used.

* Encountered artesian water; see NOTE

See Test Boring Location Plan

LOCATION: N-2600; W-1600

TOTAL DEPTH: 65'10"

BORING STARTED: July 28, 1970

BORING COMPLETED: July 29, 1970

INSPECTOR: J.O.Wanzeck & B.W.Behrman (S&FA)

DRILLER: B.Singleton

CONTRACTOR: Able Drilling, Inc.

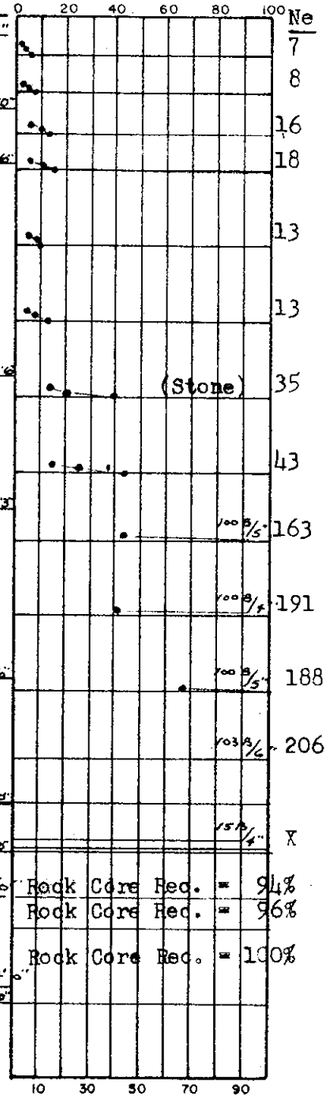
▽ WATER LEVEL in hole at indicated number of hours after completion of boring; ____ feet of casing in place. Artesian

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler ② inches, using 140 lb. weight with 30 inch free fall. Ne-Evaluated Blows/Foot

ROCK CORE DIAMETER: NX (2 1/8")

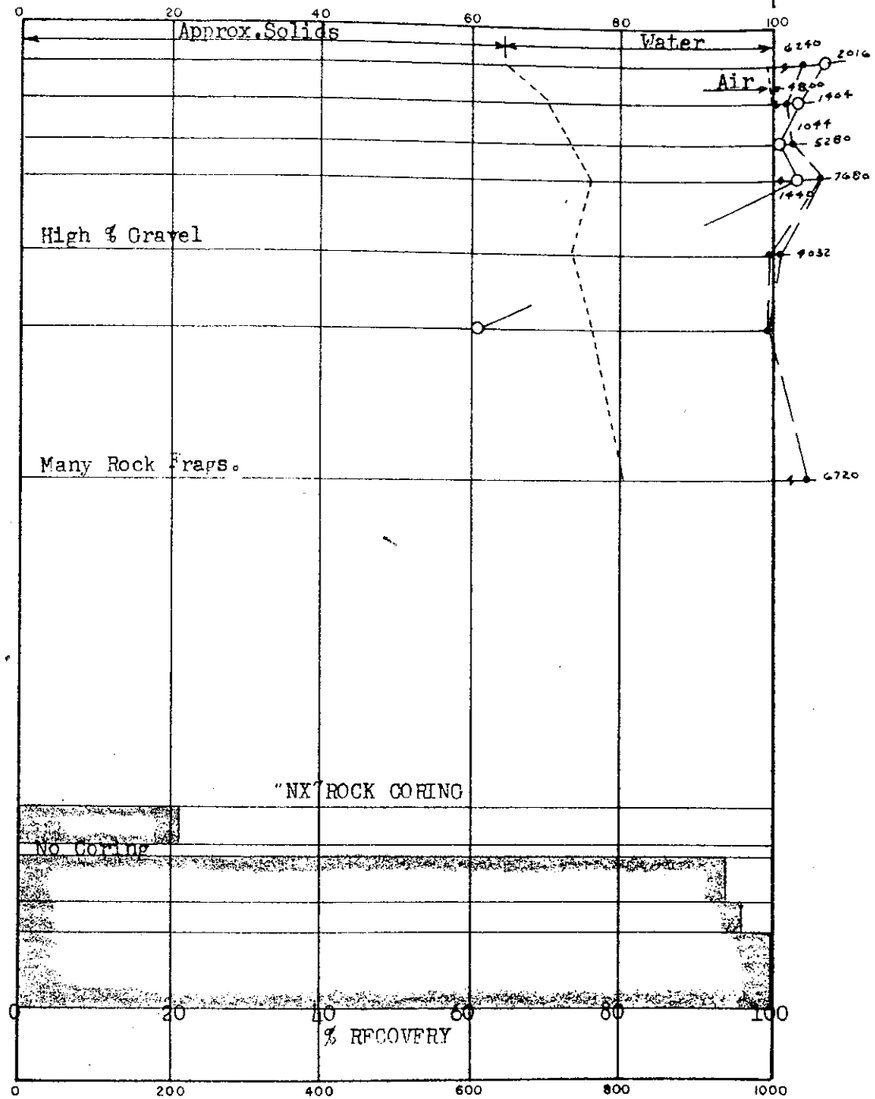
PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



** 1.75" O.D. Michigan Liner Sampler used through LS-6;
2.00" O.D. Heavy wall sampler used below

SOIL SAMPLE DATA

Lab & Field Sa No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f
LS-1	2.5	573.1	Hard	20.1	108.8
LS-2	5.0	570.6	V.Stiff	16.0	117.6
LS-3	7.5	568.1	V.Stiff	13.8	122.8
LS-4	10.0	565.6	Hard	11.8	127.8
LS-5	15.0	560.6	V.Stiff	12.8	123.5
LS-6	20.0	555.6	Firm to V.Stiff	12.3	127.6
BS-7	25.0	550.6	Hard		
LS-7	30.0	545.6	Hard	9.2	136.3
BS-9	34.5	541.1	V.Hard		
BS-10	39.3	536.3	Rock Fragments		
BS-11	44.4	531.2	Rock Fragments w/Silt&Clay		
BS-12	49.0	526.6	Rock Fragments		
	51.9	524.7			
Core Run No.1	54.1	521.5			
	55.0	520.6			
No.2	58.0	517.6			
No.3	60.0	515.6			
No.4	65.0	510.6			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

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NOTE: Artesian water encountered at d=32'3" (El.543.3), flowed over casing at 1'8" above ground surface at 33 gpm; drove casing to d=39' (El.536.6), water flowed at rate of 37.5 gpm 3 ft. above ground surface. With casing extended above ground static head was reached in 20 minutes at 15'10" above ground (El.591.4). With casing extended to d=51' (El.524.6), overnite static head was 19'2" above ground surface (El.594.8), flow was approx. 37 gpm when upper casing was removed.

At completion of boring artesian water flowed at rate of 75 gpm with casing 1'8" above ground surface. Casing capped overnite; extended to 20'8" above ground surface (El.606.3) at rate of approx. 100 gpm.

Extreme difficulty experienced in grouting hole and stopping artesian flow; used 28 bags of cement, 7 bags of dry-mix concrete & 1 bag of bentonite during period of 16 hours to stop flow.

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 18 TB 18

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 8-7-70 | JOB NO 128-A

A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 574.2 Ft. (IGLD Datum)

EVATION IN FEET

570

560

550

540

TOPSOIL; Soft Dk.Brn. SEMI-ORG. SANDY SILT 10"

Soft Mtld. Brn. TOPSOIL Mixed w/CLAYEY SILT 6"

Loose Brown FINE SAND. 3'3"

Soft Mtld. Brown V. SILTY CLAY 5'6"

Medium Brown V. SILTY CLAY, w, Sand Partings 9'6"

Firm to Stiff Brn. & Gray V. SILTY CLAY, w/Traces of Sand & Gravel. 11'6"

Firm to Stiff Gray SILTY CLAY, w/ Traces of Sand.

ROCK FRAGMENTS, w/SILT & F. SAND 18'4" 19'6"

Hard Dk. Gray V.F. SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL)

* ROCK FRAGMENTS, w/SILT & F. SAND. 28'6" 30'0"

* Encountered artesian water; water flowed at rate of 4 gpm with casing 1'9" above ground (El. 576.0) Static condition established at 9'3" above ground (El. 583.5)

Hole dry augered.

Hole grouted w/3 bags of cement, 1 bag of dry concrete & 1 bag of bentonite

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-2600; W-600

TOTAL DEPTH: 30'0"

BORING STARTED: August 6, 1970

BORING COMPLETED: August 6, 1970

INSPECTOR: J. O. Vanzeck (S&FA)

DRILLER: B. Singleton

CONTRACTOR: Able Drilling Inc.

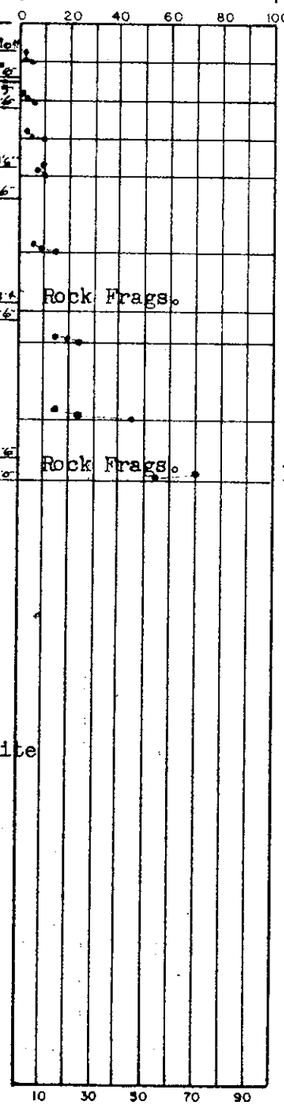
WATER LEVEL in hole of indicated number of hours after completion of boring; ____ feet of casing in place.

* PENETRATION: Number of blows required to drive ~~X~~ inch O.D. soil sampler (6) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

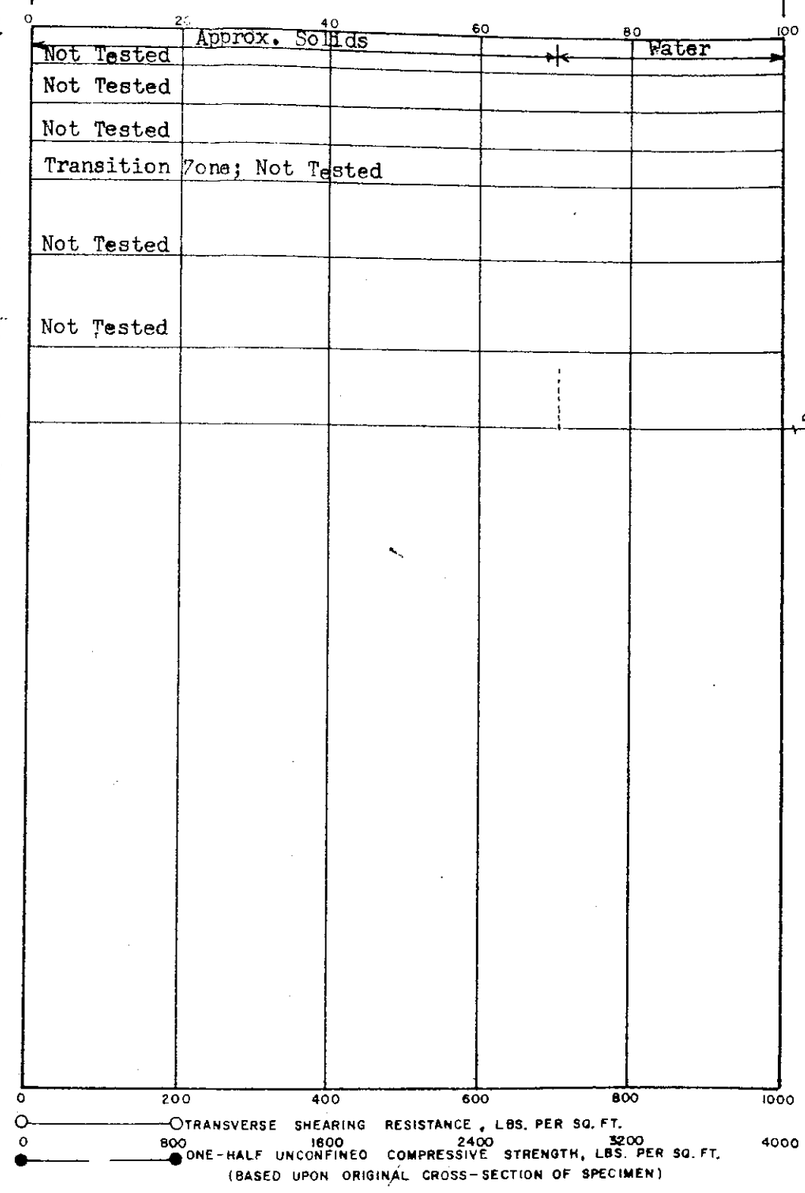
PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



**1.75" O.D. Michigan Liner Sampler used for LS-1 thru LS-5;
2.00" O.D. Heavy Wall Sampler used below.

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p c f
LS-1	2.5	571.7	Soft Topsoil	---	---
LS-2	5.0	569.2	Soft	---	---
LS-3	7.5	566.7	Medium	---	---
LS-4	10.0	564.2	Firm to Stiff	---	---
LS-5	15.0	559.2	Stiff		
BS-6	18.7	555.5	Loose Silt& Rock Frags.		
LS-6	20.0	553.2	Hard	---	---
LS-7	25.0	548.2	Hard	15.8	118.4
No Recovery	30.0	544.2			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

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SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 19 TB 19

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 573.9 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL: Dk. Gray SEMI-ORGANIC SILTY CLAY. 10"

Firm to V.Stiff Brown & Gray SILTY CLAY, w/Few Silt Lenses, Little Sand, Traces of Fine Gravel. 8'6"

560

V.Stiff to Hard Brown & Gray SILTY CLAY, w/Little Sand, Traces of Gravel. 18'0"

Hard Gray SILTY CLAY, w/Some Fine Sand, Sl.Tr.Gravel. 32'6"

550

* Hard Gray SILTY CLAY, w/Sand Pockets, Traces of Gravel. (GLACIAL TILL) 37'6"

V.Hard Dk. Gray VF SANDY SILTY CLAY, w/Some Gravel. (GLACIAL TILL) 42'0"

540

V.Compact Dark Gray CLAYEY SILT & VF SAND, w/Some Gravel & Many Rock Fragments. (GLACIAL TILL)

TOP OF ROCK, EL. 532.4 ± 41'6"

530

Med.Hd.Lt.Gr.-Brn.Mod.to V.Fragmented LIMESTONE, w/Soft Shale Layer from El.528.20 to El.527.40. Fracture moderately close from El.527.30 to El.522.40. 51'6"

520

41'6" NX casing used.

* Encountered artesian water; water level rose immediately to d=18'6" (El.555.4), and remained static for 30 minutes.

With 41'6" casing in artesian water rose to h=13'1" (El.587.0), at measured flow of 1 gpm. Level was static for 1-hr.

Hole was grouted with 7 bags cement. No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

	Ne
	7
	7
	10
	18
	19
	21
6" / 3"	155
22" / 6"	X
	117
100" / 2"	X

Rock Core Rec. = 94%

Rock Core Rec. = 95%

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water — Air

1224

1188

5520 1568

5932

2010 8485

6720

7920

Sample Disturbed by Stone

(Clayey Silt)

"NX" ROCK CORING

0 20 40 60 80 100

% RECOVERY

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used through LS-6; 2.00" O.D. Heavy wall sampler used below

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev, Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f.
LS-1	2.5	571.4	Variable: Firm-Hard	25.5	97.5
LS-2	5.0	568.9	Firm to Stiff	26.0	98.5
LS-3	7.5	566.4	V.Stiff	24.5	100.9
LS-4	10.0	563.9	V.Stiff to Hard	16.4	116.9
LS-5	14.5	559.4	Hard	12.3	125.3
LS-6	19.5	554.4	V.Hard	11.9	126.5
LS-7	23.3	550.6	Hard, w/ Sd. Pockets	10.4	127.0
LS-8	28.0	545.9	V.Hard	9.4	133.6
LS-9	33.0	540.9	V.Compact Silt	12.9	126.1
BS-10	37.2	536.7	Rock Frags w/Silt&Clay		
	41.5	532.4			
Core Run No.1	46.0	527.9			
No.2	51.5	522.4			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 108

LOCATION: N-2600; E-400

TOTAL DEPTH: 51'6"

BORING STARTED: July 27, 1970

BORING COMPLETED: July 28, 1970

INSPECTOR: J. O. Wanzeck & B. W. Behrman (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 41.5 feet of casing in place. Artesian

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler (2) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot

ROCK CORE DIAMETER: NX (2⅛")

SFA FORM E-7

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 2C TB 20

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 6-7-71	JOB NO. 128-A

Elev. Surface Feet: 573.6 Ft. (IGLD Datum)

PENETRATION*

Soil Sampler Penetration Resistance, ASTM D 1586 Blows/Ft.

0 20 40 60 80 100

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Laboratory Procedures of Soils, Water and Air

0 2 4 6 8 10

Elev.	Description	Penetration
570	TOPSOIL; Med. Dk. Gr. SEMI-ORG. V.SDY. CLAY, Firm to Stiff Brown & Gray V.SILTY CLAY, w/Traces of Sand & Gravel.	5
	V.Stiff Brown V.SILTY CLAY, w/Traces of Sand & Gravel.	9
560	V.Stiff to Hard Dk. Gray SILTY CLAY, w/Some Sand & Gravel, Few Rock Frags. (GLACIAL TILL?)	23
	Rock Frags	109 for 6"
550	V.Hard Dk. Gray V.F. SANDY SILTY CLAY, w/Some Gravel & Rock Fragments (GLACIAL TILL)	56
		30
540	Hole dry augered. No ground water encountered. Hole grouted w/2 bags of cement. No water flow during final inspection on Sept. 9, 1970.	

Approx. Solids — Water

Not Tested: Too Many Rock Frags.

1332 1584 2196 1656 9/20 7480 8640 10800 12000 5280 1512 19200 21600

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

Lab & Field Soil No.	Sample Depth, Feet	Sample Elev. Feet	Laboratory Consistency*	Water Content % of Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	571.1	Variable; Firm-Stiff	21.6	106.3
LS-2	5.0	568.6	Variable; Firm-Stiff	17.8	114.2
LS-3	7.5	566.1	V.Stiff	12.6	126.6
LS-4	10.0	563.6	V.Stiff	11.9	127.0
LS-5	15.0	558.6	Hard	11.4	130.1
LS-6	20.0	553.6	V.Stiff	12.8	127.1
LS-7	25.0	548.6	V.Hard	--	--
LS-8	30.0	543.6	V.Hard	10.0	134.3

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-2600; E-1100

TOTAL DEPTH: 30'0"

BORING STARTED: August 13, 1970

BORING COMPLETED: August 13, 1970

INSPECTOR: J. O. Wangeck (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Allo Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler (6) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used for LS-1 thru LS-6; 2.00" O.D. Heavy wall sampler used for LS-7 and LS-8.

MON 189

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 21 TB 21

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAD	DATE: 8-7-71	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 572.1 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL: Med. Dk. Gr. SEMI-ORGANIC SDY. SILTY CLAY 0"

Med. to Firm Brown (w/Some Gray) SILTY CLAY w/Little Sand, Traces of Gravel. 5'6"

Stiff to V. Stiff Brown V. SILTY CLAY, w/Some Sand, Traces of Gravel & Decomposed Rock Fragments. 14'0"

V. Stiff to Hard Dk. Gr. V.F. SDY. SILTY CLAY w/Some Gravel & Rock Fragments. (GLACIAL TILL) 29'8"

V. Hard Dk. Gr. VF SDY. SILTY CLAY w/Many Rock Fragments 30'0"

Hole dry augered.

No ground water encountered.

Hole grouted w/3 bags of bentonite.

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-2600; E-2400

TOTAL DEPTH: 30'0"

BORING STARTED: August 6, 1970

BORING COMPLETED: August 6, 1970

INSPECTOR: M. M. Dragicevic (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler (2) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

S&FA FORM 6-7

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

Ne
9
8
17
24
20
18
25
100 B/11"

5"

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids ← → Water

Not Tested	
Not Tested	
Not Tested	
Not Tested	
Not Tested	
Not Tested	
Not Tested	
	16800 ●
	18240

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT. (BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used thru LS-7; 2.00" O.D. Heavy wall sampler used for LS-8.

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	569.6	Medium to Firm	--	--
LS-2	5.0	567.1	Medium to Firm	--	--
LS-3	7.5	564.6	Stiff	--	--
LS-4	10.0	562.1	V. Stiff	--	--
LS-5	15.0	557.1	V. Stiff	--	--
LS-6	20.0	552.1	V. Stiff	--	--
LS-7	25.0	547.1	Hard	--	--
LS-8	30.0	542.1	V. Hard	12.1	127.5

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 190

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 22 TB 22

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 571.2 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — 560 — 550 — 540

TOPSOIL; Dk.Brn. SEMI-ORG. SDY. SLY. CLAY — 0'0"

Med. to Firm Mtld. Brown V. SILTY CLAY, w/Little Sand & Gravel. Traces Organic. — 6'0"

Firm to Stiff Brown, w/Gray Streaks, VERY SILTY CLAY. w/Some Sand, Traces Gravel & Rk. Frags. — 14'0"

Stiff Gray VERY SILTY CLAY, w/Some Sand, Gravel & Rock Frags (GLACIAL TILL?)

* ROCK FRAGMENTS or BOULDER — 24'0" / 24'5"

V. Hard Dk.Gray VF SANDY SILTY CLAY, w/Some Gravel, Many Rock Frags. (GLACIAL TILL) — 30'0"

T.B.-23;
Hole dry augered

* Encountered ground water; rose 16" to El. 548.9 in 1 hour.

Hole grouted w/2 bags of bentonite.

No water flow during final inspection on Sept. 9, 1970

T.B.-23A:
Hole offset 3-ft. from TB-23.

Hole augered w/o sampling to d=24'5"

No ground water encountered, dry upon completion.

Hole grouted w/3 bags of bentonite and 1 bag of cement.

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-2100; E-3150

TOTAL DEPTH: 30'0"

BORING STARTED: August 7, 1970

BORING COMPLETED: August 10, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: D.T. Corbin

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

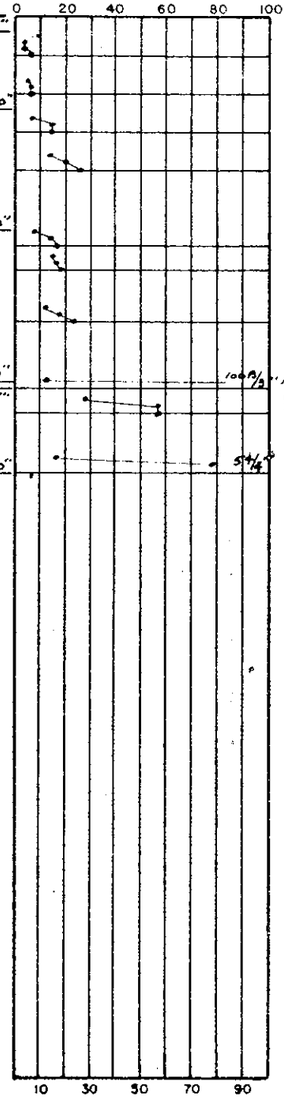
* PENETRATION: Number of blows required to drive 2.00 inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

SFA FORM E-7

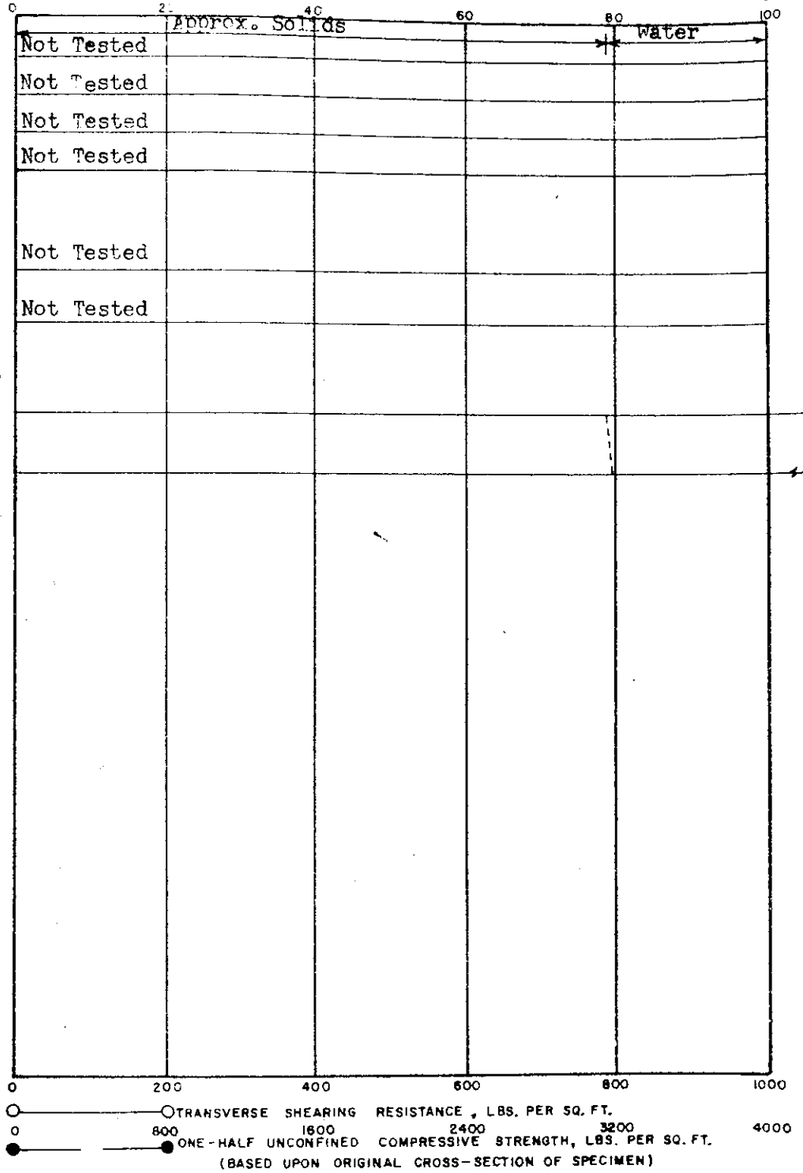
PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f.
LS-1	2.5	568.7	Medium to Firm	--	--
LS-2	5.0	566.2	Firm	--	--
LS-3	7.5	563.7	Firm to Stiff	--	--
LS-4	10.0	561.2	Firm to Stiff	--	--
No Recovery	15.0	556.2			
LS-5	16.5	554.7	Stiff	--	--
LS-6	20.0	551.2	Stiff	--	--
BS-7	24.3	546.9	V.Stiff		
LS-7	26.0	545.2	V.Hard	9.3	133.0
LS-8	30.0	541.2	V.Hard	7.7	136.6

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 191

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 23 & 23A

PLUM CREEK PROPERTY TB 23
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 6-7-71	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 570.8 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL; Med. Dk. Gray SEMI-ORG. SDY. SILTY CLAY

Med. to Firm Brown & Gray V. SILTY CLAY, w/Traces of Sand & Gravel.

* 2'0"

V. Stiff to Hard Brown & Gray V. SILTY CLAY w/Some Sand, Traces of Gravel & Rk. Frags.

13'0"

V. Stiff Dk. Gray V. SILTY CLAY, w/Some Sand, Little Gravel & Few Rock Frags. (GLACIAL TILL?)

24'0"

V. Hard Dk. Gray VF SANDY SILTY CLAY, w/Traces of Gravel, Many Rock Frags. (GLACIAL TILL)

30'0"

Hole dry augered.

* Encountered ground water; rose 3'0" in 1 hour to El. 568.0.

Hole grouted w/2 bags of cement and 1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-2100; E-3900

TOTAL DEPTH: 30'0"

BORING STARTED: August 10, 1970

BORING COMPLETED: August 10, 1970

INSPECTOR: J. G. Wanzeck (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 2.00 inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

S&FA FORM C-7

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

	0	20	40	60	80	100	Ne
0–2'							6
2'–4'							6
4'–6'							6
6'–8'							15
8'–10'							23
10'–12'							19
12'–14'							45
14'–16'							68

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water — Air

Short Sample

Transition Zone

High % Gravel

Short Sample

13440

5088

1044 6432

10560

6720 13680

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f
LS-1	2.5	568.3	Medium	27.0	96.3
LS-2	5.0	565.8	Medium to Firm	25.4	101.3
LS-3	7.5	563.3	Medium to Firm	18.2	113.4
LS-4	10.0	560.8	Hard	11.7	123.1
LS-5	15.0	555.3	V. Stiff	12.5	126.0
LS-6	20.0	550.8	Stiff	12.7	125.8
LS-7	25.0	545.8	V. Hard	9.8	132.0
LS-8	30.0	540.8	Hard to V. Hard	11.0	129.4

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 192

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 24 TB 24

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 6-7-71	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 573.3 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL; Med.Dk.Gr.SEMI-ORG.V.SDY.CLAY. 1'0"

Firm to Stiff Mtld. Brown V.SILTY CLAY, w/Traces of Sand & Organic Matter. 6'0"

560

V.Stiff to Hard Brown (w/Some Gray) VERY SILTY CLAY, w/Few Silt Lenses, Little Sand, Traces of Gravel. 13'6"

Firm to Stiff Gray VERY SILTY CLAY, w/Some Sand, Traces of Gravel. 22'6"

550

V.Hard Dk.Gray VF SANDY SILTY CLAY, w/Little Gravel, Many Rock Frags., Few Cobbles. (GLACIAL TILL) 33'0"

540

V.Hard Dk.Gray VF SANDY SILTY CLAY, V.Gravelly, Many Rock Frags.(GLACIAL TILL) 36'6"

* V.Hard Dk.Gray VERY SANDY SILTY CLAY, w/Seams of Sand, Some Gravel&Rk. Frags. (GLACIAL TILL) 41'0"

530

V.Hard Dk.Gray VERY SANDY SILTY CLAY, Mixed w/Gravel & Many Rock Frags. (GLACIAL TILL)

* REFUSAL ON GEAR BIT 48'5"

10' of 4-inch, 45' of NX casing used.
Hole advanced by roller type gear bit; wrench dropped in hole, and rock coring was prevented.

520

See Test Boring Location Plan

LOCATION: N-1450; E-900
TOTAL DEPTH: 48'5"

BORING STARTED: July 29, 1970
BORING COMPLETED: July 30, 1970

INSPECTOR: J. O. Wanzeck (S&FA)
DRILLER: D. T. Corbin
CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 45 feet of casing in place. Artesian

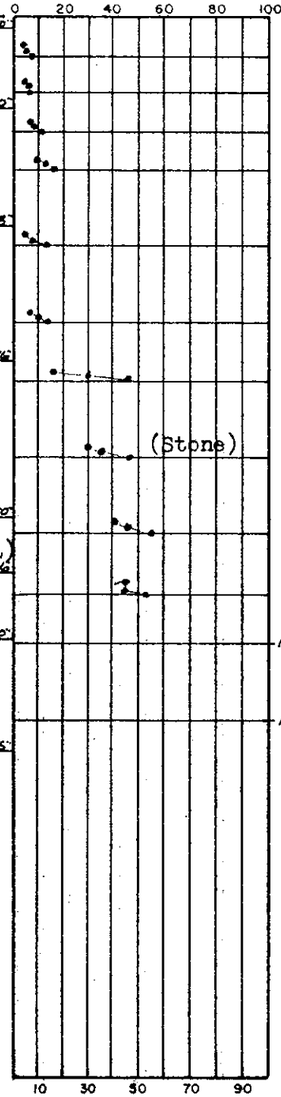
* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler (12) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

SPA FORM 4-7

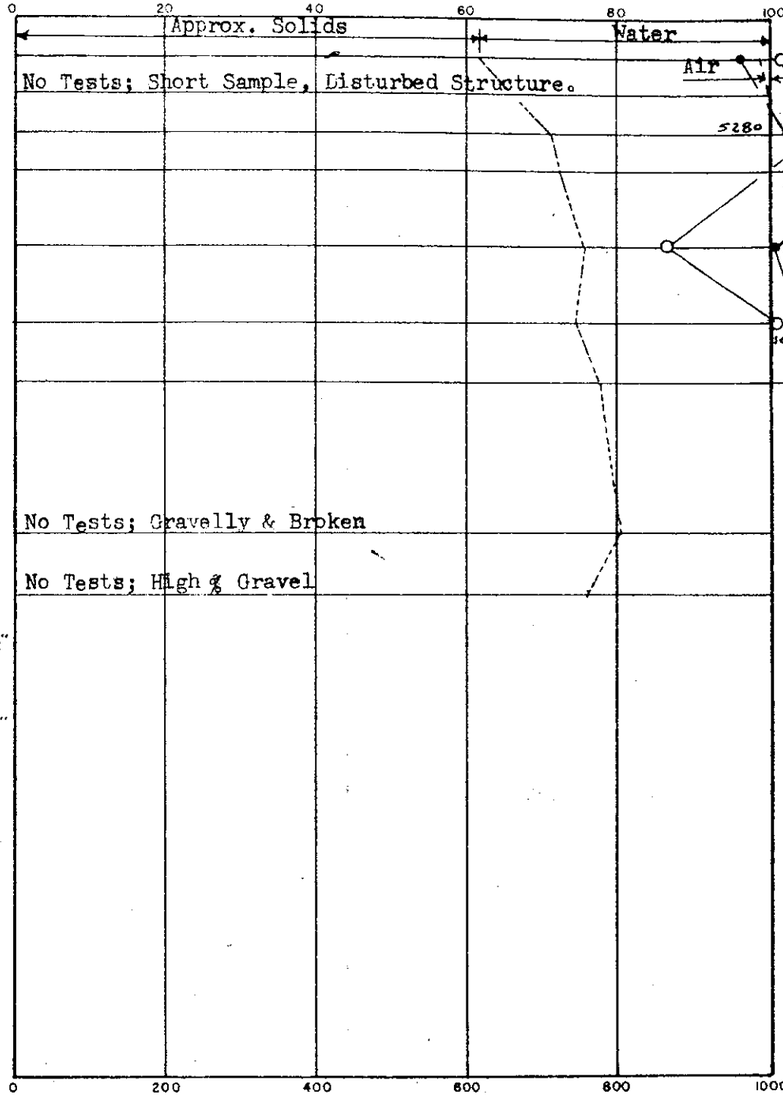
PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *



TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air



** 1.75" O.D. Michigan Liner Sampler used for LS-1 thru LS-6; 2.00" O.D. Heavy Wall Sampler used below.

* Encountered artesian water at d=37'6" (El.535.8); flow remained steady at 3 gpm for 1 hour; eased off.
Encountered artesian water at d=48'5" (El.524.9); flow of approx. 29 gpm reached static head at El. 591.6 and remained steady for 1 hour.
Hole grouted w/6 bags of cement and 1 bag of bentonite.
No water flow during final inspection on Sept. 9, 1970.

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev.	Penetration Resistance, Blows/Ft.	Water Content % by Dry Wt	Dry Unit Weight p.c.f.
LS-1	2.5	570.8	Firm to Stiff	21.9	104.5
LS-2	5.0	568.3	Firm to Stiff	21.3	--
LS-3	7.5	565.8	V.Stiff to Hard	14.8	119.8
LS-4	10.0	563.3	V.Hard	13.6	122.8
LS-5	15.0	558.3	Firm to Stiff	12.7	126.7
LS-6	20.0	553.3	Firm to Stiff	12.1	126.0
LS-7	24.0	549.3	V. Hard	10.4	130.0
BS-8	29.0	544.3	V. Hard		
LS-8	34.0	539.3	V. Hard	10.6	135.6
LS-9	38.0	535.3	V. Hard	12.0	127.6
BS-11	41.2	532.1	V. Hard		
No Rec.	46.3	527.0			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 196

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 28 TB 28

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 572.3 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL; Med.Dk.Gr.SEMI-ORG.SDY.SLY.CLAY.

Medium to Stiff Brown & Gray SILTY CLAY, w/Little Sand, Traces of Roots.

6'0"

Stiff to Hard Mtld. Brown SILTY CLAY, w/Little Sand, Traces of Gravel.

14'3"

Medium to Stiff Gray SILTY CLAY w/Some F. Sand, Some Gravel.

23'6"

V.Hard Mtld. Dk.Gray VF SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL)

30'0"

Hole dry augered.

* Encountered ground water.

Hole grouted w/3 bags of bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

10 30 50 70 90

Ne

12
8
24
30
13
22
69
63

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids

Disturbed Structure

Water

1116
1260
5760
1728
8670
6240
4234
5520
11040
9120
8640

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

Lab & Field Sa. No.	Sample Depth, Feet	Elev. Feet		Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	569.8	Stiff	18.6	—
LS-2	5.0	567.3	Stiff – Medium –	20.7 27.9	110.4 95.2
LS-3	7.5	564.8	V.Stiff	15.4	117.7
LS-4	10.0	562.3	Stiff to Hard	13.1	125.6
LS-5	15.0	557.3	Medium	12.9	124.7
LS-6	20.0	552.3	Firm to Stiff	12.7	126.6
LS-7	25.0	547.3	V. Hard	9.0	135.5
LS-8	30.0	542.3	V. Hard	10.3	131.1

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 197

See Test Boring Location Plan

LOCATION: N-1300; E-1900

TOTAL DEPTH: 30'0"

BORING STARTED: August 7, 1970

BORING COMPLETED: August 7, 1970

INSPECTOR: M. M. Dragicevic (S&FA)

DRILLER: D. T. Corbin

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 2.00 inch O.D. soil sampler (140) inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

SOIL AND FOUNDATIONS ASSOCIATES
29565 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 29 TO 29

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR:	DATE:	JOB NO.
	6-7-71	128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 570.5 Ft. (IGLD Datum)

ELEVATION IN FEET

570
- TOPSOIL; Dk. Brn. SEMI-ORGANIC V. SILTY CLAY, 10"
- Firm Brown & Gray SILTY CLAY, w/Some Sand, Traces of Gravel. 3'0"
- Medium Brown & Gray SILTY CLAY, w/Little Sand. 5'8"

560
- Stiff to Hard Mtld. Brown SILTY CLAY, w/Some Sand & Fine Gravel. 12'3"

550
- Firm to Stiff & Hard (Varies) Gray SILTY CLAY, w/Some Sand & Fine Gravel. 28'0"
- Med. Comp. Gr. FINE SAND, w/Little Gravel, 28'9"

540
- Firm to Stiff Gray SILTY CLAY, w/Some Sand & Gravel. (GLACIAL TILL?) 34'6"
- ROCK FRAGMENTS. 35'6"

530
- V. Hard Dk. Gray F. SANDY SILTY CLAY, w/Some F. Gravel, Many Rock Fragments. (GLACIAL TILL.) 44'6"

520
- V. Compact Gray SILT & ROCK FRAGMENTS. Wet. (GLACIAL TILL.)
- TOP OF ROCK 51'0"

510
- Med. Hard Light Gr.-Brn. Solid LIMESTONE, w/Some Thin Fragmented Zones. 58'8"
- Med. Hard Lt. Brown Solid LIMESTONE. 61'0"

500

* Artesian flow w/sulphur odor encountered; hole cased to d=35'6"; head 2'2" above ground surface.
Cased to d=44'6", and artesian flow continued at rate of 4 gpm, w/head 7'6" above ground surface. See other info in rock coring.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

	Ne
	6
	4
	20(?)
	13
	15
	19
	18
	18
	19
110 6/12	X
	69
100 6/1	X
100 3/4	X

Rock Core Rec. = 100%

Rock Core Rec. = 90%

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water — Air

(Disturbed)

6240
1476 8670
12480
1224 6192
4080

"NX" ROCK CORING

Artesian flow after first core run w/casing 1'8" above ground was approx. 7 gpm.

Artesian flow after second core run w/casing 1'8" above ground was approx. 15 gpm.

0 20 40 60 80 100 % RECOVERY

30 minutes after completion, artesian water was static at 17'1" above ground surface (El. 587.6)
90 minutes after completion, artesian water was static at 17'6" above ground surface (El. 588.0)

0 200 400 600 800 1000 TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000 ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT. (BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used through LS-4;
2.00" O.D. Heavy wall sampler used below.

NOTE: Extreme difficulty was experienced in stopping artesian water flow. During a total grouting period of 14 hours, 10 bags of cement, 4 bags of dry-mix concrete and 1 bag of bentonite were used.

Lab & Field Sa. No	Sample Depth, Feet	S E Feet		Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	2.5	568.0	Firm	26.4	98.0
LS-2	5.0	565.5	Medium	29.1	95.0
LS-3	7.5	563.0	Stiff to V.Stiff	14.0	120.3
LS-4	10.0	560.5	Hard	13.9	120.5
LS-5	15.0	555.5	Firm	13.5	122.4
LS-6	20.0	550.5	V.Stiff to Hard	12.2	130.0
No Rec.	25.0	545.5			
LS-7	27.5	543.0	Firm to Stiff	11.4	127.0
LS-8	31.0	539.5	Firm to Stiff	11.9	129.6
BS-9	35.0	535.5	V.Hard V. Silty Clay		
BS-10	41.0	529.5	V.Hard V. Silty Clay		
No Rec.	44.6	525.9			
No Rec.	49.7	520.8			
	51.0	519.5			
Core Run No.1	56.0	514.5			
No.2	61.0	509.5			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 198

LOCATION: See Test Boring Location Plan
TOTAL DEPTH: N-1350; E-2900 61'0"

BORING STARTED: July 22, 1970
BORING COMPLETED: July 24, 1970

INSPECTOR: J. O. Wanzeck & B. W. Behrman (S&FA)
DRILLER: B. Singleton
CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; ____ feet of casing in place. Artesian

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 6 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot

ROCK CORE DIAMETER: NX (2⅛")

S&FA FORM C-7

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 30 TB 30

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GA DATE: 8-7-70 JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 574.0 Ft. (IGLD Datum)

ELEVATION IN FEET

570

560

550

Loose Yellow SAND. 3"

TOPSOIL, MOSS & PEAT 1'6"

Medium to Firm Mtld. Brown & Gray V.SILTY CLAY, W/Trace Fine Sand. 5'6"

V.Stiff Brown VERY SILTY CLAY, w/Tr. Sand, Little Gravel, Tr.Organic 8'6"

V.Stiff to Hard Brown SILTY CLAY, w/Some Sand, Little Gravel. 11'6"

Hard Mtld. Gray SILTY CLAY, w/Some Sand, Little Gravel, Many Rock Fragments. 15'8"

V.Hard Dk.Gray VF SANDY SILTY CLAY, w/Some Sand & Gravel, Many Rock Frags. (GLACIAL TILL) 20'0"

Hole dry augered.

No ground water encountered.

Hole grouted w/1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

Ne
9
17
30
25
17
18

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

Air

1368 9600

1368 8640

7248 7680

8160

9560

9360

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	569.0			
LS-1	7.5	566.5		11.7	128.0
LS-2	10.0	564.0		11.7	127.1
LS-3	12.5	561.5		10.8	126.5
LS-4	15.0	559.0		11.4	128.3
LS-5	20.0	554.0		10.3	132.1

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 199

See Test Boring Location Plan

LOCATION: N-4650; E-400

TOTAL DEPTH: 20'0"

BORING STARTED: August 25, 1970

BORING COMPLETED: August 25, 1970

INSPECTOR: M. M. Dragicevic (S&FA)

DRILLER: R. E. Budzeika

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 1.75 inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows / Foot

ROCK CORE DIAMETER: None

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 31 TB 31

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GHO | DATE: 6-7-71 | JOB NO. 128-A

S&FA FORM 6-67

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 573.1 Ft. (IGLD Datum)

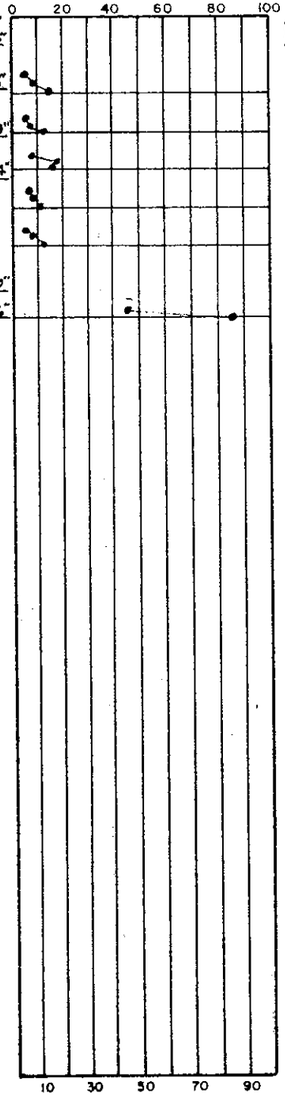
PENETRATION *

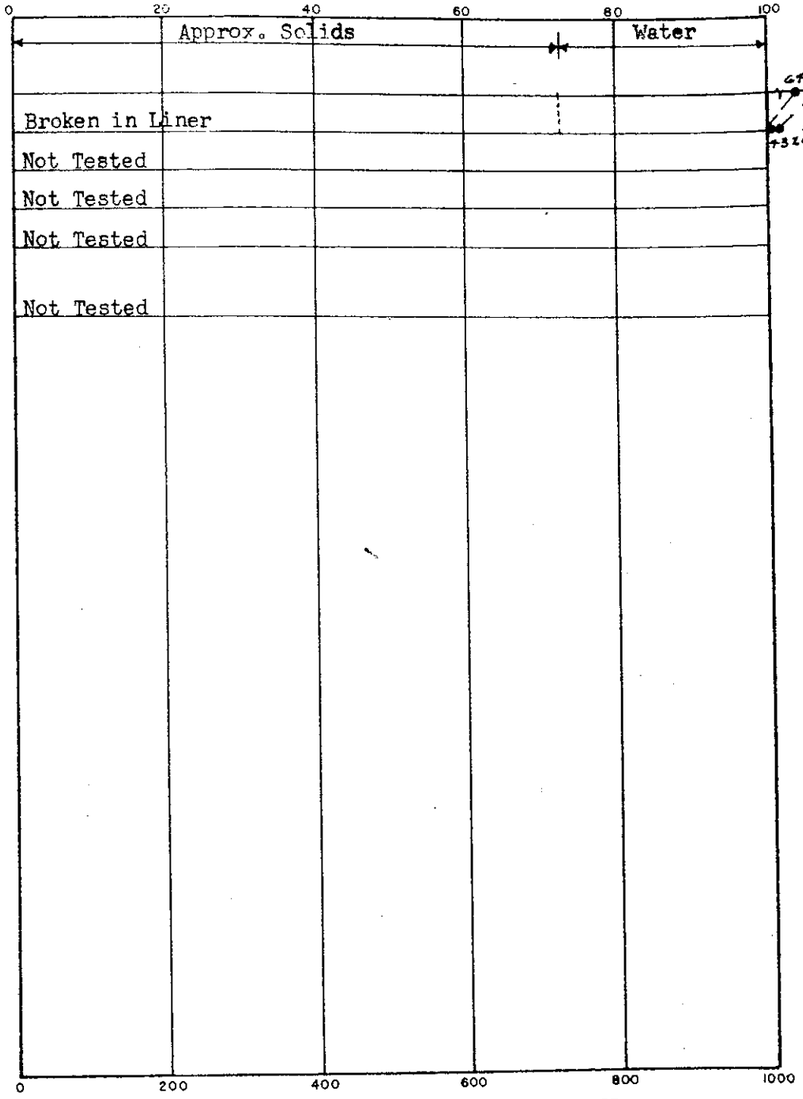
Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

ELEVATION IN FEET			Ne	Approx. Solids / Water
570	TOPSOIL; Med. Dk. Gr. SEMI-ORG. CLAYEY SILT.	1'6"		
	Loose Brown FINE TO MEDIUM SAND.	4'6"	15	
	V. Stiff Mtld. Brown VERY SILTY CLAY, w/Little Sand, Traces of Gravel.	7'9"	13	Broken in Liner
	Hard Mtld. Brown SILTY CLAY, w/Some Fine Sand.	10'4"	25	Not Tested
560	▽ 24		15	Not Tested
	V. Stiff Gray VERY SILTY CLAY, w/Some Sand, Traces of Gravel.		13	Not Tested
	V. Hard Dk. Gr. V. CLAYEY SILTY SAND. (GLACIAL TILL)	17'10" 19'6"	134	Not Tested
550	Hole dry augered; dry at completion.			
	Hole grouted w/1 bag of cement and 1 bag of bentonite.			
	No water flow during final inspection on Sept. 9, 1970.			





See Test Boring Location Plan

LOCATION: N-4700; E-1600

TOTAL DEPTH: 19'6"

BORING STARTED: September 2, 1970

BORING COMPLETED: September 3, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R.E. Budzeika

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ~~**~~ inch O.D. soil sampler (2) inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used through LS-5; 2.00" O.D. Heavy wall sampler used for LS-6.

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f
LS-1	5.0	568.1	Stiff to Hard	14.3	121.3
LS-2	7.5	565.6	V. Stiff	14.2	121.9
LS-3	10.0	563.1	Hard	--	--
LS-4	12.5	560.6	V. Stiff	--	--
LS-5	15.0	558.1	Stiff	--	--
LS-6	19.5	553.6	V. Hard	--	--

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 200

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 32 TB 32

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 6-7-71	JOB NO. 128-A

S&FA FORM E-7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 573.9 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL; Med.Dk.Brn.V.CLAYEY SILT over 8" Yellow FINE SAND. 1'-2"

Medium Brown VERY SILTY CLAY, w/Some Fine Sand, Traces Gravel. 6'-0"

V.Stiff Brown (w/Red Pockets), VERY SILTY CLAY, w/Some Sand, Traces Gravel. 10'-0"

560

V.Stiff Gray VF SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL?)

554.8 Ft

ROCK FRAGMENTS Mixed w/SILTY CLAY & SAND 19'-1"

Compact Dk.Gray FINE SAND, Mixed w/V.Hard Dk.Gr. VF SDY.SILTY CLAY (GLACIAL TILL) 20'-0"

550

Hole dry augered, dry at completion.

Hole grouted w/1 bag of cement and 1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-5050; E-2100

TOTAL DEPTH: 20'0"

BORING STARTED: September 2, 1970

BORING COMPLETED: September 2, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R. Budzeika

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole of indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 1.75 inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

SFA FORM C-7

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *.

0 20 40 60 80 100

Ne
11
21
19
18
12
35

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids | Water

Air

7480

Not Tested
Not Tested
Not Tested
Not Tested; Sand.

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	5.0	568.9	Medium	21.7	103.3
LS-2	7.5	566.4	V. Stiff	13.2	123.2
LS-3	10.0	563.9	V. Stiff	--	--
LS-4	12.5	561.4	V. Stiff	--	--
LS-5	15.0	558.9	Firm to Stiff	--	--
LS-6	20.0	553.9	Compact Fine Sand	--	--

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 201

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 33 TB 33

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

APPR: GAB | DATE: 6-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 572.9 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — 560 — 550 — 540

TOPSOIL, Dk.Brn.,SEMI-ORG.F.SANDY CLAY. 10"

Firm to V. Stiff Mtld.Brown SILTY CLAY, w/Some Sand, Traces Rock Fragments. 5'5"

V.Stiff Brown SILTY CLAY, w/Little Sand, Traces of Gravel. 8'4"

Hard Brown SILTY CLAY, w/Little Sand, Traces of Gravel. 10'6"

Stiff Gray SILTY CLAY, w/Some Sand & Gravel. 12'6"

Stiff to Very Stiff Gray SILTY CLAY, w/Some Sand, Traces of Gravel, * Many Small Rock Fragments. (GLACIAL TILL)

25'0"

Hole dry augered.

* Encountered ground water (v.slight).

Hole dry at completion of drilling; grouted w/1 bag bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0	20	40	60	80	100	Ne
10						10
14						14
21						21
18						18
12						12
11						11
16						16

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

Sample Disturbed? ?

6720 2300 2500 7480 5580 4510 6000

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa No	Sample Depth, Feet	Sample Elev, Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
LS-1	5.0	567.9	Firm to V.Stiff	13.6	125.8
LS-2	7.5	565.4	V.Stiff to Hard	13.0	125.6
LS-3	10.0	562.9	Hard	13.3	124.1
LS-4	12.5	560.4	Stiff	12.3	125.9
LS-5	15.0	557.9	Stiff	12.6	125.7
LS-6	20.0	552.9	Stiff	13.4	126.2
LS-7	25.0	547.9	V.Stiff	11.3	131.7

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-5100; E-3400

TOTAL DEPTH: 25'0"

BORING STARTED: September 2, 1970

BORING COMPLETED: September 2, 1970

INSPECTOR: M.M.Dragicevic (S&FA)

DRILLER: R.E.Budzeika

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 1.75 inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

S&FA FORM E-7

MON 202

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 34 TB 34

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 10-20-70 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 571.6 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — TOPSOIL: Dk. Brn. SEMI-ORG. V. SANDY CLAY. 1'1"

Firm Brown & Gray SILTY CLAY, w/Little Sand, Traces of Fine Gravel. 4'6"

Hard Mottled Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 8'2"

560 — V. Stiff to Hard Brown SILTY CLAY, w/Little Sand, Traces Gravel & Rock Frags. 15'3"

V. Stiff to Hard Gray F. SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL)

550 — 22'4"

V. Hard Dark Gray FINE SANDY SILTY CLAY, V. Gravelly, w/Many Rock Fragments. 25'0"

Hole dry augered; dry upon completion.

Hole grouted w/1 bag bentonite.

540 — No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0–20	20–40	40–60	60–80	80–100	Ne
4	5				9
3	4	5			12
3	5	6			14
4	6	6			16
4	6	6			16
3	5	6			14
5	8	9	5		27

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

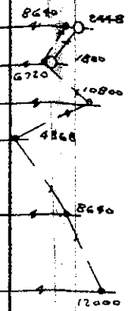
Volumetric Proportions of Solids, Water and Air

0 — 20 — 40 — 60 — 80 — 100

Approx. Solids | Water

Short Sample

Short Sample



0 — 200 — 400 — 600 — 800 — 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 — 800 — 1600 — 2400 — 3200 — 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	566.6	Firm		
LS-1	7.5	564.1	Hard	14.1	122.2
LS-2	10.0	561.6	V. Stiff to Hard	13.5	124.3
LS-3	12.5	559.1	Hard	13.5	122.1
LS-4	15.0	556.6	V. Stiff	12.3	125.7
LS-5	20.0	551.6	Hard	10.1	132.3
LS-6	25.0	546.6	V. Hard	9.6	134.3

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 203

See Test Boring Location Plan

LOCATION: N-5050; E-4400

TOTAL DEPTH: 25'0"

BORING STARTED: Sept. 1, 1970

BORING COMPLETED: Sept. 1, 1970

INSPECTOR: M.N. Dragicevic (S&FA)

DRILLER: R.E. Budzeika

CONTRACTOR: Able Drilling, Inc.

⌯ WATER LEVEL in hole at indicated number of hours after completion of boring; ____ feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler ⊚ inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used in all Liner Samples
2.00" O.D. Heavy wall Sampler used in BS-1 only.

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 35 TO 35

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 10-20-70	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller and S&FA

Ground Surface Elev. = 570.7 Ft. (IGLD Datum)

ELEVATION IN FEET

570

TOPSOIL; Dk. Brn. SEMI-ORG. F. SANDY CLAY. 1'

Medium Brown & Gray SILTY CLAY, w/Traces of Sand & Fine Gravel. 6'6"

V. Stiff Mtld. Brown SILTY CLAY, w/Some Sand, Traces of Gravel. 8'4"

560

V. Stiff Brown SILTY CLAY, w/Traces of Sand & Gravel. 10'8"

Hard Gray & Brown SILTY CLAY, w/Some Sand, Gravelly (GLACIAL TILL?) 13'6"

24

V. Stiff Gray FINE SANDY SILTY CLAY, w/Some Gravel, Many Rock Fragments. (GLACIAL TILL)

550

23'11"

Refusal; Boulder or Rock

Hole dry augered; dry upon completion.

Hole grouted w/1 bag cement & 1 bag bentonite.

No water flow during final inspection on Sept. 9, 1970.

540

See Test Boring Location Plan

LOCATION: N-4600; E-4900

TOTAL DEPTH: 23'11"

BORING STARTED: September 1, 1970

BORING COMPLETED: September 1, 1970

INSPECTOR: M.M. Draginovic (S&FA)

DRILLER: R.E. Budzelka

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler ⊕ inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot.

ROCK CORE DIAMETER: None

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

	Ne
6'6"	5
8'4"	9
10'8"	17
13'6"	12
	12
23'11"	13
	100 B/5"

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

6720 1720
7920
1152
7584
4800
4272

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used in all Liner Samples; 2.00" O.D. Heavy wall sampler used in BS-1 & BS-7 only.

SOIL SAMPLE DATA

Lab & Field Sa. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	565.7	Medium		
LS-1	7.5	563.2	V. Stiff	13.6	123.6
LS-2	10.0	560.7	V. Stiff to Hard	13.9	124.7
LS-3	12.5	558.2	Hard	13.9	122.1
LS-4	15.0	555.7	V. Stiff	12.2	127.1
LS-5	20.0	550.7	V. Stiff	13.2	123.5
BS-7	23.9	546.8	Rock Fragments		

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 204

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 36 TB 36

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 10-20-70	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 571.3 Ft. (ICLD Datum)

ELEVATION IN FEET

570

560

550

540

TOPSOIL: Loose, Dk. Brn., SEMI-ORG. V. SILTY CLAY 7"

Soft Brown & Gray SILTY CLAY, w/Some Fine Sand & Gravel.

Stiff to V. Stiff Brown SILTY CLAY, w/Some Fine Sand & Gravel.

Firm to V. Stiff Gray SILTY CLAY, w/Some Sand, Gravel & Rock Frags. (GLACIAL TILL?)

Hole Dry augered full depth.
*Ground water encountered.
Water level in hole after sampling at d=10' was at d=5'6" (El. 565.8)
Water level upon completion was at d=6'6" (El. 564.8).
Hole grouted w/1 bag of bentonite.
No water flow during final inspection on Sept. 9, 1970

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

8'6"

13'6"

25'6"

Ne
4
4
15
18
12
11
13

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

Air

6720

8690 9600

4176 4752

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt	Dry Unit Weight p.c.f.
BS-1	5.0	566.3	Soft		
LS-1	7.5	563.8	Soft to Medium	18.7	111.2
LS-2	10.0	561.3	Stiff to V. Stiff	14.1	122.8
LS-3	12.5	558.8	Hard	12.5	125.4
LS-4	15.0	556.3	V. Stiff	12.8	126.8
LS-5	20.0	551.3	Firm to Stiff	13.1	125.3
LS-6	25.0	546.3	Firm to Stiff	14.7	121.3

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 205

See Test Boring Location Plan

LOCATION: N-3750; E-4800

TOTAL DEPTH: 25'10"

BORING STARTED: August 28, 1970

BORING COMPLETED: August 28, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R. Budzeika

CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 1⅜ inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used for all LS samples; 2.00" O.D. Heavy wall sampler used for BS-1.

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 37 TB 3

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

APPR: [illegible] | DATE: 6-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 570.5 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — 560 — 550 — 540

- TOPSOIL; Med. Dk. Gr. SEMI-ORG. CLAYEY SILT. 1'8"
- Soft to Med. Brown (w/Some Gray) SILT, w/Some Fine Sand & Clay. 5'8"
- Med to Firm Brown & Gray SILTY CLAY, w/Few Sand Partings. 8'4"
- Firm Brown VERY SILTY CLAY, w/Some Sand, Little Gravel. 10'6"
- Firm Mottled Gray SILTY CLAY, w/Some Sand, Little Gravel. 13'6"
- Firm to Stiff Gray VERY SILTY CLAY, w/Little Sand, Traces of Gravel. 16'6"
- Firm to Stiff Dk. Gr. VF SDY. SILTY CLAY, w/Little Gravel, Some Rock Frags. (GLACIAL TILL) 27'4"

Hole dry augered; ground water seepage encountered between d=1'8" & d= 5'8".

Hole grouted w/1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-3200; E-4600

TOTAL DEPTH: 27'4"

BORING STARTED: August 28, 1970

BORING COMPLETED: August 31, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R. Budzeika

CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne* Evaluated Blows/Foot

ROCK CORE DIAMETER: None

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows/Ft.*

	Ne
0 20 40 60 80 100	
	6
	6
	6
	11
	18
	17
	17
	19
10 30 50 70 90	

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

1404 1476 8880 4032 4657

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used for LS samples;
2.00" O.D. Heavy wall sampler used for BS-1 & No Recovery samples.

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	565.5	Soft to Medium		
LS-1	7.5	563.0	Firm to Stiff	16.4	117.6
LS-2	10.0	560.5	Firm to V Stiff	13.9	122.2
LS-3	12.5	558.0	Firm	13.1	125.6
LS-4	15.0	555.5	Firm to Stiff	12.6	126.9
LS-5	20.0	550.5	Firm to Stiff	13.1	125.0
No Rec.	25.0	545.5			
No Rec.	27.3	543.2			

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 206

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 38 TB 38

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

S&FA FORM 6-7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 570.2 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — 84 ▽

TOPSOIL: Med. Dk. Brn. SEMI-ORG. CLAYEY SILT. 1'

Medium to Firm Brn & Gr. V. SILTY CLAY, w/Traces of Fine Sand.

Stiff Brown (w/Some Red) V. SILTY CLAY, w/Silt Partings, Traces Sd. & Gray.

560 — Stiff Gray (w/Some Red) V. SILTY CLAY, w/Some Fine Sand, Little Gravel.

Stiff Brown & Gray SILTY CLAY, w/Traces of Sand & Gravel.

V. Stiff Gray SILTY CLAY, w/Some Sd. & Gray., Few Pk. Frags.

Firm to Stiff Gray SILTY CLAY, w/Some Sand & Traces of Gravel.

550 — Refusal; Boulder or Bedrock? (could not penetrate)

Hole dry augered, no ground water encountered.

540 — Hole grouted w/1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

See Test Boring Location Plan

LOCATION: N-2600; E-4300

TOTAL DEPTH: 21'6"

BORING STARTED: August 28, 1970

BORING COMPLETED: August 28, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R. Budzeika

CONTRACTOR: Able Drilling

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 9 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Nem Evaluated Blows/Foot

ROCK CORE DIAMETER: None

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

Ne
8
17
19
18
15
19

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

1296 5760 1080 6240 6720 7200 6480 6624

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

** 1.75" O.D. Michigan Liner Sampler used for all LS samples; 2.00" O.D. Heavy wall sampler used for BS-1

SOIL SAMPLE DATA

Lab & Field Sa. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	565.2	Medium		
LS-1	7.5	562.7	V. Stiff	13.5	122.7
LS-2	10.0	560.2	V. Stiff	12.0	126.9
LS-3	12.5	557.7	Hard	13.7	122.8
LS-4	15.0	555.2	Hard	12.0	126.2
LS-5	20.0	550.2	Firm to Stiff	13.4	122.6

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 207

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 39 TB39

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 9-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 570.2 Ft. (IGLD Datum)

ELEVATION IN FEET

570 — TOPSOIL;Med.Dk.Brn.SFMI-ORG.V.SLY.CLAY 10"

Medium Brown & Gray VERY SILTY CLAY, w/Some Fine Sand, Traces of Gravel. 5'6"

V.Stiff Mtld.Brown VERY SILTY CLAY, w/Some Fine Sand, Traces of Gravel. 8'4"

560 — Hard Brown SILTY CLAY, w/Some Fine Sand, Traces of Gravel. 10'6"

Stiff to Hard Gray (w/Traces of Brown) VF SANDY SILTY CLAY, w/Traces of Gravel & Rock Frags. (GLACIAL TILL)

550 — 20'6"

V.Hard Dk.Gray VF SANDY SILTY CLAY, w/Some Gravel & Rock Fragments. (GLACIAL TILL)

540 — 30'0"

Hole dry augered; no ground water encountered.

Hole grouted w/2 bags of bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

Ne	
7	
19	
21	
19	Broken in Liner
12	
17	
43	
39	Broken in Liner

C248 C248 7680 8160 5520 7968 7704 9690 15890 14400

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

Lab & Field Sa. No	Sample Depth, Feet	Samp Elev Feet	Consistency *	Moisture %	Dry Unit Weight p.c.f
BS-1	5.0	565.2	Medium		
LS-1	7.5	562.7	V. Stiff to Hard	13.6	123.8
LS-2	10.0	560.2	Hard	12.8	126.6
LS-3	12.5	557.7	V. Stiff	11.1	132.8
LS-4	15.0	555.2	Stiff	12.8	125.6
LS-5	20.0	550.2	Hard	9.9	132.2
LS-6	25.0	545.2	V. Hard	11.5	127.5
LS-7	30.0	540.2	V. Hard	11.2	130.3

See Test Boring Location Plan

LOCATION: N-1500; E-3400

TOTAL DEPTH: 30'0"

BORING STARTED: August 27, 1970

BORING COMPLETED: August 27, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R. Pudzeika

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 1.75" inch O.D. soil sampler 30 inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used for LS-1 thru LS-6; 2.00" O.D. Heavy wall sampler used for BS-1 & LS-7.

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 208

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. LO TB 40

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 6-7-71 | JOB NO. 128-A

S&FA FORM C-7

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 571.6 Ft. (IGLD Datum)

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

Lab & Field Sa. No	Sample Depth Feet	Elevation	Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	566.6	Medium		
LS-1	7.5	564.1	Firm to Stiff	17.5	115.2
LS-2	10.0	561.6	Hard	13.2	124.5
LS-3	12.5	559.1	Firm	12.9	123.2
LS-4	15.0	556.6	Firm	13.7	121.5
LS-5	20.0	551.6	Stiff	12.3	125.7
LS-6	25.0	546.6	V. Stiff to Hard	12.1	128.4

570 — TOPSOIL, Med. Dk. Brn., SEMI-ORG. V. SILTY CLAY 11"

Soft to Med. Brown & Gray SILTY CLAY, w/Little Sand.

5'6"

Med. to Firm Mtld. Brown V. SILTY CLAY, w/Traces of Sand & Gravel.

8'4"

560 — Hard Brown to Gray SILTY CLAY, w/Traces of Fine Sand & Gravel.

10'6"

Firm Gray VF SANDY SILTY CLAY, w/Little Gravel & Few Rock Frags. (GLACIAL TILL)

15'6"

550 — Stiff to Hard Dk. Gray VF SDY. SILTY CLAY, w/Little Gravel & Some Rock Frags. (GLACIAL TILL)

25'6"

540

* Encountered ground water w/hole at d=8'6"; drilling stopped for 16 hours and ground water rose 2 ft. to El.568.6.

Hole continued by dry augering.

Hole grouted w/1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

Ne	Approx. Solids	Water
5		
6		
28	Transition Zone	
14		
16		
21		
26		

1152 1512 3120 c720

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.

(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

10 30 50 70 90

See Test Boring Location Plan

LOCATION: N-1300; E-2400

TOTAL DEPTH: 25'0"

BORING STARTED: August 26, 1970

BORING COMPLETED: August 27, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R. Budzeika

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used for all LS samples; 2.00" O.D. Heavy wall sampler used for BS-1.

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 209

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 41 TB 41

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO	DATE: 6-7-71	JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 573.2Ft. (IGLD Datum)

Elev.	Description	Depth
	TOPSOIL;Med.Dk.Brn.SEMI-ORG.CLAYEY SILT.	1'5"
570	Firm Brown CLAYEY SILT, w/Pockets of Fine Sand.	5'8"
	Soft to Hard (Varies)Brown & Gray V.SILTY CLAY, w/Some Sand & Gravel.	8'6"
	Hard Brown SILTY CLAY, w/Tr. Sd.&Gravel	10'6"
560	V.Stiff to Hard Brown (w/Some Gray) SILTY CLAY, w/Traces Sand & Gravel.	15'8"
	V.Stiff to Hard Dk.Gray VF SDY.SILTY CLAY, w/Little Gravel, Few Rock Frags. (GLACIAL TILL)	20'0"
550	Hole dry augered; no ground water encountered.	
	Hole grouted w/1 bag of bentonite.	
	No water flow during final inspection on September 9, 1970.	

ELEVATION IN FEET

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

0 20 40 60 80 100

Ne
9
4
20
20
15
16

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids — Water

Transition Zone

1872
2160
18000
9600
5740
5856
5566

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.
(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field Sa No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	568.2	Firm		
LS-1	7.5	565.7	Soft — Hard —	27.6 17.6	96.9 114.5
LS-2	10.0	563.2	Hard	12.9	125.8
LS-3	12.5	560.7	Hard	13.1	125.9
LS-4	15.0	558.2	V. Stiff to Hard	13.3	124.1
LS-5	20.0	553.2	V. Stiff to Hard	12.4	125.3

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-1500; E-1400

TOTAL DEPTH: 20'0"

BORING STARTED: August 26, 1970

BORING COMPLETED: August 26, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R. Budzeika

CONTRACTOR: Able Drilling, Inc.

= WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler 12 inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used for all LS samples; 2.00" O.D. Heavy wall sampler used for BS-1

MON 210

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 42 TB 42

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: [illegible] DATE: 6-7-71 JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 576.4 Ft. (IGLD Datum)

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows *

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

SOIL SAMPLE DATA

570	Med.Dk.Brn. SEMI-ORG. V.SILTY CLAY.						
	Firm Reddish-Brown (w/Some Gray) VERY SILTY CLAY, w/Some Sand.	5'6"	10		Lab & Field So. No	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
					BS-1	5.0	571.4	Firm		
	V.Stiff to V.Hard Brown SILTY CLAY, w/Some Sand, Traces of Gravel.	10'6"	12		LS-1	7.5	568.9	V. Stiff to Hard	13.8	124.6
			30		LS-2	10.0	566.4	V. Hard	12.5	126.9
	Stiff to V.Hard (Varies)Gray(w/Some Brn.) SILTY CLAY,w/Few Sand Partings,Tr.Gray.	12'6"	24	Transition Zone	LS-3	12.5	563.9	Stiff to V. Hard	12.2	125.1
560	V.Stiff Gray SILTY CLAY, w/Some Sand, Little Gravel. (GLACIAL TILL?)	16'6"	17		LS-4	15.0	561.4	V. Stiff	12.6	124.1
	Hard Dk.Gray VF SDY. SILTY CLAY, w/Some Grav. & Bk. Frags.(GLACIAL TILL)	20'0"	22		LS-5	20.0	556.4	Hard	13.4	124.2
550	Hole dry augered; no ground water encountered.									
	Hole grouted w/1 bag of bentonite.									
	No water flow during final inspection on Sept. 9, 1970.									

1872 7920 2232 9600 4752 7680 6048 6528 7920 6960

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT. (BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

* Laboratory consistency based upon visual examination of sample, independent of field evaluation and strength determined by laboratory test.

MON 214

See Test Boring Location Plan

LOCATION: N-3100; W-1400

TOTAL DEPTH: 20'0"

BORING STARTED: August 24, 1970

BORING COMPLETED: August 24, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R.E. Budzeika

CONTRACTOR: Able Drilling, Inc.

▽ WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive ** inch O.D. soil sampler @ inches, using 140 lb. weight with 30 inch free fall. Ne= Evaluated Blows/Foot

ROCK CORE DIAMETER: None

** 1.75" O.D. Michigan Liner Sampler used for LS-1 thru LS-4; 2.00" O.D. Heavy wall sampler used for BS-1 and LS-5.

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

LOG OF TEST BORING NO. 46 TB46

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAO | DATE: 5-7-71 | JOB NO. 128-A

LOG OF SUBSURFACE PROFILE

Classifications by: Driller & S&FA

Ground Surface Elev. = 577.4 Ft. (IGLD Datum)

EVATION IN FEET

570

560

550

TOPSOIL; Soft Dk.Brn.SEMI-ORG.V.SILTY CLAY. 6'0"

Hard Lt.Brown & Gray CLAYEY SILT, w/Little Sand.

V.Hard Brown VERY SILTY CLAY, w/Traces of Sand & Gravel. 10'8"

Hard Gr.(w/Some Brn.) VF SDY. SILTY CLAY, w/Traces Gray.&Bk.Frags.(GLACIAL TILL?) 13'0"

Hard Dk.Gray VF SDY.SILTY CLAY, w/Little Gravel. Few Rock Fragments. (GLACIAL TILL) 20'0"

Hole dry augered; no ground water encountered.

Hole grouted w/1 bag of bentonite.

No water flow during final inspection on Sept. 9, 1970.

PENETRATION *

Soil Sampler Penetration Resistance, ASTM D 1586 Blows/Ft. *

0 20 40 60 80 100

Ne

22
23
26
23
21
29

10 30 50 70 90

TRANSVERSE SHEARING RESISTANCE & UNCONFINED COMPRESSIVE STRENGTH

Volumetric Proportions of Solids, Water and Air

0 20 40 60 80 100

Approx. Solids | Water

2580
1800
8/60
7392
5088
8/60
7490

0 200 400 600 800 1000

TRANSVERSE SHEARING RESISTANCE, LBS. PER SQ. FT.

0 800 1600 2400 3200 4000

ONE-HALF UNCONFINED COMPRESSIVE STRENGTH, LBS. PER SQ. FT.
(BASED UPON ORIGINAL CROSS-SECTION OF SPECIMEN)

SOIL SAMPLE DATA

Lab & Field So. No.	Sample Depth, Feet	Sample Elev., Feet	Laboratory Consistency *	Water Content % by Dry Wt.	Dry Unit Weight p.c.f.
BS-1	5.0	572.4	Hard		
LS-1	7.5	569.9	V. Hard	12.3	127.6
LS-2	10.0	567.4	Hard	13.3	122.8
LS-3	12.5	564.9	Hard	11.3	128.5
LS-4	15.0	562.4	V. Stiff	12.5	126.0
LS-5	20.0	557.4	Hard	11.6	127.2

* Laboratory consistency based upon visual examination of sample, independant of field evaluation and strength determined by laboratory test.

See Test Boring Location Plan

LOCATION: N-3950; W-1200

TOTAL DEPTH: 20'0"

BORING STARTED: August 24, 1970

BORING COMPLETED: August 24, 1970

INSPECTOR: M.M. Dragicevic (S&FA)

DRILLER: R.T. Budzeika

CONTRACTOR: Able Drilling, Inc.

WATER LEVEL in hole at indicated number of hours after completion of boring; 0 feet of casing in place.

* PENETRATION: Number of blows required to drive 2.00 inch O.D. soil sampler 6" inches, using 140 lb. weight with 30 inch free fall. Ne = Evaluated Blows/Foot

ROCK CORE DIAMETER: None

MON 215

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

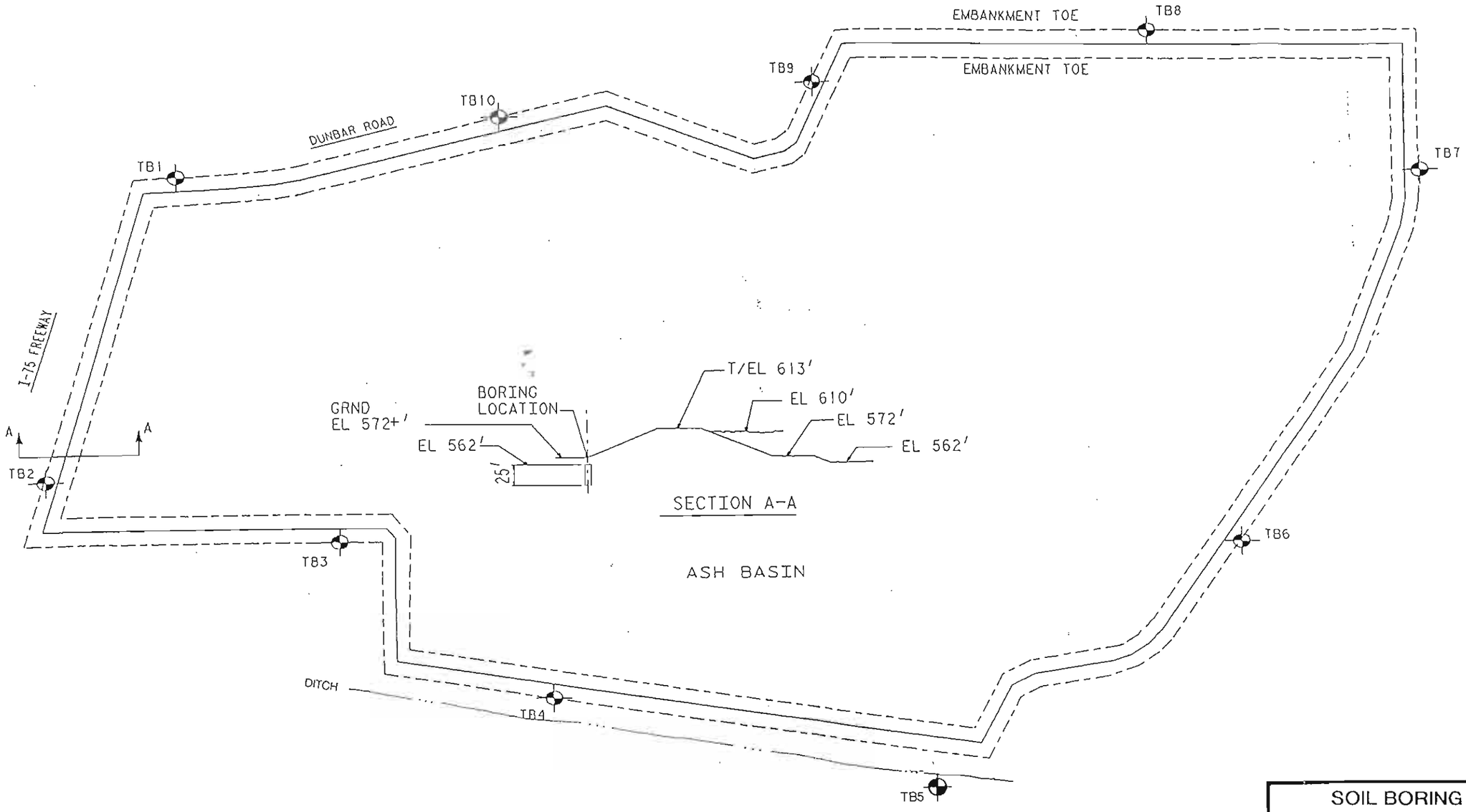
LOG OF TEST BORING NO. L7 TB47

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

APPR: GAA | DATE: 6-7-71 | JOB NO. 123-A

APPENDIX D – 1990’s BORING LOGS



NOTE:

THE SOIL BORING ELEVATIONS AND LOCATIONS WERE DETERMINED BY DETROIT EDISON.
TO THE BEST OF OUR KNOWLEDGE, THE BORINGS SHOWN ON THIS PLAN ARE AT THEIR APPROXIMATE LOCATIONS.

SOIL BORING LOCATION DIAGRAM
VERIFICATION OF SOIL BARRIER
MONROE, MICHIGAN

soil and materials engineers, inc

BAY CITY
KALAMAZOO
LANSING
PLYMOUTH
TOLEDO

Date	11-9-94
Drawn By	ARR
Scale	NTS
Job	PG 22087

soil and materials engineers, inc.

MON 844

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: SDN DATE: 9/12/94
JOB NUMBER: PG22087

BORING TB1
SHEET: 1

DRILLER: JH RIG: 26

ELEVATION (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE, NUMBER & INTERVAL
	GROUND SURFACE ELEVATION = 577	
575	Silty Clay Fill-Trace Sand, Gravel and Topsoil-Brown-Hard (CL-Fill)	CS1, CS2
570	Silty Clay-Some Sand-Trace Gravel-with Occasional Silt & Sand Seams & Layers-Mottled Brown-Hard (CL)	CS3, CS4, CS5, CS6
565		
560	Silty Clay-Some Sand-Trace Gravel-Gray-Hard (CL)	CS7, CS8
555	Silty Clay-Trace Sand & Gravel-with Fine Sand Layer from 24 to 25 feet-Gray-Hard (CL)	CS9, CS10, CS11, CS12
550		
545	Driller reported 1.5 feet of layered Shale & Limestone	CS13
540		
535		
530		
525		
520		

Notes:

1. Soil boring location 4519.60 North and -1114.24 East.
2. End of boring at 24 feet (elevation 543 feet).
3. Groundwater was not observed after completion of the drilling operations.

STANDARD PENETRATION - ○ (BLOWS/FOOT)
0 10 20 30 40 50

NATURAL DRY DENSITY - ◈ (LBS./CU. FT.)
110 120 130
MOISTURE % - ◆
LIMITS - ⊢—⊣
0 10 20 30 40

LEGEND
▽- PENETROMETER TEST
⊠- TORVANE SHEAR TEST
○- UNCONFINED COMPRESSION TEST

SHEAR STRENGTH (KIPS/SQ. FT.)
0 1 2 3 4 5
4.5+

WATER LEVEL OBSERVATIONS
▼ GROUNDWATER ENCOUNTERED DURING DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

soil and materials engineers, inc.

MON 845

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: SDN DATE: 9/20/94
JOB NUMBER: PG22087

BORING TB2
SHEET: 1

DRILLER: JH | RIG: 26

ELEVATION (FEET) | SYMBOLIC PROFILE | PROFILE DESCRIPTION | SAMPLE TYPE, NUMBER & INTERVAL

GROUND SURFACE ELEVATION = 578

575 — Silty Clay Fill-Trace Sand, Gravel, Topsoil and Brick Pieces- Brown-Hard to Very Stiff (CL-Fill) — CS1, CS2

570 — Silty Clay-Some Sand-Trace Gravel-Brown-Hard (CL) — CS3, CS4

565 — CS5, CS6

560 — CS7, CS8

555 — Silty Clay-Some Sand-Trace Gravel-Gray-Hard (CL) — CS9, CS10

550 — CS11, CS12

545 — Limestone — CS13

Notes:

1. Artesian water encountered at 32 feet (elevation 546 feet). Groundwater observed 1 foot above ground surface immediately after completion of drilling.
2. Soil boring location 2473.92 North and -1676.06 East.
3. End of boring at 33 feet (elevation 545 feet).

540
535
530
525
520
515

STANDARD PENETRATION - ○ (BLOWS/FOOT)
0 10 20 30 40 50

NATURAL DRY DENSITY - ◈ (LBS./CU. FT.)
110 120 130
MOISTURE % - ◆
LIMITS - ⊢⊣
0 10 20 30 40

LEGEND
▽- PENETROMETER TEST
⊠- TORVANE SHEAR TEST
○- UNCONFINED COMPRESSION TEST

SHEAR STRENGTH (KIPS/SQ. FT.)
0 1 2 3 4 5

4.5+ ▽→

WATER LEVEL OBSERVATIONS
▼ GROUNDWATER ENCOUNTERED DURING DRILLING
▼ GROUNDWATER 0 HOURS AFTER DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

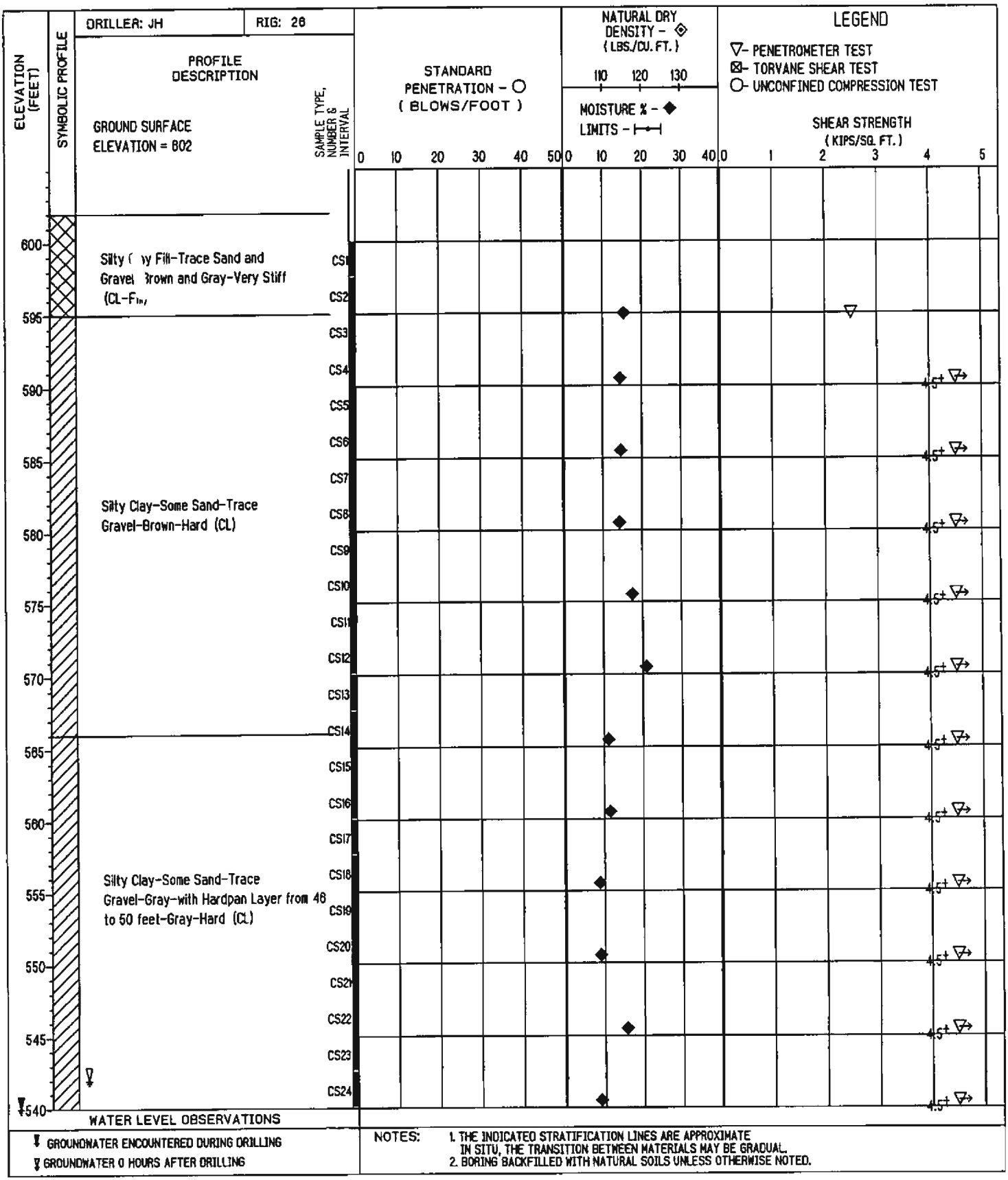
soil and materials engineers, inc.

MON 846

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: SDN DATE: 9/19/94
JOB NUMBER: PG22087

BORING TB3
SHEET: 1



WATER LEVEL OBSERVATIONS

▼ GROUNDWATER ENCOUNTERED DURING DRILLING

▼ GROUNDWATER 0 HOURS AFTER DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

soil and materials engineers, inc.

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: SDN DATE: 9/19/94
JOB NUMBER: PG22087

BORING TB3
SHEET: 2

DRILLER: JH | RIG: 26

ELEVATION (FEET)	SYMBOLIC PROFILE	PROFILE DESCRIPTION	SAMPLE TYPE, NUMBER & INTERVAL
		GROUND SURFACE ELEVATION = 602	
		Weathered Limestone	CS25
535		Notes:	
530		1. Soil boring location 2441.20 North and -291.12 East.	
525		2. End of boring at 63 feet (elevation 539 feet).	
520			
515			
510			
505			
500			
495			
490			
485			
480			
475			

STANDARD PENETRATION - ○ (BLOWS/FOOT)
0 10 20 30 40 50

NATURAL DRY DENSITY - ◈ (LBS./CU. FT.)
110 120 130
MOISTURE % - ◆
LIMITS - ⊢⊣
0 10 20 30 40

LEGEND
▽- PENETROMETER TEST
⊠- TORVANE SHEAR TEST
○- UNCONFINED COMPRESSION TEST

SHEAR STRENGTH (KIPS/SQ. FT.)
0 1 2 3 4 5

WATER LEVEL OBSERVATIONS
▼ GROUNDWATER ENCOUNTERED DURING DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

soil and materials engineers, inc.

MON 847

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON
A/E:
BY: SDN DATE: 9/16/94
JOB NUMBER: PG22087

BORING TB4
SHEET: 1

DRILLER: JH RIG: 28

PROFILE DESCRIPTION

GROUND SURFACE ELEVATION = 578

Silty Clay Fill-Trace to Some Sand, Trace of Gravel, Topsoil and Roots -Brown-Hard to Very Stiff (CL-Fill)

Silty Clay-Some Sand-Trace Gravel-Mottled Brown-Hard (CL)

Silty Clay-Some Sand-Trace Gravel-Gray-Hard (CL)

Silty Clay-Trace to Some Sand-Trace Gravel-Gray-Hard (CL)

Driller reported 1 foot of Limestone

Notes:

1. Soil boring location 1544.94 North and 368.61 East.
2. Artesian water encountered at 37 feet (elevation 541 feet).
3. End of boring at 38 feet (elevation 540 feet).

ELEVATION (FEET): 575, 570, 565, 560, 555, 550, 545, 540, 535, 530, 525, 520, 515

SAMPLE TYPE, NUMBER & INTERVAL: CS1, CS2, CS3, CS4, CS5, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14

STANDARD PENETRATION - ○ (BLOWS/FOOT): 0 10 20 30 40 50

NATURAL DRY DENSITY - ◈ (LBS./CU. FT.): 110 120 130

MOISTURE % - ◆

LIMITS - ⊢⊣: 0 10 20 30 40

LEGEND
▽- PENETROMETER TEST
⊠- TORVANE SHEAR TEST
○- UNCONFINED COMPRESSION TEST

SHEAR STRENGTH (KIPS/SQ. FT.): 0 1 2 3 4 5

4.5+ ▽→

WATER LEVEL OBSERVATIONS

⚷ GROUNDWATER ENCOUNTERED DURING DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

soil and materials engineers, inc.

MON 848

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: SDN DATE: 9/15/94
JOB NUMBER: PG22087

BORING TB5
SHEET: 1

DRILLER: JH RIG: 26

PROFILE DESCRIPTION

GROUND SURFACE ELEVATION = 575

Silty Clay Fill-Trace Gravel, Silt, Topsoil, Roots and Slag- Dark Gray-Very Stiff (CL-Fill)

Silty Clay-Some Sand-Trace Gravel-Mottled Brown-Very Stiff (CL)

Silty Clay-Some Sand-Trace Gravel-Gray-Very Stiff to Hard (CL)

Silty Clay-Some Sand-Trace of Gravel-Gray-Hard (CL)

Driller reported 2.5 feet of Limestone

Notes:

1. Soil boring location 1032.95 North & 2728.92 East.

2. End of boring at 49.5 feet (elevation 525.5 feet).

ELEVATION (FEET): 575, 570, 565, 560, 555, 550, 545, 540, 535, 530, 525, 520, 515

SYMBOLIC PROFILE

SAMPLE TYPE, NUMBER & INTERVAL: CS1, CS2, CS3, CS4, CS5, CS6, CS7, CS8, CS9, CS10, CS11, CS12, CS13, CS14, CS15, CS16, CS17, CS18, CS19

STANDARD PENETRATION - ○ (BLOWS/FOOT): 0 10 20 30 40 50

NATURAL DRY DENSITY - ◈ (LBS./CU. FT.): 110 120 130

MOISTURE % - ◆

LIMITS - ⊢⊣

SHEAR STRENGTH (KIPS/SQ. FT.): 0 1 2 3 4 5

LEGEND
- ▽- PENETROMETER TEST
- ⊠- TORVANE SHEAR TEST
- ○- UNCONFINED COMPRESSION TEST

4.5+

WATER LEVEL OBSERVATIONS

▼ GROUNDWATER ENCOUNTERED DURING DRILLING

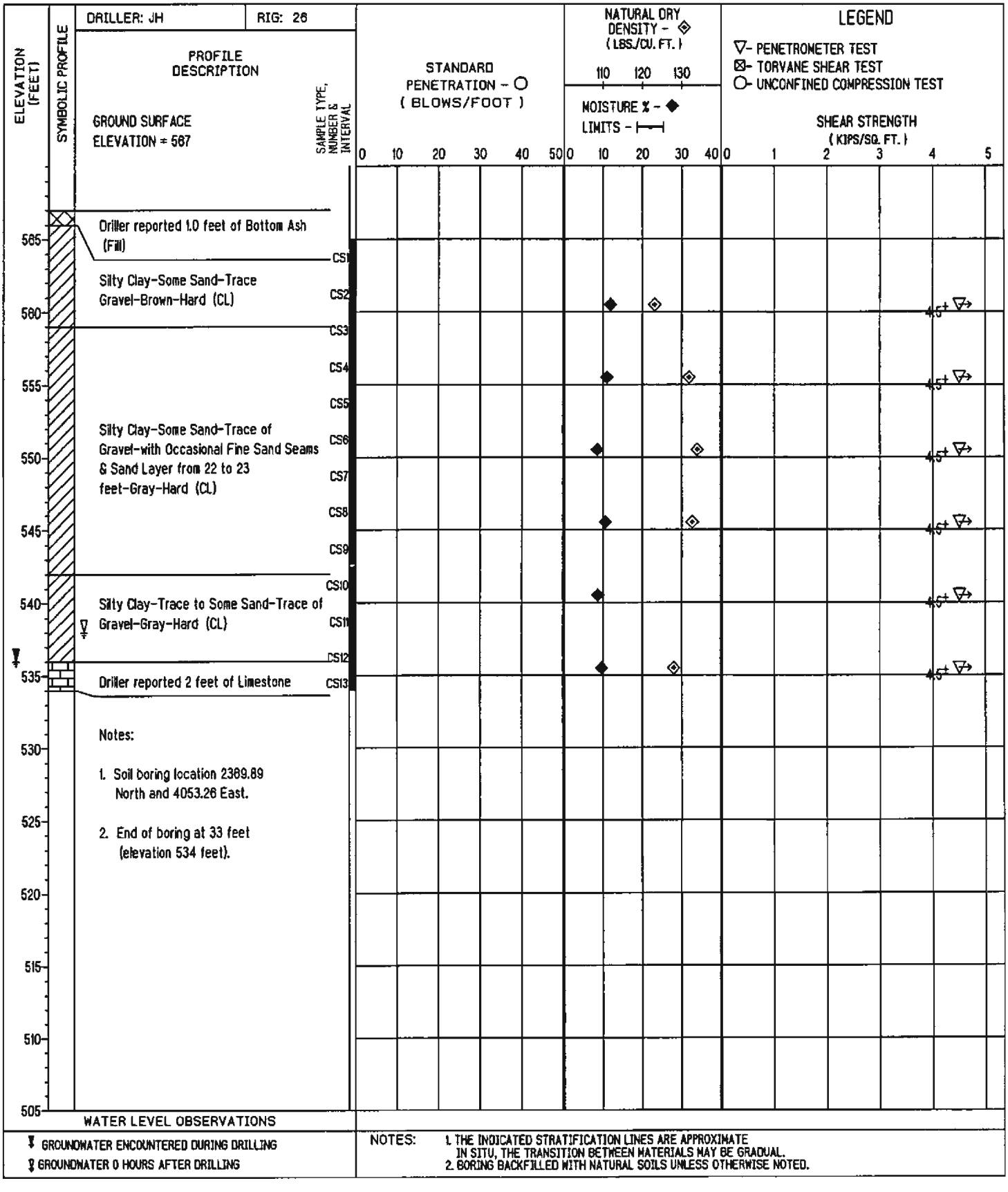
▼ GROUNDWATER 0 HOURS AFTER DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

soil and materials engineers, inc.

MON 849

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON
A/E:
BY: SDN DATE: 9/14/94
JOB NUMBER: PG22087
BORING TB6
SHEET: 1



Notes:

1. Soil boring location 2389.89 North and 4053.26 East.
2. End of boring at 33 feet (elevation 534 feet).

WATER LEVEL OBSERVATIONS

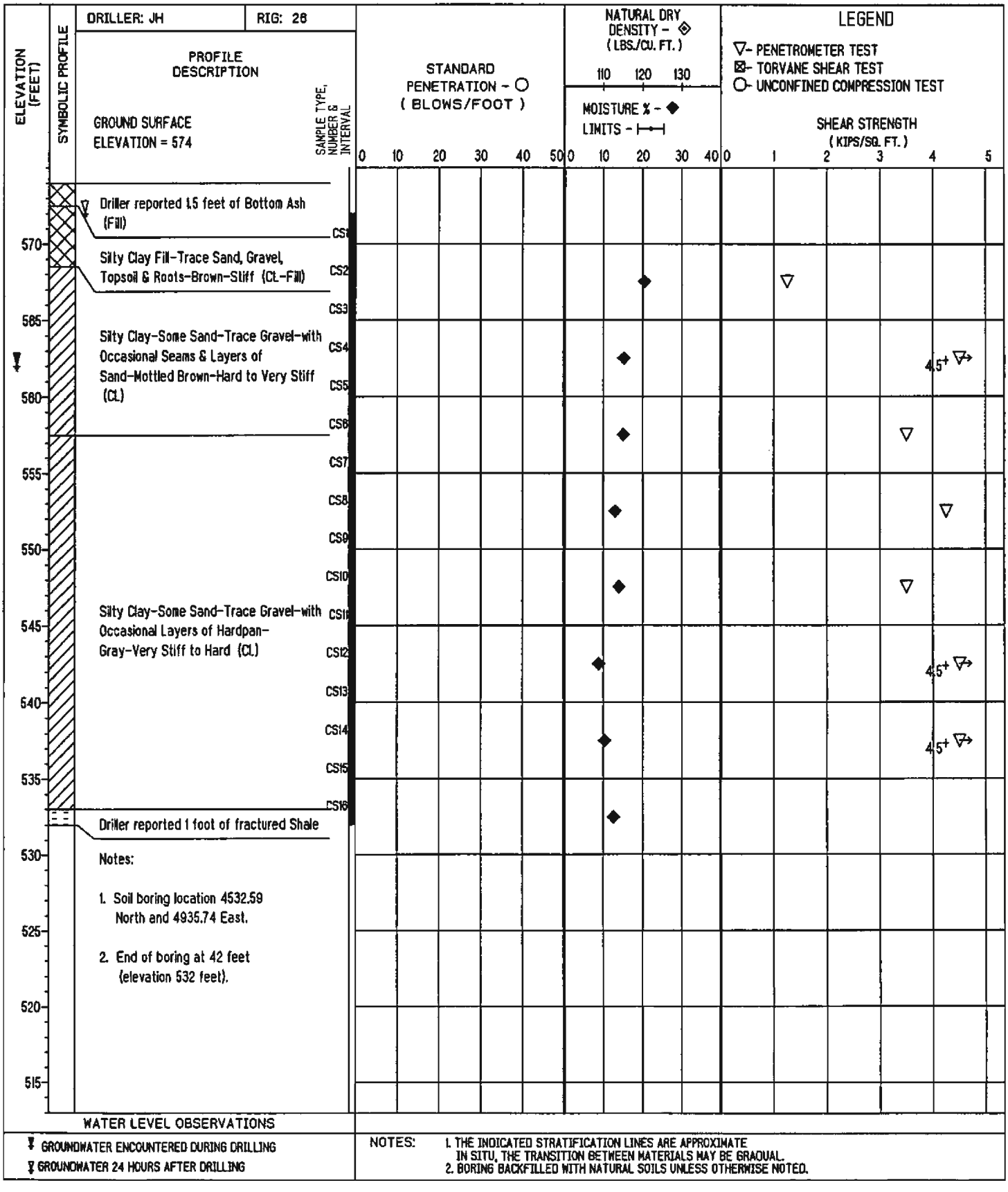
▼ GROUNDWATER ENCOUNTERED DURING DRILLING
▼ GROUNDWATER 0 HOURS AFTER DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

soil and materials engineers, inc.

MON 850

JOB NAME: VERIFICATION OF SOIL BARRIER A/E:
JOB LOCATION: MONROE, MICHIGAN BY: SDN DATE: 9/13/94 BORING TB7
OWNER: DETROIT EDISON JOB NUMBER: PG22087 SHEET: 1



WATER LEVEL OBSERVATIONS

▼ GROUNDWATER ENCOUNTERED DURING DRILLING
▽ GROUNDWATER 24 HOURS AFTER DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

soil and materials engineers, inc.

MON 851

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: LMJ/SDN DATE: 9/13/94
JOB NUMBER: PG22087

BORING TB8
SHEET: 1

DRILLER: JH | RIG: 26

ELEVATION (FEET)	PROFILE DESCRIPTION	SAMPLE TYPE, NUMBER & INTERVAL
	GROUND SURFACE ELEVATION = 578	
575	Silty Clay Fill-Trace Sand, Gravel and Brick-Brown-Very Stiff to Stiff (CL-Fill)	CS1, CS2
570	Silty Clay-Trace Sand and Gravel-with Occasional Sand Seams- Mottled Brown-Hard (CL)	CS3, CS4, CS5, CS6
560	Silty Clay-Some Sand-Trace of Gravel-with Occasional Sand Seams-Gray-Hard (CL)	CS7, CS8, CS9, CS10, CS11, CS12
545	Silty Clay-Some Sand-Trace of Gravel-with Occasional Silt Layers-Gray-Hard (CL)	CS13, CS14, CS15, CS16
535	Weathered Shale-with Occasional Silt & Sand Layers	CS17, CS18
530	Notes: 1. Soil boring location 5291.48 North and 3558.45 East. 2. End of boring at 46 feet (elevation 532 feet).	
520		

STANDARD PENETRATION - ○ (BLOWS/FOOT)
0 10 20 30 40 50

NATURAL DRY DENSITY - ◈ (LBS./CU. FT.)
110 120 130
MOISTURE % - ◆
LIMITS - ⊢⊣
0 10 20 30 40

LEGEND
▽- PENETROMETER TEST
⊠- TORVANE SHEAR TEST
○- UNCONFINED COMPRESSION TEST

SHEAR STRENGTH (KIPS/SQ. FT.)
0 1 2 3 4 5
4.5+

WATER LEVEL OBSERVATIONS
▼ GROUNDWATER ENCOUNTERED DURING DRILLING
▽ GROUNDWATER 0 HOURS AFTER DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

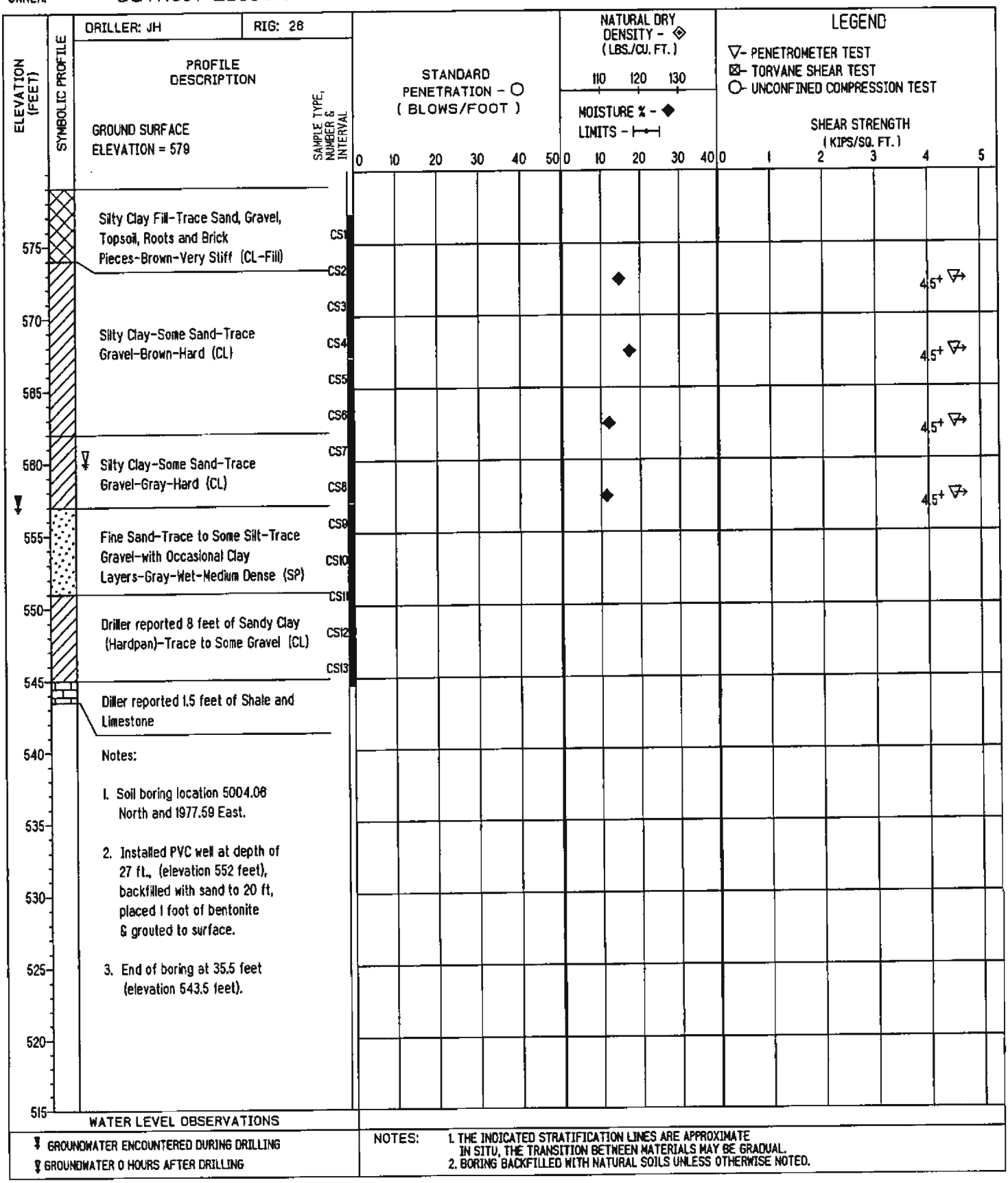
soil and materials engineers, inc.

MON 852

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: SDN DATE: 9/12/94
JOB NUMBER: PG22087

BORING TB9
SHEET: 1



WATER LEVEL OBSERVATIONS

▼ GROUNDWATER ENCOUNTERED DURING DRILLING
▼ GROUNDWATER 0 HOURS AFTER DRILLING

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

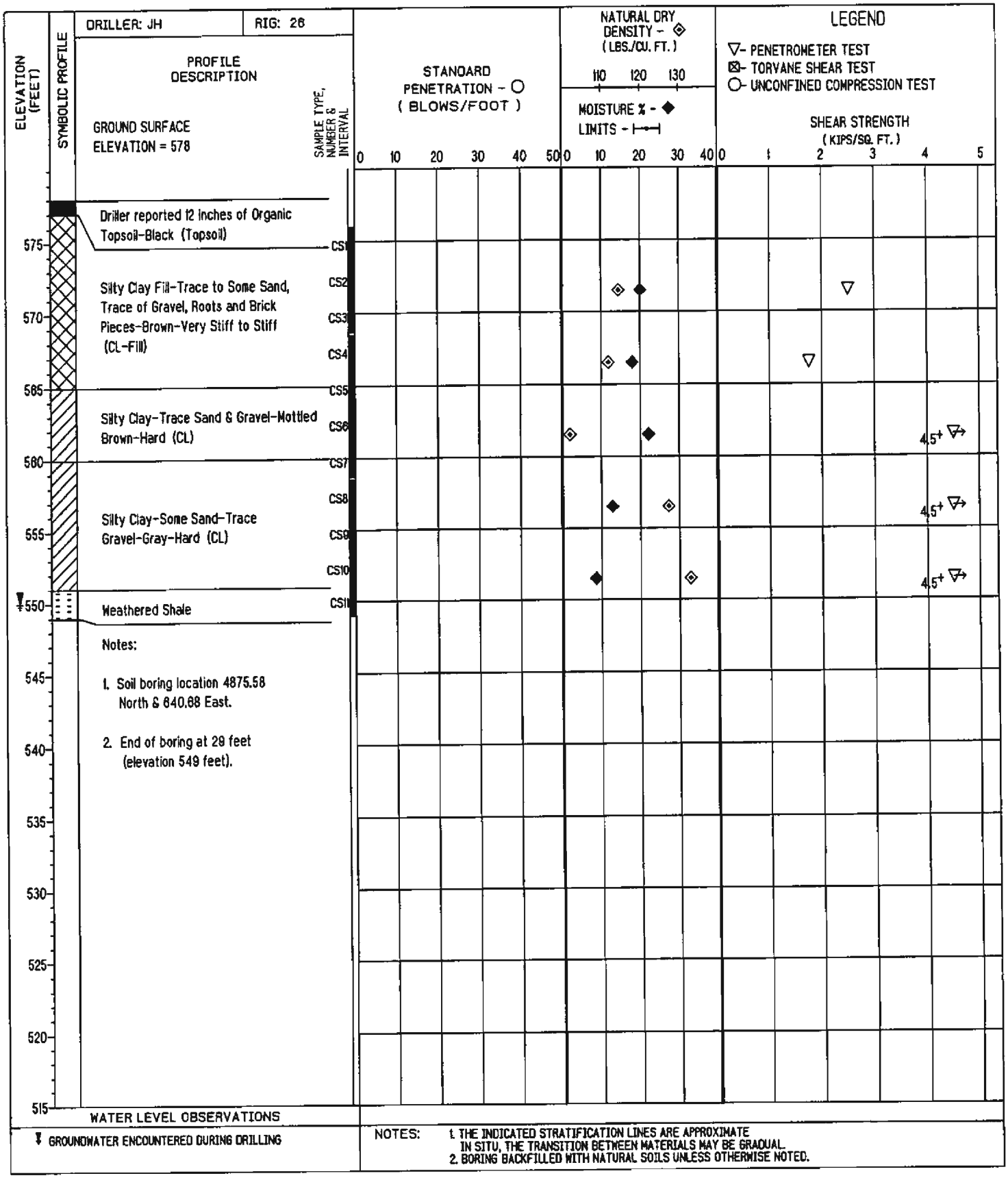
soil and materials engineers, inc.

MON 853

JOB NAME: VERIFICATION OF SOIL BARRIER
JOB LOCATION: MONROE, MICHIGAN
OWNER: DETROIT EDISON

A/E:
BY: SDN DATE: 9/9/94
JOB NUMBER: PG22087

BORING TB10
SHEET: 1



WATER LEVEL OBSERVATIONS

▼ GROUNDWATER ENCOUNTERED DURING DRILLING

Notes:

1. Soil boring location 4875.58 North & 640.68 East.
2. End of boring at 29 feet (elevation 549 feet).

NOTES:
1. THE INDICATED STRATIFICATION LINES ARE APPROXIMATE IN SITU, THE TRANSITION BETWEEN MATERIALS MAY BE GRADUAL.
2. BORING BACKFILLED WITH NATURAL SOILS UNLESS OTHERWISE NOTED.

APPENDIX E – 2016 BORING LOGS

LEGEND

- MONITORING WELLS
- APPROXIMATE BOUNDARY OF FLY ASH BASIN

NOTES

1. BASE MAP IMAGERY FROM ESRI/MICROSOFT, "WORLD IMAGERY", WEB BASEMAP SERVICE LAYER.
2. WELL LOCATIONS SURVEYED BY BMJ ENGINEERS AND SURVEYORS INC. IN MARCH AND MAY 2016.

N

0 600 1,200 Feet

1 " = 600 '

1:7,200

PROJECT:

DTE ELECTRIC COMPANY
MONROE POWER PLANT FLY ASH BASIN
7955 EAST DUNBAR ROAD
MONROE, MICHIGAN

TITLE:

MONITORING NETWORK AND SITE PLAN

DRAWN BY:	J. PAPEZ	PROJ NO.:	265996.0001
CHECKED BY:	C. SCIESZKA		
APPROVED BY:	V. BUENING		**FIGURE 1**
DATE:	OCTOBER 2017		

TRC
1540 Eisenhower Place
Ann Arbor, MI 48108-3284
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 265996-0001-000_Stat.mxd

Plot Date: 10/4/2017, 13:56:35 PM by SMAJOR - - LAYOUT: ANSI B(11"x17")
Path: E:\DTE\CCR_Sites\2017_265996\265996-0001-000_Stat.mxd

Coordinate System: NAD 1983 UTM Zone 17N (Meter)
Map Rotation: 0

TRC - GIS

WELL CONSTRUCTION LOG

TRC

WELL NO. MW-16-01

Facility/Project Name:	Date Drilling Started:	Date Drilling Completed:	Project Number:
DTE EC: Monroe FAB	2/17/16	2/17/16	231828.0001.0000

Drilling Firm:	Drilling Method:	Surface Elev. (ft)	TOC Elevation (ft)	Total Depth (ft bgs)	Borehole Dia. (in)
Stock Drilling	Sonic	578.91	581.74	60.0	6

Boring Location: SW of fly ash basin.	Personnel	Drilling Equipment:
N: 143121.86 E: 13394675.84	Logged By - Jennifer Reed Driller - Austin Goldsmith	TerraSonic

Civil Town/City/or Village:	County:	State:	Water Level Observations:		
Monroe, MI	Monroe	Michigan	While Drilling:	Date/Time	Depth (ft bgs)
			After Drilling:	Date/Time 3/17/16 08:45	Depth (ft bgs) 2.00

SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
1 CS	65		0	**SILTY CLAY** mostly clay, some silt, low plasticity, very dark gray (7.5YR 3/1), no odor, moist, medium stiff, high organic content, roots and grass.				
				Change to no roots at 3.5 feet.				
				Change to hard at 5.0 feet.				
				Change to medium stiff at 5.5 feet.				
				Change to trace to few gravel at 6.0 feet.				
2 CS	95		10	Change to medium plasticity, dark gray (10YR 4/1) mottled with yellowish brown (10YR 5/6), at 12.5 feet.				
				Change to dark gray (10YR 4/1), very stiff at 17.5 feet.				
3 ST	60		20					
4 CS	100				CL-ML			
5 CS	100		30	Change to weathered limestone appearance, light gray (10YR 7/1), slight odor, stiff at 32.5 feet.				
6 CS	95		40	Change to not cohesive at 42.5 feet. Change to little silt, few coarse sand at 43.5 feet. Change to some silt, trace coarse sand at 45.0 feet.				
				Grades to wet from 40 to 48 feet. Change to bedrock fragments encountered, wet at 48.0 feet.				
7 CS	100		50	**LIMESTONE** very weathered, light gray (10YR 7/1), moist, medium dense, similar to silt.				
				End of boring at 55.0 feet below ground surface.				

SOIL BORING WELL CONSTRUCTION LOG 231828.0001.GPJ TRC_CORP.GDT 231828.0001.0000 5/16/16

Signature: Reed

Firm: TRC Environmental Corporation
1540 Eisenhower Place Ann Arbor, Michigan
734-971-7080
Fax 734-971-9022

WELL CONSTRUCTION LOG

WELL NO. MW-16-02

Facility/Project Name:	Date Drilling Started:	Date Drilling Completed:	Project Number:
DTE EC: Monroe FAB	2/18/16	2/18/16	231828.0001.0000

Drilling Firm:	Drilling Method:	Surface Elev. (ft)	TOC Elevation (ft)	Total Depth (ft bgs)	Borehole Dia. (in)
Stock Drilling	Sonic	579.44	581.81	55.0	6

Boring Location: S of fly ash basin. N: 140938.78 E: 13396986.03	Personnel: Logged By - Jennifer Reed; Driller - Austin Goldsmith	Drilling Equipment: TerraSonic

Civil Town/City/or Village:	County:	State:	Water Level Observations:
Monroe, MI	Monroe	Michigan	While Drilling: Date/Time — Depth (ft bgs); After Drilling: Date/Time 3/17/16 09:30 — Depth (ft bgs) -4.82

SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
1 CS	90		0	**SILTY CLAY** mostly clay, some silt, trace to few sand, trace to few gravel, low plasticity, dark brown (10YR 3/3), no odor, moist, hard. Change to dry at 3.25 feet. Change to dark gray (10YR 4/1) at 5.0 feet.				Artesian well conditions present.
2 CS	95		10	Change to moist at 9.5 feet Change to very stiff at 10.5 feet. Change to dark gray (10YR 4/1), mottled with light reddish brown (5YR 6/3) at 12.0 feet.				
3 ST	65		20		CL-ML			
4 CS	100			Change to no mottling at 25.0 feet.				
5 ST	95		30					
6 CS	100							
7 CS	100		40	**SILTY CLAY WITH SAND** mostly clay, some silt, little fine to coarse sand, low plasticity, dark gray (10YR 4/1), no odor, moist, very stiff. Change to light gray (10YR 7/1), slight odor at 42.5 feet.	CL-ML			
8 CS	100		50	**SILTY CLAY** mostly clay, some silt, few gravel, very low plasticity, light gray (10YR 7/1), slight odor, moist, hard. Change to dry, not cohesive at 51.5 feet.	CL-ML			
				LIMESTONE weathered, slight odor, saturated.				
			60	End of boring at 60.0 feet below ground surface.				

SOIL BORING WELL CONSTRUCTION LOG 231828.0001.GPJ TRC_CORP.GDT 231828.0001.0000 5/16/16

Signature: Jreed

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734-971-7080
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WELL CONSTRUCTION LOG

TRC

WELL NO. MW-16-03

Facility/Project Name:	Date Drilling Started:	Date Drilling Completed:	Project Number:
DTE EC: Monroe FAB	2/16/16	2/16/16	231828.0001.0000

Drilling Firm:	Drilling Method:	Surface Elev. (ft)	TOC Elevation (ft)	Total Depth (ft bgs)	Borehole Dia. (in)
Stock Drilling	Sonic	577.29	579.95	50.0	6

Boring Location: E of fly ash basin. N: 139040.68 E: 13395136.56	Personnel: Logged By - Chris Scieszka; Driller - Austin Goldsmith	Drilling Equipment: TerraSonic

Civil Town/City/or Village:	County:	State:	Water Level Observations: While Drilling: Date/Time; After Drilling: Date/Time 3/17/16 09:25	Depth (ft bgs); Depth (ft bgs) -13.95
Monroe, MI	Monroe	Michigan		

SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
1 CS	70		0	**SILTY CLAY** mostly clay, some silt, low plasticity, very dark brown (10YR 2/2), no odor, moist, medium stiff (2.0 tsf), high organics, roots. Change to no roots, trace fine gravel at 2.5 feet. Change to wood fragments present at 8.0 feet.				Artesian well conditions present.
2 CS	60		10	Change to medium to high plasticity, dark gray (10YR 4/1), mottled with yellowish brown (10YR 5/6) and light reddish brown (5YR 6/3), no organics at 10.0 feet. Change to trace to few fine to coarse sand, trace to few fine gravel low plasticity, yellowish brown (10YR 5/4), at 12.0 feet. Change to dark gray (10YR 4/1), very stiff (3.0 tsf) at 17.0 feet.	CL-ML			
3 ST	100		20					
4 CS	100							
5 CS	100		30	Change to hard (>4.0 tsf) at 30.0 feet.				
6 CS	100		40	**SAND** mostly fine to coarse sand, trace to few silt, very dark gray (10YR 3/1), no odor, moist, loose.	SP			
				SILTY CLAY mostly clay, some silt, low plasticity, dark gray (10YR 4/1), no odor, moist, very stiff (3.0 tsf).	CL-ML			
				LIMESTONE light gray (10YR 7/1), slight odor, weathered, saturated. Change to very weathered, moist at 41.0 feet. Change to competent, dry.				
			50	End of boring at 50.0 feet below ground surface.				

SOIL BORING WELL CONSTRUCTION LOG 231828.0001.GPJ TRC_CORP.GDT 231828.0001.0000 5/16/16

Signature:

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734-971-7080
Fax 734-971-9022

WELL CONSTRUCTION LOG

TRC

WELL NO. MW-16-04

Facility/Project Name:	Date Drilling Started:	Date Drilling Completed:	Project Number:
DTE EC: Monroe FAB	2/15/16	2/15/16	231828.0001.0000

Drilling Firm.	Drilling Method:	Surface Elev. (ft)	TOC Elevation (ft)	Total Depth (ft bgs)	Borehole Dia. (in)
Stock Drilling	Sonic	582.64	585.54	50.0	6

Boring Location: N of fly ash basin.	Personnel	Drilling Equipment:
N: 140704.67 E: 13390758.97	Logged By - Chris Scieszka Driller - Austin Goldsmith	TerraSonic

Civil Town/City/or Village:	County:	State:	Water Level Observations:
Monroe, MI	Monroe	Michigan	While Drilling: Date/Time Depth (ft bgs) After Drilling: Date/Time 3/17/16 10:15 Depth (ft bgs) -19.40

SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
1 CS	20		0	**SILTY CLAY** mostly clay, little to some silt, trace to few fine to coarse sand, trace to few fine to coarse gravel, low plasticity, dark brown (10YR 3/3), no odor, dry, hard (>4.0 tsf).				Artesian well conditions present.
2 CS	100		10	Change to soft (0.5 tsf) at 10.0 feet.				
				Change to very stiff (3 to 4 tsf) at 15.0 feet.				
3 ST	80		20	Change to dark gray (10YR 4/1) at 19.0 feet.	CL-ML			
4 CS	100			Change to very stiff to hard (3 to >4 tsf) at 22.0 feet.				
5 CS	100		30	Change to cobble present at 29.5 feet. Change to hard (>4.0 tsf) at 31.0 feet.				
6 CS	80		40	**SILTY GRAVEL** mostly fine to coarse gravel, little to some silt, few fine to coarse sand, gray (10YR 5/1), no odor, saturated, medium dense to dense.	GM			
				SILTY SAND mostly fine to medium sand, little to some silt, gray (10YR 5/1), no odor, moist to saturated, dense to very dense.	SM ML			
			50	**SILT** mostly silt, trace to few fine sand, no plasticity, dark grayish brown (10YR 4/2), no odor, dry, very dense.				
				LIMESTONE gray (10YR 5/1) to dark gray (10 R 4/1), dry, competent but fractured. End of boring at 50.0 feet below ground surface.				

SOIL BORING WELL CONSTRUCTION LOG 231828.0001.GPJ TRC_CORP.GDT 231828.0001.0000 5/16/16

Signature:

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1540 Eisenhower Place Ann Arbor, Michigan
734-971-7080
Fax 734-971-9022

WELL CONSTRUCTION LOG

TRC

WELL NO. MW-16-05

Facility/Project Name:	Date Drilling Started:	Date Drilling Completed:	Project Number:
DTE EC: Monroe FAB	4/12/16	4/13/16	231828.0001.0000

Drilling Firm:	Drilling Method:	Surface Elev. (ft)	TOC Elevation (ft)	Total Depth (ft bgs)	Borehole Dia. (in)
Stock Drilling	Sonic	580.51	583.25	50.0	6

Boring Location: S edge of fly ash basin, along farm field edge. N: 139537.14 E: 13392810.51	Personnel: Logged By - Jennifer Reed; Driller - Austin Goldsmith	Drilling Equipment: TerraSonic

Civil Town/City/or Village:	County:	State:	Water Level Observations: While Drilling: Date/Time; After Drilling: Date/Time 5/5/16 12:47	Depth (ft bgs); Depth (ft bgs) -16.70
Monroe, MI	Monroe	Michigan		

SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
1 CS	75		0	**SILTY CLAY** mostly clay, little to some silt, low plasticity, very dark brown (10YR 2/2), no odor, moist, medium stiff, organic material present, roots and grass. Change to few to little fine to coarse sand at 2.5 feet. Change to brown (10YR 5/3), very stiff, no organic material at 5.0 feet. Change to trace to few gravel, gray (10YR 5/1) at 7.5 feet.	CL-ML			Artesian well conditions present.
2 CS	100		10					
3 CS	100		20					
4 CS	100		30	Change to no to trace fine to medium sand, no gravel, dark gray (10YR 4/1), hard at 30 feet.				
5 CS	100		40	**LIMESTONE** weathered, light gray (10YR 7/1), slight odor, moist to dry. Change to competent at 46.5 feet.				
			50	End of boring at 50.0 feet below ground surface.				

SOIL BORING WELL CONSTRUCTION LOG 231828.0001.GPJ TRC_CORP.GDT 231828.0001.0000 5/16/16

Signature:

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734-971-7080
Fax 734-971-9022

WELL CONSTRUCTION LOG

WELL NO. MW-16-06

Facility/Project Name:	Date Drilling Started:	Date Drilling Completed:	Project Number:
DTE EC: Monroe FAB	4/13/16	4/13/16	231828.0001.0000

Drilling Firm:	Drilling Method:	Surface Elev. (ft)	TOC Elevation (ft)	Total Depth (ft bgs)	Borehole Dia. (in)
Stock Drilling	Sonic	579.20	581.94	50.0	6

Boring Location: NE of fly ash basin, along the river's edge.	Personnel	Drilling Equipment:
N: 142566.72 E: 13396398.37	Logged By - Jennifer Reed Driller - Austin Goldsmith	TerraSonic

Civil Town/City/or Village:	County:	State:	Water Level Observations:		
Monroe, MI	Monroe	Michigan	While Drilling:	Date/Time	Depth (ft bgs)
			After Drilling:	Date/Time 5/5/16 09:30	Depth (ft bgs) -3.45

SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
1 CS	98		0	**CLAYEY SILT WITH SAND** mostly silt, few to little fine to coarse sand, few to little clay, black (10YR 2/1), no odor, moist, medium stiff, high organic content, roots and grass. Change to very dark gray (10YR 3/1) at 2.5 feet.	ML-CL			Artesian well conditions present.
				SILTY CLAY mostly clay, some silt, few to little fine to coarse sand, light yellowish brown (10YR 6/4), moist, medium stiff. Change to brown (10YR 5/3), very stiff to hard at 7.0 feet.				
2 CS	100		10	Change to dark gray (10YR 4/1), hard at 11.5 feet. Change to no to trace sand at 15.0 feet.	CL-ML			
3 CS	100		20	**SILTY CLAY WITH SAND** mostly clay, some silt, little fine to coarse sand, dark gray (10YR 4/1), moist, hard.				
4 CS	100		30		CL-ML			
5 CS	100		40					
				GRAVEL AND COBBLES large broken limestone boulders, and cobbles, saturated.	GP			
			50	End of boring at 50.0 feet below ground surface.				

SOIL BORING WELL CONSTRUCTION LOG 231828.0001.GPJ TRC_CORP.GDT 231828.0001.0000 5/19/16

Signature: Reed

Firm: TRC Environmental Corporation
1540 Eisenhower Place Ann Arbor, Michigan
734-971-7080
Fax 734-971-9022

WELL CONSTRUCTION LOG

WELL NO. MW-16-07

Facility/Project Name:	Date Drilling Started:	Date Drilling Completed:	Project Number:
DTE EC: Monroe FAB	4/14/16	4/14/16	231828.0001.0000

Drilling Firm:	Drilling Method:	Surface Elev. (ft)	TOC Elevation (ft)	Total Depth (ft bgs)	Borehole Dia. (in)
Stock Drilling	Sonic	575.41	578.40	40.0	6

Boring Location: N of fly ash basin, S of E Dunbar Road, W of main gate.	Personnel	Drilling Equipment:
N: 143408.82 E: 13392311.01	Logged By - Jennifer Reed Driller - Austin Goldsmith	TerraSonic

Civil Town/City/or Village:	County:	State:	Water Level Observations:		
Monroe, MI	Monroe	Michigan	While Drilling:	Date/Time	Depth (ft bgs)
			After Drilling:	Date/Time 5/5/16 10:44	Depth (ft bgs)

SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (%)	BLOW COUNTS	DEPTH IN FEET	LITHOLOGIC DESCRIPTION	USCS	GRAPHIC LOG	WELL DIAGRAM	COMMENTS
			0	**TOPSOIL**				
1 CS	95			**SILTY CLAY** mostly clay, some silt, few to little sand, brown (10YR 5/3) to gray (10YR 5/1), no odor, moist, medium stiff.				Artesian well conditions present.
			10	Change to dark gray (10YR 4/1) at 9.5 feet.	CL-ML			
2 CS	100							
			20					
3 CS	100			**SANDY SILT WITH CLAY** mostly silt, little sand, little clay, dark gray (10YR 4/1), moist, medium to very stiff. Change to little to some sand at 25.0 feet.				
			30	Change to gray (GLEY1 5/N), crumbly at 28.5 feet.	ML-CL			
4 CS	100			Change to wet at 35.0 feet.				
				LIMESTONE weathered, light gray (10YR 7/1), slight odor, wet.				
			40	Change to saturated at 39.5 feet.				
				End of boring at 40.0 feet below ground surface.				
			50					

SOIL BORING WELL CONSTRUCTION LOG 231828.0001.GPJ TRC_CORP.GDT 231828.0001.0000 6/6/16

Signature: Austin Smith for J Reed

Firm: TRC Environmental Corporation
1540 Eisenhower Place Ann Arbor, Michigan
734-971-7080
Fax 734-971-9022

APPENDIX F – 2020 BORING LOGS

Geosyntec consultants	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-1	
Drilling Start Date:	12/1/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/2/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample	
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-	
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8847	-83.3855

Elevation (ft. amsl)	LITHOLOGY	RECOVERY (ft.)	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615		6'/6'	B-1-1 (0-6')	GRAVEL (GP) - Gray gravel fill with coarse sand SILTY CLAY (CL) - Dark brown, slight reddish brown mottling, trace coarse and fine gravel, little sand, stiff to hard, moist	>4.5, 1.5, 3.5, 1.0	Boring drilled through the crest of the embankment at Station 90+00
610						
605		10.5'/ 10'	B-1-2 (6-16')	Becomes grayish brown to brown Becomes dark brown, more gravelly Becomes less gravelly	2.0, 4.0, 3.0, 4.0, 1.0, 3.5, 1.0	
600		4'/4'	B-1-3 (16-20')	Becomes medium stiff to very stiff	1.0, 1.0, 2.0, 0.5	
595		50%	B-1-ST-1 (20-22.5')	Becomes light brown	>4.5	
590		6'/3.5'	B-1-4 (22.5-26')	Becomes dark brown, slight reddish brown mottling, some coarse gravel and sand, trace fine gravel, stiff to hard, moist	4.0, 1.5, 2.0	

Geosyntec consultants	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant	Boring: B-1

Drilling Start Date:	12/1/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/2/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample	
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-	
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8847	-83.3855

Elevation (ft. amsl)	LITHOLOGY	RECOVERY (ft.)	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
585		9.5'/ 10'	B-1-5 (26-36')	Same as above, little sand Becomes more gravelly from 32' to 35'	2.0, 4.0, 4.5, 4.0, 1.5	
580						
		6'/4'	B-1-6 (36-40')		4.0, 4.5	
575				Becomes medium to dark brown, some sand, hard, moist		
		75%	B-1-ST-2 (40-42.5')		>4.5	
		6'/3.5'	B-1-7 (42.5-46')		>4.5	
570				Becomes gray to dark gray, some brown mottling, some coarse gravel and sand, hard, moist to dry		
				Same as above, few gravel		
565		11'/10'	B-1-8 (46-56')	Same as above, very stiff to hard	>4.5, 3.5, 2.5, 3.0, 2.5, 4.5, 4.0	
560						

Geosyntec consultants	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant	Boring: B-1

Drilling Start Date:	12/1/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/2/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample	
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-	
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8847	-83.3855

Elevation (ft. amsl)	LITHOLOGY	RECOVERY (ft.)	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
555		5.5'/ 4'	B-1-9 (56-60')	Same as above, very stiff	3.0, 2.0	
		100%	B-1-ST-3 (60-62.5)	Become gray to dark gray, some brown mottling, some coarse gravel and sand, hard, moist to dry	4.5	
550		5'/3.5'	B-1-10 (62.5-66')	Becomes dark gray, some coarse and fine gravel, some sand, very stiff to hard, moist	4.5, 4.5	
					3.0	
545		9'/10'	B-1-11 (66-76')	Same as above, beomces few gravel		Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout
540				End of boring at 76'		

Geosyntec consultants engineers | scientists | innovators	**Client: DTE Energy** **Project: DTE Monroe Alternative Liner Demonstration Boring Logs** **Monroe Power Plant**		**Boring: B-2**	
Drilling Start Date:	12/2/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/3/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample	
Drilling Method:	Sonic	**GW During Drilling (ft. bgs)**	-	
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8816	-83.3816

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615				GRAVEL (GP) - Gray gravel fill with sand from 0" to 4"		
				SILTY CLAY (CL) - Light brown silty clay, some sand, few coarse and fine gravel, stiff to hard, moist		
		4'/6'	B-2-1 (0'-6')		>4.5, 2.5, 3.5, 2.5	Boring drilled through the crest of the embankment at Station 110+00
610						
				Becomes few gravel, little sand, medium stiff to hard, moist		
				Becomes more sandy from 6' to 8'		
605		7'/10'	B-2-2 (6'-16')		1.0, 2.5, 1.5, 4.5, 0.5, 0.5	
600				Becomes more gravelly from 15' to 17'		
		3'/4'	B-2-3 (16'-20')		0.5, 0.5, 1.0	
595		75%	B-2-ST-2 (20'-22')		1.0	
				Becomes sandier, few coarse and fine gravel, medium stiff to hard, moist		
		4'/4'	B-2-4 (22'-26')		1.0, >4.5, 3.5	
				Slight reddish-brown mottling from 24' to 25'		
590						

Geosyntec consultants	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant	Boring: B-2

Drilling Start Date:	12/2/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/3/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample	
Drilling Method:	Sonic	**GW During Drilling (ft. bgs)**	-	
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8816	-83.3816

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
585		8'/10'	B-2-5 (26'-36')	Same as above	2.0, 4.0, >4.5, 3.5, 1.5	
580						
		7'/10'	B-2-6 (36'-46')	Becomes dark brown, few reddish-brown mottling, coarse gravel, little sand, stiff to hard, moist	1.5, 2.5, >4.5, 2.5, 2.5, 1.5	
575						
570						
		10'/10'	B-2-7 (46'-56')	Becomes dark gray to brownish gray, few reddish-brown mottling, stiff to hard, moist	1.5, 3.0, 1.5, 2.5, >4.5, 4.5	
565						
560						

Geosyntec consultants engineers | scientists | innovators	**Client: DTE Energy** **Project: DTE Monroe Alternative Liner Demonstration Boring Logs** **Monroe Power Plant**		**Boring: B-2**	
Drilling Start Date:	12/2/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/3/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample	
Drilling Method:	Sonic	**GW During Drilling (ft. bgs)**	-	
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8816	-83.3816

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
555		10'/10'	B-2-8 (56'-66')	Becomes very stiff to hard Same as above, with white to light gray gravelly coarse sand, some coarse gravel from 59' to 60'	4.5, 2.5, >4.5, >4.5, >4.5	
550						
		10'/10'	B-2-9 (66'-76')	Becomes medium gray, moist to wet, slight odor Becomes more gravelly	>4.5, >4.5, 2.5, 1.5, 3.0, 2.0, 4.0	Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout
545						
540				*End of boring at 76'*		

Geosyntec consultants
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Client: DTE Energy

Project: DTE Monroe Alternative Liner Demonstration Boring Logs

Monroe Power Plant

Boring: B-3

Drilling Start Date:	12/3/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/3/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8785 -83.376

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615				GRAVEL (GP) - Gray gravel fill with coarse sand 0" to 6"		Boring drilled through the crest of the embankment at Station 130+00
				SILTY CLAY (CL) - Medium brown with few reddish-brown mottling, trace gravel, little sand, medium stiff to hard, moist to dry		
610		7'/10'	B-3-1 (0'-10')		2.5, 3.0, 4.5, >4.5, 0.5	
605				Same as above, with consistency from stiff to hard		
		3.5'/6'	B-3-2 (10'-16')		4.0, 1.5, 2.0	
600				Becomes less sandy, more silty		
				Same as above, becomes dark brown with few reddish-brown mottling, trace gravel, stiff to hard, moist to dry		
595		8'/10'	B-3-3 (16'-26')		1.5, 2.5, 2.5, 4.5	
				Slight reddish-brown mottling from 24' to 25'		
590						

Geosyntec consultants engineers | scientists | innovators	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-3	
Drilling Start Date:	12/3/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/3/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample	
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-	
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8785	-83.376

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
585		9'/10'	B-3-4 (26'-36')	Same as above	3.0, 3.0, 4.0, >4.5	
580						
575		10'/10'	B-3-5 (36'-46')	Same as above, no gravel	4.0, 2.5, 3.5, 4.5, >4.5	
570				Becomes less sandy, more silty		
565		10'/10'	B-3-6 (46'-56')	Some reddish-brown mottling, more gravelly Color changes gradually from brown to gray from 50 to 53'	>4.5, 3.5, 4.0, 3.5, 4.0, 3.0, 4.0, 3.0, 2.5	
560						

Geosyntec consultants engineers | scientists | innovators	**Client: DTE Energy** **Project: DTE Monroe Alternative Liner Demonstration Boring Logs** **Monroe Power Plant**	**Boring: B-3**

Drilling Start Date:	12/3/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/3/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8785 -83.376

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
555		10'/10'	B-3-7 (56'-66')	Becomes medium gray, trace gravel, little sand, moist Becomes more gravelly	3.0, 1.5, 0.5, 1.0, 1.5, <0.5	
550				Trace white fine sand, becomes more gravelly Becomes dark gray, more gravelly, some medium to coarse sand, few clay, dry		
545		10'/10'	B-3-8 (66'-76')	Same as above	>4.5, >4.5, >4.5, >4.5	Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout
540				*End of boring at 76'*		

Geosyntec consultants
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Client: DTE Energy

Project: DTE Monroe Alternative Liner Demonstration Boring Logs

Monroe Power Plant

Boring: B-4

Drilling Start Date:	12/4/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/4/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8779 -83.3696

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615		3.5'/6'	B-4-1 (0'-6')	GRAVEL (GP) - Gray gravel fill with coarse sand 0" to 6" Becomes light brown		Boring drilled through the crest of the embankment at Station 150+00
610						
605		3'/9'	B-4-2 (6'-15')	SILTY CLAY (CL) - Light to medium brown, little coarse gravel, few fine gravel, few sand, stiff to very stiff, moist	1.5, 1.5, 1.5, 2.5	
600		83%	B-4-ST-1 (15'-17')	Becomes trace gravel, little sand	4.0	
595		3.5'/4'	B-4-3 (17'-21')	Becomes less gravelly; few reddish-brown mottling	1.5, 1.5, 4.0	
590		4'/5'	B-4-4 (21'-26')		1.5, 2.0, 3.0	

Drilling Start Date:	12/4/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/4/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8779 -83.3696

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
			B-4-5 (26-30')	Same as above, with medium stiff to very stiff consistency	0.5, 3.5	
585		10'/14'	B-4-6 (30'-35')	Becomes medium to dark brown, very stiff to hard, moist to dry	2.0, 2.0, 2.5, 3.5	
580			B-4-7 (35'-40')	Same as above	>4.5, 3.5	
575		96%	B-4-ST-2 (40'-42')	Becomes brownish-gray from 39.5' to 40'	3.5	
		3'/4'	B-4-8 (42'-46')	Same as above	4.5	
570		11'/9'	B-4-9 (46'-51')	Becomes less gravelly	2.5, 4.5, 4.5	
565			B-4-10 (51'-55')	Becomes dark gray, few brown mottling, some fine gravel, little coarse gravel, little sand, very stiff to hard, dry	3.5, >4.5, >4.5, 3.5	
560		100%	B-4-ST-3 (55'-57.5')	Becomes trace gravel	> 4.5	

Drilling Start Date:	12/4/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/4/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8779 -83.3696

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
555		6/5.5'	B-4-11 (57.5'-63')		1.5, >4.5	
		3'/3'	B-4-12 (63'-66')	Becomes CL-ML, few gravel, some sand, stiff to hard, dry 3" dark gray sand seam at 65.5'	> 4.5	
550		6.5'/4'	B-4-13 (66'-70')	Becomes medium gray, little coarse black sand, few coarse and fine gravel, stiff to hard, moist	> 4.5, 2.5, 2.0	
545		83%	B-4-ST-3 (70'-72.5')		4.0	
		6'/3.5'	B-4-14 (72.5-76)	Becomes sandy, wet at 72.5' to 73.5'	1.5, >4.5	Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout
540				*End of boring at 76'*		

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Client: DTE Energy

Project: DTE Monroe Alternative Liner Demonstration Boring Logs

Monroe Power Plant

Boring: B-5

Drilling Start Date:	12/5/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/5/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Pitcher Barrel, Grab Sample
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8813 -83.3638

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615				GRAVEL (GP) - Gray gravel fill with coarse sand 0' to 1'		Boring drilled through the crest of the embankment at Station 170+00
		4'/6'	B-5-1 (0'-6')	SILTY CLAY - Medium to dark brown, little coarse gravel, few fine gravel, few sand, medium stiff to very stiff, moist	4.0, 4.0, 0.5, 2.0	
610						
		9.5'/10'	B-5-2 (6'-11')	Becomes trace gravel, little sand Trace reddish-brown mottling from 6' to 8'	1.5, 1.5, 2.5, 2.0, 1.0	
605						
			B-5-3 (11'-16')	Few gray silt 11' to 12'		
600						
		3'/5'	B-5-4 (16'-21')	Same as above, with medium stiff consistency Increasing gray silt from 17' to 22'	1.5, 1.5, 1.5	
595						
		2'/5'	B-5-5 (21'-26')	Becomes medium to dark brown, little coarse gravel, few fine gravel, few sand, very stiff, moist	3.5, 2.5	
590						

Drilling Start Date:	12/5/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/5/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Pitcher Barrel, Grab Sample
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8813 -83.3638

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
			B-5-6 (26'-31')	Becomes trace gravel, little sand		
585		8.5'/10'		Becomes dark brown, some coarse gravel, little fine gravel, little sand, very stiff to hard, moist to dry	4.5, 4.5, 4.5, >4.5, 3.5	
			B-5-7 (31'-36')			
580						
		7'/6'	B-5-8 (36'-42')	Becomes trace gravel, few sand	2.5, 4.5, 2.5	
575						
		4'/4'	B-5-9 (42'-46')	Same as above	>4.5, 2.5	
570						
			B-5-10 (46'-51')	Becomes less gravelly		
565		11'/10'		Becomes medium gray, very stiff to hard, moist to dry	>4.5, 2.5, 3.0, 2.0, >4.5,	
			B-5-11 (51'-56')			
560						

Drilling Start Date:	12/5/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/5/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Pitcher Barrel, Grab Sample
Drilling Method:	Sonic	**GW During Drilling (ft. bgs):**	-
Drilling Equipment:	600T	**GW After Drilling (ft. bgs):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8813 -83.3638

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
		6'/5'	B-5-12 (56'-61')	Same as above	4.0, 2.5	
555						
		5'/5'	B-5-13 (61'-66')	Becomes medium gray, stiff to very stiff Becomes less gravelly from 62' to 69'	3.5, 2.5	
550						
		2.5'/4'	B-5-14 (66'-70')	Same as above	1.5, 1.0, 2.0	
545		Attempted to collect Shelby Tube sample, no recovery				Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout
540		27%	B-5-ST-1 (73.5'-76')	SILTY SAND (SM), medium gray, trace gravel *End of boring at 76'*		

Geosyntec consultants engineers | scientists | innovators	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-6	
Drilling Start Date:	12/5/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/6/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8857	-83.362

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615				GRAVEL (GP) - Medium gray gravel fill with coarse sand 0' to 1.5'		Boring drilled through the crest of the embankment at Station 8+00
		6/6'	B-6-1 (0'-6')	SILTY CLAY (CL) - Medium brown, few reddish-brown mottling, some sand, little coarse and fine gravel, stiff to very stiff, moist to dry	3.5, 2.0, 1.5	
610						
			B-6-2 (6'-11')	Becomes trace gravel, little sand		
605		9.5'/10'			2.5, 3.5, 3.0, 1.5, 2.0	
			B-6-3 (11'-16")	Pockets of few gray silty clay from 12' to 14'		
600						
		4'/5'	B-6-4 (16'-21')	Same as above	2.0, 1.5	
595						
		4'/4'	B-6-5 (21'-25')	Becomes medium brown, few reddish-brown mottling, some sand, little coarse and fine gravel, very stiff, moist to dry	2.5, 3.0	
590						

Geosyntec consultants engineers | scientists | innovators	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-6	
Drilling Start Date:	12/5/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/6/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8857	-83.362

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
		73%	B-6-ST-1 (25'-27')	Becomes less sandy	3.5	
				Reddish-brown mottling becomes more abundant		
585			B-6-6 (27'-31')			
		11'/9'			4.0, 3.5, 1.5, 2.0, 4.0, 2.5	
			B-6-7 (31'-36')	Becomes few gravel, with pockets of gray silty clay		
580						
				Same as above, with very stiff to hard consistency		
		4'/4'	B-6-8 (36'-40')	Becomes less gravelly from 36' to 45'	>4.5, 4.5, 3.0, 2.5	
575						
		50%	B-6-ST-2 (40'-42.5')	Becomes trace gravel	>4.5	
			B-6-9 (42.5'-45')	Becomes medium brown, few reddish-brown mottling, some sand, little coarse and fine gravel, stiff to very stiff, moist to dry	3.0, 1.5	
570						
			B-6-10 (45'-50')	Becomes dark brown, some gray mottling, trace gravel, little sand, very stiff to hard, moist to dry		
		13.5'/ 12.5'			3.0, 2.0, >4.5, >4.5, >4.5, 2.5	
565						
			B-6-11 (50'-55')	Becomes medium gray, little coarse gravel, few fine gravel, few sand, very stiff to hard, moist to dry		
560						

Geosyntec consultants engineers | scientists | innovators	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-6	
Drilling Start Date:	12/5/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/6/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8857	-83.362

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
		100%	B-6-ST-3 (55'-57.5')	Becomes more sandy	>4.5	
555		2.5'/ 2.5'	B-6-12 (57.5'-60')	Becomes dark gray, some coarse gravel, little fine gravel, little sand, hard, dry	>4.5	
550		5'/5'	B-6-13 (60'-65')	Becomes trace gravel	>4.5, >4.5, >4.5	
		100%	B-6-ST-4 (65'-67.5')		>4.5	
545		9'/7.5'	B-6-14 (67.5'-70')	Becomes less gravelly	>4.5	
540			B-6-15 (70'-76')	Becomes more gravelly Some coarse gray sand *End of boring at 76'*	>4.5, >4.5	Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout

Geosyntec consultants
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Client: DTE Energy

Project: DTE Monroe Alternative Liner Demonstration Boring Logs

Monroe Power Plant

Boring: B-7

Drilling Start Date:	12/6/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/6/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8878 -83.3688

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615				GRAVEL (GP) - Gray gravel fill with coarse sand 0' to 1'		Boring drilled through the crest of the embankment at Station 28+00
		4'/6'	B-7-1 (0'-6')	SILTY CLAY (CL) - Medium to dark brown, few reddish-brown mottling, trace gravel, little sand, stiff to very stiff, moist to dry	3.5, 3.5, 2.0	
610						
		8'/10'	B-7-2 (6'-11')	Becomes less gravelly and sandy Few gray silty clay from 7' to 20'	2.0, 1.5, 2.0, 2.5, 2.5, 3.5	
605			B-7-3 (11'-16')	Same as above		
600		4'/5'	B-7-4 (16'-21')	Same as above, with consistency from medium stiff to hard	2.0, 2.5, 4.5	
595		4'/5'	B-7-5 (21'-26')	Becomes medium to dark brown, few reddish-brown mottling, stiff to very stiff, moist to dry	2.0, 1.5, 2.5	
590						

Geosyntec consultants	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-7	
Drilling Start Date:	12/6/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/6/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8878	-83.3688

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
585		9.5'/10'	B-7-6 (26-31")	Few grayish-black silty clay from 26' to 28'	2.0, 2.5, >4.5, 4.5, >4.5, 4.5	
			B-7-7 (31'-36')	Becomes dark brown, some gray silty clay interspersed, little reddish-brown mottling, very stiff to hard, moist		
580						
		3'/5'	B-7-8 (36'-41')	Same as above	2.5, 4.5	
575						
		3'/5'	B-7-9 (41'-46')	Same as above	>4.5, 3.5	
570						
		9.5'/10'	B-7-10 (46'-51')	Becomes medium gray, moist to dry	4.0, 3.0, 3.0, >4.5	
565						
			B-7-11 (51'-56')			
560						

Geosyntec consultants engineers | scientists | innovators	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-7
Drilling Start Date:	12/6/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/6/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8878 -83.3688

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
		5.5'/5'	B-7-12 (56'-61')	Same as above, with hard consistency	4.0, 4.5, >4.5	
555						
		6'/4'	B-7-13 (61'-65')		2.5, 4.0	
				Becomes more sandy beginning at 64'		
550		100%	B-7-ST-1 (65'-67.5')		>4.5	
				Becomes medium to dark gray, hard, dry		
			B-7-14 (67.5'-71')		>4.5, >4.5, >4.5	
545						
		10.5'/ 8.5'		Becomes more gravelly		Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout
			B-7-15 (71'-76')			
540				Becomes moist to wet		
				End of boring at 76'		

Geosyntec consultants	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant	Boring: B-8

Drilling Start Date:	12/7/2020	**Boring Depth (ft):**	76		
Drilling End Date:	12/7/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing		
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample		
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-		
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-		
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615		
Logged By:	Sean Karoly	**Location (Y, X):**	41.8884	-83.3747	

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615		4'/6'	B-8-1 (0'-6')	GRAVEL (GP) - Light to medium gray gravel fill Becomes brown, clayey, and moist at 3' Becomes light gray, sandy at 4'		Boring drilled through the crest of the embankment at Station 48+00
610						
605		7'/10'	B-8-2 (6'-11') B-8-3 (11'-16")	SILTY CLAY (CL) - Medium to dark brown, few gravel, little sand, very stiff to hard, moist Same as above	4.0, 3.5, 3.0, 2.5, >4.5	
600		3.5'/5'	B-8-4 (16'-21')	Becomes trace gravel, stiff to very stiff consistency	3.0, 2.0, 3.0	
595		3.5'/5'	B-8-5 (21'-26')	Becomes medium to dark brown, stiff to very stiff Few gray silty clay from 23' to 26'	2.5, 2.0	
590						

Geosyntec consultants engineers | scientists | innovators	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-8	
Drilling Start Date:	12/7/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/7/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8884	-83.3747

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
			B-8-6 (26-31")	Same as above		
585		7.5'/10'			1.0, 3.5, 4.5	
			B-8-7 (31'-36')	Few gray silty clay at 32'		
580						
		6.5'/5'	B-8-8 (36'-41')	Becomes dark brown with few gray silty clay, few reddish-brown mottling very stiff to hard, moist	3.5, >4.5	
575						
		5'/5'	B-8-9 (41'-46')	Same as above	>4.5, >4.5, 3.5, 2.5	
570						
			B-8-10 (46'-51')	Becomes more gravelly		
565		12'/10'		Becomes medium to dark gray, few gravel, some reddish-brown mottling, few black mottling, moist to dry	3.5, 3.5, 3.5, >4.5, >4.5	
			B-8-11 (51'-56')			
560						

Geosyntec consultants
engineers | scientists | innovators

Client: DTE Energy

Project: DTE Monroe Alternative Liner Demonstration Boring Logs

Monroe Power Plant

Boring: B-8

Drilling Start Date:	12/7/2020	**Boring Depth (ft):**	76
Drilling End Date:	12/7/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Grab Sample
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615
Logged By:	Sean Karoly	**Location (Y, X):**	41.8884 -83.3747

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
555		6'/5'	B-8-12 (56'-61')	Becomes more sandy	2.5, 4.0, 4.5, >4.5	
550		6'/5'	B-8-13 (61'-66')	Becomes more gravelly and sandy at 65.5'	>4.5, >4.5, 2.5, 4.0	
545		8.5'/10'	B-8-14 (66'-71')	CLAYEY GRAVEL (GC) - Light to dark gray some sand and clay, wet, slight odor		
540			B-8-15 (71'-76')	Becomes sandier, dry, stronger odor *End of boring at 76'*		Borehole grouted with grout mixture; 25 to 30 gallons of water per 1 bag of Halliburton Quik-Grout 20% Solids Pumpable Bentonite Grout

Geosyntec consultants engineers | scientists | innovators	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant		Boring: B-9	
Drilling Start Date:	12/7/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/8/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8893	-83.3818

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
615		3.5'/6'	B-9-1 (0'-6')	GRAVEL - Light gray to light brown gravel fill with coarse sand from 0' to 6' Becomes sandy at 2'		Boring drilled through the crest of the embankment at Station 68+00
610						
605		9.5'/10'	B-9-2 (6'-11')	SILTY CLAY - Medium to dark brown, few coarse and fine gravel, few sand, very stiff to hard, moist	3.5, 2.5, 3.5, 4.5, 4.0	
			B-9-3 (11'-16")	Same as above		
600		5'/5'	B-9-4 (16'-21')	Becomes trace gravel, little sand	3.5, 4.0	
595		4'/4'	B-9-5 (21'-25')	Becomes less gravelly from 25' to 32'	>4.5, >4.5, 4.0	

Geosyntec consultants (engineers | scientists | innovators)	Client: DTE Energy Project: DTE Monroe Alternative Liner Demonstration Boring Logs Monroe Power Plant	Boring: B-9

Drilling Start Date:	12/7/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/8/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8893	-83.3818

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
590		100%	B-9-ST-1 (25'-27')	Becomes few sand	3.0	
		9.5'/9'	B-9-6 (27'-30')	Same as above, with very stiff to hard consistency	2.0, 3.0, >4.5, 4.0, 4.5	
585			B-9-7 (30'-36')	Pockets of gray silty clay from 33' to 36', becomes sandier		
580		4'/4'	B-9-8 (36'-40')	Becomes brownish gray from 36' to 38'	1.5, 3.5, 3.5	
575		100%	B-9-ST-2 (40'-42')	Becomes more gravelly	4.5	
		6'/4'	B-9-9 (42'-46')	Few pinkish-red clay at 42' Becomes dark brown, few reddish-brown mottling, trace gravel, little sand, hard, moist	4.5, >4.5	
570		11.5'/9'	B-9-10 (46'-50')		>4.5, 3.5, 3.0, 4.5	
565			B-9-11 (50'-55')	Becomes medium to dark gray, some reddish-brown mottling, few coarse and fine gravel, few sand, very stiff to hard, moist		

Geosyntec consultants engineers | scientists | innovators	**Client: DTE Energy** **Project: DTE Monroe Alternative Liner Demonstration Boring Logs** **Monroe Power Plant**		**Boring: B-9**	
Drilling Start Date:	12/7/2020	**Boring Depth (ft):**	76	
Drilling End Date:	12/8/2020	**Boring Diameter (in.)**	4.25 inner casing, 6 outer casing	
Drilling Company:	Cascade Drilling	**Sampling Method(s):**	Shelby Tube, Grab Sample, Pitcher Barrel	
Drilling Method:	Sonic	**DTW During Drilling (ft):**	-	
Drilling Equipment:	600T	**DTW After Drilling (ft):**	-	
Driller Name:	Rob Howell	**Ground Surface Elev. (ft):**	615	
Logged By:	Sean Karoly	**Location (Y, X):**	41.8893	-83.3818

Elevation (ft. amsl)	LITHOLOGY	RECOVERY	SAMPLE	MATERIAL DESCRIPTION	PENETROMETER	REMARKS
560		63%	B-9-ST-3 (55'-57')	Becomes sandier	4.0	
		6'/5'	B-9-12 (57'-60')	Becomes less sandy, hard consistency	4.0	
555		5'/5'	B-9-13 (60'-65')	Becomes more gravelly at 63'	>4.5, >4.5, 4.5	
				Becomes dark gray, sandy at 64.5'		
550		33%	B-9-ST-4 (65'-67')	*End of boring at 67' (refusal)*		

APPENDIX G – 1970’s LABORATORY TEST RESULTS

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

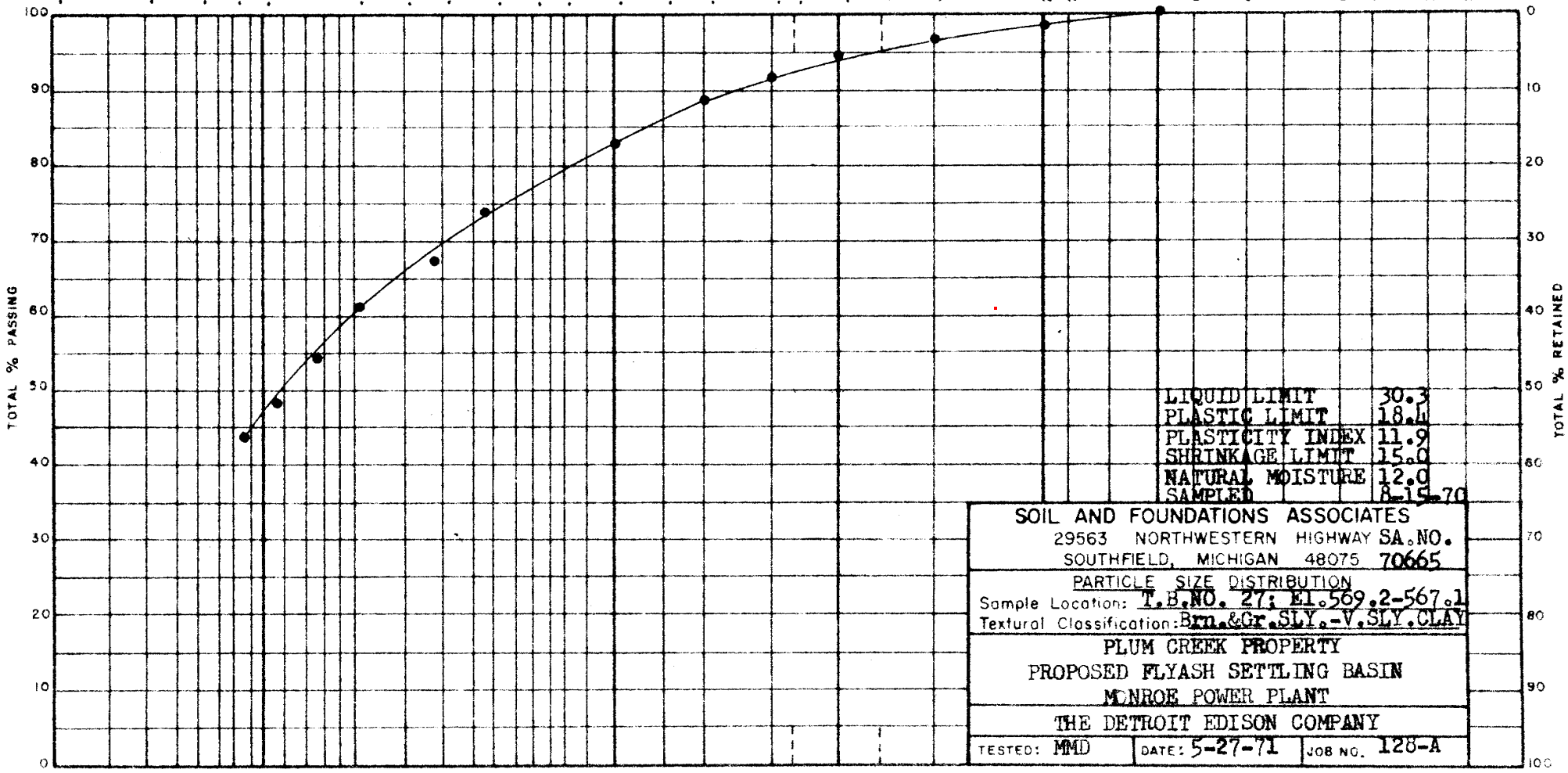
AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 47 %	Silt 36 %	Fine Sand 11 %	Medium Sand 05 %	C. Sand 01 %	Gravel 00 %

U.S SIEVE SERIES No. 200 140 100 60 40 20 10 4 1/4" 3/8" 1/2" 3/4" 1" 1-1/2" 2" 3"

Diameter in Millimeters

.001 .002 .003 .004 .005 .010 .015 .020 .030 .040 .050 .074 .105 .149 .250 .297 .420 .590 .840 2.00 2.38 3.36 4.76 6.35 9.52 12.7 19.1 25.4 38.1 50.8 76.2



LIQUID LIMIT	30.3
PLASTIC LIMIT	18.4
PLASTICITY INDEX	11.9
SHRINKAGE LIMIT	15.0
NATURAL MOISTURE	12.0
SAMPLED	8-15-70

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY SA.NO.
SOUTHFIELD, MICHIGAN 48075 70665

PARTICLE SIZE DISTRIBUTION
Sample Location: T.B.NO. 27; El.569.2-567.1
Textural Classification: Brn.&Gr.SLY.-V.SLY.CLAY

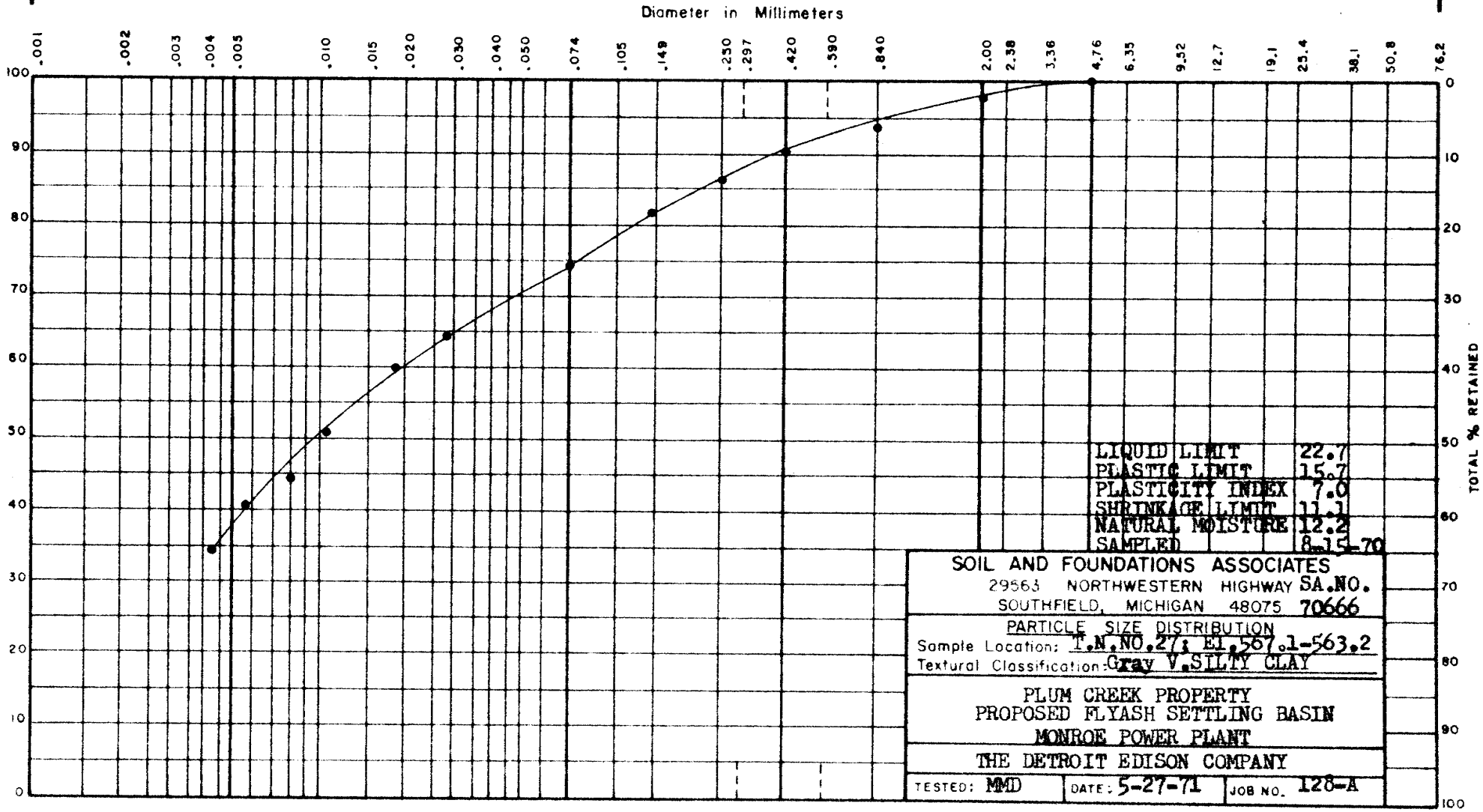
PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

TESTED: MMD | DATE: 5-27-71 | JOB NO. 128-A

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 38 %	Silt 36 %	Fine Sand 16 %	Medium Sand 08 %	C. Sand 02 %	Gravel 00 %



LIQUID LIMIT	22.7
PLASTIC LIMIT	15.7
PLASTICITY INDEX	7.0
SHRINKAGE LIMIT	11.1
NATURAL MOISTURE	12.2
SAMPLED	8-15-70

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

SA.NO. 70666

PARTICLE SIZE DISTRIBUTION
Sample Location: T.N.NO.27; El.567.1-563.2
Textural Classification: Gray V.SILTY CLAY

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

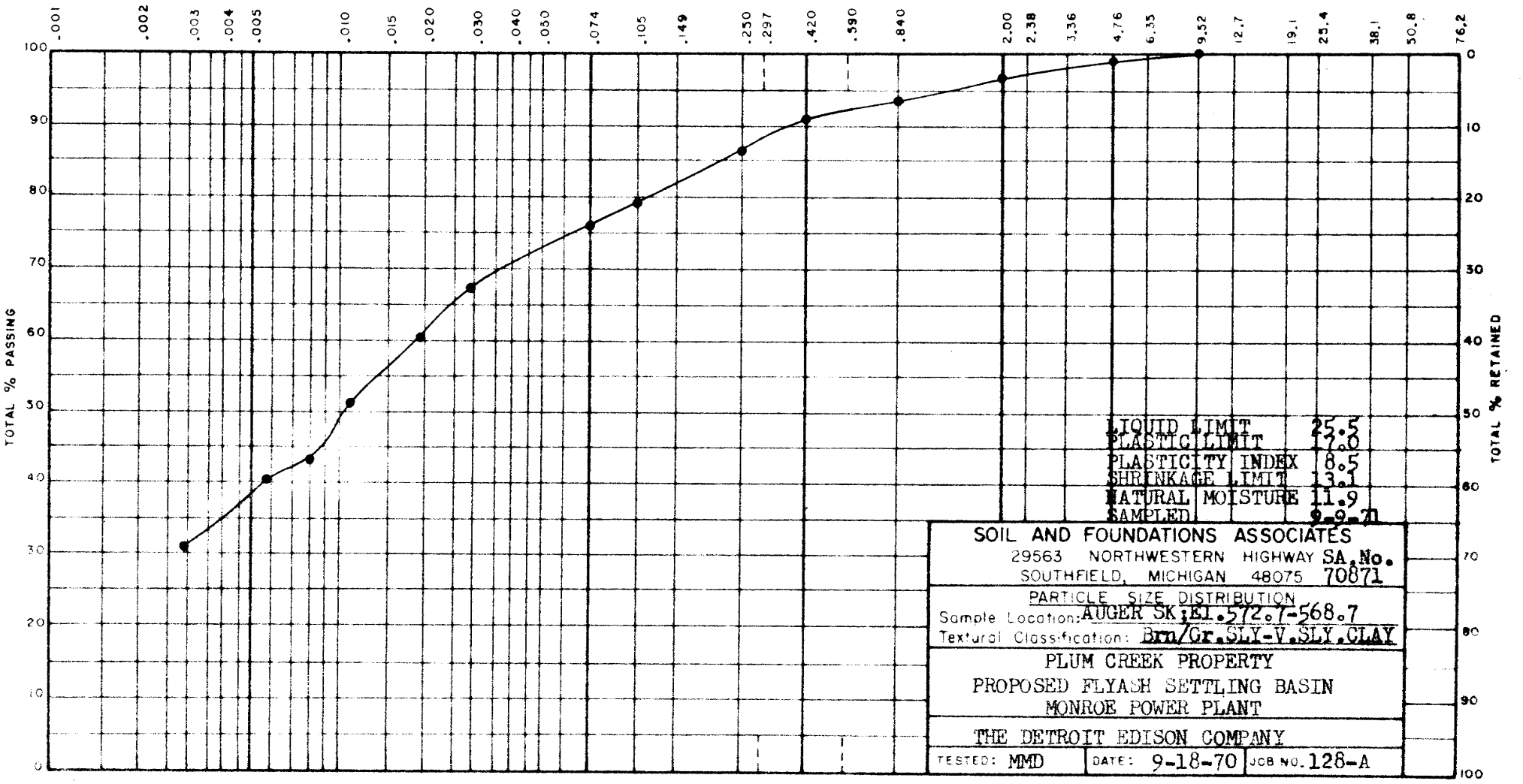
TESTED: MMD | DATE: 5-27-71 | JOB NO. 128-A

SFA FORM 6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 38 %	Silt 38 %	Fine Sand 15 %	Medium Sand 06 %	C. Sand 02 %	Gravel 01 %



LIQUID LIMIT	25.5
PLASTIC LIMIT	17.0
PLASTICITY INDEX	8.5
SHRINKAGE LIMIT	13.1
NATURAL MOISTURE	11.9
SAMPLED	9-9-70

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY SA. No.
SOUTHFIELD, MICHIGAN 48075 70871

PARTICLE SIZE DISTRIBUTION
Sample Location: AUGER SK; El. 572.7-568.7
Textural Classification: Brn/Gr. SLY-V. SLY. CLAY

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

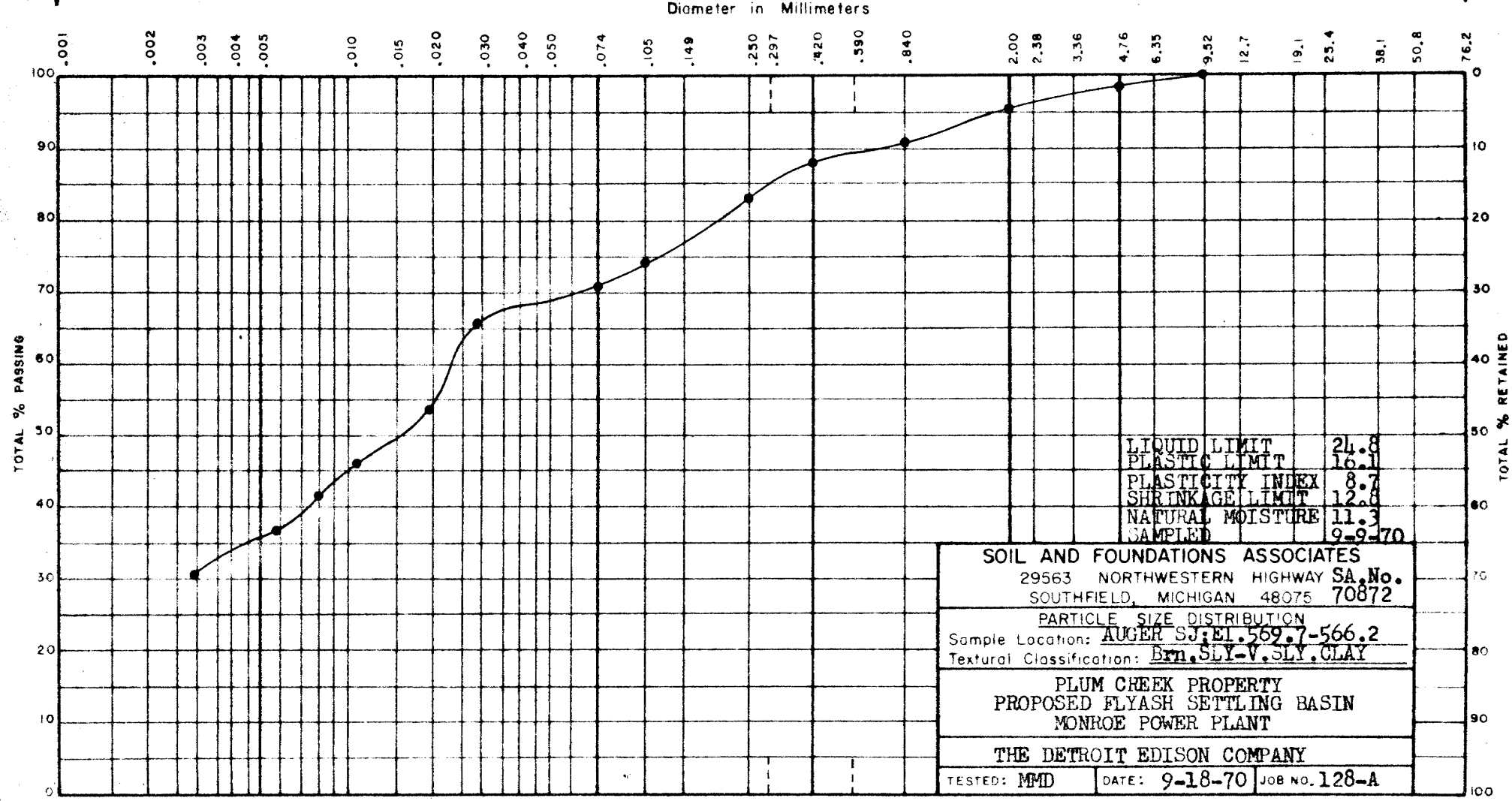
TESTED: MMD | DATE: 9-18-70 | JOB NO. 128-A

SFA FORM F-6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 36 %	Silt 35 %	Fine Sand 17 %	Medium Sand 08 %	C. Sand 03 %	Gravel 01 %



LIQUID LIMIT	24.8
PLASTIC LIMIT	16.1
PLASTICITY INDEX	8.7
SHRINKAGE LIMIT	12.8
NATURAL MOISTURE	11.3
SAMPLED	9-9-70

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

SA. No. 70872

PARTICLE SIZE DISTRIBUTION
Sample Location: AUGER SJ; El. 569.7-566.2
Textural Classification: Brn. SLY-V. SLY. CLAY

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

TESTED: MMD | DATE: 9-18-70 | JOB NO. 128-A

SFA FORM E-6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 34 %	Silt 35 %	Fine Sand 18 %	Medium Sand 07 %	C. Sand 03 %	Gravel 03 %

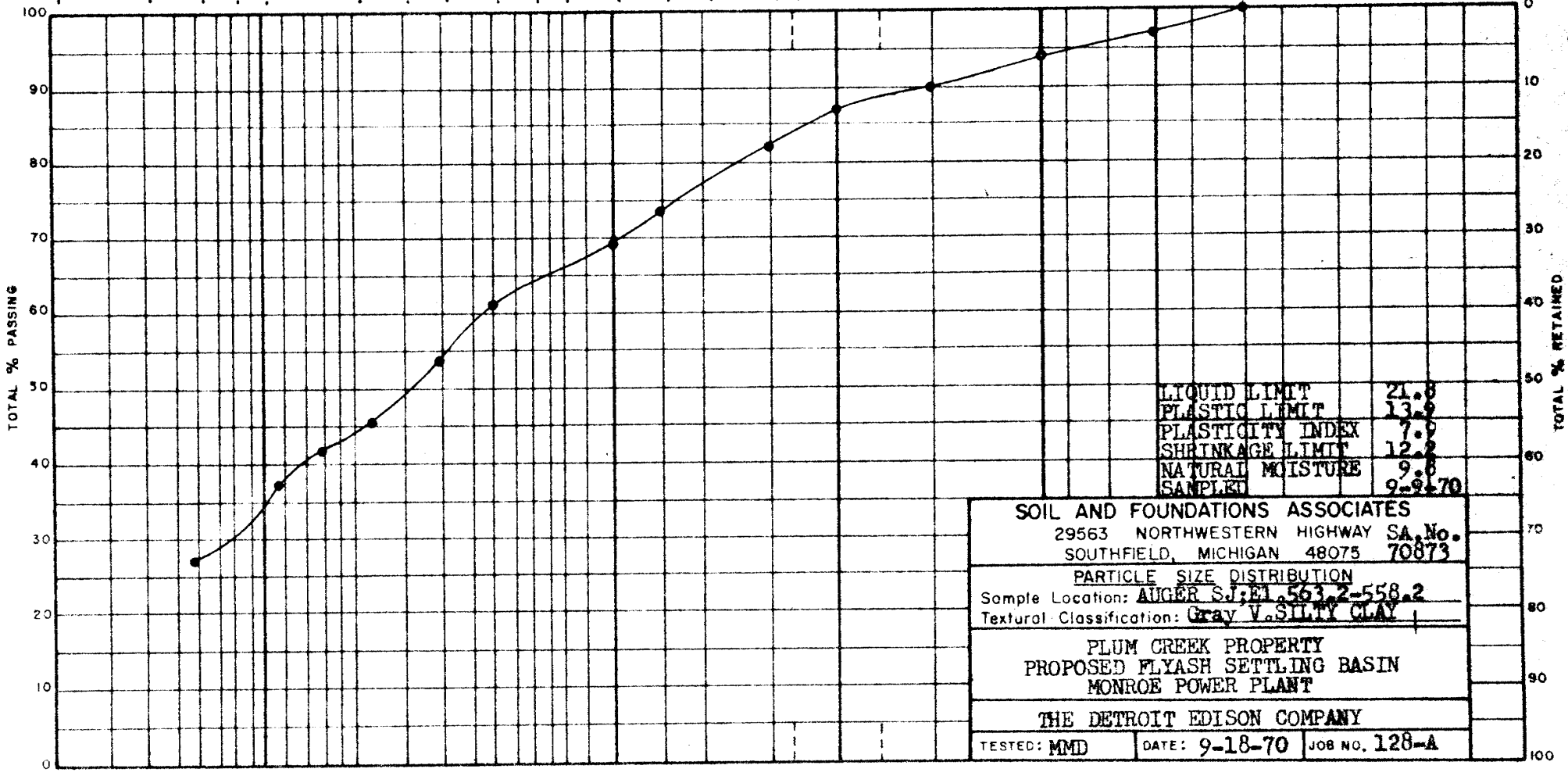
U.S. SIEVE SERIES No. 200 140 100 60 40 20 10 4 1/4" 3/8" 1/2" 3/4" 1" 1-1/2" 2"

Diameter in Millimeters

.001 .002 .003 .004 .005 .010 .015 .020 .030 .040 .050 .074 .105 .149 .250 .297 .420 .590 .840 2.00 2.38 3.36 4.76 6.35 9.52 12.7 19.1 25.4 38.1 50.8 76.2

TOTAL % PASSING

TOTAL % RETAINED



LIQUID LIMIT	21.8
PLASTIC LIMIT	13.9
PLASTICITY INDEX	7.9
SHRINKAGE LIMIT	12.2
NATURAL MOISTURE	9.8
SAMPLED	9-9-70

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

SA. No. 70873

PARTICLE SIZE DISTRIBUTION
Sample Location: AUGER S.J.;El.563.2-558.2
Textural Classification: Gray V. SILTY CLAY

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

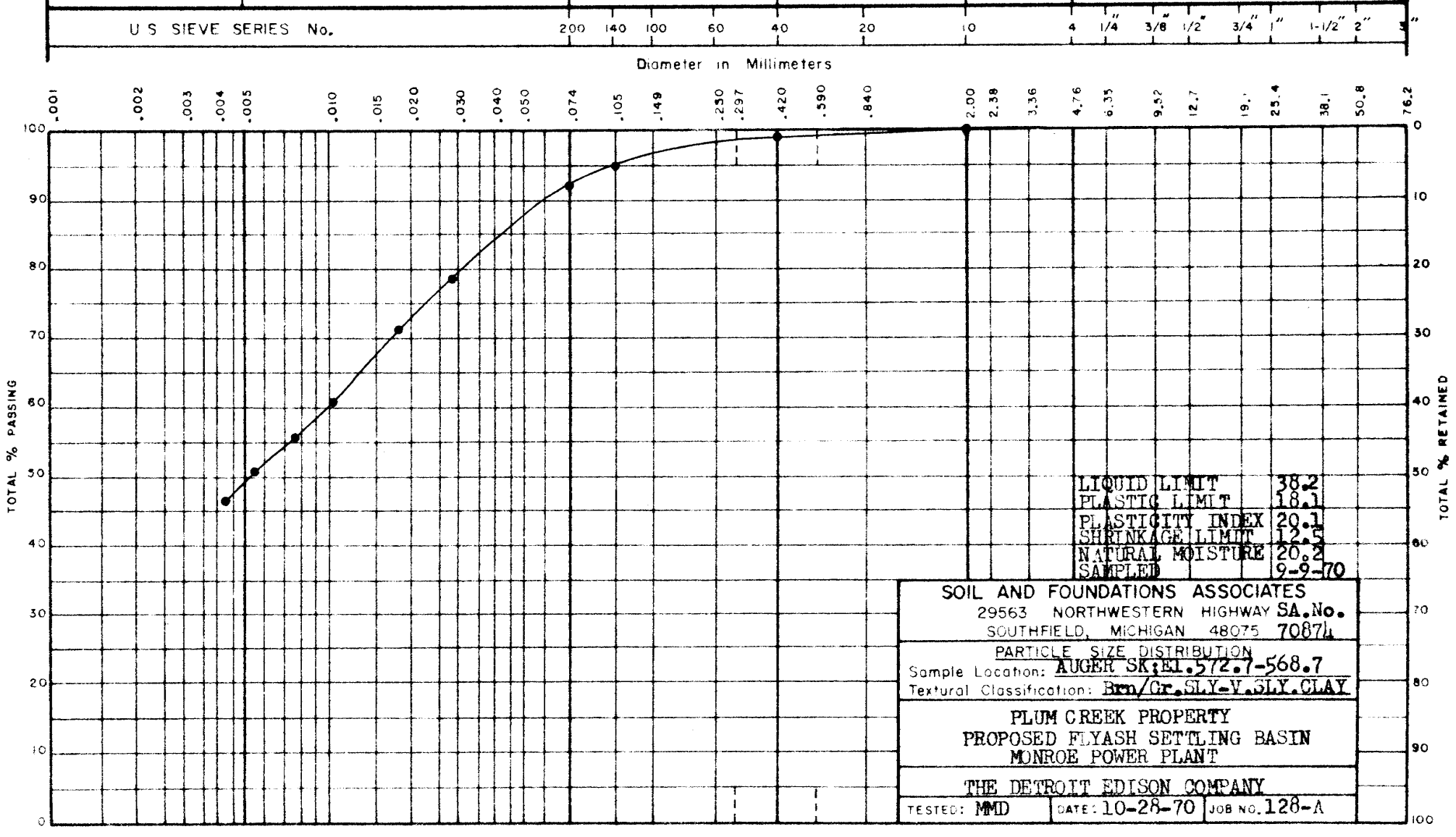
TESTED: MMD | DATE: 9-18-70 | JOB NO. 128-A

SFA FORM E-6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 49 %	Silt 43 %	Fine Sand 07 %	Medium Sand 01 %	C. Sand 00 %	Gravel 00 %



LIQUID LIMIT	38.2
PLASTIC LIMIT	18.1
PLASTICITY INDEX	20.1
SHRINKAGE LIMIT	12.5
NATURAL MOISTURE	20.2
SAMPLED	9-9-70

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY SA. No.
SOUTHFIELD, MICHIGAN 48075 7087A

PARTICLE SIZE DISTRIBUTION
Sample Location: AUGER SK; El. 572.7-568.7
Textural Classification: Brn/Gr. SLY-V. SLY. CLAY

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

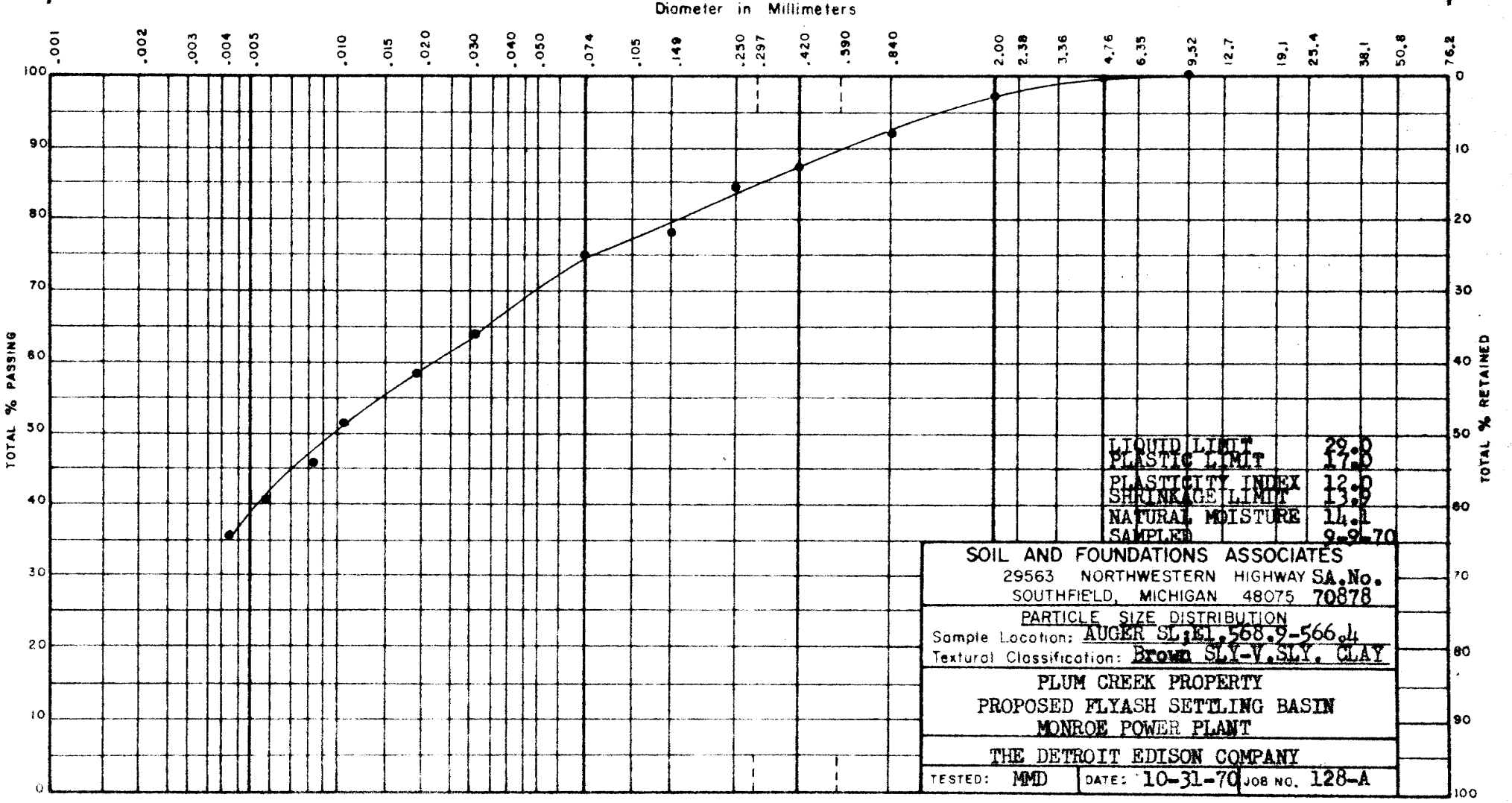
TESTED: MMD | DATE: 10-28-70 | JOB NO. 128-A

SEA FORM E-6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 38 %	Silt 37 %	Fine Sand 12 %	Medium Sand 10 %	C. Sand 02 %	Gravel 01 %



LIQUID LIMIT	29.0
PLASTIC LIMIT	17.0
PLASTICITY INDEX	12.0
SHRINKAGE LIMIT	13.9
NATURAL MOISTURE	14.1
SAMPLED	9-9-70

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

S.A. No. 70878

PARTICLE SIZE DISTRIBUTION

Sample Location: AUGER SL;El.568.9-566.4

Textural Classification: Brown SLY-V.SLY. CLAY

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

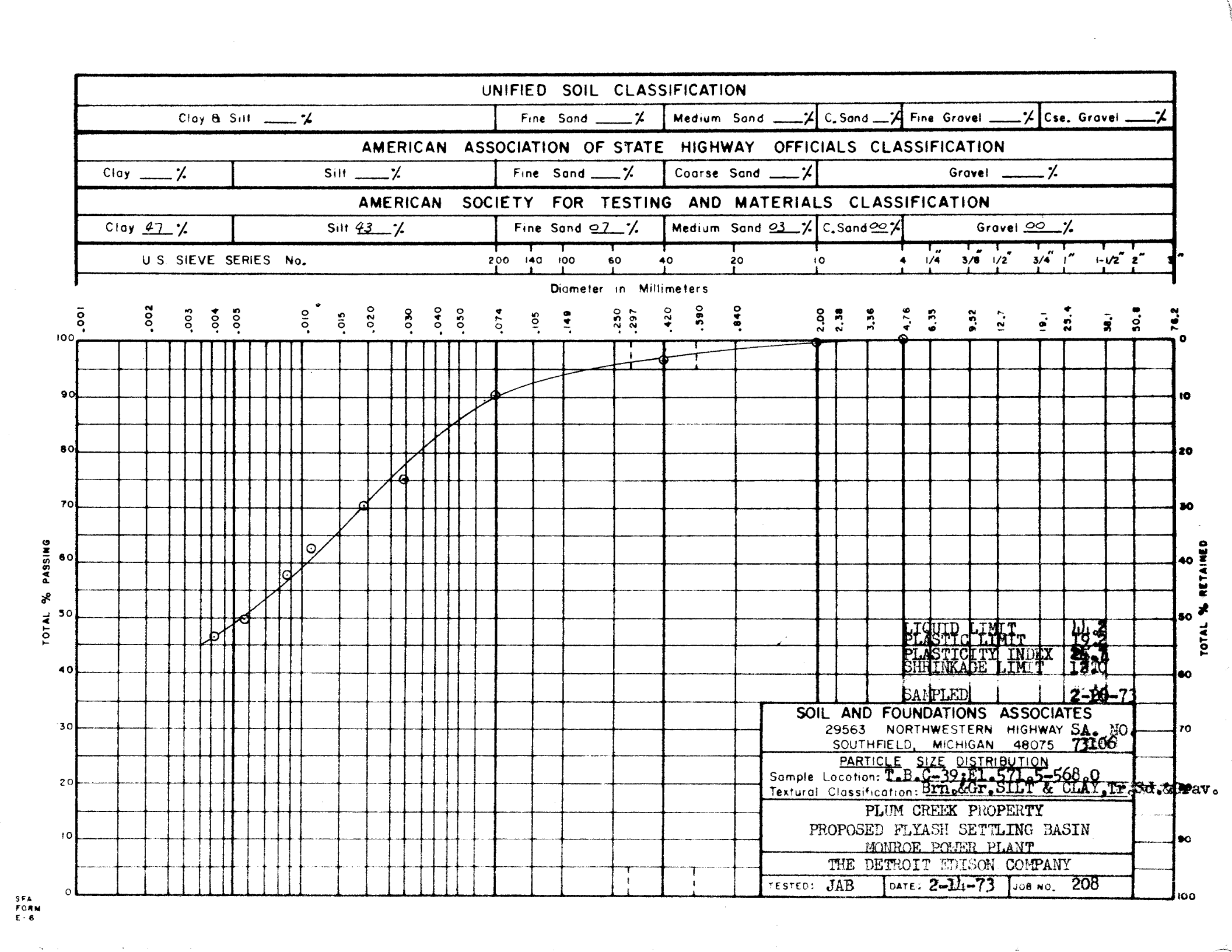
TESTED: MMD | DATE: 10-31-70 | JOB NO. 128-A

SFA FORM E-6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 47 %	Silt 43 %	Fine Sand 07 %	Medium Sand 03 %	C. Sand 00 %	Gravel 00 %



LIQUID LIMIT	44.2
PLASTIC LIMIT	19.2
PLASTICITY INDEX	25.0
SHRINKAGE LIMIT	13.0
SAMPLED	2-10-73

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

SA. NO. 73106

PARTICLE SIZE DISTRIBUTION
Sample Location: T.B.C-39;E1.571.5-568.0
Textural Classification: Brn.&Gr.SILT & CLAY,Tr.Sd.&Grav.

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

TESTED: JAB | DATE: 2-14-73 | JOB NO. 208

SFA FORM E-6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Coa. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 44 %	Silt 44 %	Fine Sand 11 %	Medium Sand 01 %	C. Sand 00 %	Gravel 00 %

U.S. SIEVE SERIES No. 200 140 100 60 40 20 10 4 1/4" 3/8" 1/2" 3/4" 1" 1-1/2" 2" 3"

Diameter in Millimeters

.001 .002 .003 .004 .005 .010 .015 .020 .030 .040 .050 .074 .105 .149 .250 .297 .420 .590 .840 2.00 2.38 3.36 4.76 6.35 9.52 12.7 19.1 25.4 38.1 50.8 76.2

TOTAL % PASSING

TOTAL % RETAINED

LIQUID LIMIT	44.5
PLASTIC LIMIT	19.1
PLASTICITY INDEX	25.4
SHRINKAGE LIMIT	NT
NATURAL MOISTURE	15.3
SAMPLED	2-20-73

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

SA. NO. 73168

PARTICLE SIZE DISTRIBUTION

Sample Location: TB C-39; El. 571.5-568.0

Textural Classification: Brn. & Gr. SILT & CLAY, Lt. Sand

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT

THE DETROIT EDISON COMPANY

TESTED: WFL | DATE: 3-27-73 | JOB NO. 208

SFA FORM E-6

UNIFIED SOIL CLASSIFICATION					
Clay & Silt ___ %	Fine Sand ___ %	Medium Sand ___ %	C. Sand ___ %	Fine Gravel ___ %	Cse. Gravel ___ %

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS CLASSIFICATION				
Clay ___ %	Silt ___ %	Fine Sand ___ %	Coarse Sand ___ %	Gravel ___ %

AMERICAN SOCIETY FOR TESTING AND MATERIALS CLASSIFICATION					
Clay 45 %	Silt 44 %	Fine Sand 10 %	Medium Sand 01 %	C. Sand 00 %	Gravel 00 %

U.S. SIEVE SERIES No. 200 140 100 60 40 20 10 4 1/4" 3/8" 1/2" 3/4" 1" 1-1/2" 2" 3"

Diameter in Millimeters

.001 .002 .003 .004 .005 .010 .015 .020 .030 .040 .050 .074 .105 .149 .250 .297 .420 .590 .840 2.00 2.38 3.36 4.76 6.35 9.52 12.7 19.1 25.4 38.1 50.8 76.2

TOTAL % PASSING

TOTAL % RETAINED

LIQUID LIMIT	45.1
PLASTIC LIMIT	21.7
PLASTICITY INDEX	23.4
SHRINKAGE LIMIT	11.3
NATURAL MOISTURE	25.3
SAMPLED	2-28-73

SOIL AND FOUNDATIONS ASSOCIATES
29563 NORTHWESTERN HIGHWAY
SOUTHFIELD, MICHIGAN 48075

Sa. No. 73512

PARTICLE SIZE DISTRIBUTION

Sample Location: TB C-3; El. 572.8-571.6

Textural Classification: Brn. & Gr. SILT & CLAY, Lit. Sd.

PLUM CREEK PROPERTY
PROPOSED FLYASH SETTLING BASIN
MONROE POWER PLANT
THE DETROIT EDISON COMPANY

TESTED: TPR | DATE: 4-25-73 | JOB NO. 208

SFA FORM E-6

APPENDIX H – 1990’s LABORATORY TEST RESULTS

TABLE 1
LABORATORY TEST RESULTS
VERIFICATION OF NATURAL SOIL BARRIER - MONROE ASH BASIN
SME PROJECT NO. PG-22087

BORING NO.	SAMPLE NO.	DEPTH (feet)	CLASSIFICATION SYMBOL	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY	VOID RATIO (calculated)	ATTERBERG LIMITS			PARTICLE SIZE DISTRIBUTION (%)						COEFFICIENT OF PERMEABILITY (cm/sec)
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT	CLAY	
B2	CS2	6.5	CL	21	108	2.73	0.58	42	17	25	0	0	2	5	36	57	3.3E-08
B2	CS4	11.5	CL	12	126	2.68	0.33	23	15	8	0	0	8	18	39	35	5.8E-08
B2	CS6	16.5	CL	12	126	2.72	0.35	23	14	9	0	0	8	16	40	36	1.3E-08
B2	CS8	21.5	CL	12	127	2.72	0.34	24	13	11	0	0	8	17	38	37	1.5E-08
B2	CS10	26.5	CL	10	131	2.75	0.31	20	11	9	0	0	9	24	34	33	2.0E-08
B2	CS12	31.5	CL	12	122	2.73	0.40	32	15	17	0	0	5	9	39	47	2.0E-08
B4	CS2	6.5	CL	18	111	2.73	0.53	45	19	26	0	0	2	8	37	53	6.6E-08
B4	CS4	11.5	CL	21	109	2.73	0.56	43	17	26	0	0	3	11	36	50	2.1E-08
B4	CS6	16.5	CL	12	126	2.71	0.34	24	13	11	0	0	8	17	41	34	4.7E-08
B4	CS8	21.5	CL	11	136	2.70	0.24	23	13	10	0	0	8	18	37	37	2.1E-08
B4	CS10	26.5	CL	11	130	2.73	0.31	23	14	9	0	0	8	17	38	37	3.0E-08
B4	CS12	31.5	CL	10	128	2.71	0.32	25	14	11	0	0	4	11	44	41	1.8E-08
B4	CS14	36.5	CL	8	118	2.73	0.44	24	13	11	0	0	13	23	44	20	*
B6	CS2	6.5	CL	12	123	2.70	0.37	27	15	12	0	0	8	17	39	36	7.4E-08
B6	CS4	11.5	CL	11	132	2.72	0.29	23	13	10	0	0	8	17	39	36	1.8E-08
B6	CS6	16.5	CL	8	134	2.72	0.27	21	12	9	0	0	7	22	38	33	4.0E-08
B6	CS8	21.5	CL	11	133	2.75	0.29	21	12	9	0	0	7	21	37	35	6.5E-08
B6	CS10	26.5	CL	9	125	2.71	0.35	26	14	12	0	0	5	13	39	43	*
B6	CS12	31.5	CL	10	128	2.74	0.34	26	15	11	0	0	11	17	33	39	*
B8	CS2	6.5	CL	13	118	2.73	0.44	41	15	26	0	0	3	12	35	50	1.5E-08
B8	CS4	11.5	CL	17	112	2.73	0.52	34	17	17	0	0	7	17	38	38	2.2E-08
B8	CS6	16.5	CL	13	127	2.73	0.34	26	15	11	0	0	9	19	38	34	4.8E-08
B8	CS8	21.5	CL	12	129	2.74	0.33	24	14	10	0	0	8	17	40	35	1.6E-08
B8	CS10	26.5	CL	13	130	2.76	0.32	25	14	11	0	0	7	18	36	39	1.7E-08
B8	CS12	31.5	CL	10	134	2.73	0.27	20	11	9	0	0	10	24	41	25	4.7E-08
B8	CS14	36.5	CL	11	135	2.75	0.27	23	12	11	0	0	11	24	31	34	3.8E-08
B8	CS16	41.5	CL	10	127	2.78	0.37	23	13	10	0	0	15	19	46	20	1.9E-07

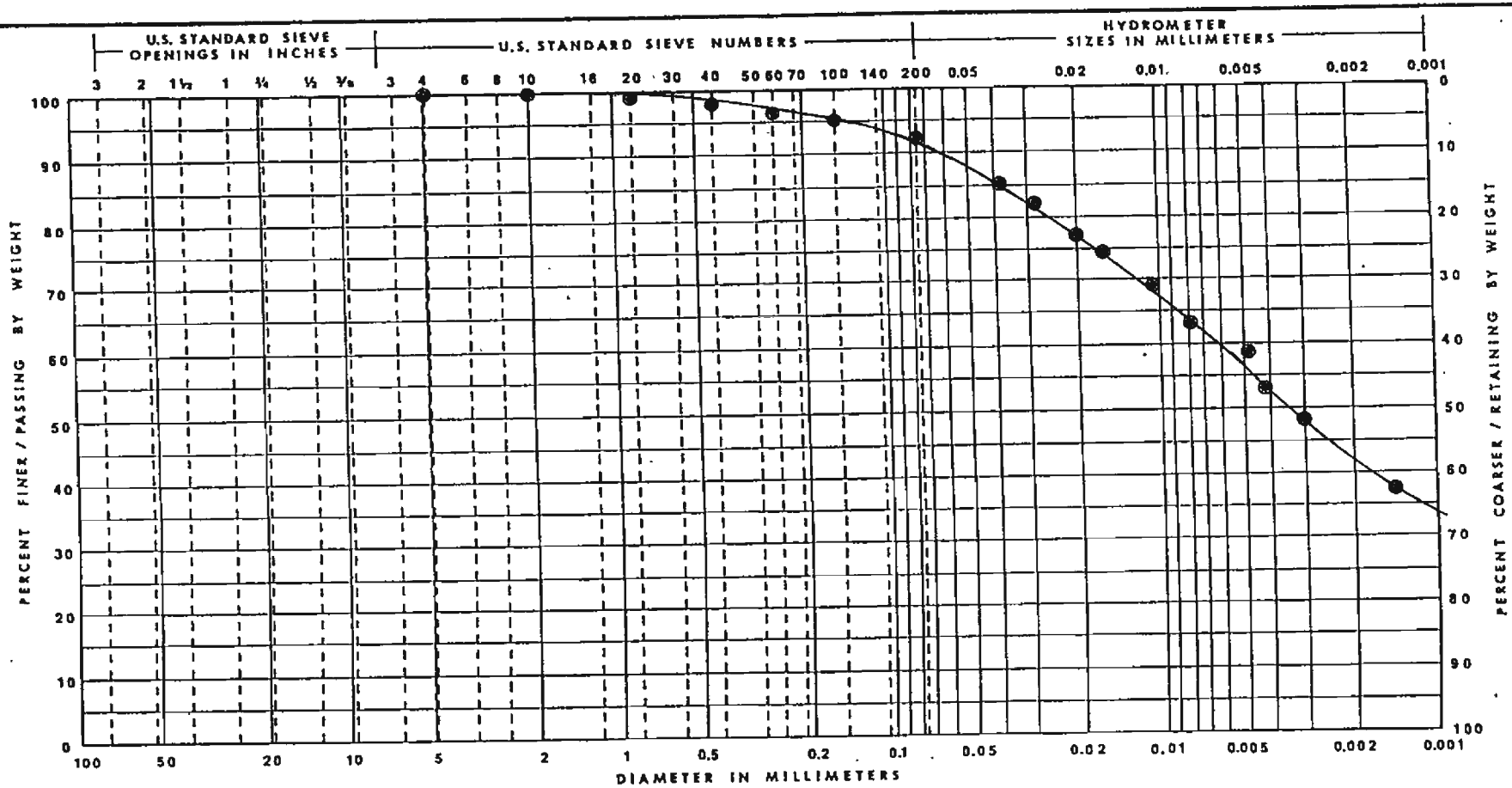
TABLE 1

LABORATORY TEST RESULTS
VERIFICATION OF NATURAL SOIL BARRIER - MONROE ASH BASIN
SME PROJECT NO. PG-22087

BORING NO.	SAMPLE NO.	DEPTH (feet)	CLASSIFICATION SYMBOL	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	SPECIFIC GRAVITY	VOID RATIO (calculated)	ATTERBERG LIMITS			PARTICLE SIZE DISTRIBUTION (%)						COEFFICIENT OF PERMEABILITY (cm/sec)
								LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT	CLAY	
B10	CS2	6.5	CL	20	114	2.72	0.49	40	15	25	0	0	3	13	35	49	3.6E-08
B10	CS4	11.5	CL	18	112	2.75	0.53	35	15	20	0	0	2	9	39	50	1.2E-08
B10	CS6	16.5	CL	22	102	2.74	0.68	36	17	19	0	0	1	2	37	60	5.3E-08
B10	CS8	21.5	CL	13	127	2.71	0.33	25	14	11	0	0	8	17	37	38	3.7E-08
B10	CS10	26.5	CL	10	133	2.74	0.29	23	14	9	0	0	7	17	39	37	1.5E-08

NOTE:

* Sample too small or disturbed to run test.

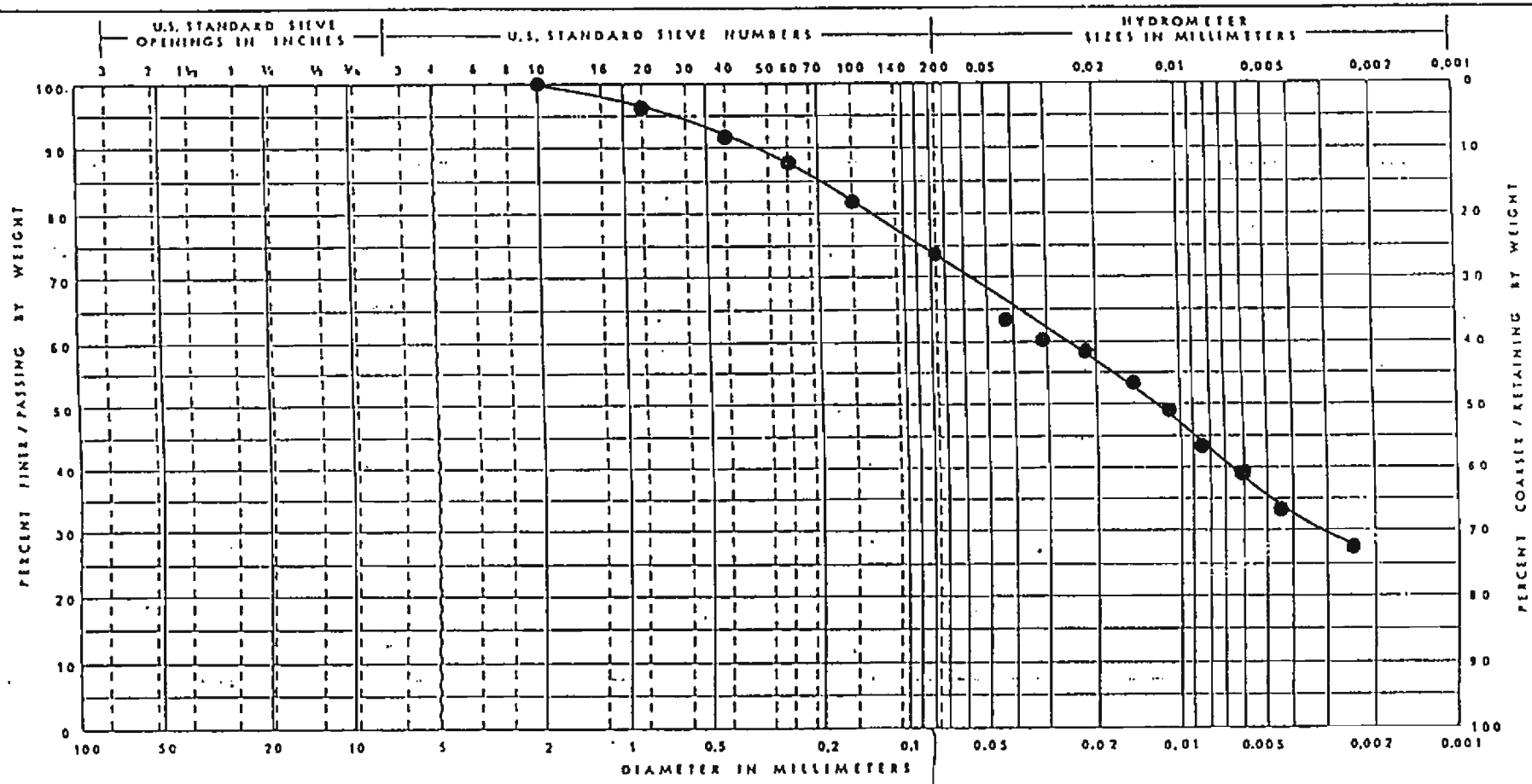


CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B2	CS2	6.5	Silty Clay- Trace of Sand, Gravel, Topsoil & Brick Pieces- Brown (CL)	93	

MONROE ASH BASIN
DETROIT EDISON
MONROE, MICHIGAN

DRAWN SDN
APP'D
DATE 12/14/94
JOB PG22087

soil and materials engineers, inc



	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL			COARSE SAND	FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B2	CS4	11.5	Silty Clay, Some Sand, Trace of Gravel, Gray (CL)	74	

MONROE ASH BASIN
DETROIT EDISON
MONROE, MICHIGAN

DRAWN MCS
APP'D
DATE 10/25/94
JOB PG-22087

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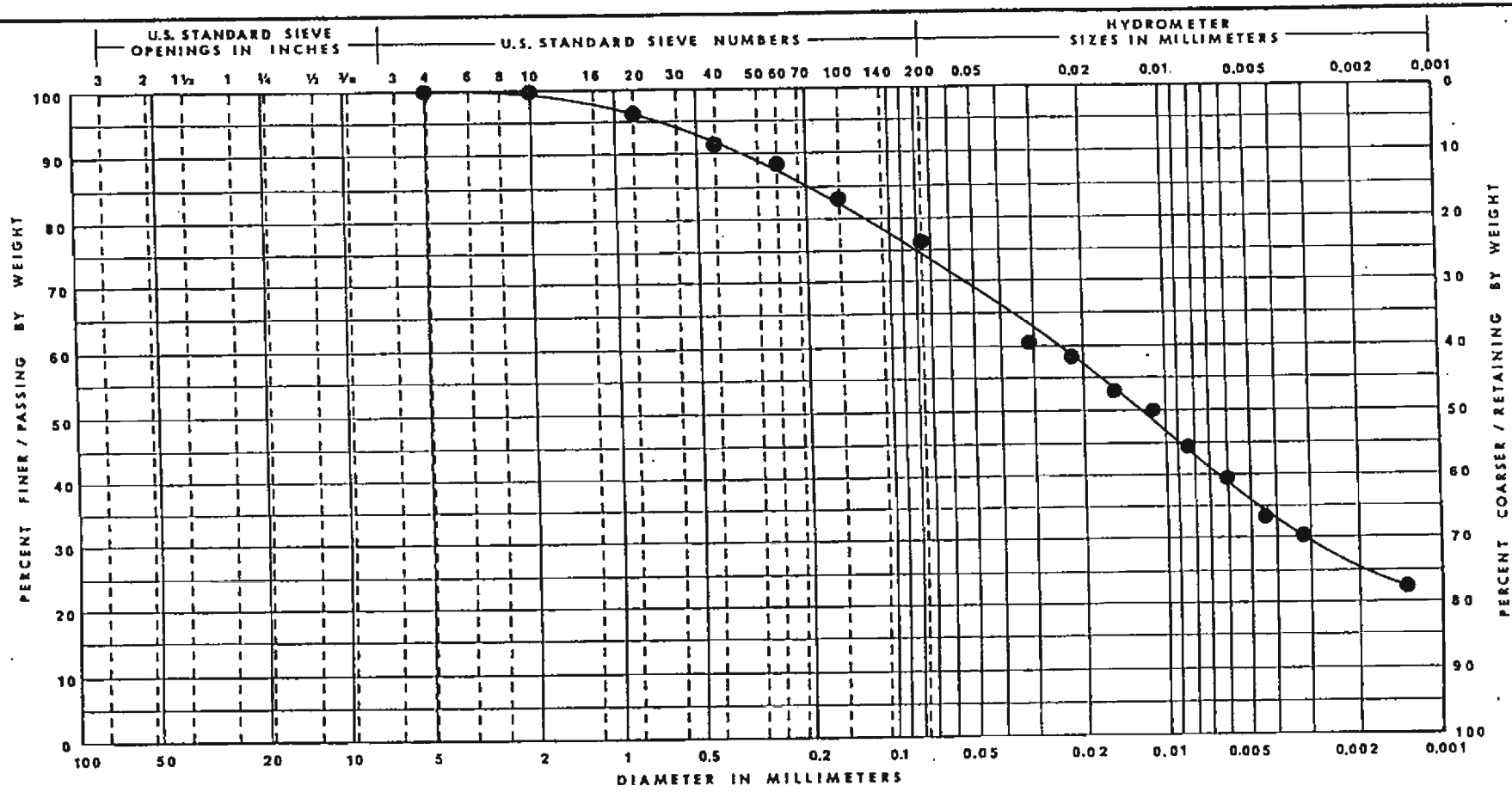

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B2	CS6	16.5	Silty Clay-Some Sand-Trace of	76	
				Gravel-Gray (CL)		

MONROE ASH BASIN
DETROIT EDISON
MONROE, MICHIGAN

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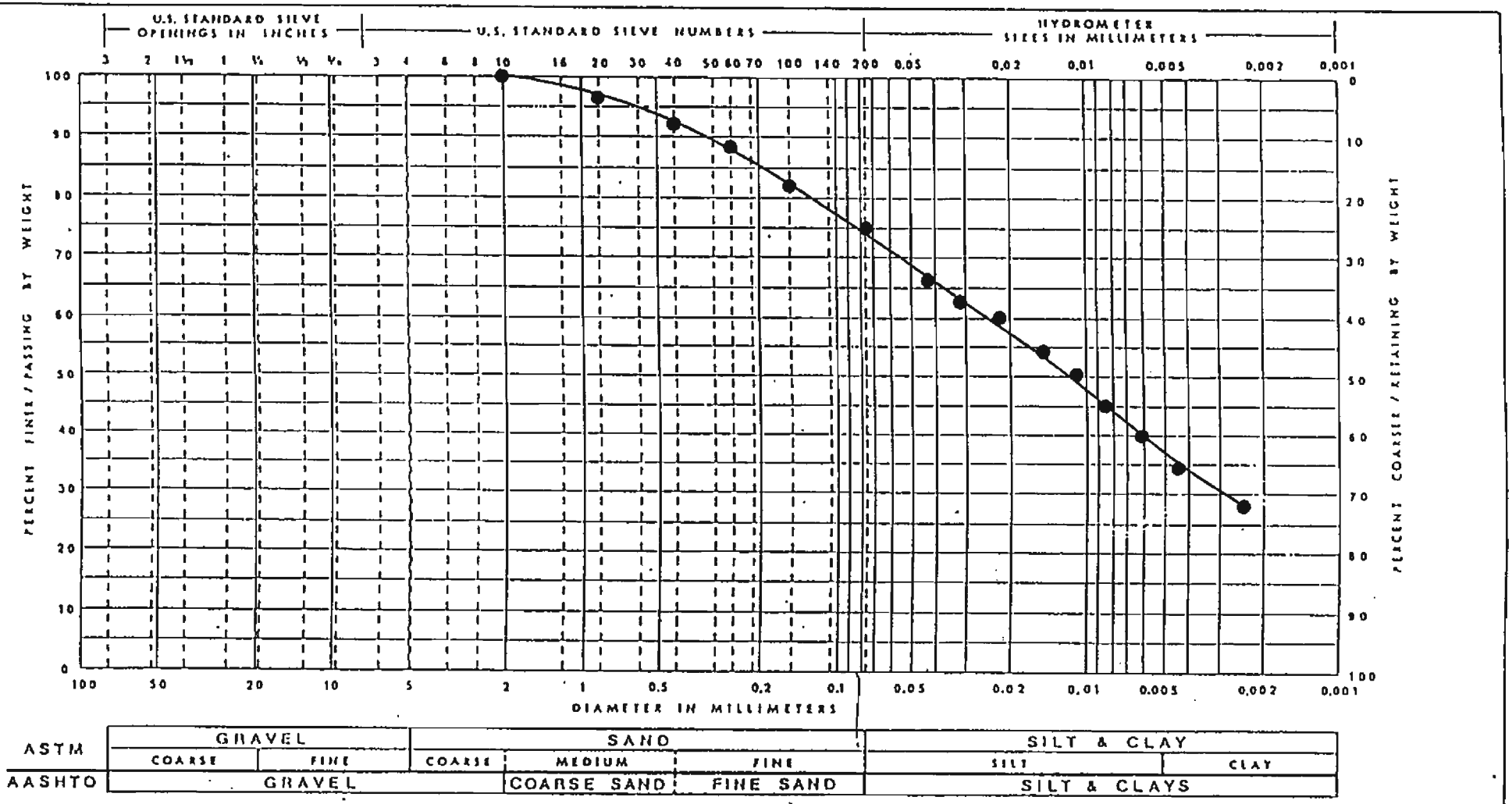

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B2	CS8	21.5	Silty Clay, Some Sand, Trace of Gravel, Gray (CL)	75	

MONROE ASH BASIN
DETROIT, EDISION
MONROE MICHIGAN

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APP'D
DATE 10/25/94
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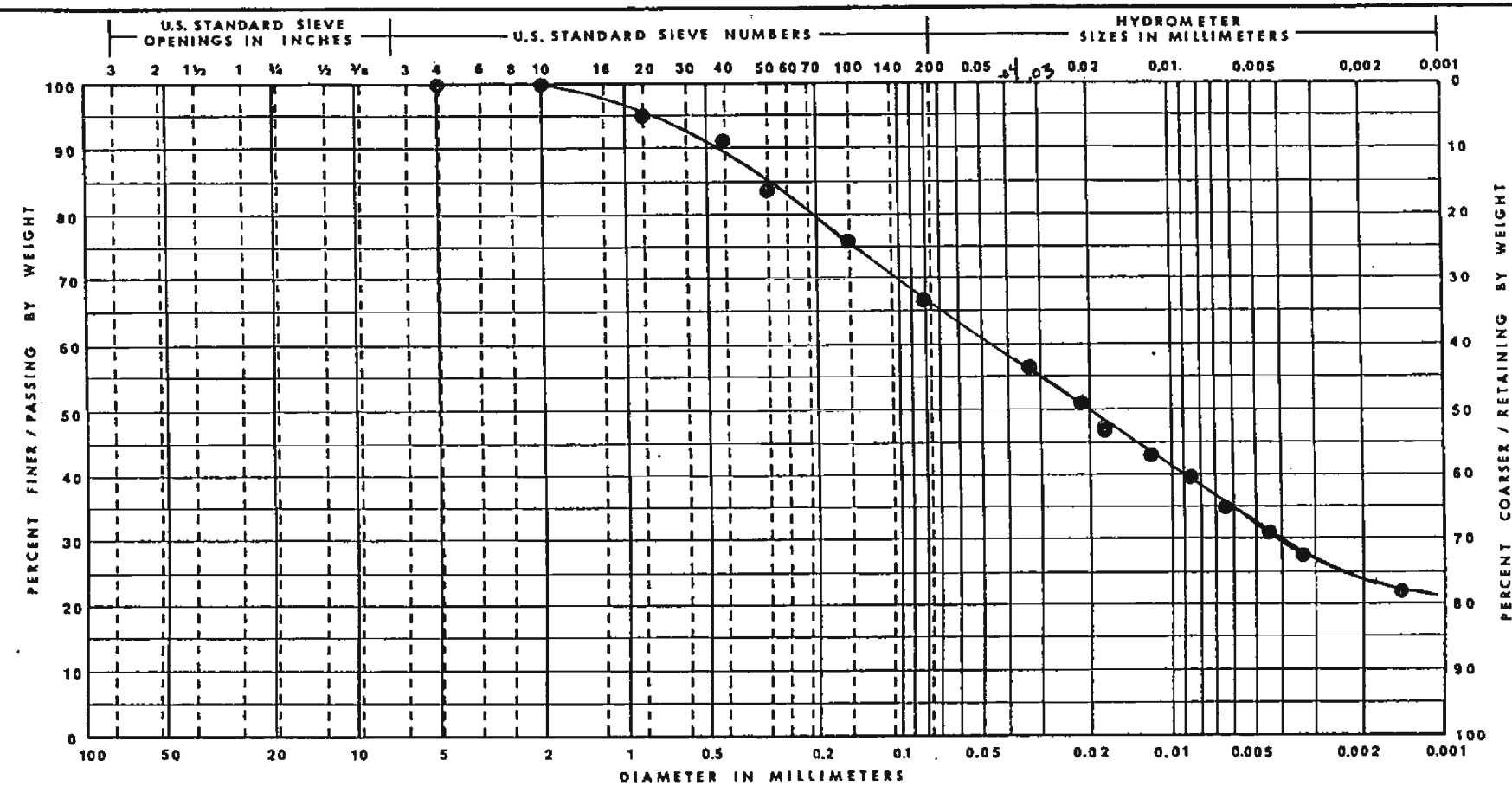

ASTM	GRAVEL		SAND			SILT & CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B2	CS10	26.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	67	

MONROE ASH BASIN
DETROIT EDISON
MONROE, MICHIGAN

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DATE 12/14/94
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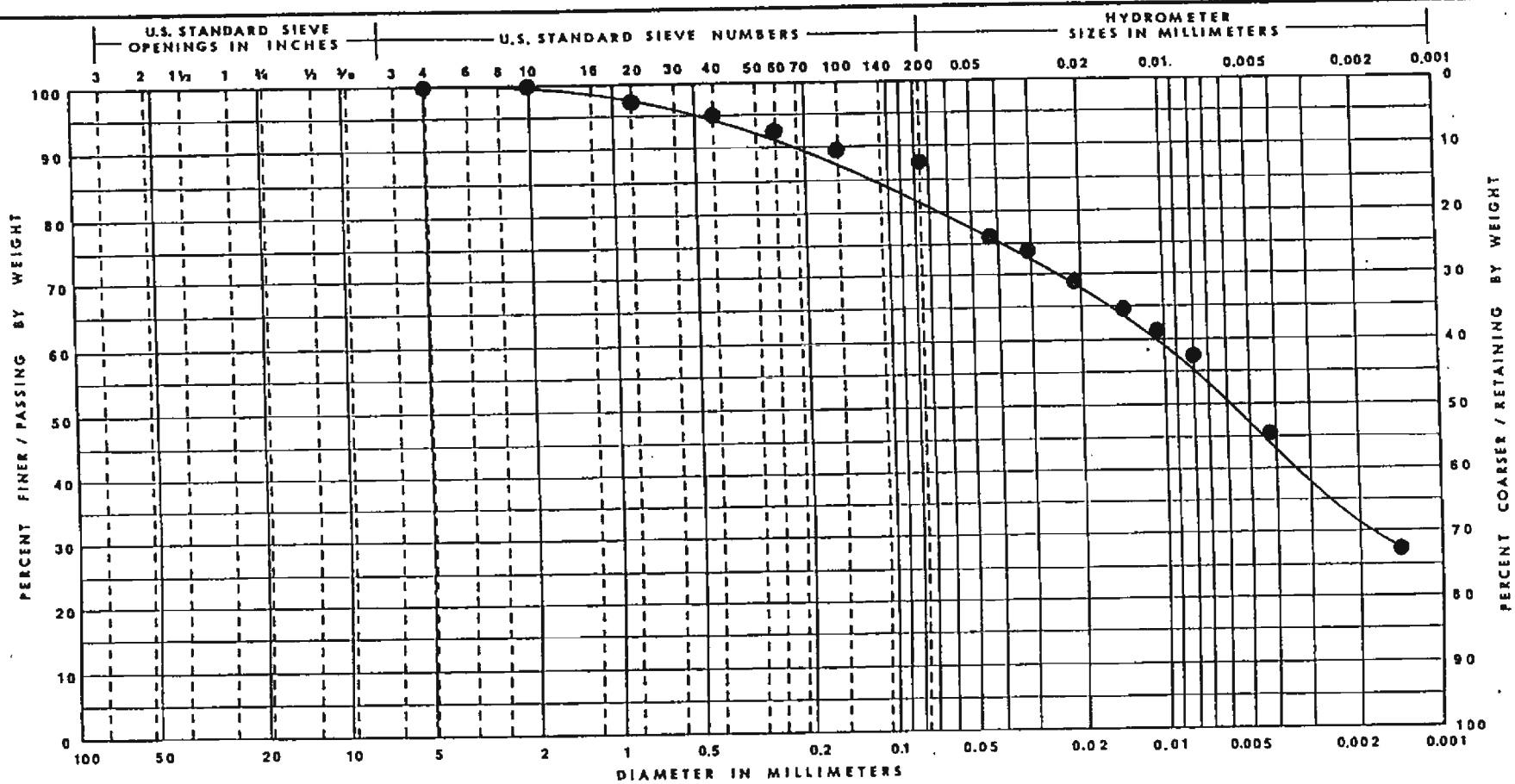

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B2	CS12	34.5	Silty Clay-Trace to Some Sand-	86	
				Trace of Gravel-Gray (CL)		

MONROE ASH BASIN
DETROIT EDISON
MONROE, MICHIGAN

DRAWN MCS
APP'D
DATE 12/6/94
JOB PG22087

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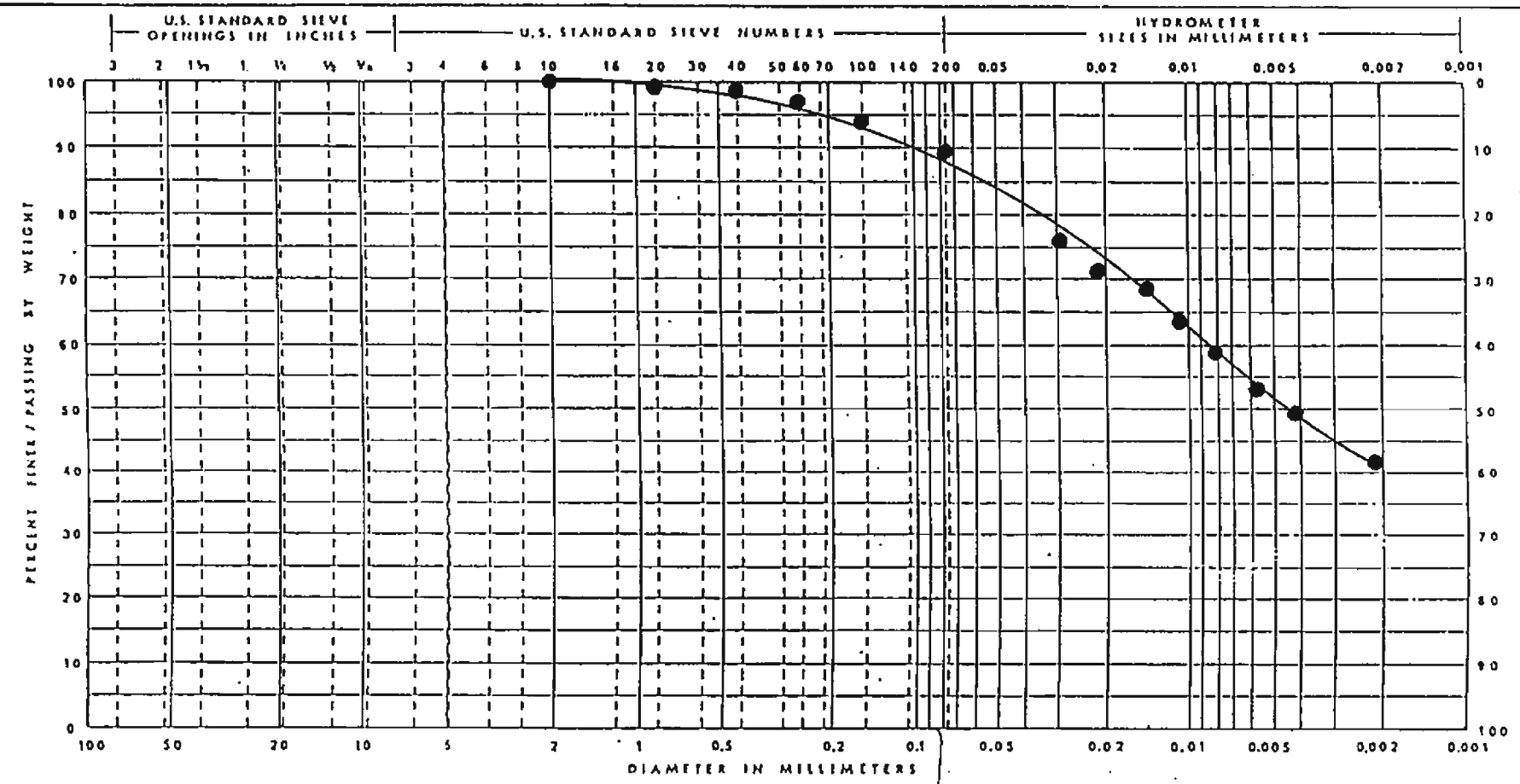
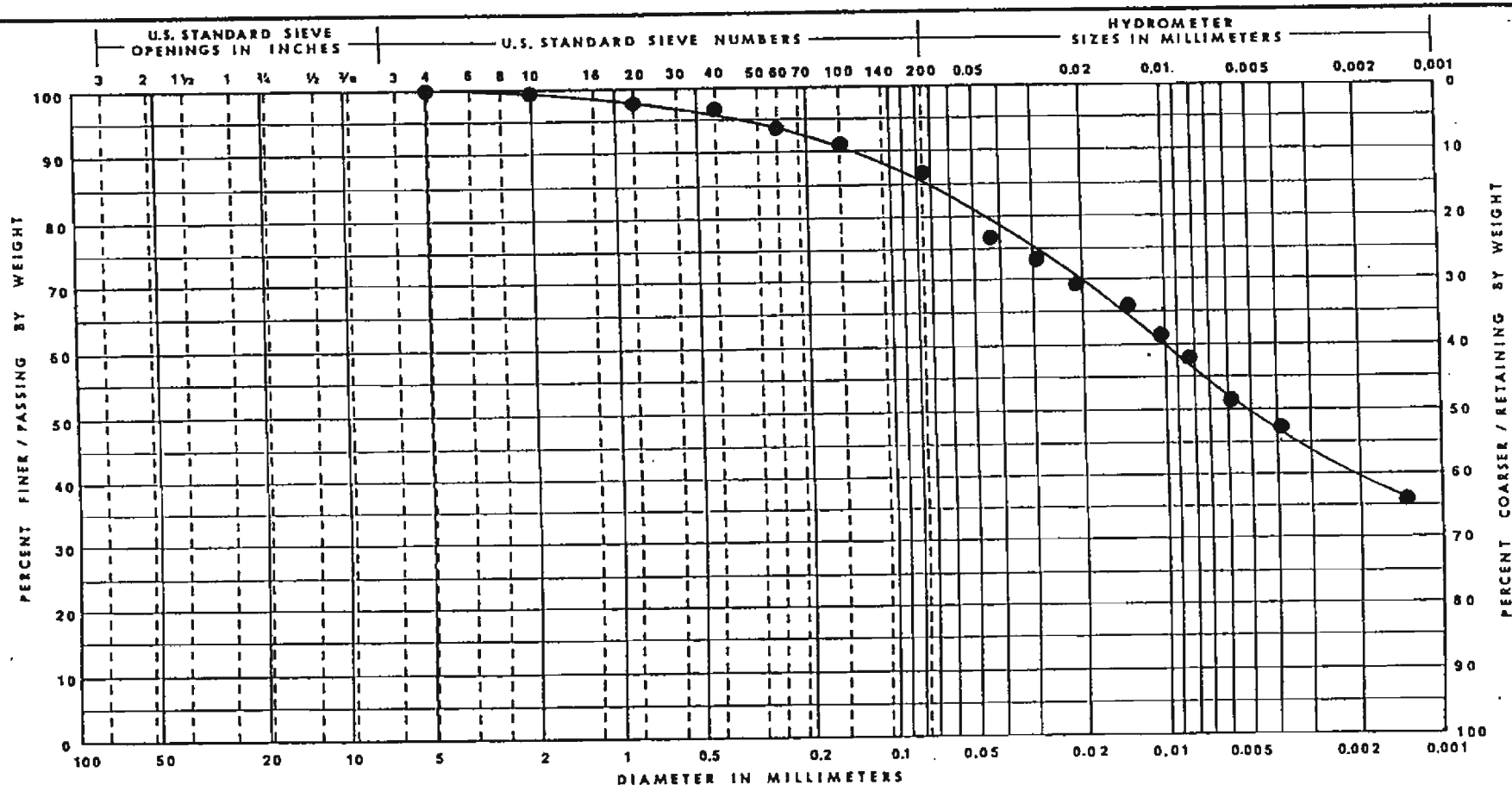


CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
:	B4	CS2	6.5	Silty Clay, Trace to Some	90	
				Sand, Trace Gravel, Mottled		
				Brown (CL)		

MONROE ASH BASIN
EDTROIT EDISION
MONROE, MICHIGAN

DRAWN MCS
APP'D
DATE 10/25/94
JOB PG-22087

soil and materials engineers, inc

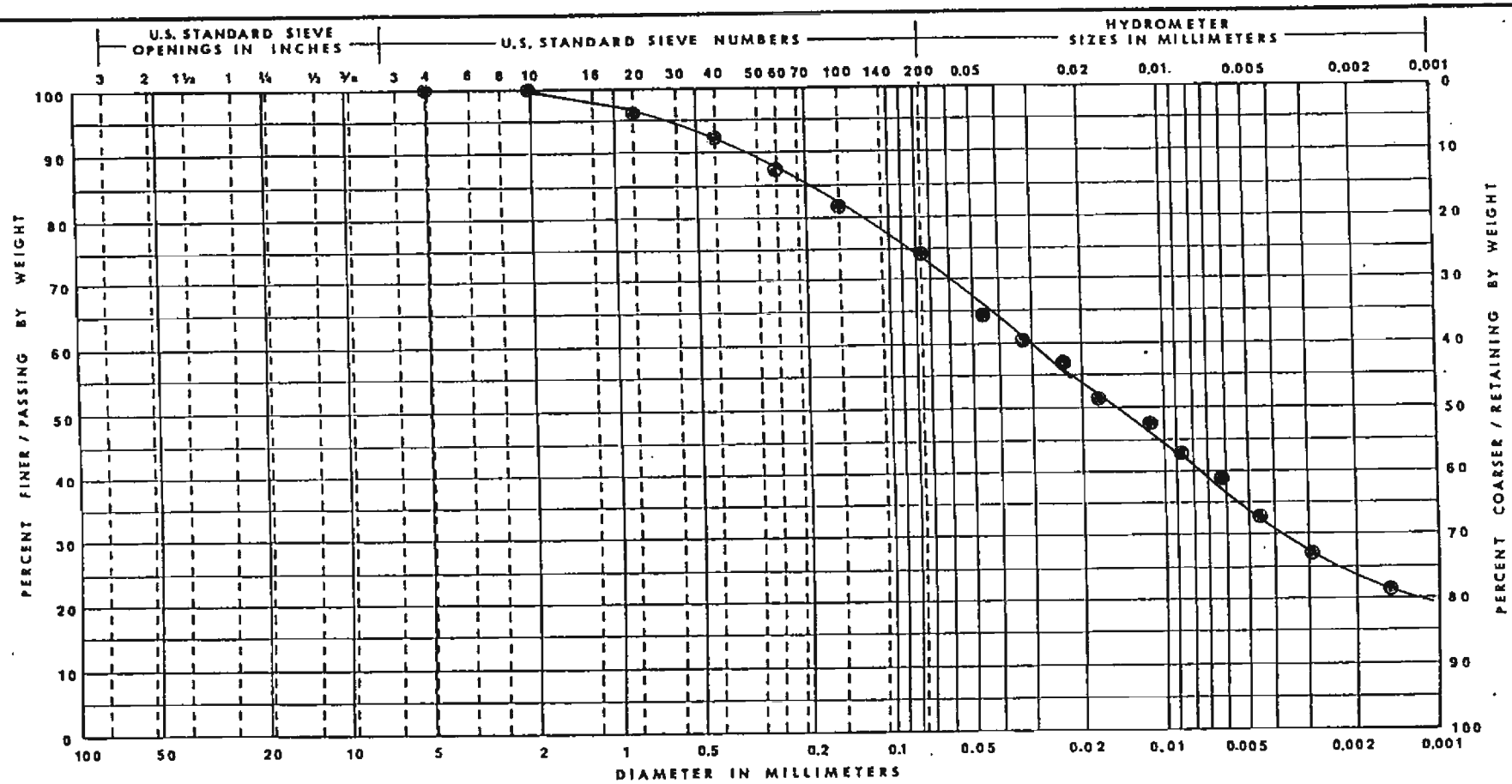


CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B4	CS4	11.5	Silty Clay-Trace to Some Sand-	86	
				Trace of Gravel, Topsoil &		
				Roots-Brown (CL)		

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

DRAWN MCS
APP'D
DATE 12/6/94
JOB PG22087

soil and materials engineers, inc



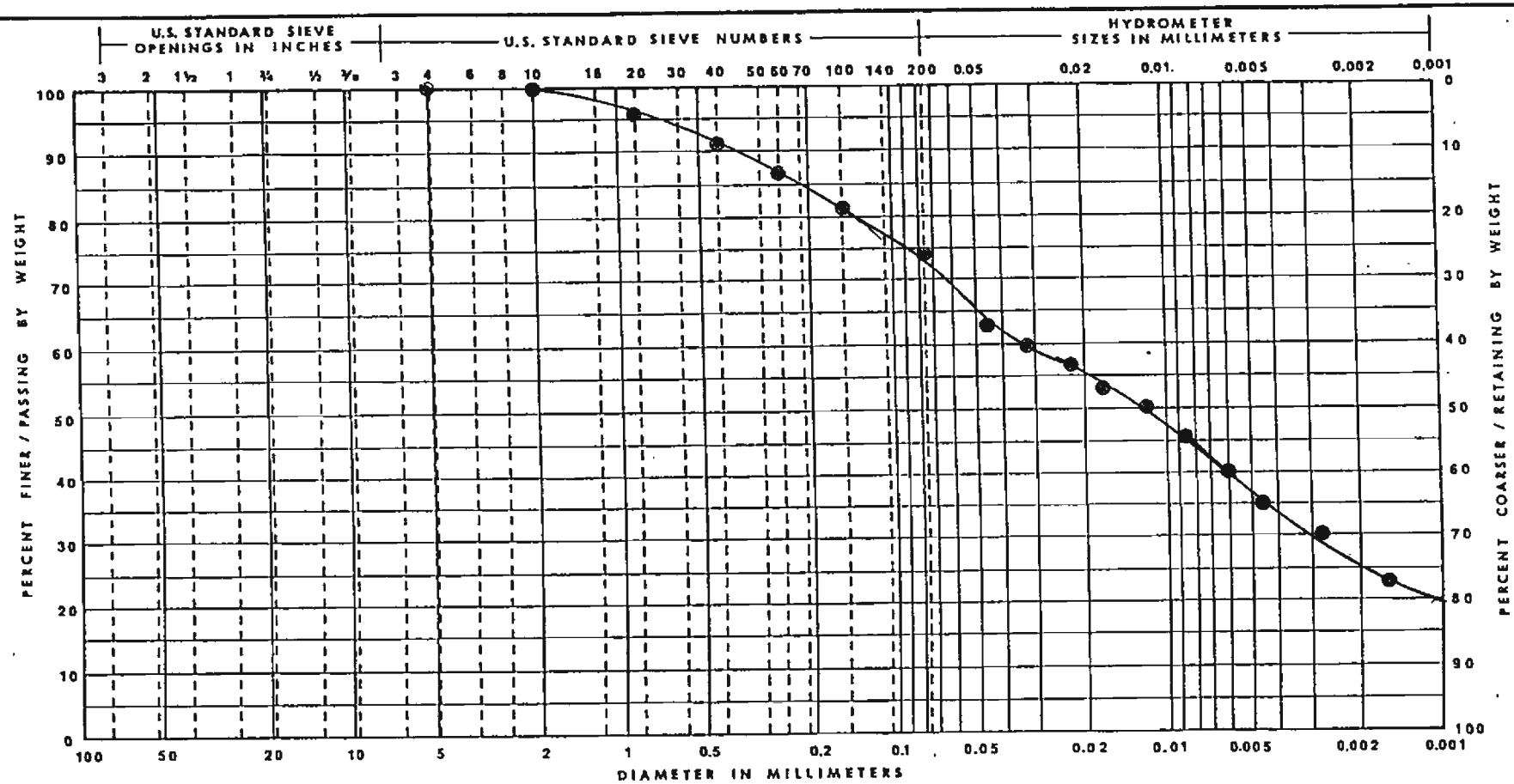
	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B4	CS6	16.5	Silty Clay-Some Sand-Trace of Gravel-Mottled Brown (CL)	75	

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

DRAWN	SDN
APP'D	
DATE	12/14/94
JOB	PG22087

soil and materials engineers, inc



	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B4	CS8	21.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	74	

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

DRAWN SDN
APP'D
DATE 12/14/94
JOB PG22087

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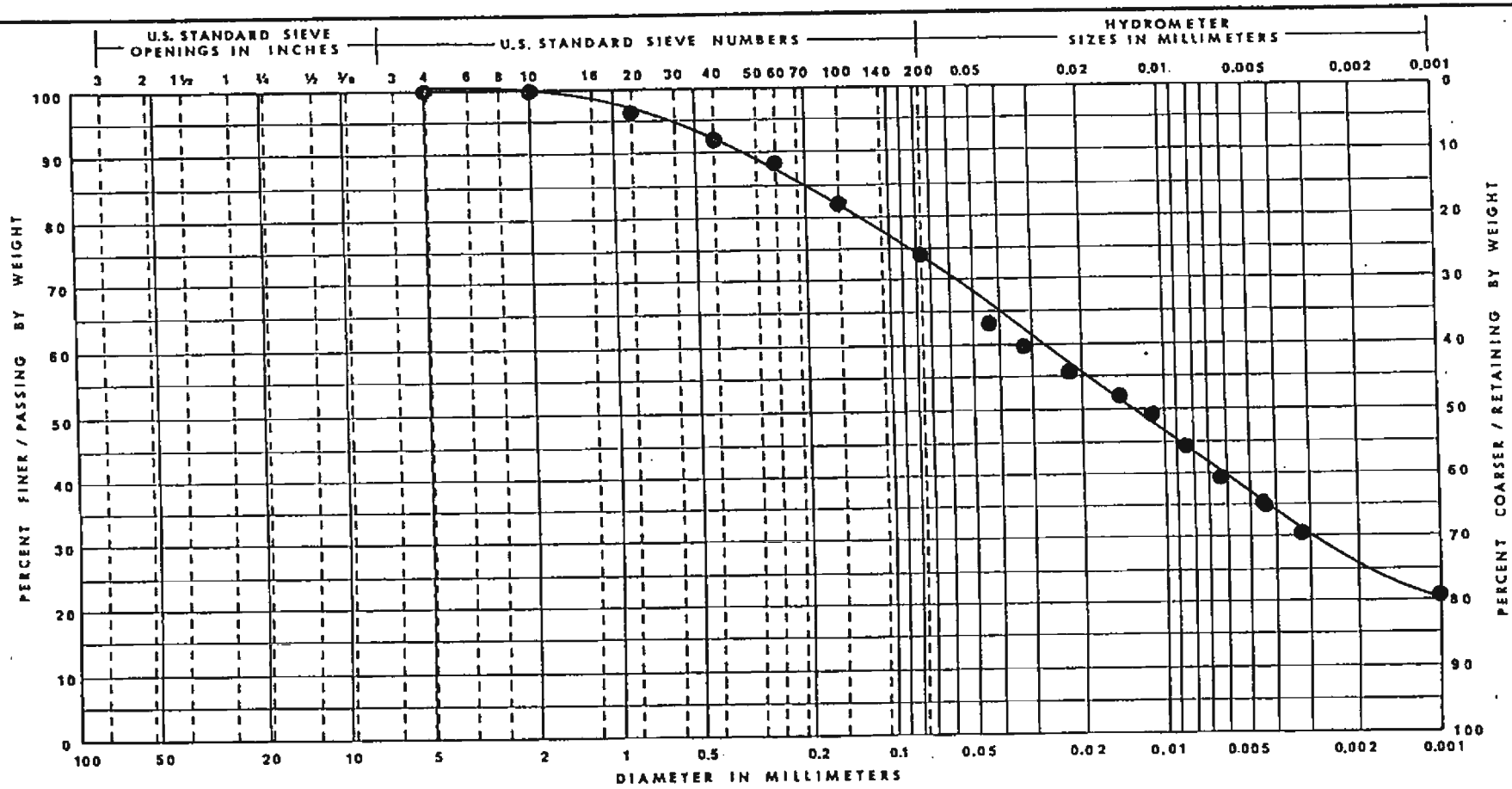

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B4	CS10	26.5	Silty Clay-Some Sand-Trace of	75	
				Gravel-Gray (CL)		

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

DRAWN MCS
APP'D
DATE 12/29/94
JOB PG22087

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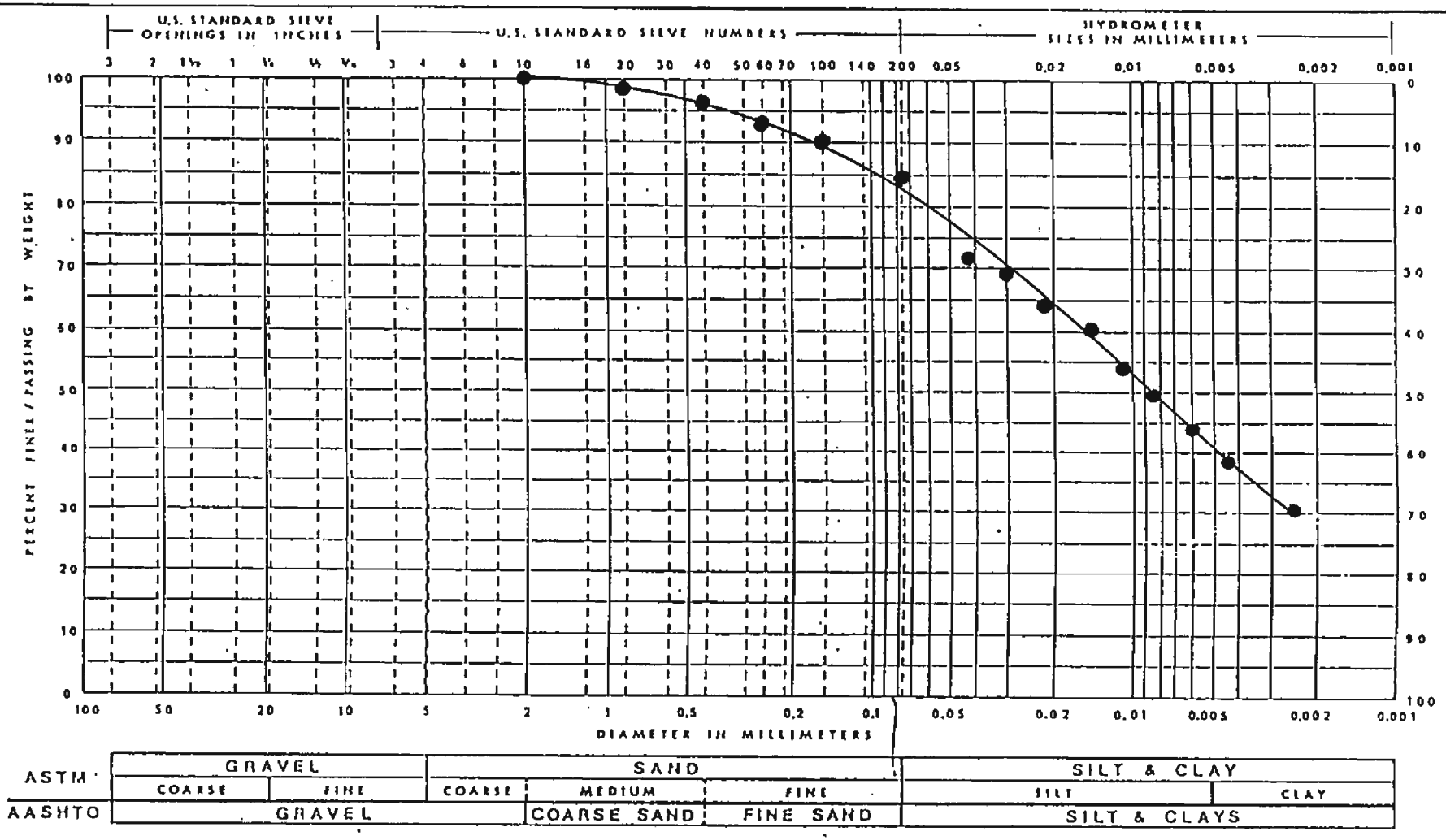

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B4	CS12	31.5	Silty Clay, Trace to Some Sand, Trace of Gravel, Gray (CL)	85	

MONROE ASH BASIN
DETROIT EDISION
MONROE, MICHIGAN

DRAWN	MCS
APP'D	
DATE	10/25/94
JOB	PG-22087

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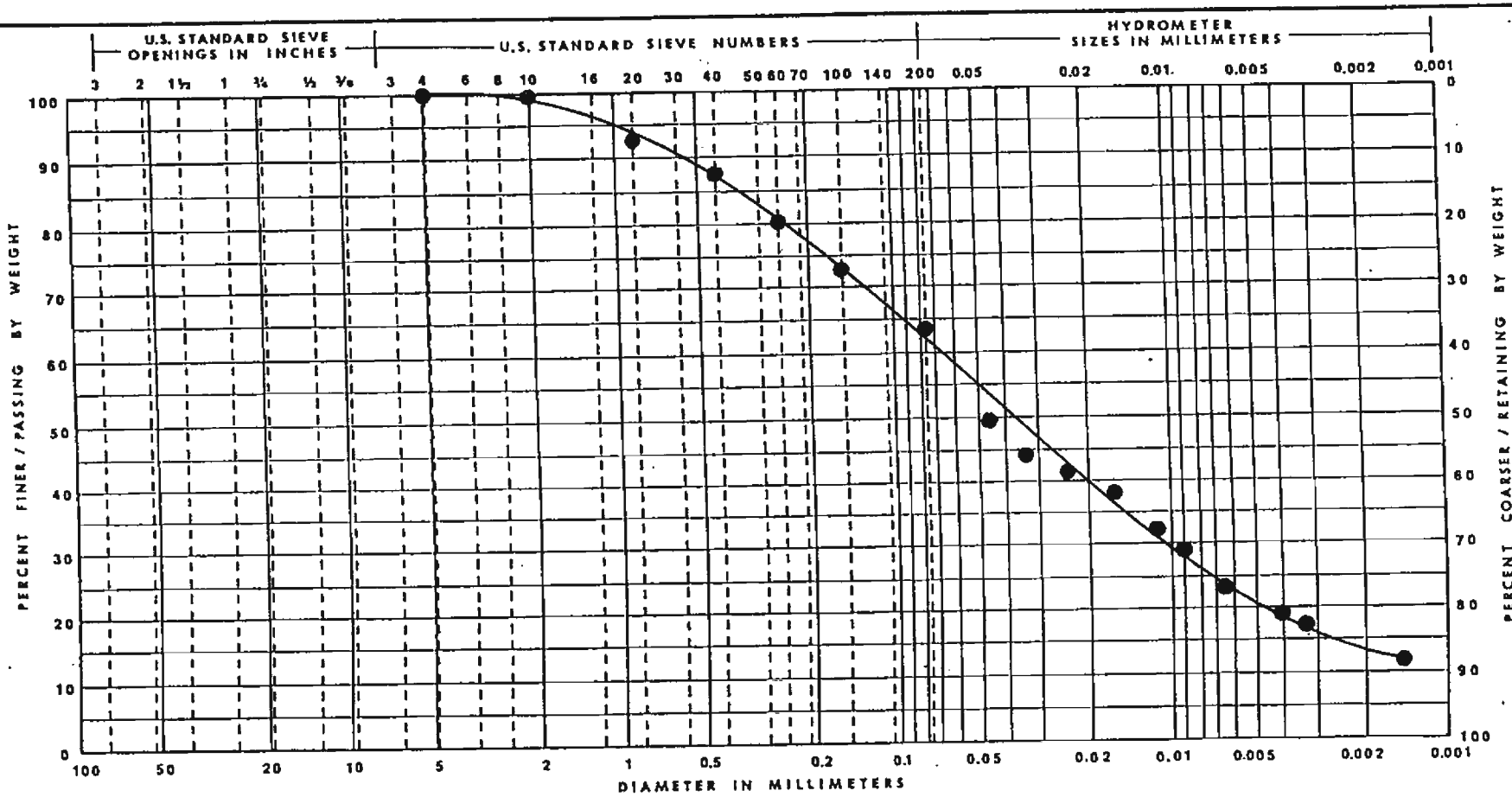

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B4	CS14	36.5	Limestone	64	

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

DRAWN MCS
APP'D
DATE 12/6/94
JOB PG22087

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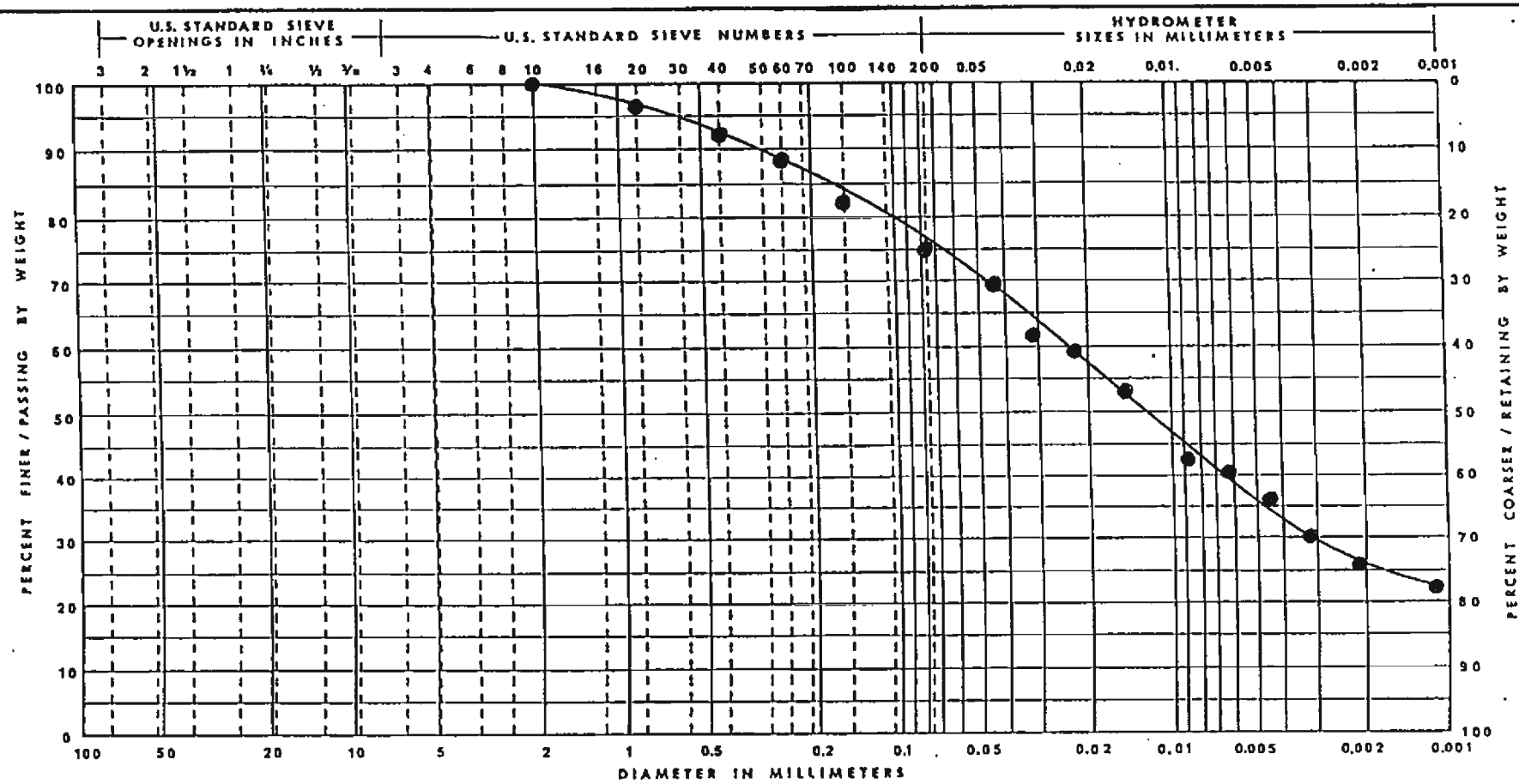


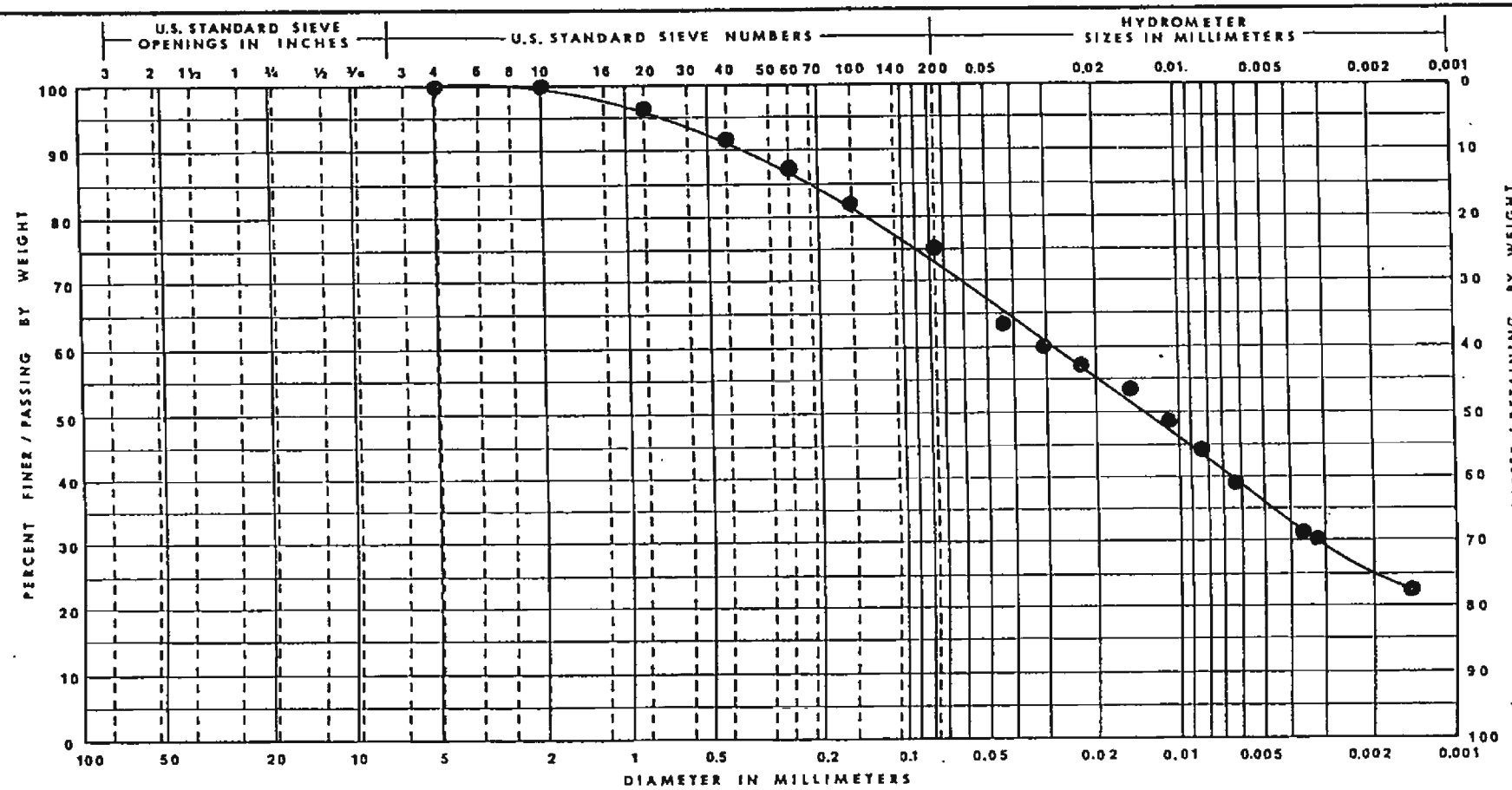
ASTM	GRAVEL		SAND			SILT & CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B6	CS2	6.5	Silty Clay, Some Sand, Trace	75	
				of Gravel, Mottled Brown (CL)		

MONROE ASH BASIN
DETROIT EDISON
MONROE, MICHIGAN

DRAWN MCS
APP'D
DATE 10/10/94
JOB PG-22087

soil and materials engineers, inc



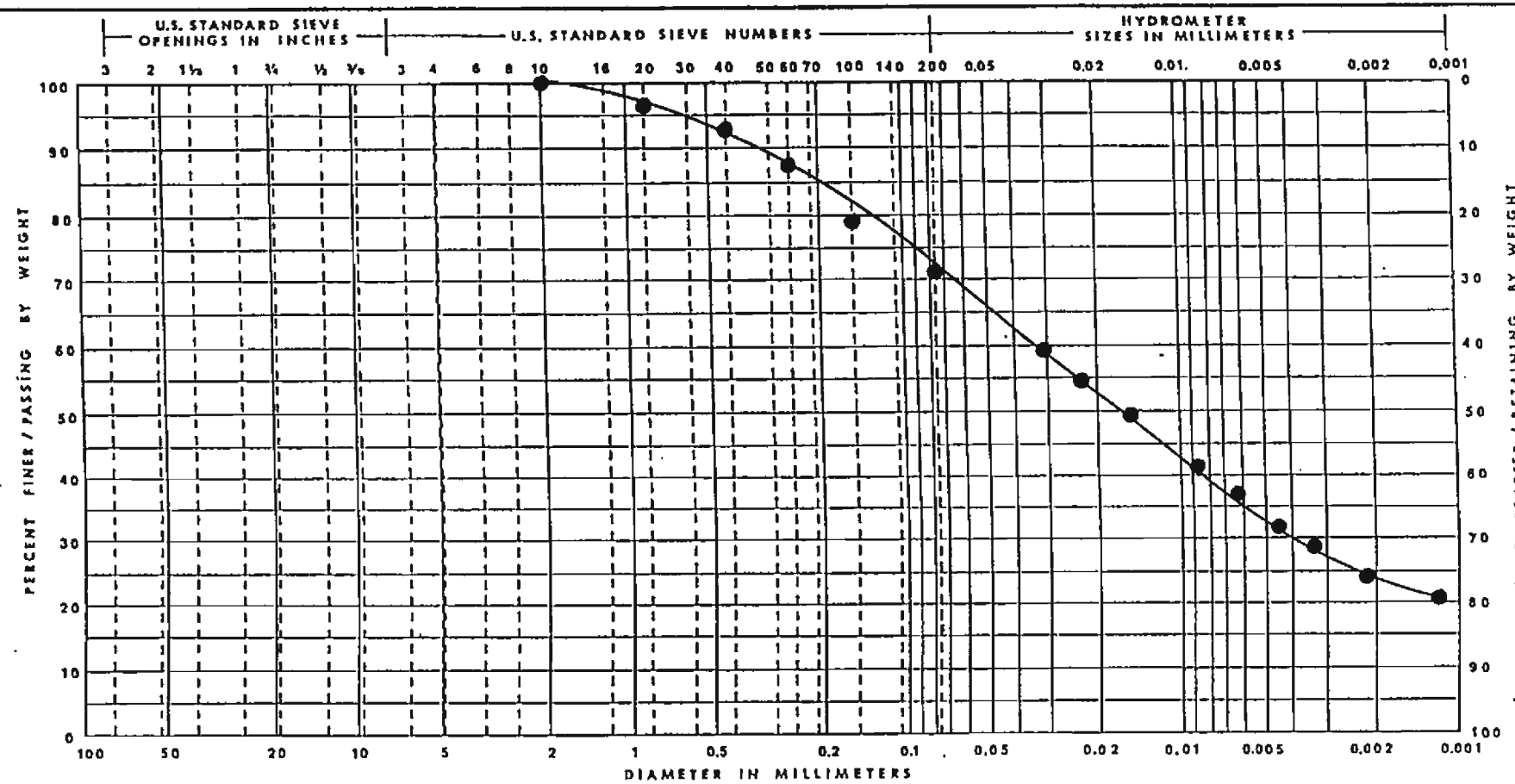
	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B6	CS4	11.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	75	

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

DRAWN MCS
APP'D
DATE 12/6/94
JOB PG22087

soil and materials engineers, inc



	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL			COARSE SAND	FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B6	CS6	16.5	Silty Clay, Some Sand, Trace	71	
				of Gravel, Gray (CL)		

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

DRAWN MCS
APP'D
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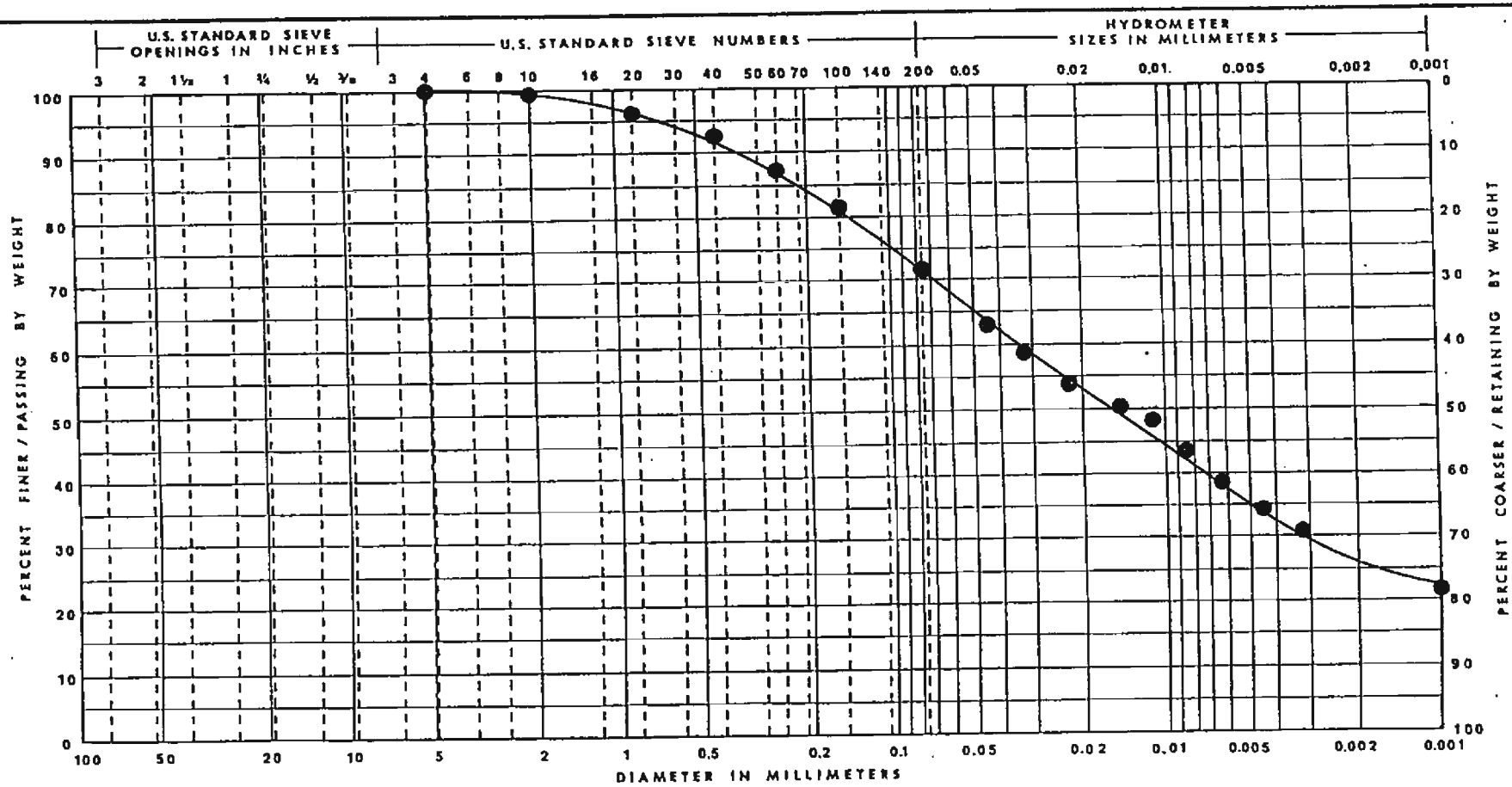

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B6	CS8	21.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	72	

MONROE ASH BASIN
DETROIT EDISON
DETROIT, MICHIGAN

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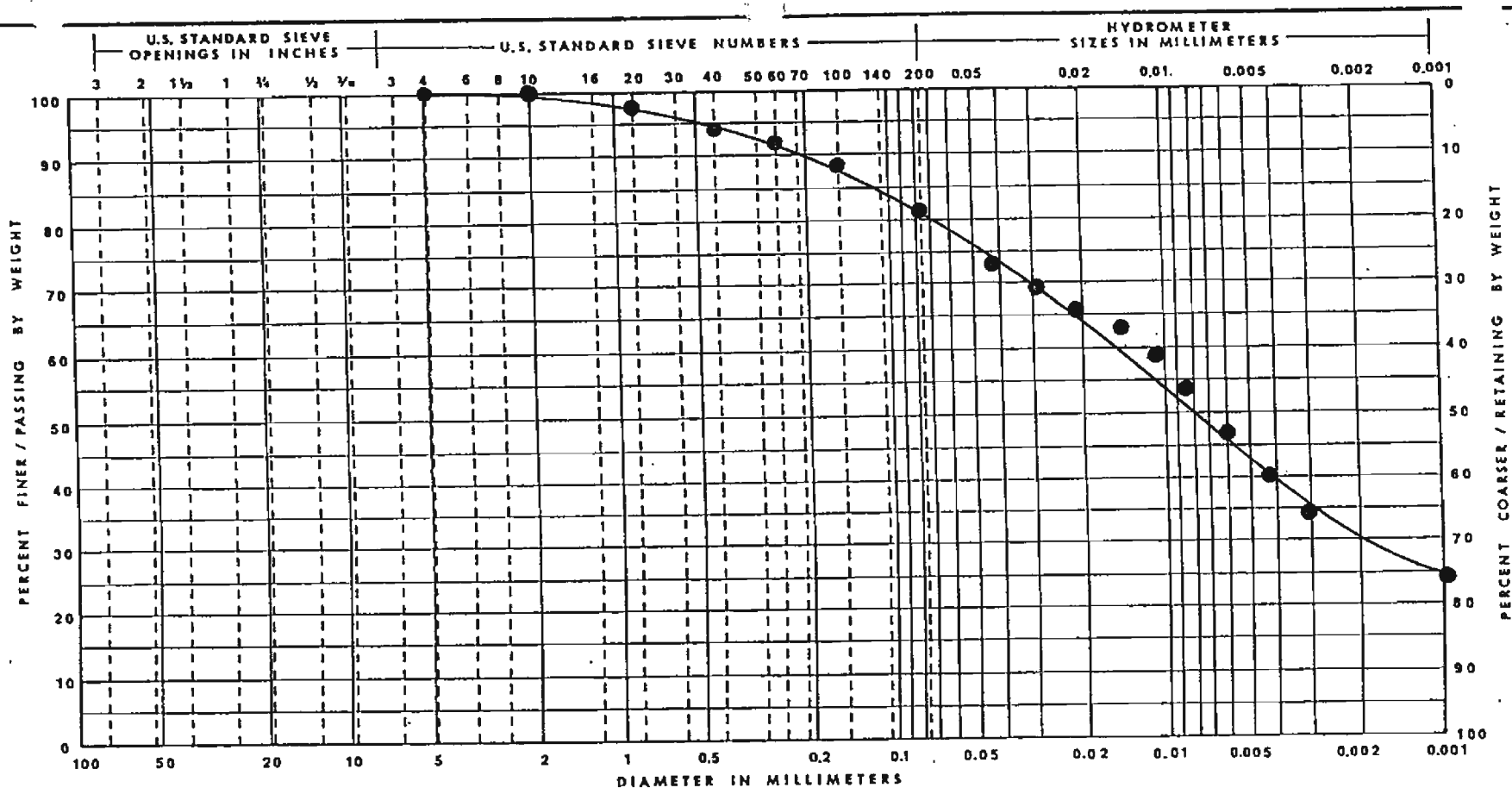

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm
	B6	CS10	26.5	Silty Clay-Trace to Some Sand- Trace of Gravel-Gray (CL)	81

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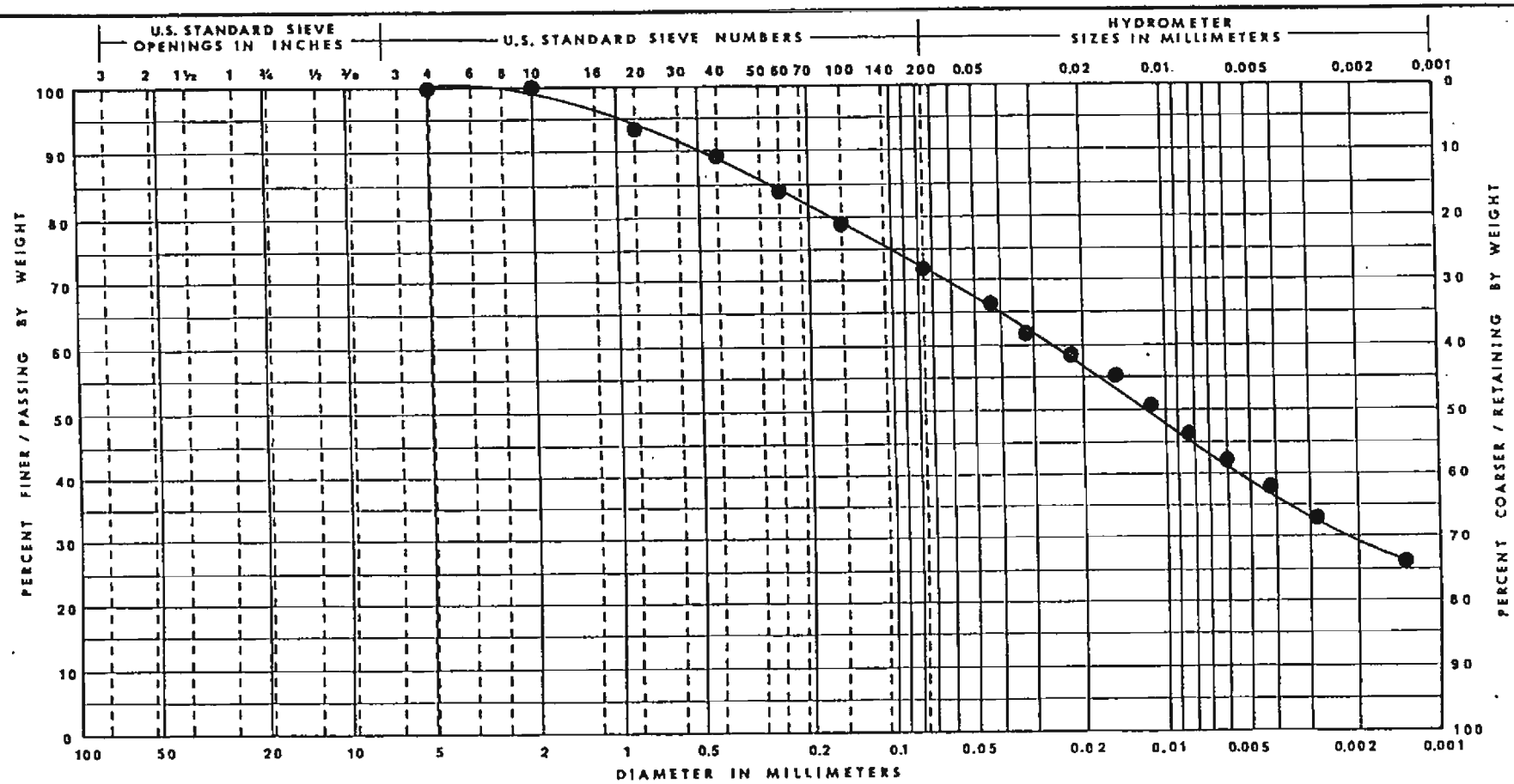

ASTM	GRAVEL		SAND			SILT & CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B6	CS12	31.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	72	

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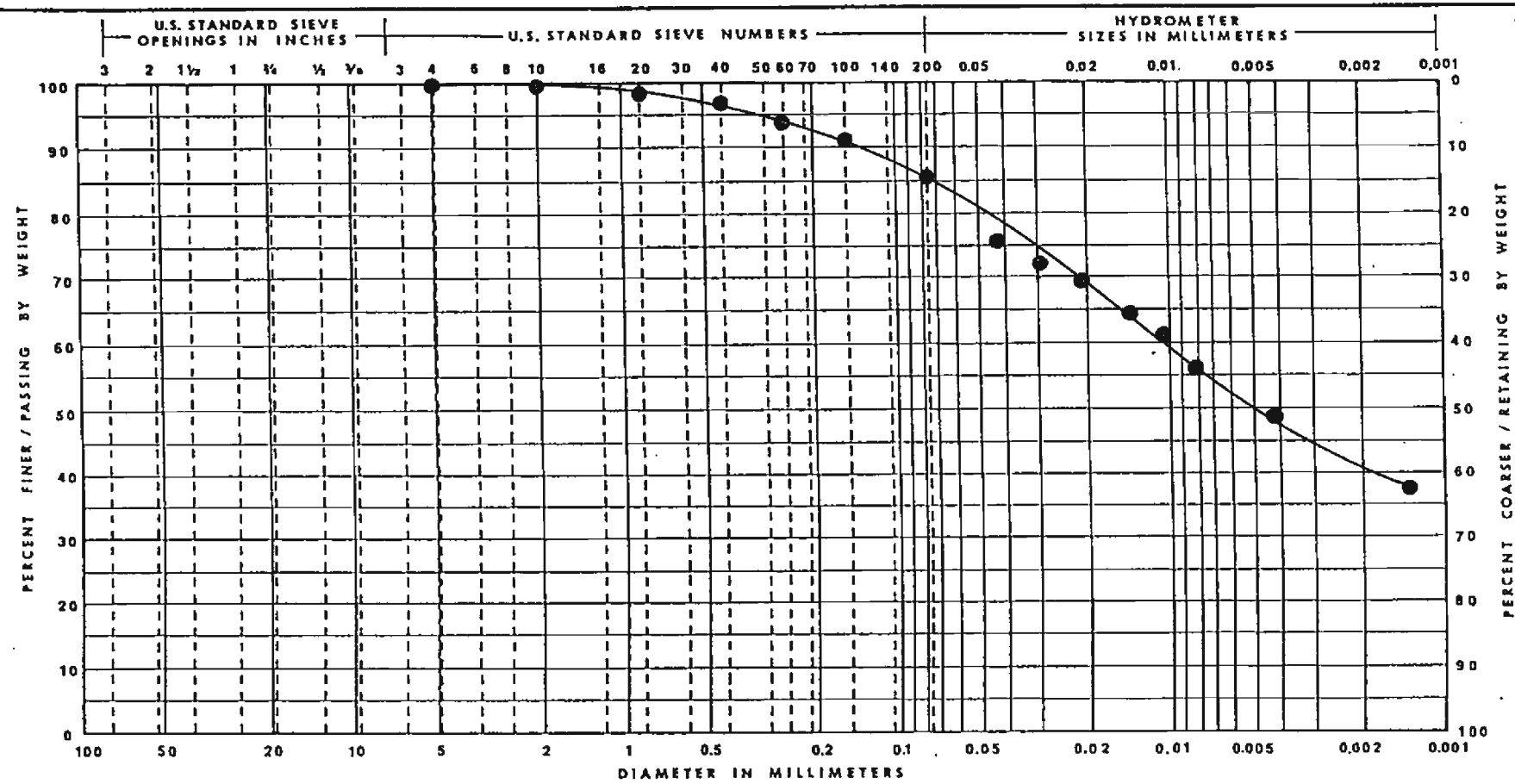

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL			COARSE SAND	FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B8	CS2	6.5	Silty Clay-Trace to Some Sand-Trace of Gravel-Mottled Brown (CL)	85	

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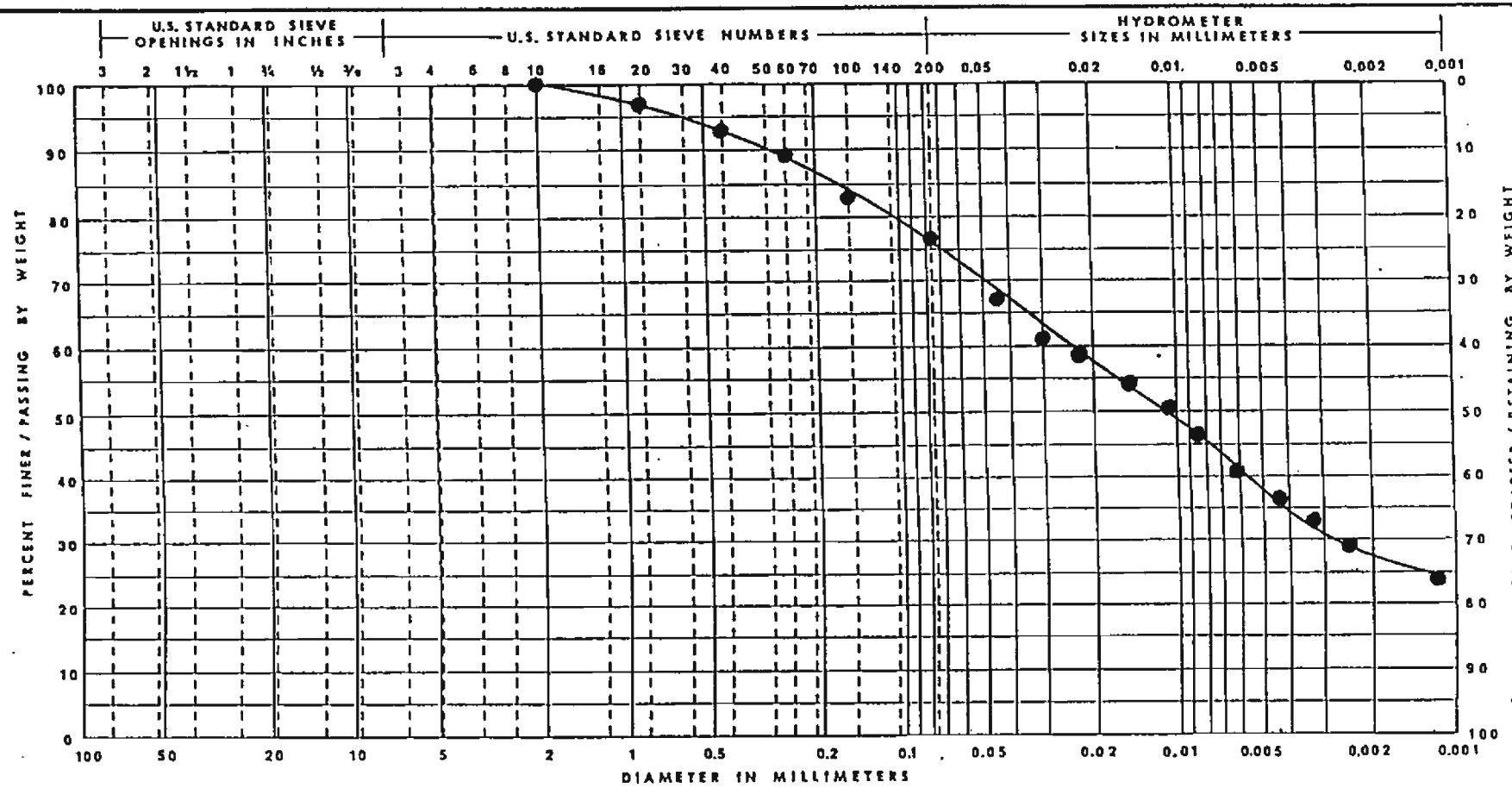

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm
	B8	CS4	11.5	Silty Clay, Some Sand, Trace	76
				of Gravel, Mottled Brown (CL)	

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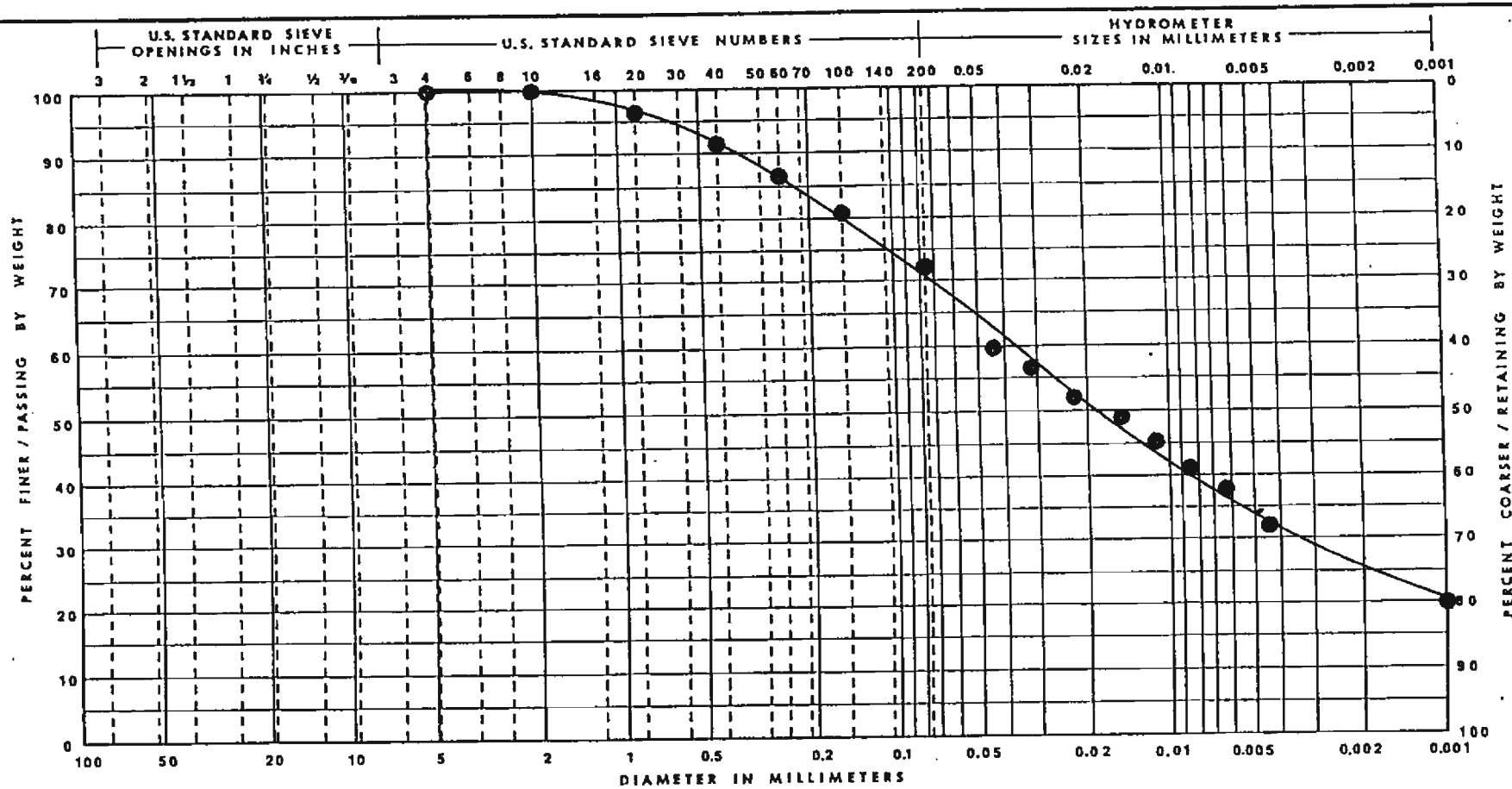

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm
	B8	CS6	16.5	Silty Clay-Some Sand-Trace of Gravel-Mottled Brown (CL)	72

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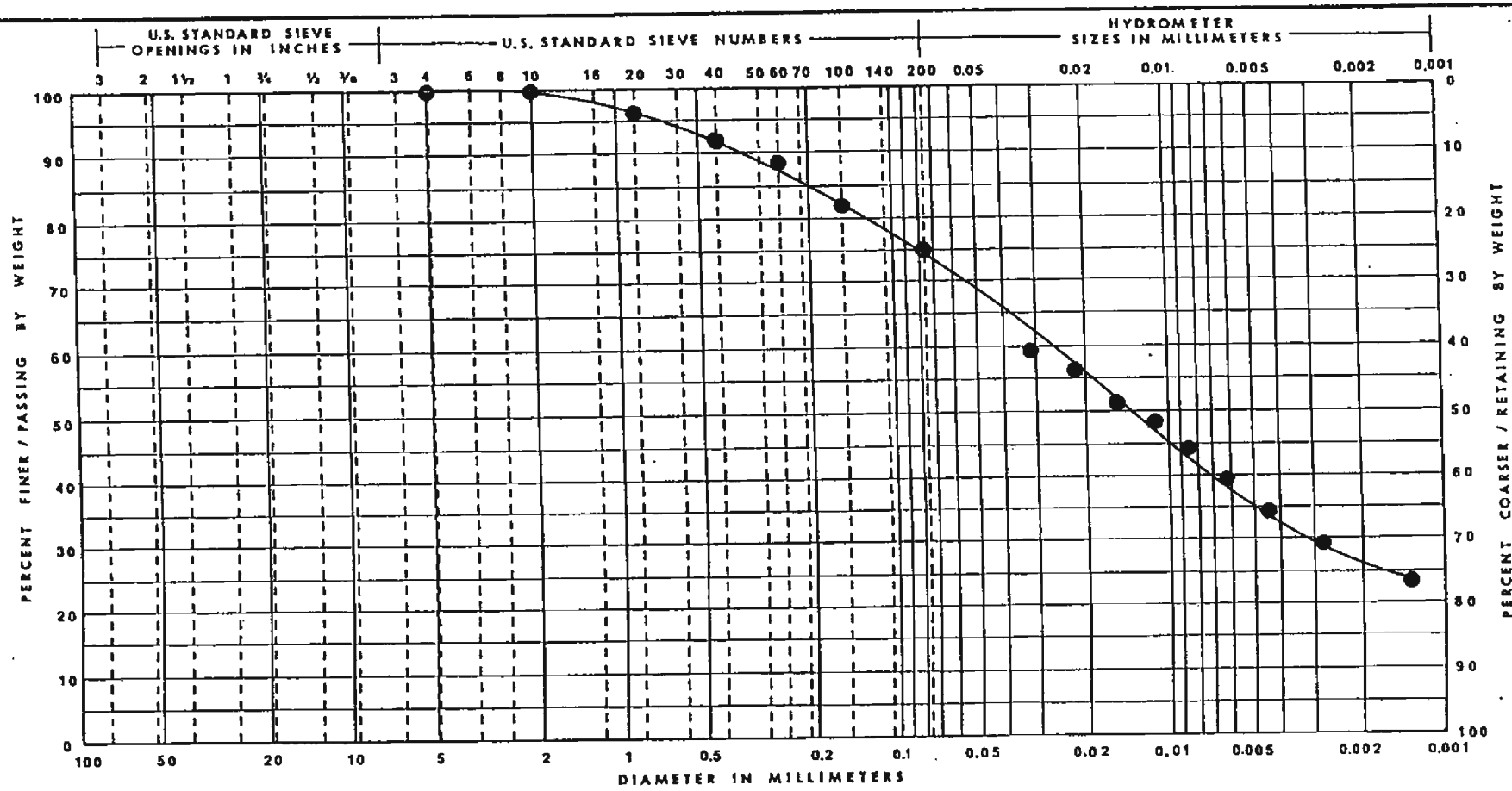

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B8	CS8	21.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	75	

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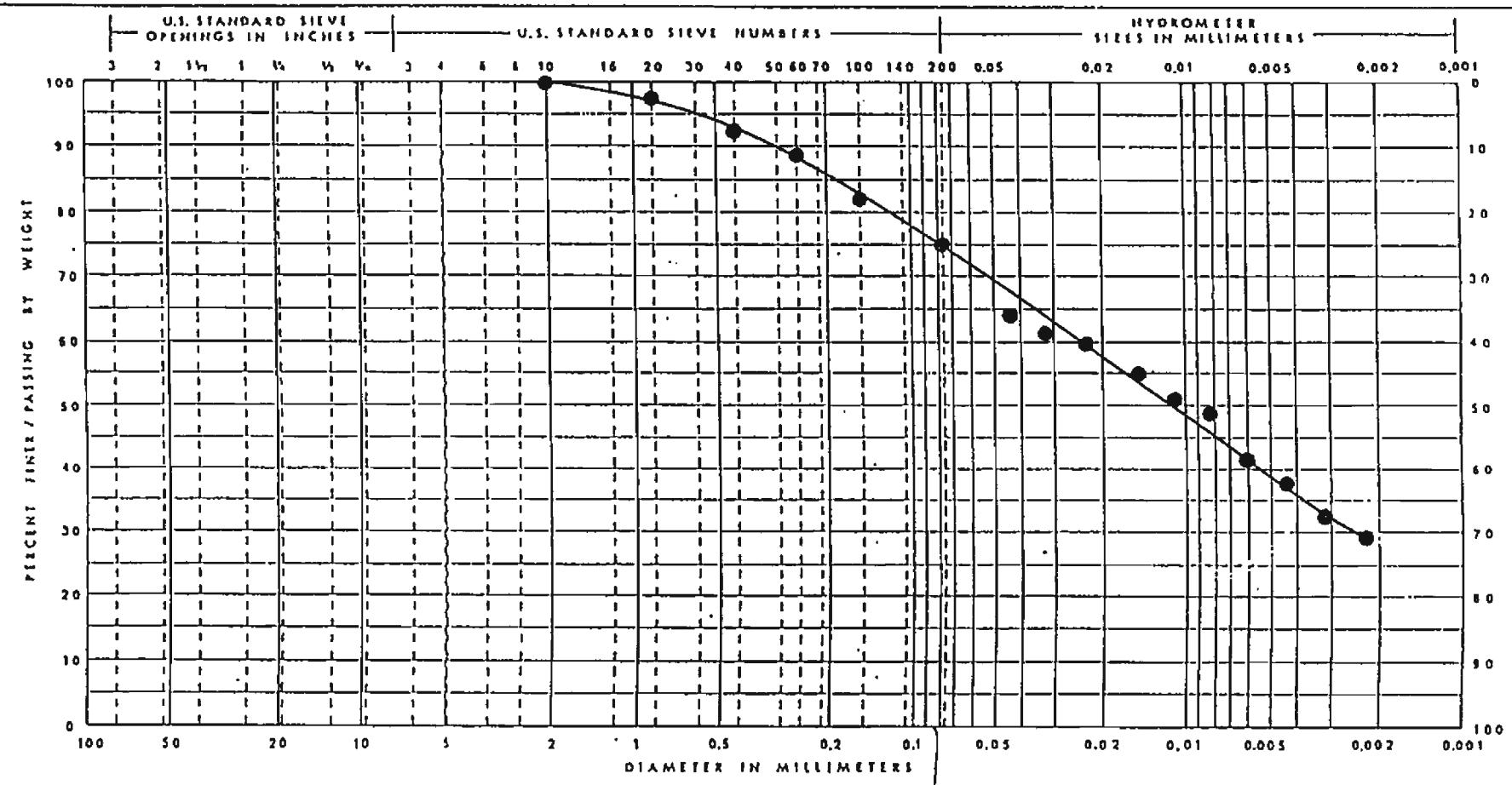

ASTM	GRAVEL		SAND			SILT & CLAY	
	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND	FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B8	CS10	26.5	Silty Clay, Some Sand, Trace of Gravel, Gray (CL)	75	

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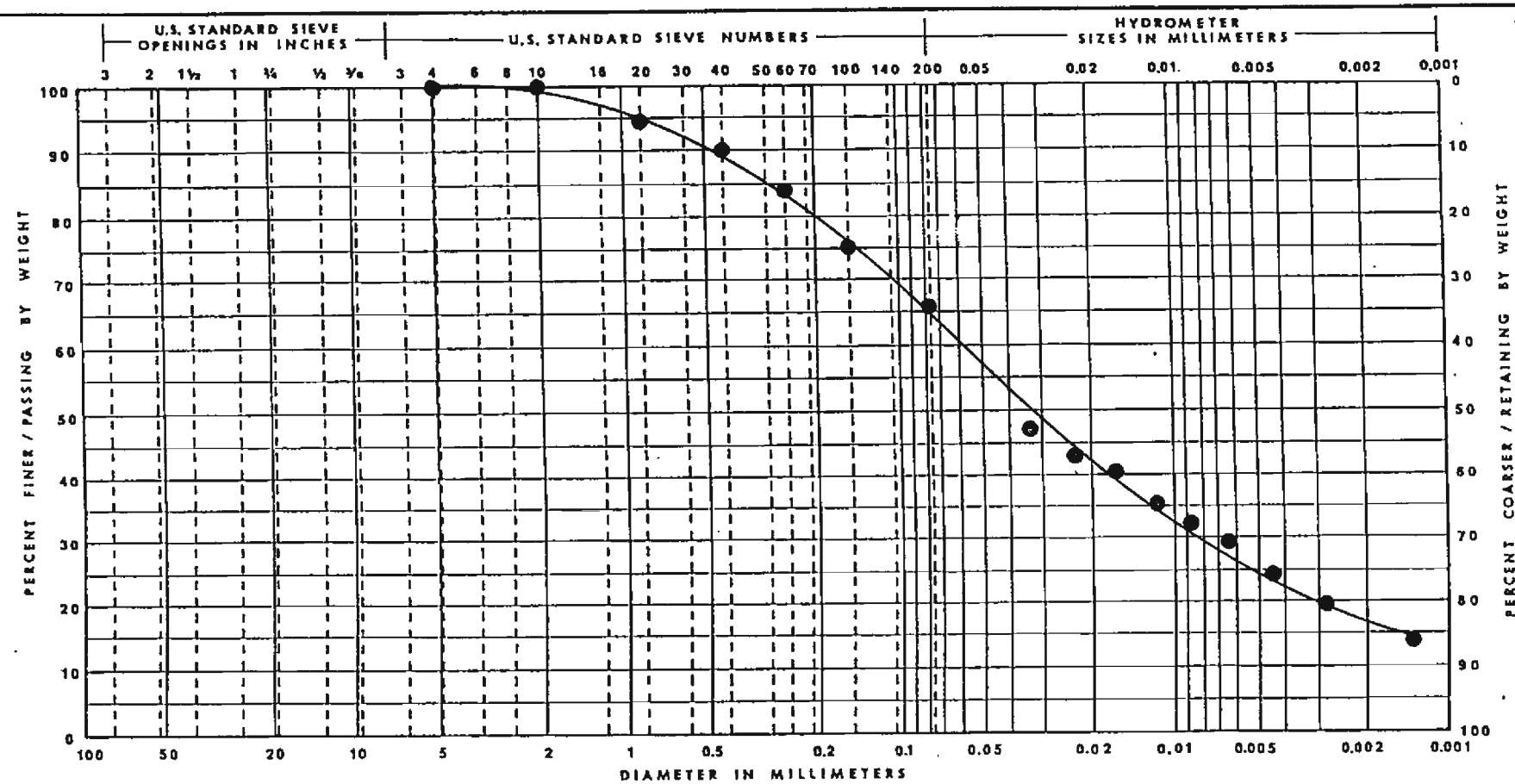

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B8	CS12	31.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	66	

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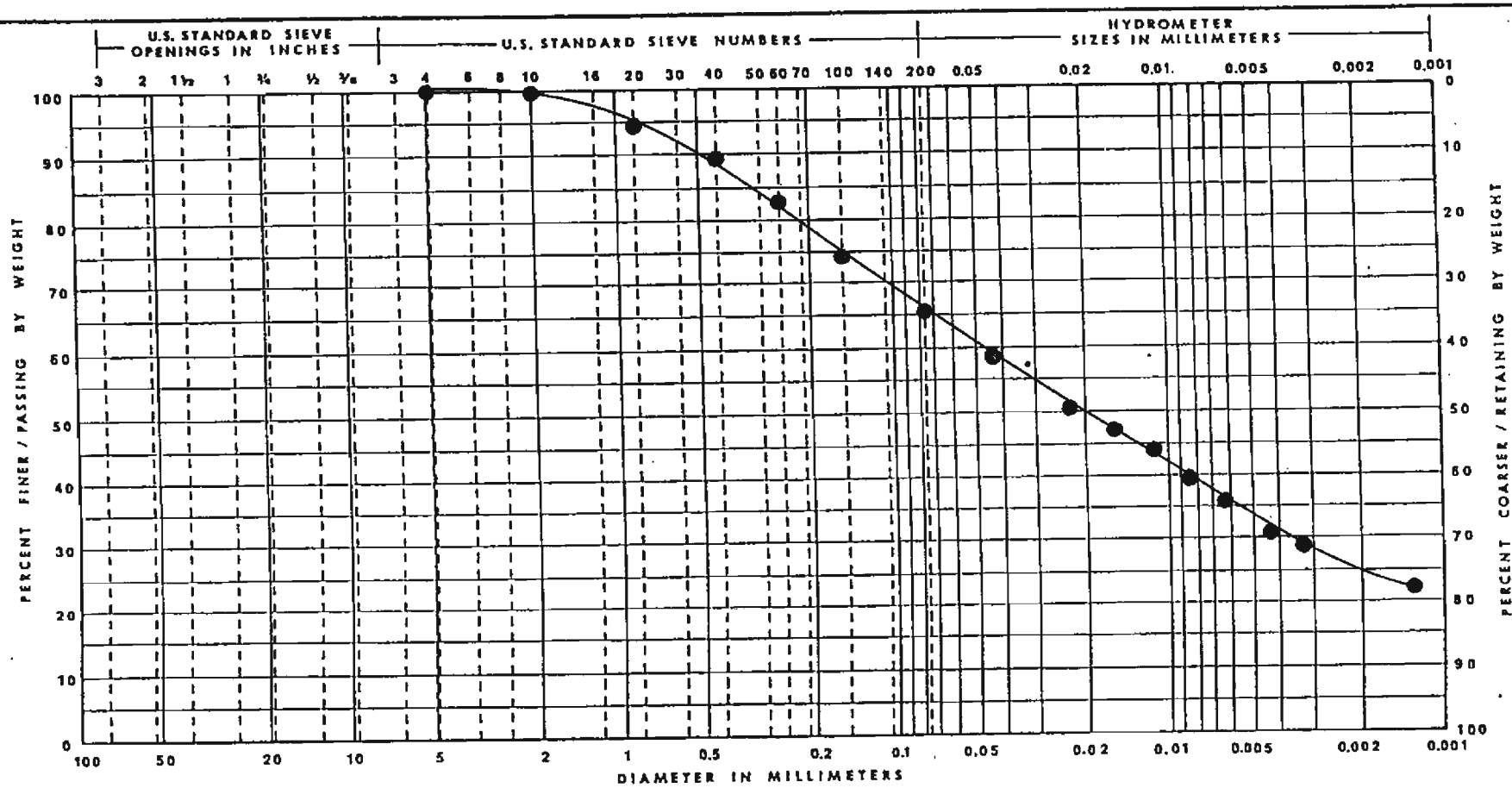

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B8	CS14	36.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	65	

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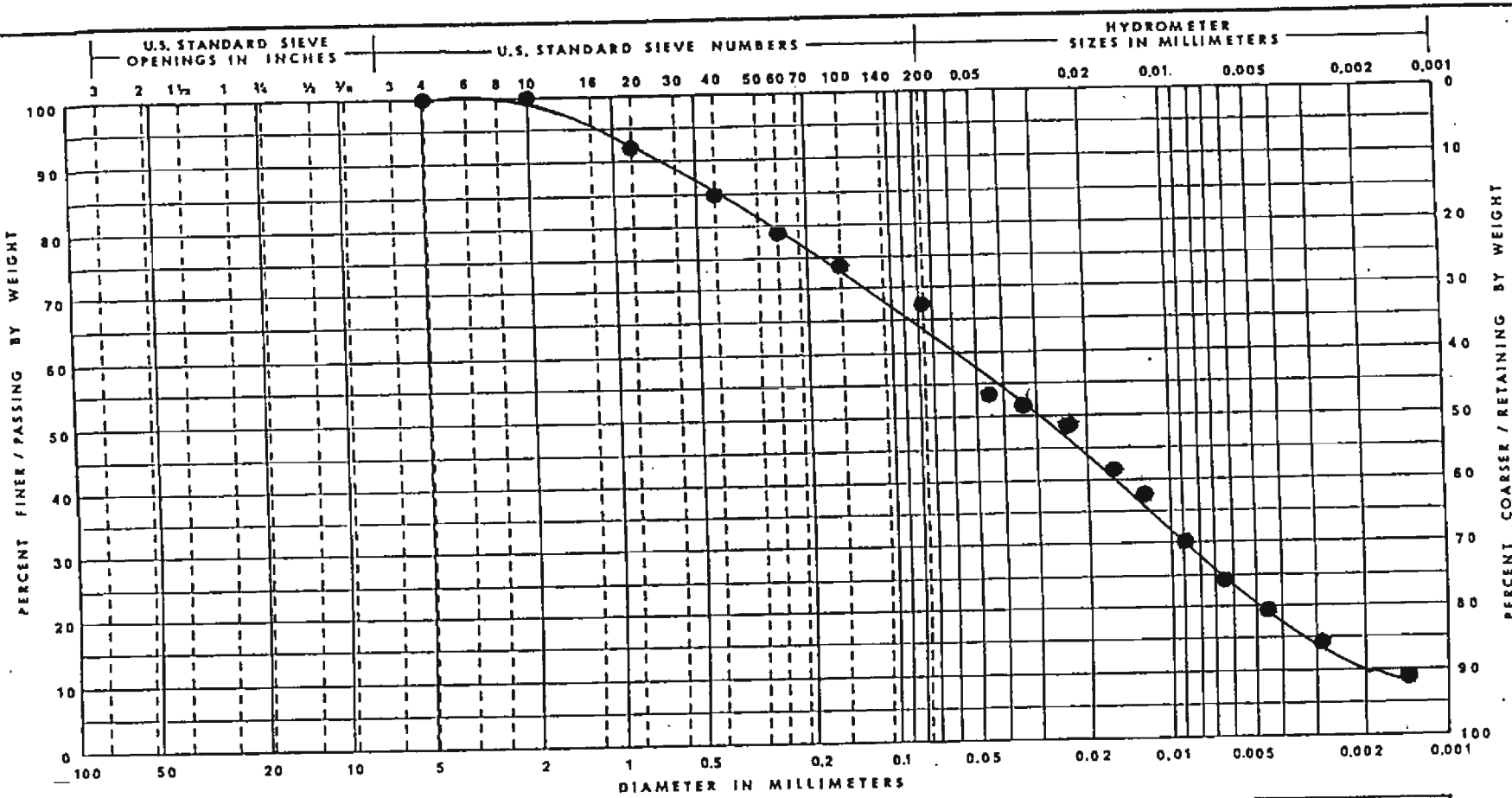

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B8	CS16	41.5	Clayey Silt-Some Sand-Trace of Gravel-Gray (CL)	66	

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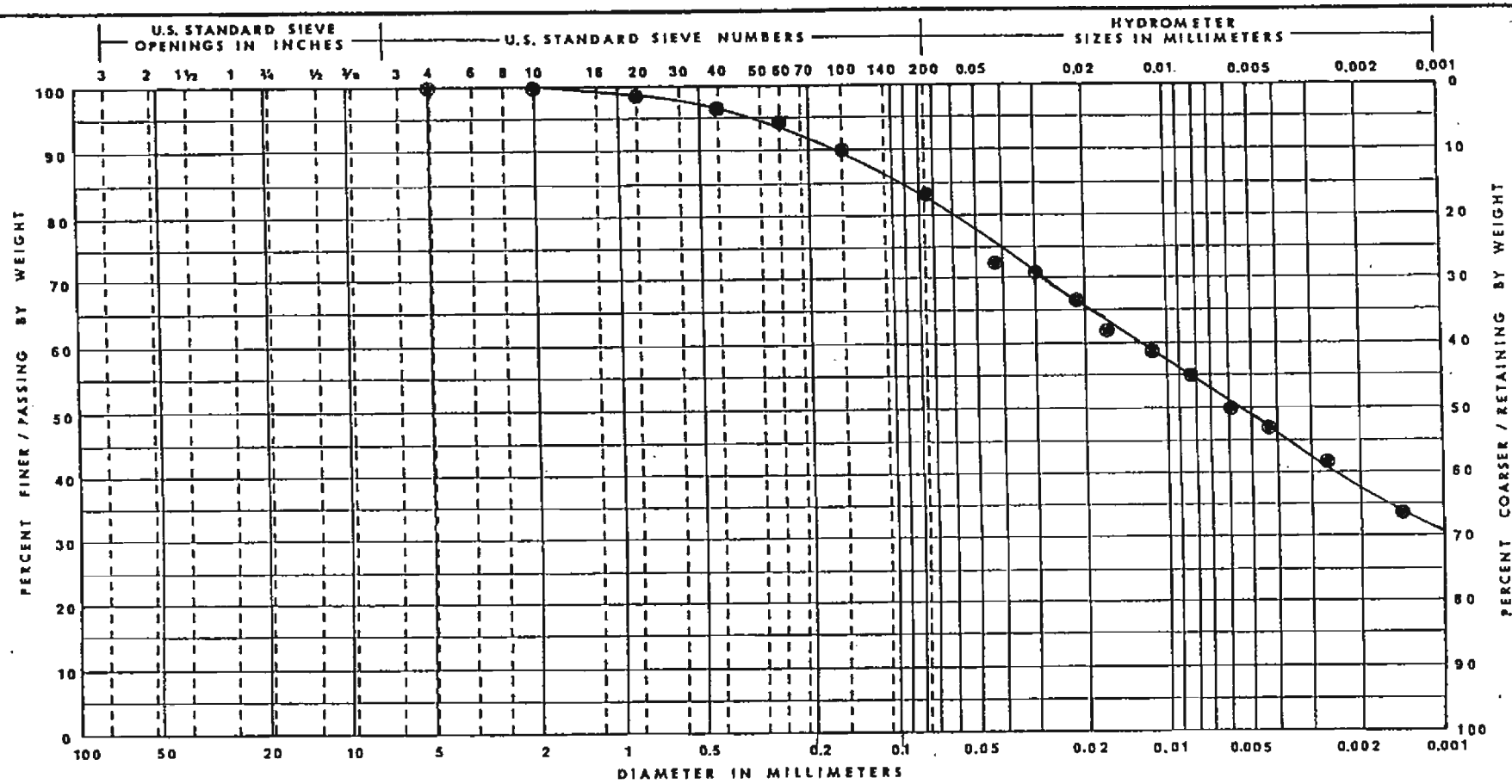

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B10	CS2	6.5	Silty Clay-Trace to Some Sand-	84	
				Trace of Gravel, Roots & Brick		
				Pieces-Brown (CL)		

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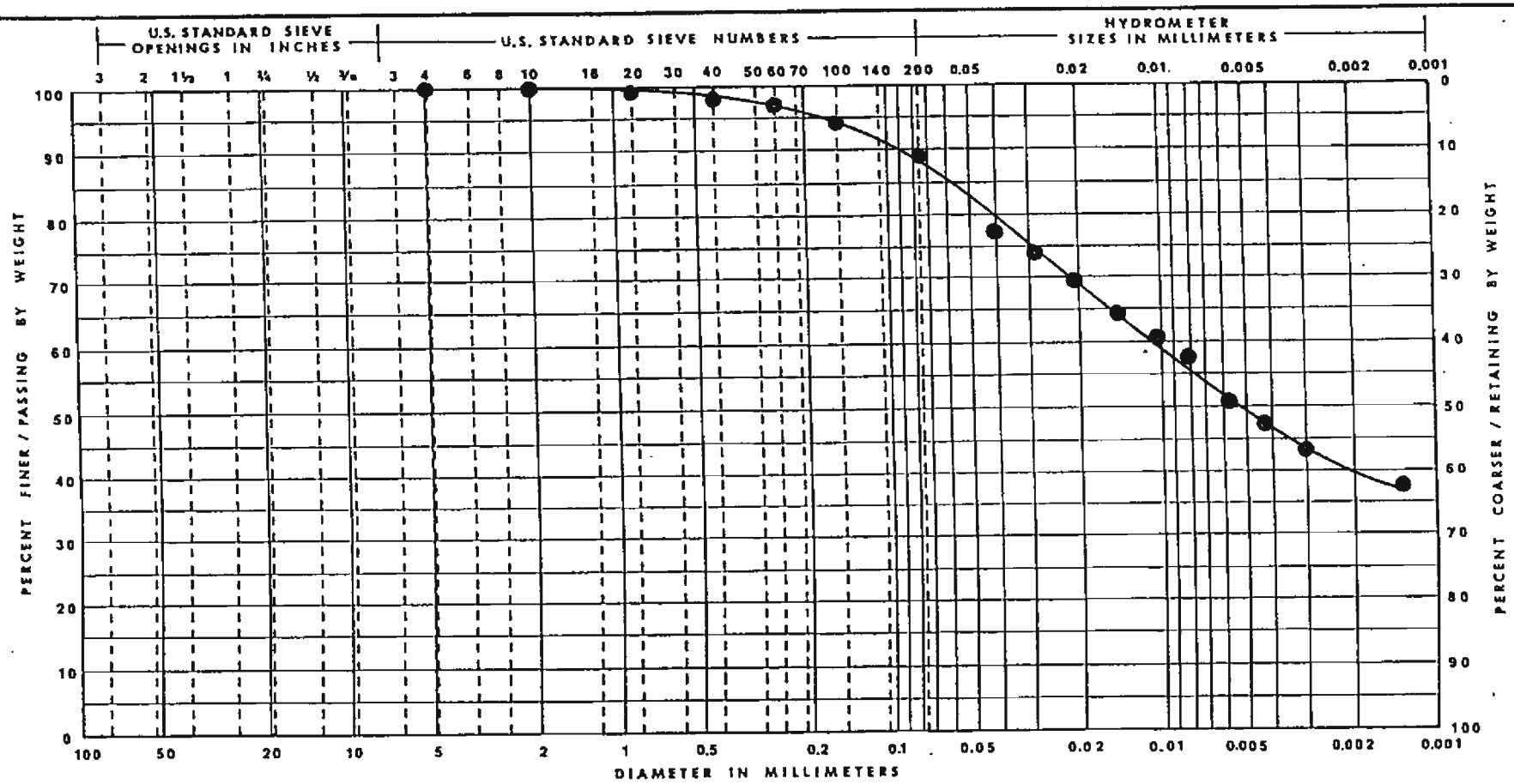

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm
	B10	CS4	11.5	Silty Clay-Trace to Some Sand-	89
				Trace of Gravel, Roots & Brick	
				Pieces-Brown (CL)	

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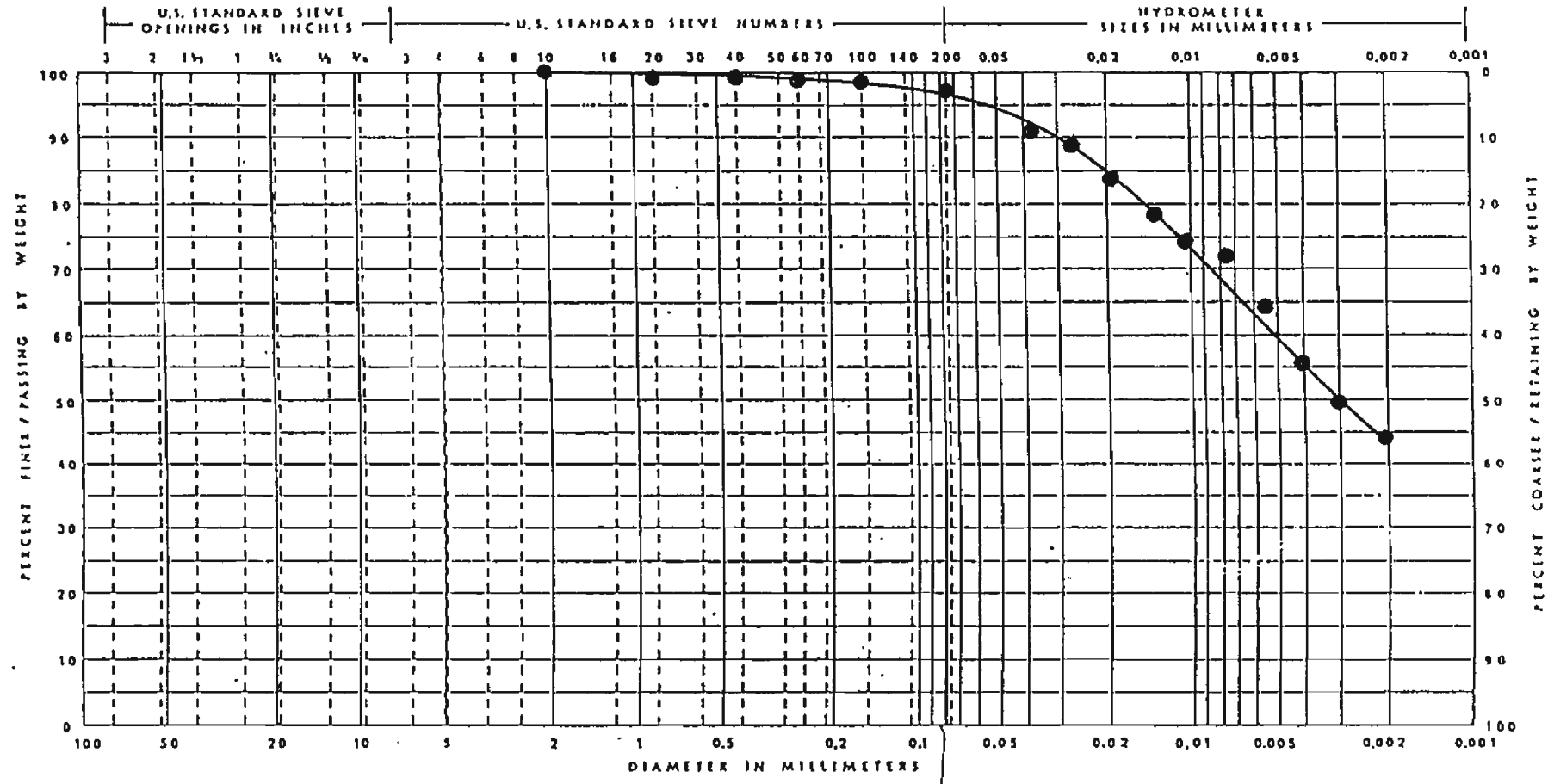

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B10	CS6	16.5	Silty Clay, Trace of Sand and Gravel, Mottled Brown (CL)	97	

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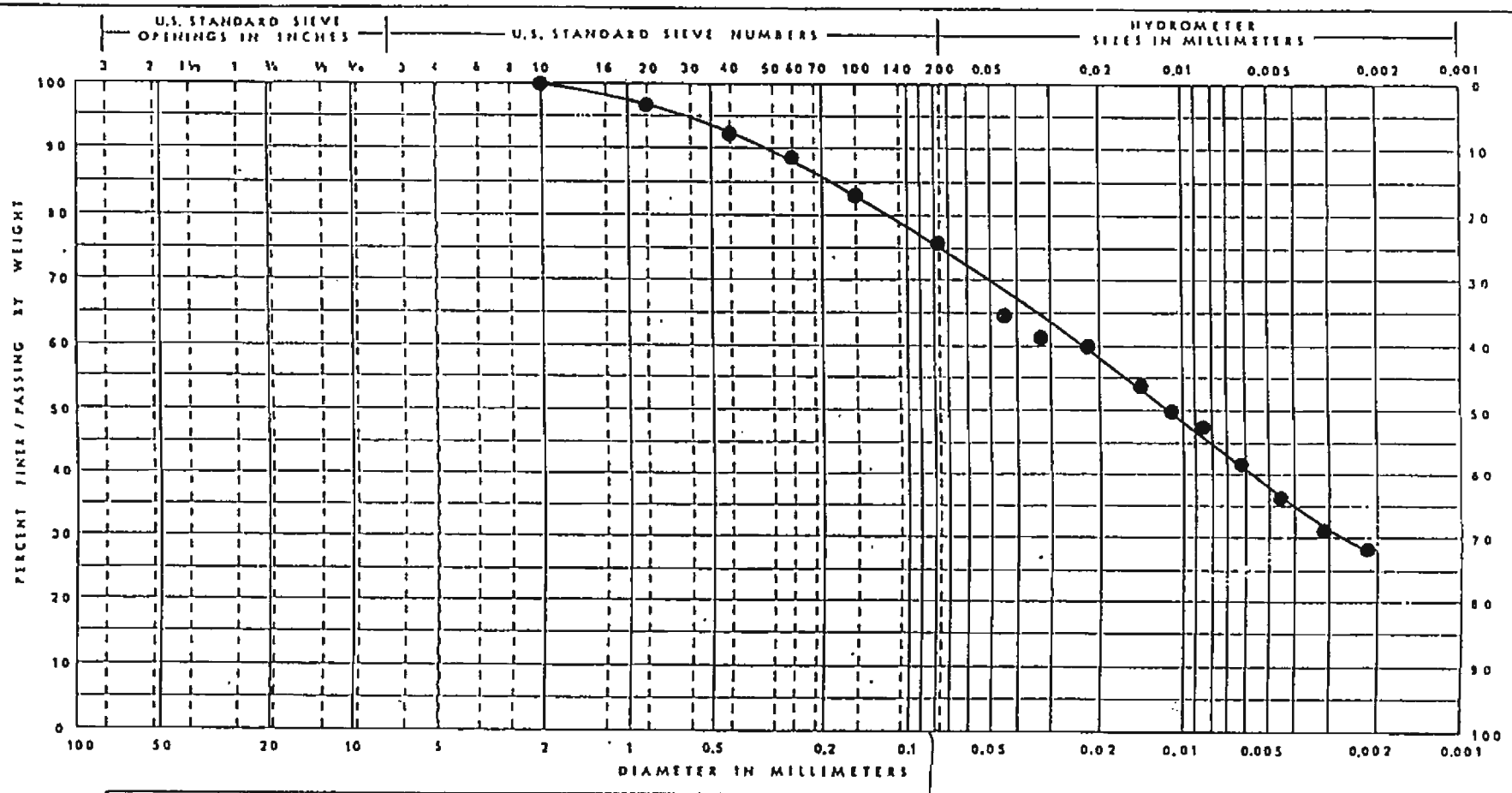

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B10	CS8	21.5	Silty Clay, Some Sand, Trace of Gravel, Gray (CL)	75	

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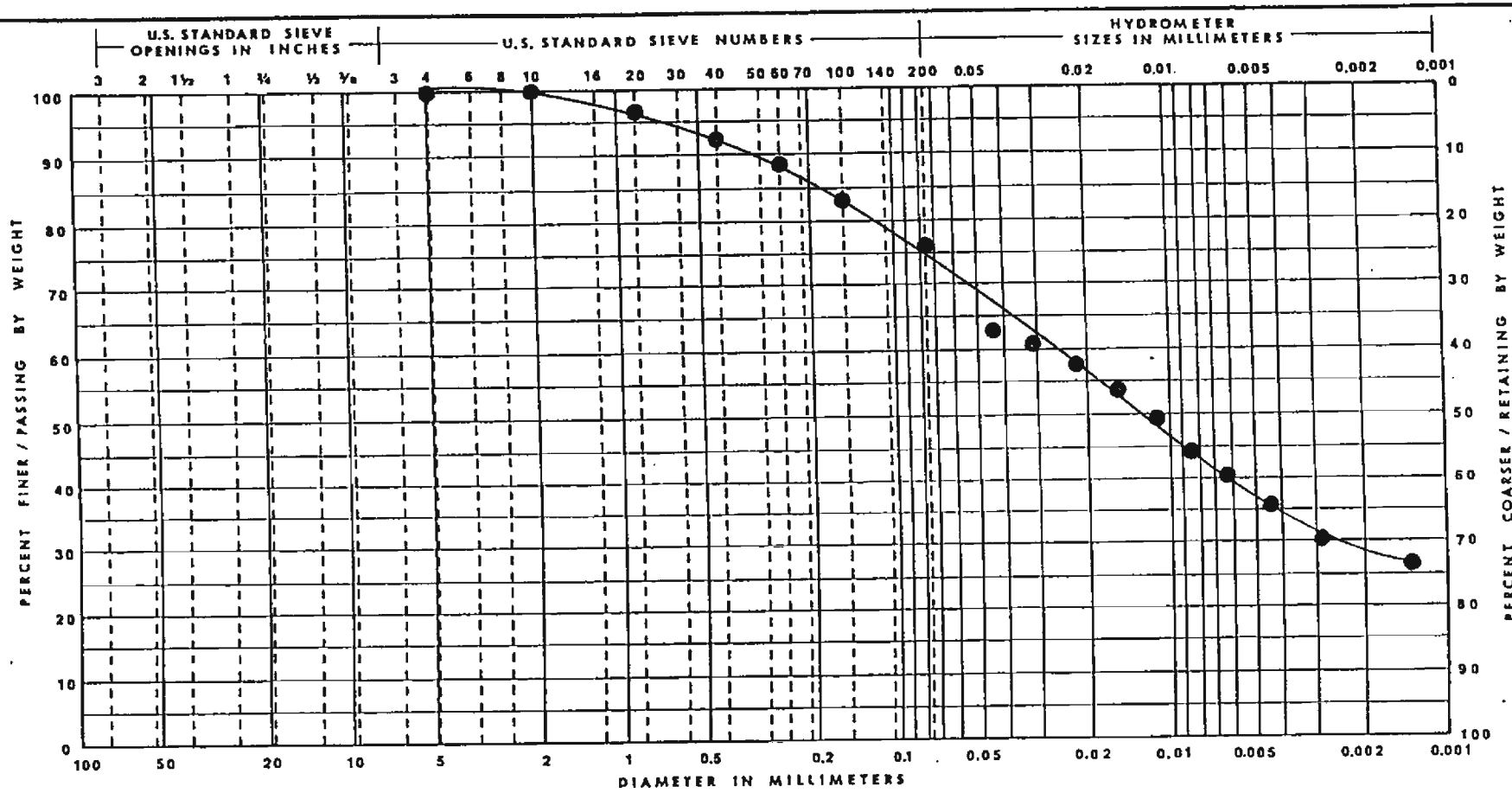

	GRAVEL		SAND			SILT & CLAY	
ASTM	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
AASHTO	GRAVEL		COARSE SAND		FINE SAND	SILT & CLAYS	

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH (FT)	SAMPLE CLASSIFICATION	% < 0.074 mm	
	B10	CS10	26.5	Silty Clay-Some Sand-Trace of Gravel-Gray (CL)	76	

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APPENDIX I – 2016 LABORATORY TEST RESULTS

TRC Environmental Corporation

Falling Head, Rising Tailwater Permeability Test (ASTM D5084, Method C)

QC: JPH

QA: JPH

Project Name:	DTE - Monroe FAB	Cell #:	8
Project #:	231828.0001.0000	USCS Description:	N/A
Sample Name:	MW-16-01, 20-22'	USCS Classification:	N/A
Visual Descript:	Gray sandy lean clay, with gravel	Average Kv =	1.6E-08 cm/s

		Initial Values	Final Values			
Sample Type:	Undisturbed					
Sample Dia. (in)		2.87	2.87	Permeant:	Water	
Sample Ht. (in)		3.31	3.31	Permeant Specific Gravity:	1.00	
Tare & Wet (g)		542.53	912.90	Sample Specific Gravity:	2.81	Est.
Tare & Dry (g)		495.80	821.70	Confining Pressure (psi):	100.0	
Tare (g)		90.23	91.36	Burette Diameter (in):	0.250	
Sample Wt. (g)		816.00	821.54	Burette Zero (cm):	100.0	
Moisture (%)		11.5	12.5	Maximum Gradient:	6.7	
Wet Density (pcf)		145.1	146.0	Average Gradient:	6.5	
Dry Density (pcf)		130.1	129.8	Max. Effect. Stress (psi):	5.8	
Saturation (%)		92.9	100.0	Min. Effect. Stress (psi):	4.4	
				Ave. Effect. Stress (psi):	4.9	

	Date			Time		Run	Temp	Pressure (psi)		Cham	Cham.	Bot	Bot.	Top	Top	Flow	Kv ***	Ave.*
	Yr.	Mo.	Day	Hr.	Min.	Time (s)	C°**	Bot	Top	(cm)	Dif.(cm)	(cm)	Dif.(cm)	(cm)	Dif.(cm)	Dif.(%)	cm/s	0,1
1	2016	3	2	5	6.00		0.0	95	95	45.70		2.90		102.20				
2	2016	3	2	9	13.00	14820	24.0	95	95	46.50	0.80	4.15	1.25	100.65	1.55	-10.7	5.6E-08	
3	2016	3	2	12	8.00	10500	22.0	95	95	46.70	0.20	4.95	0.80	99.85	0.80	0.0	4.8E-08	
4	2016	3	2	20	42.00	30840	22.0	95	95	48.30	1.60	7.20	2.25	97.85	2.00	5.9	4.5E-08	
5	2016	3	3	14	8.00	62760	23.0	95	95	50.95	2.65	10.90	3.70	94.55	3.30	5.7	3.8E-08	
6	2016	3	3	18	52.00	17040	24.0	95	95	51.50	0.55	11.80	0.90	93.80	0.75	9.1	3.4E-08	
7	2016	3	4	13	27.00	66900	22.0	95	95	53.20	1.70	14.70	2.90	91.15	2.65	4.5	3.2E-08	
8	2016	3	4	18	53.00	19560	22.0	95	95	53.80	0.60	15.45	0.75	90.45	0.70	3.4	3.0E-08	
9	2016	3	7	5	14.00	210060	22.0	95	95	58.95	5.15	21.05	5.60	85.35	5.10	4.7	2.2E-08	
10	2016	3	7	8	14.00	10800	23.0	95	95	59.30	0.35	21.30	0.25	85.15	0.20	11.1	1.9E-08	
11	2016	3	7	13	26.00	18720	22.0	95	95	59.75	0.45	21.65	0.35	84.80	0.35	0.0	1.8E-08	
12	2016	3	7	18	47.00	19260	21.0	95	95	60.50	0.75	22.05	0.40	84.55	0.25	23.1	1.7E-08	
13	2016	3	8	5	5.00	37080	25.0	95	95	61.50	1.00	22.75	0.70	83.85	0.70	0.0	1.7E-08	
14	2016	3	8	13	23.00	29880	22.0	95	95	62.20	0.70	23.30	0.55	83.30	0.55	0.0	1.8E-08	
15	2016	3	8	19	23.00	21600	22.0	95	95	63.10	0.90	23.70	0.40	83.10	0.20	33.3	1.4E-08	
16	2016	3	9	5	30.00	36420	24.0	95	95	63.80	0.70	24.30	0.60	82.40	0.70	-7.7	1.8E-08	
17	2016	3	9	11	14.00	20640	24.0	95	95	64.30	0.50	24.65	0.35	82.15	0.25	16.7	1.5E-08	
18	2016	3	9	20	22.00	32880	22.0	95	95	64.70	0.40	25.25	0.60	81.70	0.45	14.3	1.7E-08	
19	2016	3	10	4	59.00	31020	23.0	95	95	65.20	0.50	25.70	0.45	81.20	0.50	-5.3	1.6E-08	1
20	2016	3	10	8	24.00	12300	23.0	95	95	65.40	0.20	25.90	0.20	81.00	0.20	0.0	1.7E-08	1
21	2016	3	10	11	23.00	10740	23.0	95	95	65.40	0.00	26.05	0.15	80.85	0.15	0.0	1.5E-08	1
22	2016	3	10	20	45.00	33720	23.0	95	95	66.20	0.80	26.65	0.60	80.45	0.40	20.0	1.6E-08	1
23	2016	3	11	4	53.00	29280	22.0	95	95	66.20	0.00	27.05	0.40	79.95	0.50	-11.1	1.8E-08	1
24	2016	3	11	7	57.00	11040	24.0	95	95	66.60	0.40	27.20	0.15	79.80	0.15	0.0	1.5E-08	1
25																		
26																		

**A zero in this column starts a series of measurements.

*Average Kv for those rows with a 1 in the Ave. column.

1.6E-08 cm/s

(Termination determined by stable Kv and low flow differential.)

***Kv adjusted for temperature.

TRC Environmental Corporation

Falling Head, Rising Tailwater Permeability Test (ASTM D5084, Method C)

QC: JPH

QA: JPH

Project Name:	DTE - Monroe FAB	Cell #:	9
Project #:	231828.0001.0000	USCS Description:	N/A
Sample Name:	MW-16-02, 30-32'	USCS Classification:	N/A
Visual Descript:	Gray sandy lean clay, with gravel	Average Kv =	1.3E-08 cm/s

		Initial Values	Final Values			
Sample Type:	Undisturbed					
Sample Dia. (in)		2.87	2.86	Permeant:	Water	
Sample Ht. (in)		3.06	3.03	Permeant Specific Gravity:	1.00	
Tare & Wet (g)		392.27	822.40	Sample Specific Gravity:	2.80	Est.
Tare & Dry (g)		353.20	733.00	Confining Pressure (psi):	100.0	
Tare (g)		89.98	90.41	Burette Diameter (in):	0.250	
Sample Wt. (g)		733.20	731.99	Burette Zero (cm):	100.0	
Moisture (%)		14.8	13.9	Maximum Gradient:	9.2	
Wet Density (pcf)		141.0	143.2	Average Gradient:	9.0	
Dry Density (pcf)		122.8	125.7	Max. Effect. Stress (psi):	5.7	
Saturation (%)		98.2	100.0	Min. Effect. Stress (psi):	4.2	
				Ave. Effect. Stress (psi):	4.8	

	Date			Time		Run	Temp	Pressure (psi)		Cham	Cham.	Bot	Bot.	Top	Top	Flow	Kv ***	Ave.*
	Yr.	Mo.	Day	Hr.	Min.	Time (s)	C°**	Bot	Top	(cm)	Dif.(cm)	(cm)	Dif.(cm)	(cm)	Dif.(cm)	Dif.(%)	cm/s	0,1
1	2016	3	2	5	7.00		0.0	95	95	55.10		2.10		101.90				
2	2016	3	2	9	14.00	14820	24.0	95	95	55.90	0.80	2.65	0.55	101.15	0.75	-15.4	2.4E-08	
3	2016	3	2	12	9.00	10500	22.0	95	95	56.20	0.30	2.95	0.30	100.75	0.40	-14.3	1.9E-08	
4	2016	3	2	20	43.00	30840	22.0	95	95	57.75	1.55	4.05	1.10	99.90	0.85	12.8	1.8E-08	
5	2016	3	3	14	9.00	62760	23.0	95	95	60.30	2.55	5.95	1.90	98.50	1.40	15.2	1.5E-08	
6	2016	3	3	18	53.00	17040	24.0	95	95	60.85	0.55	6.50	0.55	98.00	0.50	4.8	1.8E-08	
7	2016	3	4	13	28.00	66900	22.0	95	95	62.50	1.65	8.30	1.80	96.55	1.45	10.8	1.5E-08	
8	2016	3	4	18	54.00	19560	22.0	95	95	63.10	0.60	8.80	0.50	96.15	0.40	11.1	1.5E-08	
9	2016	3	7	5	15.00	210060	22.0	95	95	67.80	4.70	13.70	4.90	92.40	3.75	13.3	1.4E-08	
10	2016	3	7	8	14.00	10740	23.0	95	95	68.30	0.50	13.95	0.25	92.20	0.20	11.1	1.5E-08	
11	2016	3	7	13	26.00	18720	21.0	95	95	68.60	0.30	14.35	0.40	92.00	0.20	33.3	1.2E-08	
12	2016	3	7	18	48.00	19320	21.0	95	95	69.35	0.75	14.80	0.45	91.75	0.25	28.6	1.3E-08	
13	2016	3	8	5	5.00	37020	25.0	95	95	70.40	1.05	15.60	0.80	91.15	0.60	14.3	1.3E-08	
14	2016	3	8	13	48.00	31380	22.0	95	95	70.40	0.00	16.15	0.55	90.70	0.45	10.0	1.2E-08	
15	2016	3	8	19	24.00	20160	22.0	95	95	71.75	1.35	16.60	0.45	90.55	0.15	50.0	1.1E-08	
16	2016	3	9	5	31.00	36420	24.0	95	95	72.40	0.65	17.25	0.65	90.15	0.40	23.8	1.1E-08	
17	2016	3	9	11	15.00	20640	24.0	95	95	72.80	0.40	17.65	0.40	89.85	0.30	14.3	1.3E-08	
18	2016	3	9	20	23.00	32880	22.0	95	95	73.20	0.40	18.35	0.70	89.55	0.30	40.0	1.2E-08	
19	2016	3	10	4	59.00	30960	23.0	95	95	73.60	0.40	18.85	0.50	89.10	0.45	5.3	1.2E-08	1
20	2016	3	10	8	23.00	12240	23.0	95	95	73.80	0.20	19.10	0.25	88.90	0.20	11.1	1.4E-08	1
21	2016	3	10	11	23.00	10800	23.0	95	95	73.80	0.00	19.30	0.20	88.70	0.20	0.0	1.5E-08	1
22	2016	3	10	20	46.00	33780	23.0	95	95	74.50	0.70	20.00	0.70	88.45	0.25	47.4	1.1E-08	1
23	2016	3	11	4	54.00	29280	22.0	95	95	74.40	-0.10	20.45	0.45	87.85	0.60	-14.3	1.5E-08	1
24	2016	3	11	7	58.00	11040	24.0	95	95	74.80	0.40	20.70	0.25	87.75	0.10	42.9	1.3E-08	1
25																		
26																		

**A zero in this column starts a series of measurements.

(Termination determined by stable Kv and low flow differential.)

*Average Kv for those rows with a 1 in the Ave. column. 1.3E-08 cm/s

***Kv adjusted for temperature.

TRC Environmental Corporation

Falling Head, Rising Tailwater Permeability Test (ASTM D5084, Method C)

QC: JPH

QA: JPH

Project Name:	DTE - Monroe FAB	Cell #:	10
Project #:	231828.0001.0000	USCS Description:	N/A
Sample Name:	MW-16-03, 20-22'	USCS Classification:	N/A
Visual Descript:	Gray sandy lean clay, with gravel	Average Kv =	1.2E-08 cm/s

		Initial Values	Final Values			
Sample Type:	Undisturbed					
Sample Dia. (in)		2.87	2.87	Permeant:	Water	
Sample Ht. (in)		3.00	3.01	Permeant Specific Gravity:	1.00	
Tare & Wet (g)		563.98	834.70	Sample Specific Gravity:	2.82	Est.
Tare & Dry (g)		512.90	750.80	Confining Pressure (psi):	100.0	
Tare (g)		88.99	90.55	Burette Diameter (in):	0.250	
Sample Wt. (g)		740.10	744.15	Burette Zero (cm):	100.0	
Moisture (%)		12.0	12.7	Maximum Gradient:	9.8	
Wet Density (pcf)		145.3	145.8	Average Gradient:	9.4	
Dry Density (pcf)		129.7	129.4	Max. Effect. Stress (psi):	5.7	
Saturation (%)		95.6	100.0	Min. Effect. Stress (psi):	4.2	
				Ave. Effect. Stress (psi):	4.8	

	Date			Time		Run	Temp	Pressure (psi)		Cham	Cham.	Bot	Bot.	Top	Top	Flow	Kv ***	Ave.*
	Yr.	Mo.	Day	Hr.	Min.	Time (s)	C°***	Bot	Top	(cm)	Dif.(cm)	(cm)	Dif.(cm)	(cm)	Dif.(cm)	Dif.(%)	cm/s	0,1
1	2016	3	2	5	8.00		0.0	95	95	50.70		2.00		101.60				
2	2016	3	2	9	14.00	14760	24.0	95	95	50.40	-0.30	2.65	0.65	100.90	0.70	-3.7	2.4E-08	
3	2016	3	2	12	9.00	10500	22.0	95	95	51.00	0.60	2.95	0.30	100.50	0.40	-14.3	1.9E-08	
4	2016	3	2	20	44.00	30900	22.0	95	95	52.65	1.65	3.85	0.90	99.75	0.75	9.1	1.5E-08	
5	2016	3	3	14	10.00	62760	23.0	95	95	55.10	2.45	5.50	1.65	98.30	1.45	6.5	1.4E-08	
6	2016	3	3	18	54.00	17040	24.0	95	95	55.30	0.20	6.00	0.50	97.90	0.40	11.1	1.5E-08	
7	2016	3	4	13	29.00	66900	22.0	95	95	57.20	1.90	7.55	1.55	96.50	1.40	5.1	1.3E-08	
8	2016	3	4	18	55.00	19560	22.0	95	95	57.70	0.50	8.00	0.45	96.00	0.50	-5.3	1.5E-08	
9	2016	3	7	5	15.00	210000	22.0	95	95	63.25	5.55	12.30	4.30	92.10	3.90	4.9	1.3E-08	
10	2016	3	7	8	15.00	10800	23.0	95	95	63.40	0.15	12.60	0.30	91.90	0.20	20.0	1.6E-08	
11	2016	3	7	13	27.00	18720	21.0	95	95	63.80	0.40	12.85	0.25	91.60	0.30	-9.1	1.1E-08	
12	2016	3	7	18	49.00	19320	21.0	95	95	64.65	0.85	13.35	0.50	91.35	0.25	33.3	1.4E-08	
13	2016	3	8	5	6.00	37020	25.0	95	95	65.15	0.50	14.00	0.65	90.75	0.60	4.0	1.1E-08	
14	2016	3	8	13	48.00	31320	22.0	95	95	66.90	1.75	14.40	0.40	90.15	0.60	-20.0	1.2E-08	
15	2016	3	8	19	25.00	20220	22.0	95	95	67.60	0.70	14.80	0.40	89.95	0.20	33.3	1.1E-08	
16	2016	3	9	5	31.00	36360	24.0	95	95	67.70	0.10	15.50	0.70	89.35	0.60	7.7	1.3E-08	1
17	2016	3	9	11	15.00	20640	24.0	95	95	68.40	0.70	15.85	0.35	89.00	0.35	0.0	1.2E-08	1
18	2016	3	9	20	24.00	32940	22.0	95	95	69.10	0.70	16.40	0.55	88.60	0.40	15.8	1.1E-08	1
19	2016	3	10	5	0.00	30960	23.0	95	95	70.20	1.10	16.75	0.35	88.05	0.55	-22.2	1.1E-08	1
20	2016	3	10	8	24.00	12240	23.0	95	95	69.90	-0.30	17.00	0.25	87.80	0.25	0.0	1.6E-08	1
21	2016	3	10	11	24.00	10800	23.0	95	95	70.20	0.30	17.20	0.20	87.70	0.10	33.3	1.1E-08	1
22	2016	3	10	20	47.00	33780	23.0	95	95	70.40	0.20	17.80	0.60	87.40	0.30	33.3	1.0E-08	1
23	2016	3	11	4	54.00	29220	22.0	95	95	71.40	1.00	18.15	0.35	86.75	0.65	-30.0	1.4E-08	1
24	2016	3	11	7	58.00	11040	24.0	95	95	71.25	-0.15	18.35	0.20	86.65	0.10	33.3	1.0E-08	1
25																		
26																		

**A zero in this column starts a series of measurements.

(Termination determined by stable Kv and low flow differential.)

*Average Kv for those rows with a 1 in the Ave. column. 1.2E-08 cm/s

***Kv adjusted for temperature.

TRC Environmental Corporation

Falling Head, Rising Tailwater Permeability Test (ASTM D5084, Method C)

QC: JPH

QA: JPH

Project Name:	DTE - Monroe FAB	Cell #:	11
Project #:	231828.0001.0000	USCS Description:	N/A
Sample Name:	MW-16-04, 20-22'	USCS Classification:	N/A
Visual Descript:	Gray sandy lean clay, with gravel	Average Kv =	1.2E-08 cm/s

		Initial Values	Final Values			
Sample Type:	Undisturbed					
Sample Dia. (in)		2.87	2.85	Permeant:	Water	
Sample Ht. (in)		3.55	3.51	Permeant Specific Gravity:	1.00	
Tare & Wet (g)		869.30	961.20	Sample Specific Gravity:	2.80	Est.
Tare & Dry (g)		785.95	875.10	Confining Pressure (psi):	100.0	
Tare (g)		0.00	89.15	Burette Diameter (in):	0.250	
Sample Wt. (g)		869.30	872.05	Burette Zero (cm):	100.0	
Moisture (%)		10.6	11.0	Maximum Gradient:	8.4	
Wet Density (pcf)		144.2	148.4	Average Gradient:	8.1	
Dry Density (pcf)		130.4	133.7	Max. Effect. Stress (psi):	5.7	
Saturation (%)		87.3	100.0	Min. Effect. Stress (psi):	4.1	
				Ave. Effect. Stress (psi):	4.7	

	Date			Time		Run	Temp	Pressure (psi)		Cham	Cham.	Bot	Bot.	Top	Top	Flow	Kv ***	Ave.*
	Yr.	Mo.	Day	Hr.	Min.	Time (s)	C°**	Bot	Top	(cm)	Dif.(cm)	(cm)	Dif.(cm)	(cm)	Dif.(cm)	Dif.(%)	cm/s	0,1
1	2016	3	2	5	8.00		0.0	95	95	52.10		2.10		102.60				
2	2016	3	2	9	15.00	14820	24.0	95	95	53.45	1.35	2.75	0.65	101.85	0.75	-7.1	3.0E-08	
3	2016	3	2	12	10.00	10500	22.0	95	95	54.20	0.75	3.15	0.40	101.45	0.40	0.0	2.5E-08	
4	2016	3	2	20	40.00	30600	22.0	95	95	56.60	2.40	4.40	1.25	100.50	0.95	13.6	2.4E-08	
5	2016	3	3	14	6.00	62760	23.0	95	95	60.60	4.00	6.50	2.10	98.80	1.70	10.5	2.1E-08	
6	2016	3	3	18	50.00	17040	24.0	95	95	61.60	1.00	7.05	0.55	98.40	0.40	15.8	1.9E-08	
7	2016	3	4	13	25.00	66900	22.0	95	95	64.60	3.00	8.85	1.80	96.75	1.65	4.3	1.9E-08	
8	2016	3	4	18	51.00	19560	22.0	95	95	65.60	1.00	9.35	0.50	96.30	0.45	5.3	1.8E-08	
9	2016	3	7	5	16.00	210300	22.0	95	95	73.80	8.20	13.55	4.20	92.50	3.80	5.0	1.5E-08	
10	2016	3	7	8	15.00	10740	23.0	95	95	74.30	0.50	13.80	0.25	92.30	0.20	11.1	1.7E-08	
11	2016	3	7	13	27.00	18720	21.0	95	95	74.95	0.65	14.10	0.30	92.00	0.30	0.0	1.4E-08	
12	2016	3	7	18	46.00	19140	21.0	95	95	75.95	1.00	14.45	0.35	91.85	0.15	40.0	1.1E-08	
13	2016	3	8	5	6.00	37200	25.0	95	95	77.60	1.65	15.00	0.55	91.35	0.50	4.8	1.1E-08	
14	2016	3	8	13	50.00	31440	22.0	95	95	78.60	1.00	15.45	0.45	90.80	0.55	-10.0	1.4E-08	
15	2016	3	8	19	21.00	19860	22.0	95	95	79.60	1.00	15.80	0.35	90.70	0.10	55.6	9.9E-09	
16	2016	3	9	5	32.00	36660	24.0	95	95	80.80	1.20	16.30	0.50	90.20	0.50	0.0	1.1E-08	1
17	2016	3	9	11	16.00	20640	24.0	95	95	81.60	0.80	16.60	0.30	89.90	0.30	0.0	1.2E-08	1
18	2016	3	9	20	20.00	32640	22.0	95	95	82.25	0.65	17.10	0.50	89.60	0.30	25.0	1.1E-08	1
19	2016	3	10	5	0.00	31200	23.0	95	95	82.90	0.65	17.55	0.45	89.10	0.50	-5.3	1.4E-08	1
20	2016	3	10	8	24.00	12240	23.0	95	95	83.30	0.40	17.70	0.15	89.00	0.10	20.0	9.1E-09	1
21	2016	3	10	11	24.00	10800	23.0	95	95	83.50	0.20	17.85	0.15	88.85	0.15	0.0	1.2E-08	1
22	2016	3	10	20	43.00	33540	23.0	95	95	84.50	1.00	18.35	0.50	88.60	0.25	33.3	1.0E-08	1
23	2016	3	11	4	55.00	29520	22.0	95	95	84.70	0.20	18.65	0.30	88.05	0.55	-29.4	1.3E-08	1
24	2016	3	11	7	59.00	11040	24.0	95	95	85.30	0.60	18.85	0.20	88.00	0.05	60.0	1.0E-08	1
25																		
26																		

**A zero in this column starts a series of measurements.

*Average Kv for those rows with a 1 in the Ave. column.

1.2E-08 cm/s

(Termination determined by stable Kv and low flow differential.)

***Kv adjusted for temperature.

APPENDIX J – 2020 LABORATORY TEST RESULTS

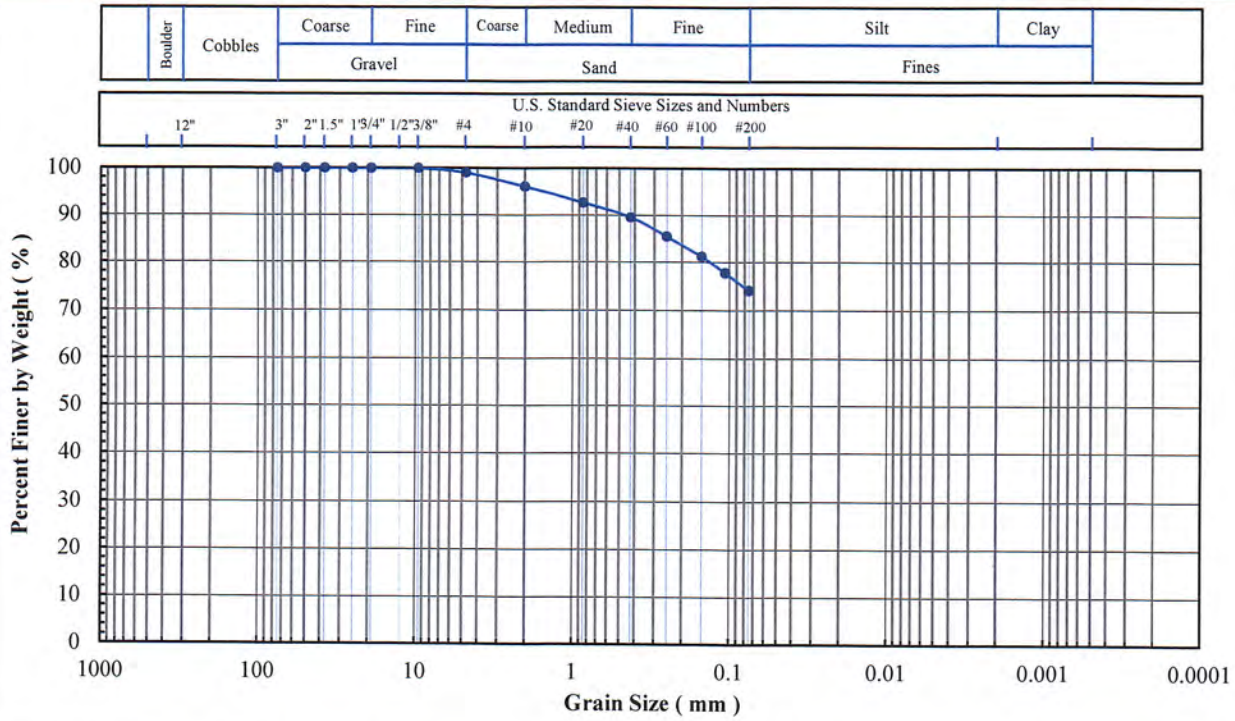
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B1-2 (6-16')
Lab Sample No:	20L012

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

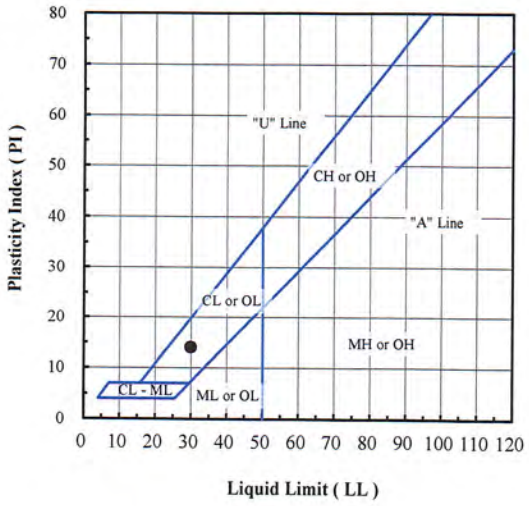


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.0
#10	2.00	96.1
#20	0.850	92.7
#40	0.425	89.6
#60	0.250	85.5
#100	0.150	81.2
#140	0.106	77.8
#200	0.075	74.1

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.0
Sand (%):	24.9
Fines (%):	74.1
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B1-2 (6-16')	20L012	14.8	74.1	30	16	14	CL - Lean clay with sand

Note(s):

01-20-2020
AA, WSR

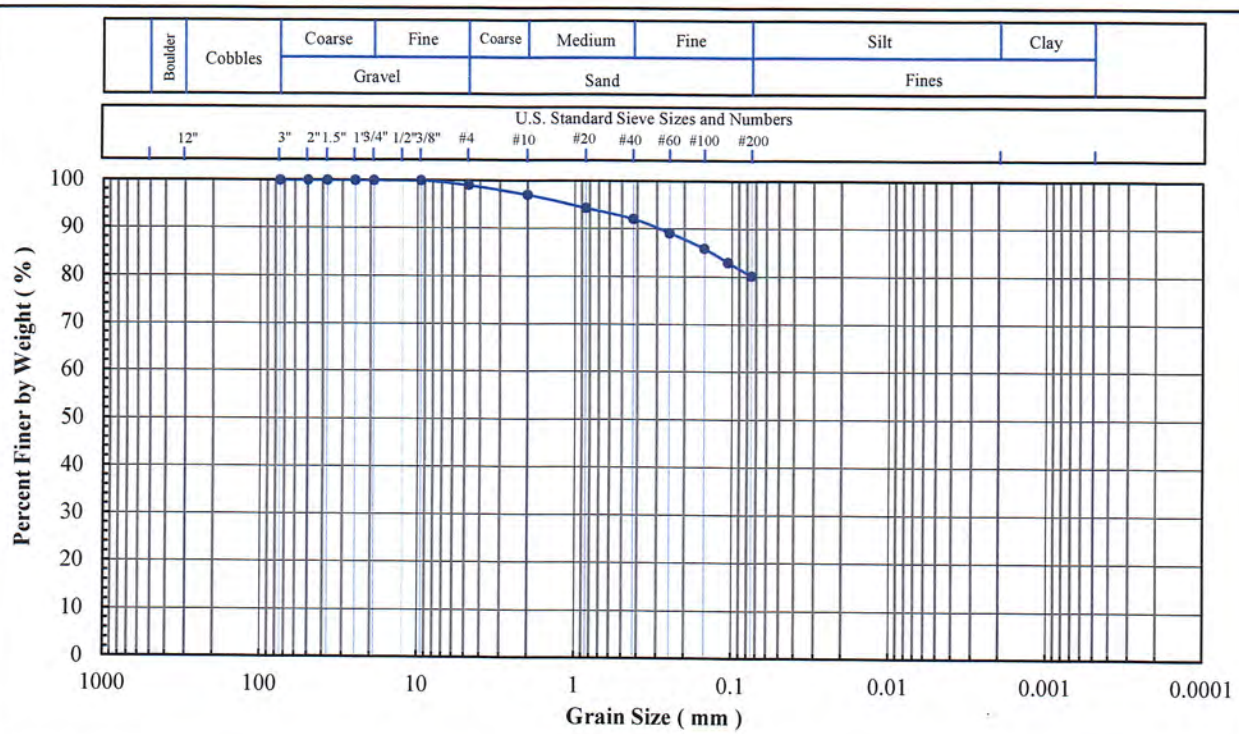
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B1-5 (26-36')
Lab Sample No:	20L015

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

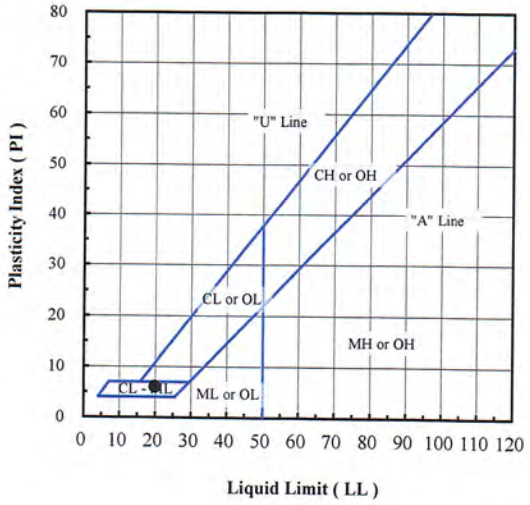


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.0
#10	2.00	97.0
#20	0.850	94.3
#40	0.425	92.0
#60	0.250	89.1
#100	0.150	85.9
#140	0.106	83.0
#200	0.075	80.2

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.0
Sand (%):	18.8
Fines (%):	80.2
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B1-5 (26-36')	20L015	20.8	80.2	20	14	6	CL-ML - Silty clay with sand

Note(s):

01-20-2021
AA, NJR

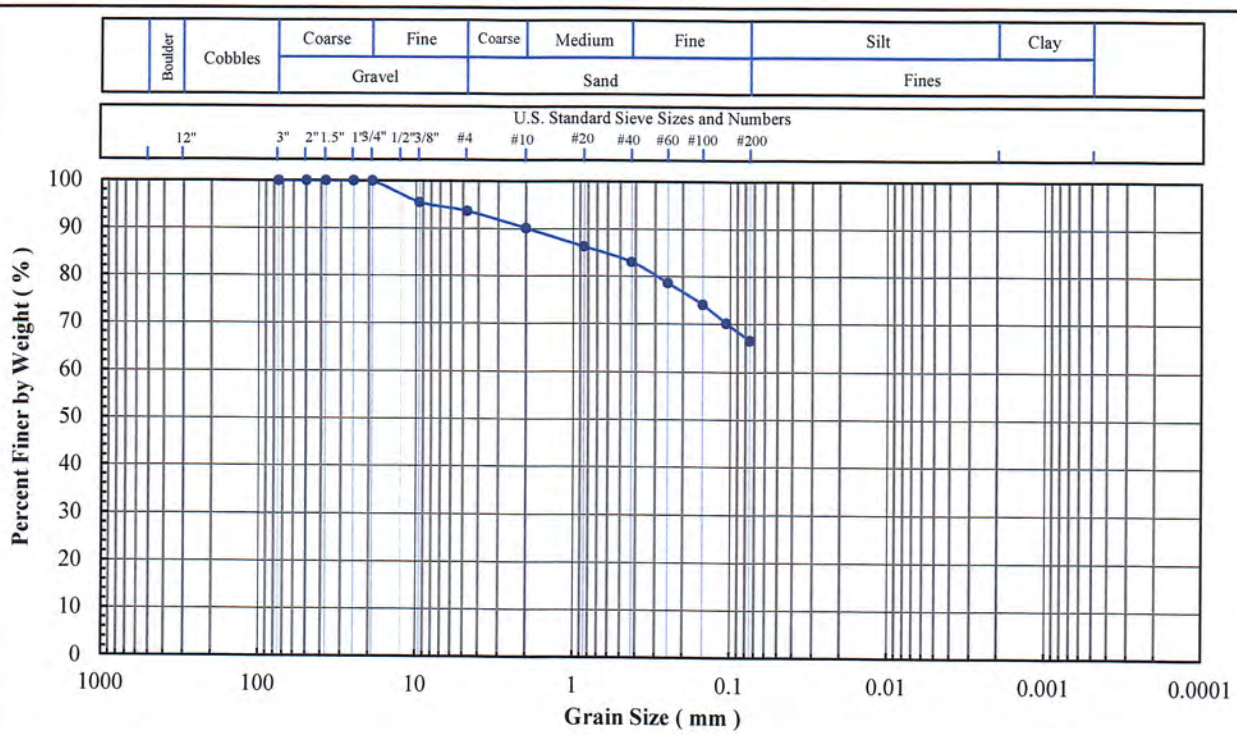
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B1-8 (46-56')
Lab Sample No:	20L018

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

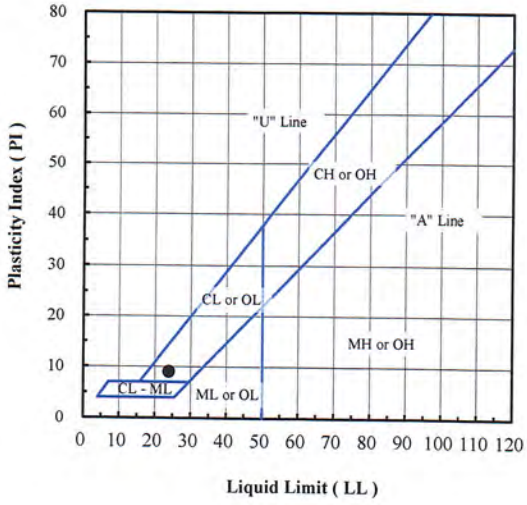


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	96
#4	4.75	94
#10	2.00	90
#20	0.850	86
#40	0.425	83
#60	0.250	79
#100	0.150	74
#140	0.106	70
#200	0.075	67

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	6
Sand (%):	27
Fines (%):	67
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B1-8 (46-56')	20L018	15.7	67	24	15	9	CL - Sandy lean clay

Note(s): Sieve specimen was undersized.

01-20-2021 AA, NSR

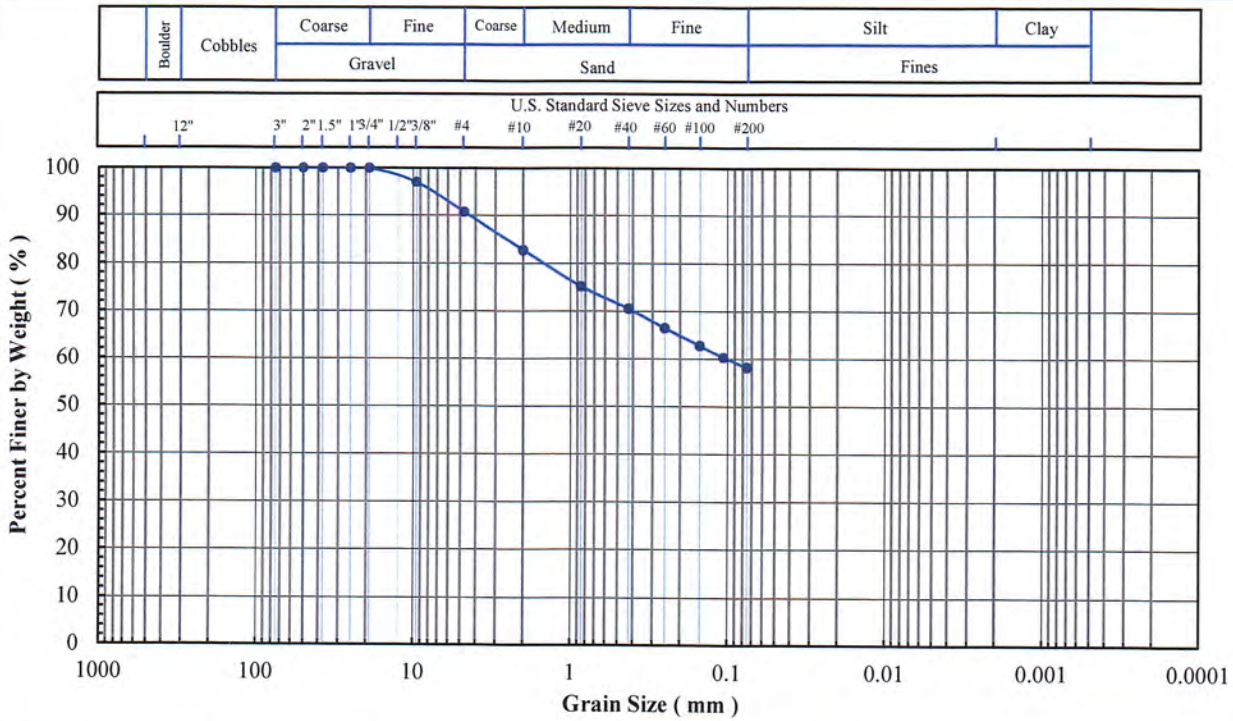
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B1-11 (66-76')
Lab Sample No:	20L021

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

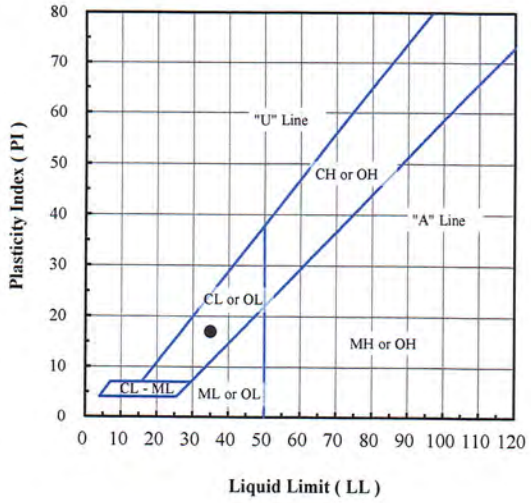


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	97
#4	4.75	91
#10	2.00	83
#20	0.850	75
#40	0.425	71
#60	0.250	66
#100	0.150	63
#140	0.106	60
#200	0.075	58

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	9
Sand (%):	33
Fines (%):	58
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B1-11 (66-76')	20L021	10.1	58	35	18	17	CL - Sandy lean clay

Note(s): Sieve specimen was undersized.

01-20-2021
AA, MSR

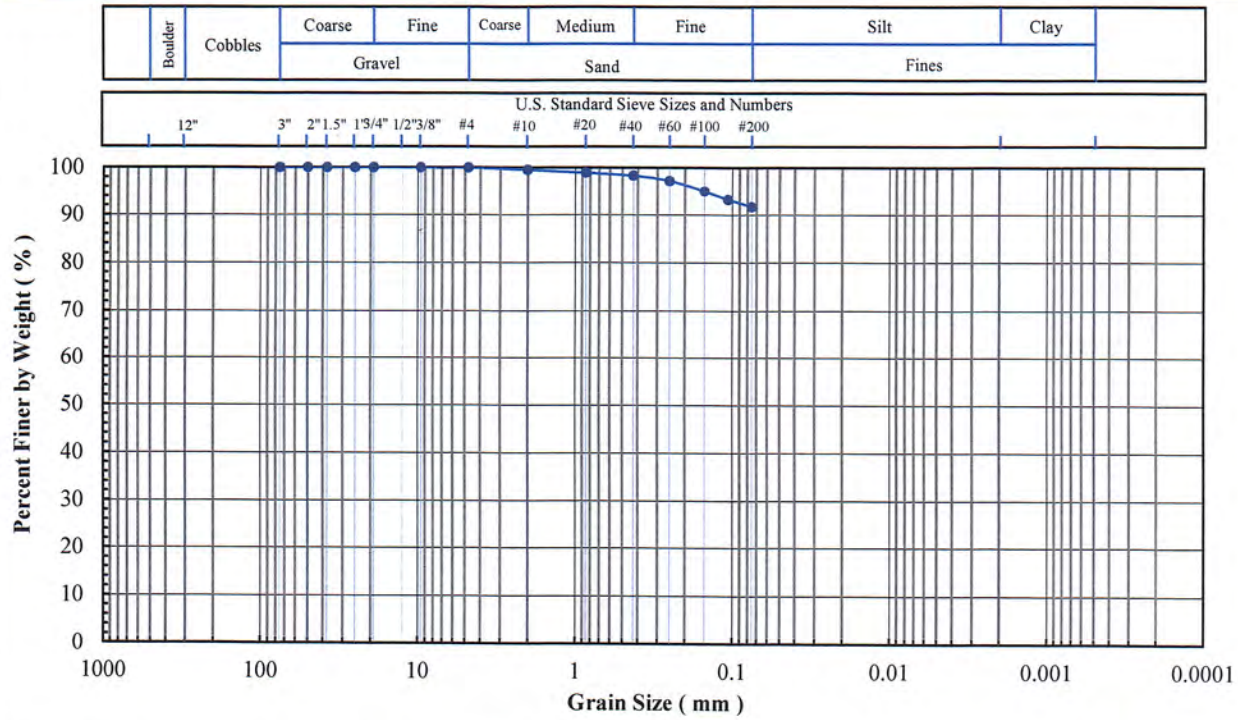
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B1-ST-2 (40-42')
Lab Sample No:	20L126

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

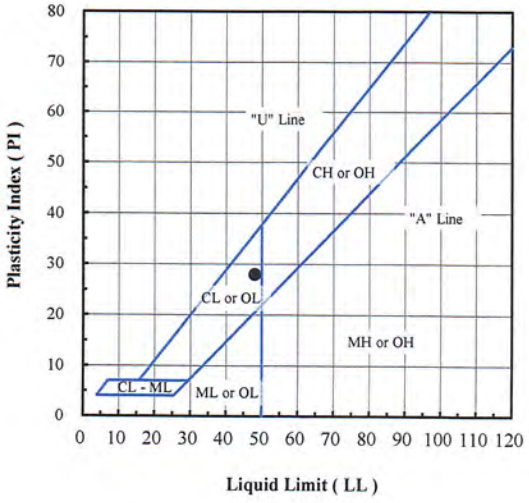


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	99.5
#20	0.850	98.9
#40	0.425	98.3
#60	0.250	97.2
#100	0.150	95.0
#140	0.106	93.2
#200	0.075	91.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	8.3
Fines (%):	91.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B1-ST-2 (40-42')	20L126	20.0	91.7	48	20	28	CL - Lean Clay

Note(s):

01-26-2021
AM, NSR

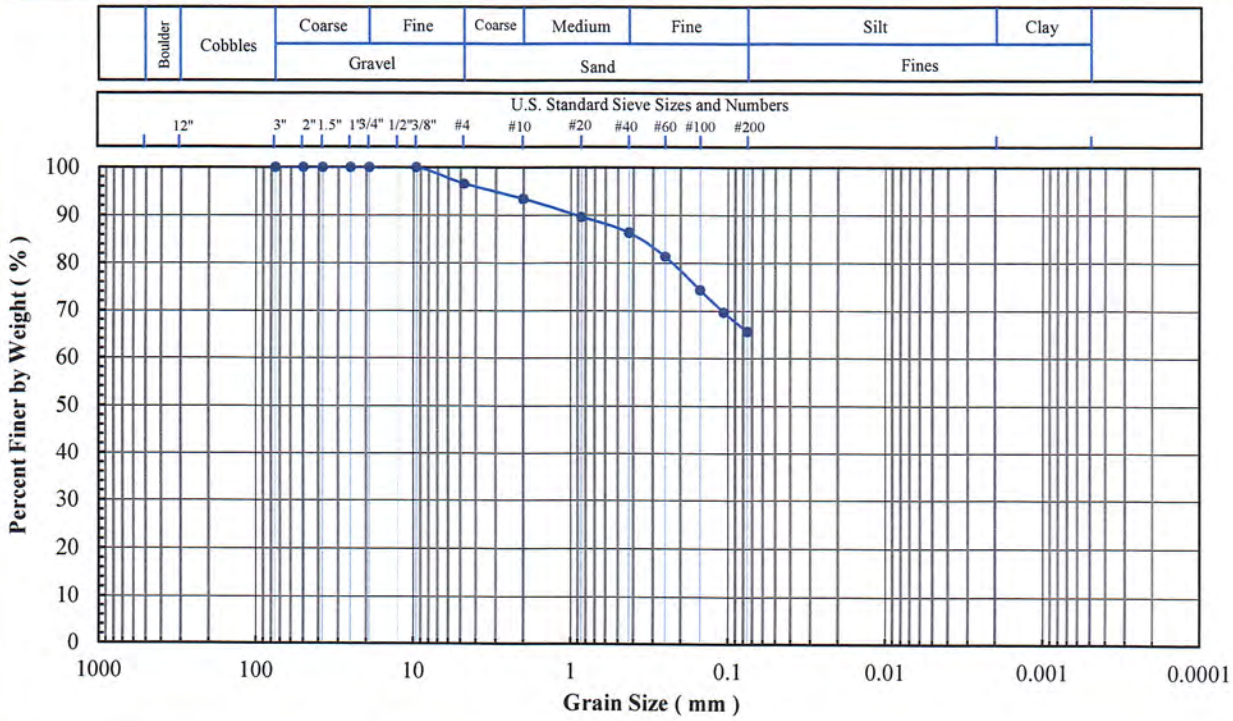
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B1-ST-3 (60-62')
Lab Sample No:	20L127

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

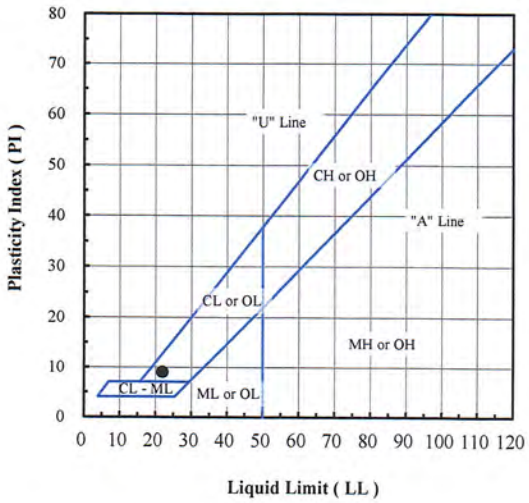


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	96.5
#10	2.00	93.4
#20	0.850	89.6
#40	0.425	86.4
#60	0.250	81.3
#100	0.150	74.3
#140	0.106	69.6
#200	0.075	65.5

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3.5
Sand (%):	31.0
Fines (%):	65.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B1-ST-3 (60-62')	20L127	11.0	65.5	22	13	9	CL - Sandy lean clay

Note(s):

01-26-2021
AA, NSVR

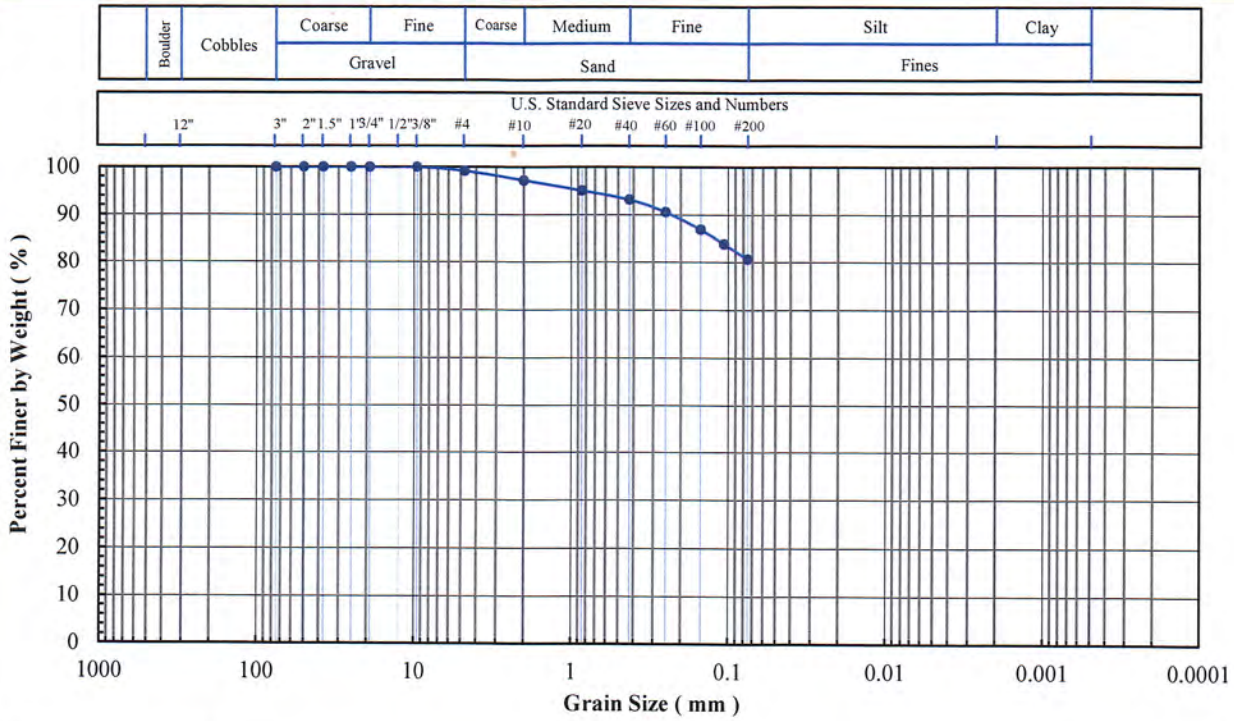
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B2-2 (6-16')
Lab Sample No:	20L023

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

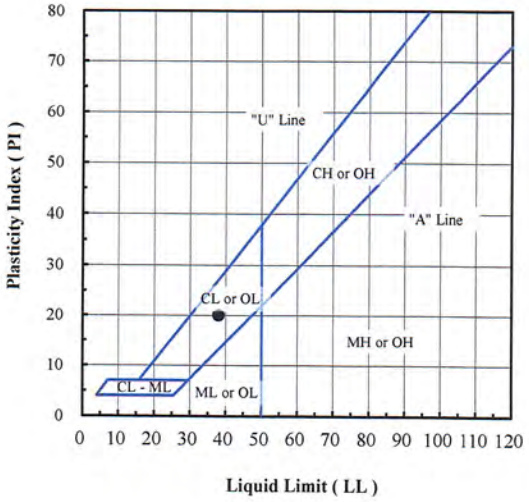


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.2
#10	2.00	97.2
#20	0.850	95.1
#40	0.425	93.2
#60	0.250	90.6
#100	0.150	86.9
#140	0.106	83.8
#200	0.075	80.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.8
Sand (%):	18.5
Fines (%):	80.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B2-2 (6-16')	20L023	19.5	80.7	38	18	20	CL - Lean clay with sand

Note(s):

01-20-2021
AA, NSR

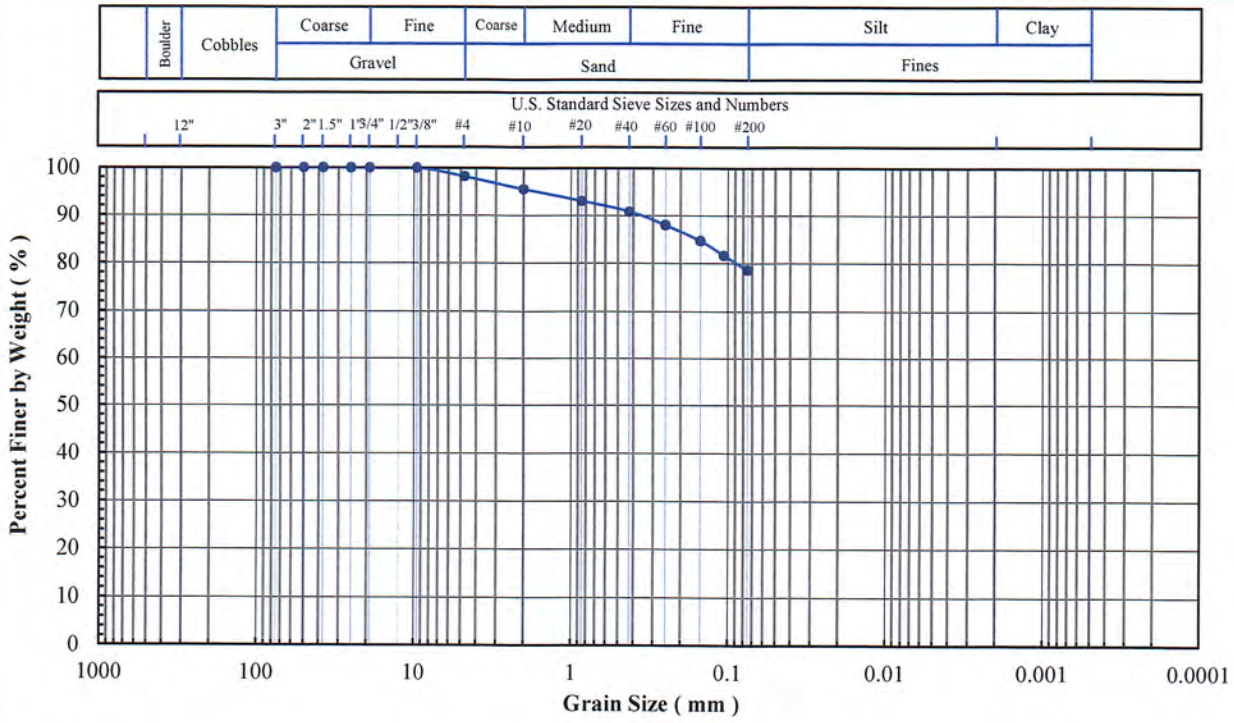
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B2-6 (36-46')
Lab Sample No:	20L027

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

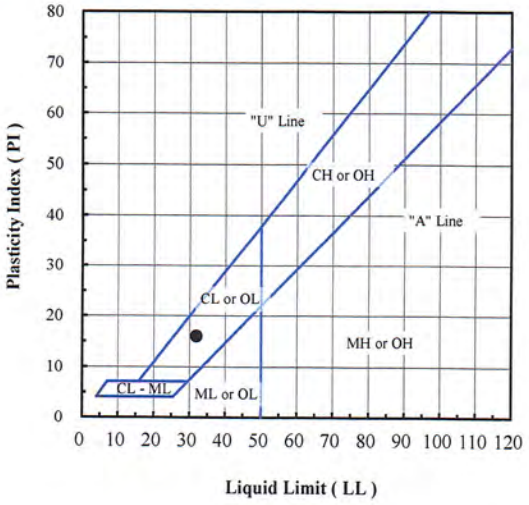


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.2
#10	2.00	95.5
#20	0.850	93.0
#40	0.425	90.8
#60	0.250	88.0
#100	0.150	84.7
#140	0.106	81.6
#200	0.075	78.6

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.8
Sand (%):	19.6
Fines (%):	78.6
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B2-6 (36-46')	20L027	18.6	78.6	32	16	16	CL - Lean clay with sand

Note(s):

01-20-2021
AA, NSR

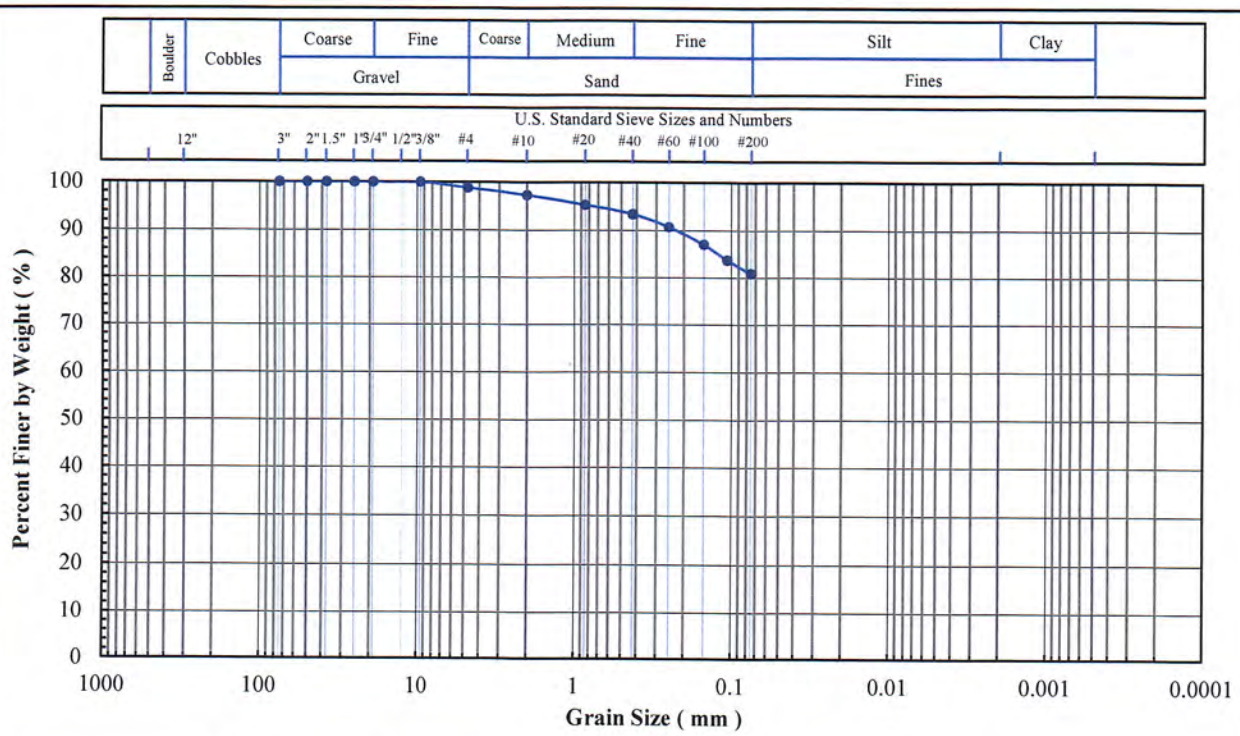
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B2-7 (46-56')
Lab Sample No:	20L028

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

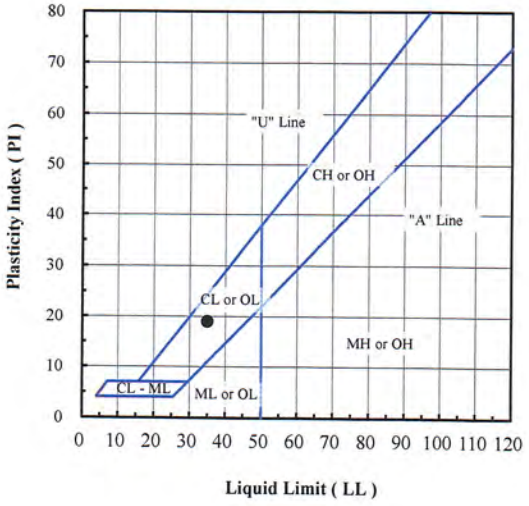


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.8
#10	2.00	97.3
#20	0.850	95.3
#40	0.425	93.4
#60	0.250	90.7
#100	0.150	87.0
#140	0.106	83.7
#200	0.075	80.9

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.2
Sand (%):	17.9
Fines (%):	80.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B2-7 (46-56')	20L028	17.9	80.9	35	16	19	CL - Lean clay with sand

Note(s):

01-20-2021 AA, NSR

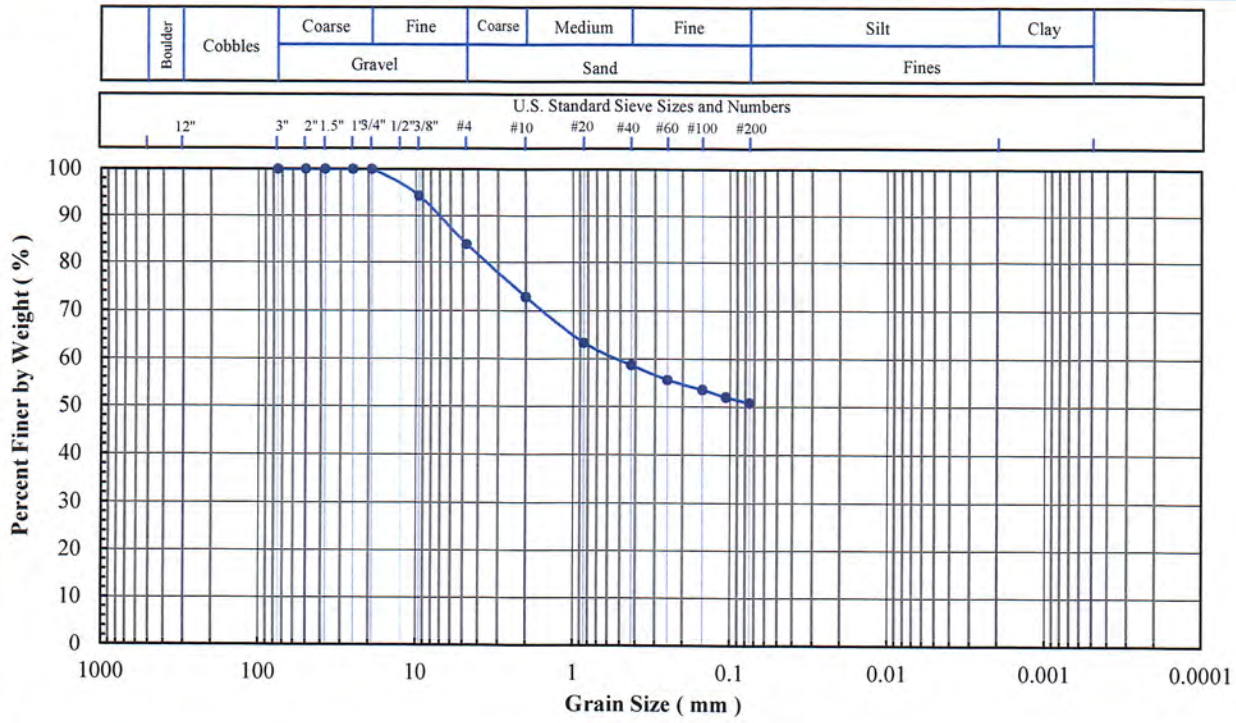
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B2-9 (66-76')
Lab Sample No:	20L030

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

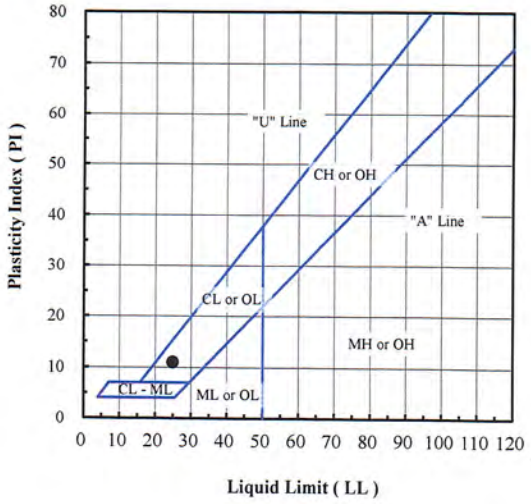


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	94
#4	4.75	84
#10	2.00	73
#20	0.850	63
#40	0.425	59
#60	0.250	56
#100	0.150	54
#140	0.106	52
#200	0.075	51

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	16
Sand (%):	33
Fines (%):	51
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B2-9 (66-76')	20L030	11.7	51	25	14	11	CL - Sandy lean clay with gravel

Note(s): Sieve specimen was undersized.

01-20-2021
AA, NSR

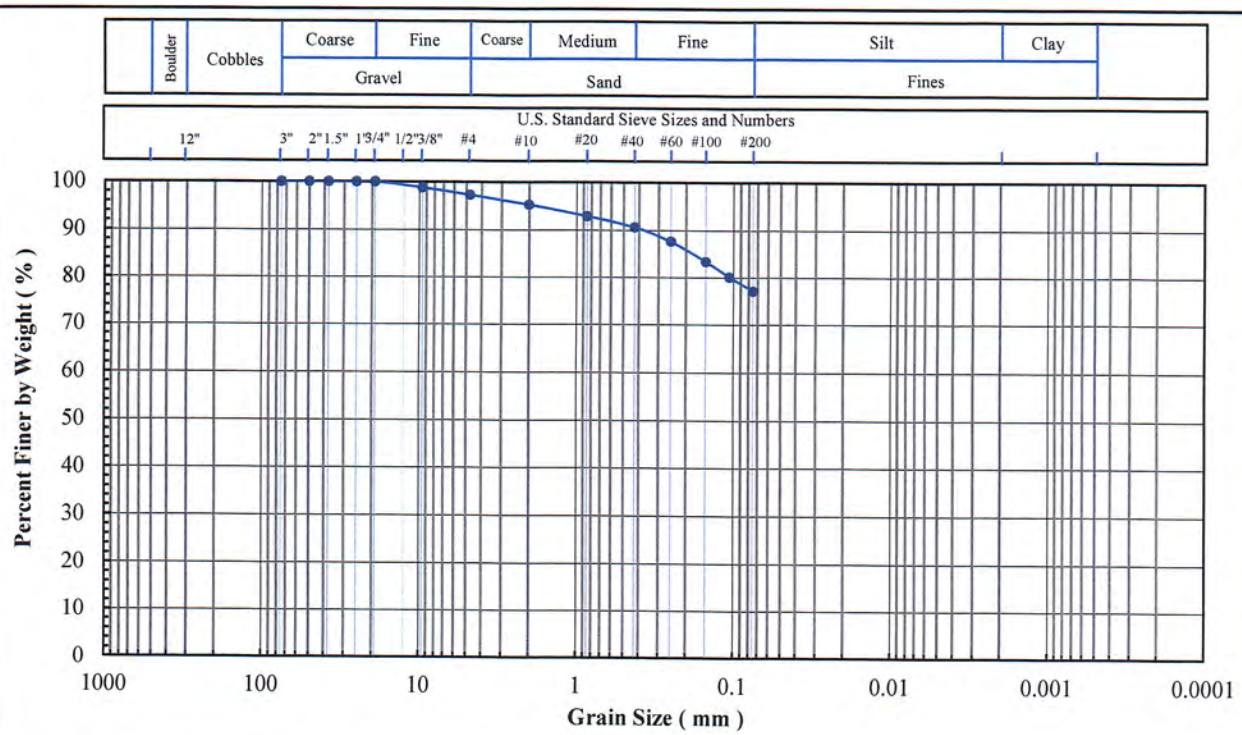
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B2-ST-1 (20-22')
Lab Sample No:	20L128

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

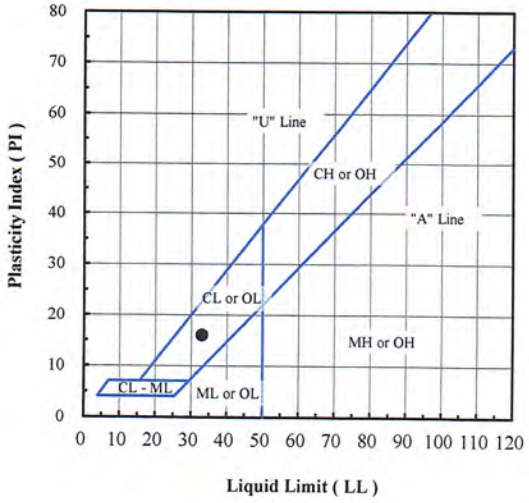


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	99
#4	4.75	97
#10	2.00	95
#20	0.850	93
#40	0.425	91
#60	0.250	88
#100	0.150	83
#140	0.106	80
#200	0.075	77

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3
Sand (%):	20
Fines (%):	77
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B2-ST-1 (20-22')	20L128	16.9	77	33	17	16	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-26-2021
AA, NSK

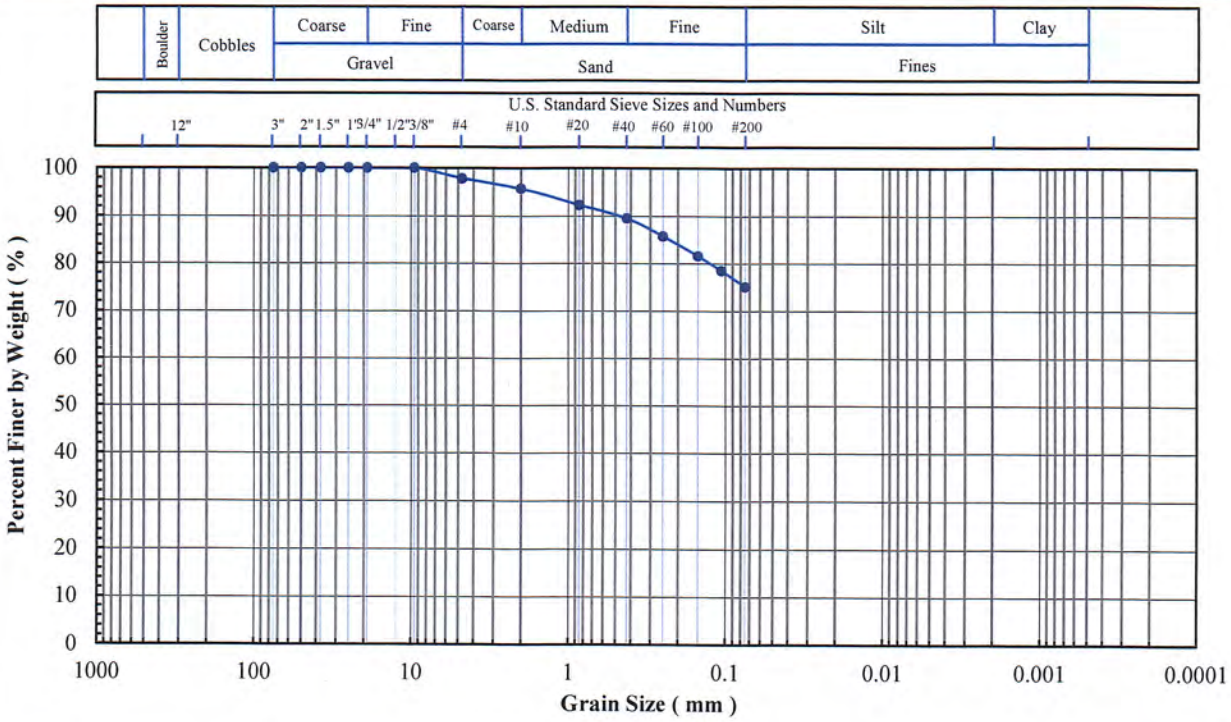
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-1 (0-10')
Lab Sample No:	20L031

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

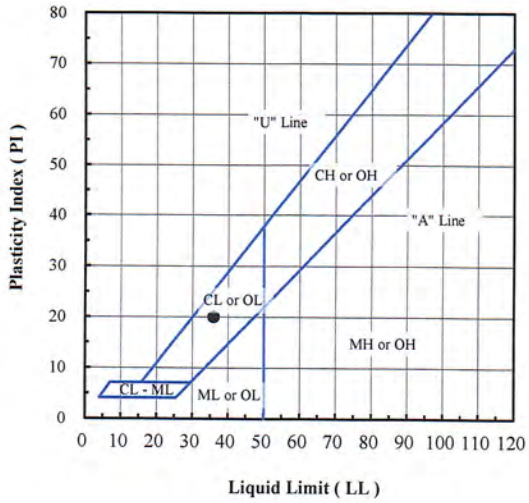


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.8
#10	2.00	95.7
#20	0.850	92.3
#40	0.425	89.5
#60	0.250	85.8
#100	0.150	81.6
#140	0.106	78.5
#200	0.075	75.1

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.2
Sand (%):	22.7
Fines (%):	75.1
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B3-1 (0-10')	20L031	15.6	75.1	36	16	20	CL - Lean clay with sand

Note(s):

01-20-2021
AA, NSR

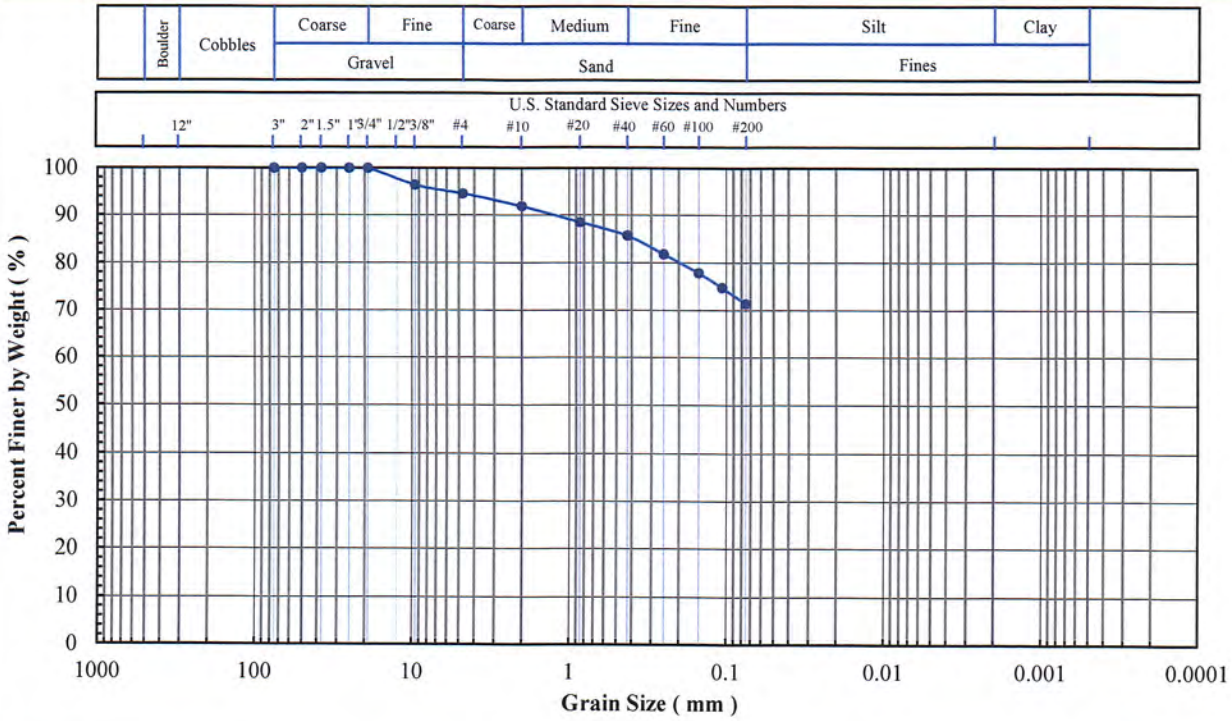
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-2 (10-16')
Lab Sample No:	20L032

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

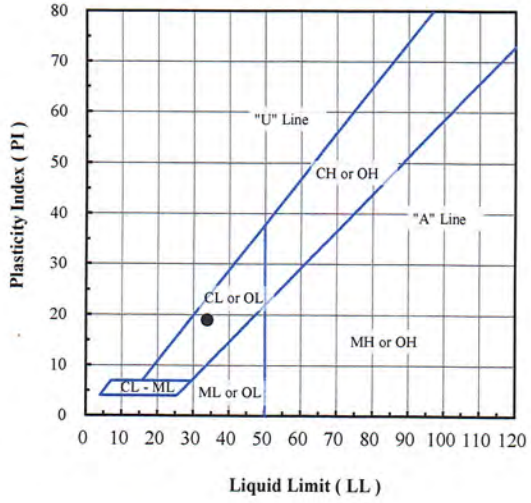


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	96
#4	4.75	95
#10	2.00	92
#20	0.850	89
#40	0.425	86
#60	0.250	82
#100	0.150	78
#140	0.106	75
#200	0.075	71

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	5
Sand (%):	24
Fines (%):	71
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B3-2 (10-16')	20L032	17.6	71	34	15	19	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-20-2021
AM, NSA

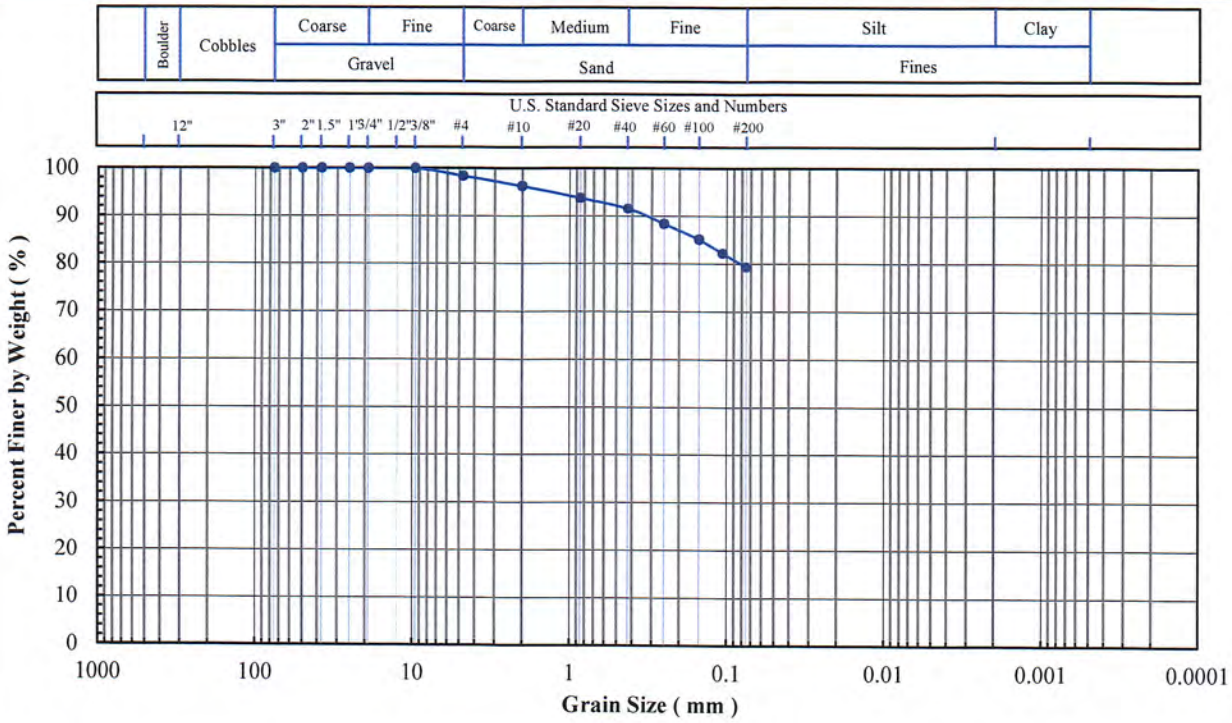
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-3 (16-26')
Lab Sample No:	20L033

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

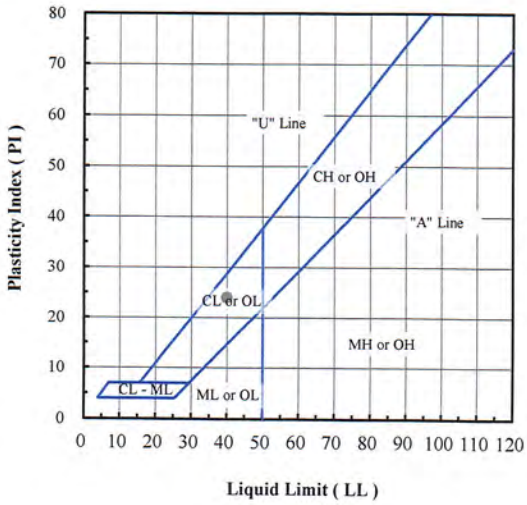


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.4
#10	2.00	96.3
#20	0.850	93.8
#40	0.425	91.6
#60	0.250	88.4
#100	0.150	85.1
#140	0.106	82.2
#200	0.075	79.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.6
Sand (%):	19.1
Fines (%):	79.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B3-3 (16-26')	20L033	19.4	79.3	40	16	24	CL - Lean clay with sand

Note(s):

01-20-2021
AA, NSA

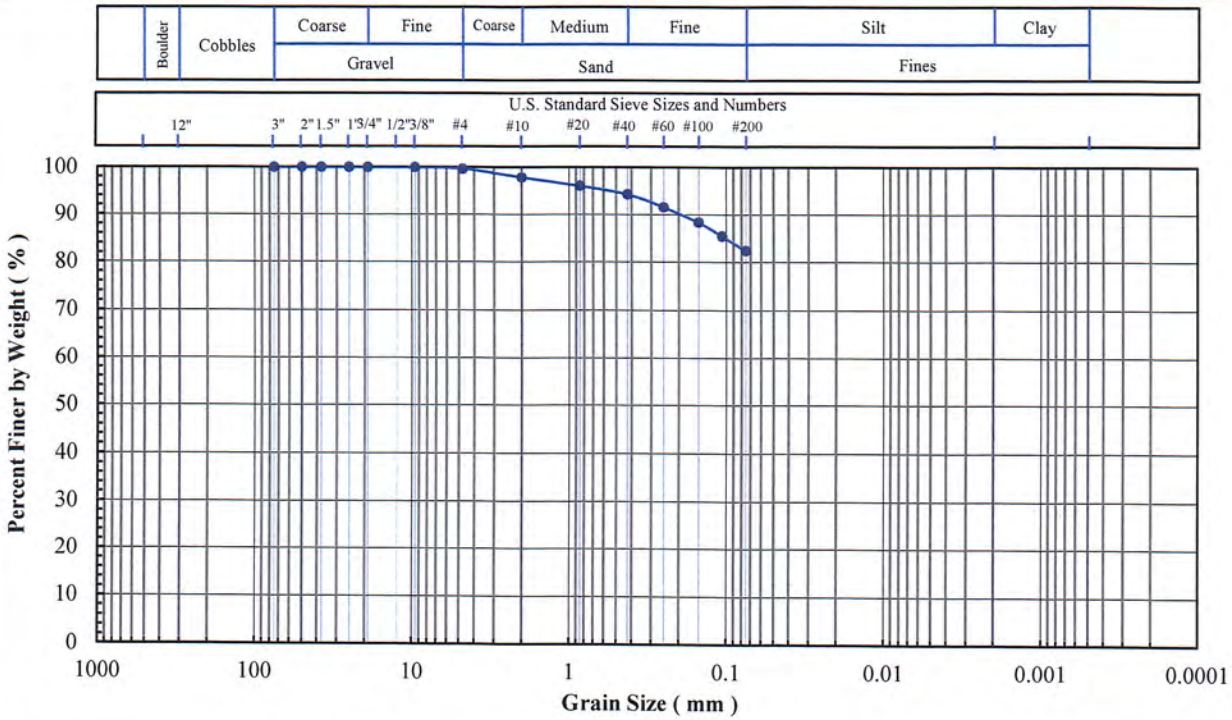
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-4 (26-36')
Lab Sample No:	20L034

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

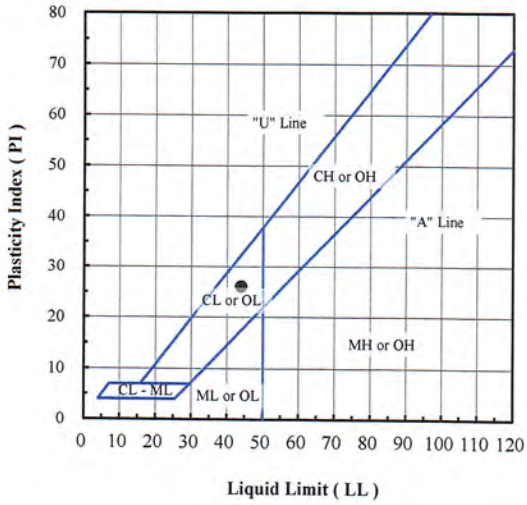


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.7
#10	2.00	97.9
#20	0.850	96.1
#40	0.425	94.3
#60	0.250	91.6
#100	0.150	88.4
#140	0.106	85.5
#200	0.075	82.5

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.3
Sand (%):	17.2
Fines (%):	82.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B3-4 (26-36')	20L034	17.1	82.5	44	18	26	CL - Lean clay with sand

Note(s):

01-20-2021
AA, NSR

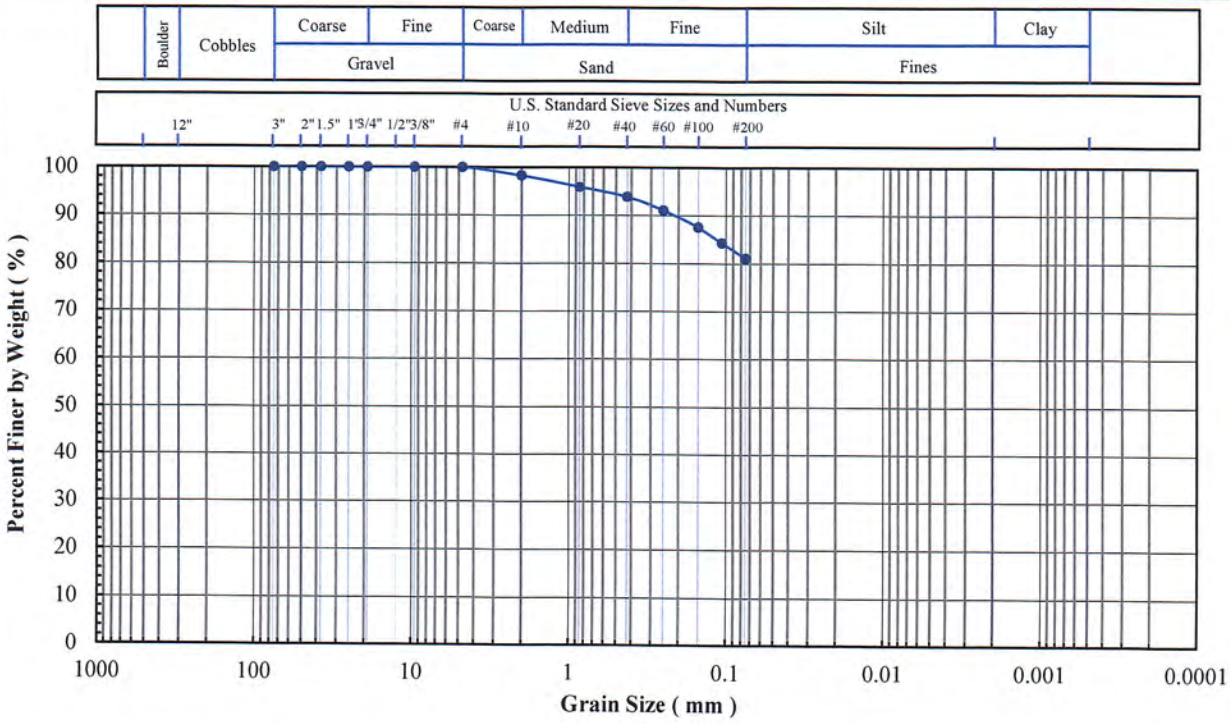
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-5 (36-46')
Lab Sample No:	20L035

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

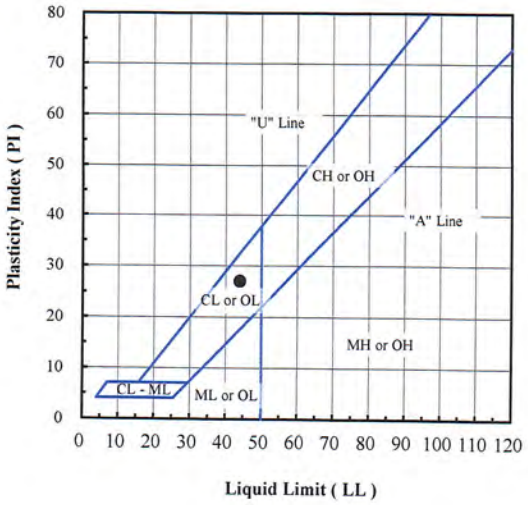


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	98.3
#20	0.850	95.9
#40	0.425	93.8
#60	0.250	91.0
#100	0.150	87.5
#140	0.106	84.3
#200	0.075	81.1

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	18.9
Fines (%):	81.1
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B3-5 (36-46')	20L035	15.9	81.1	44	17	27	CL - Lean clay with sand

Note(s):

01-20-2021
AA, WSR

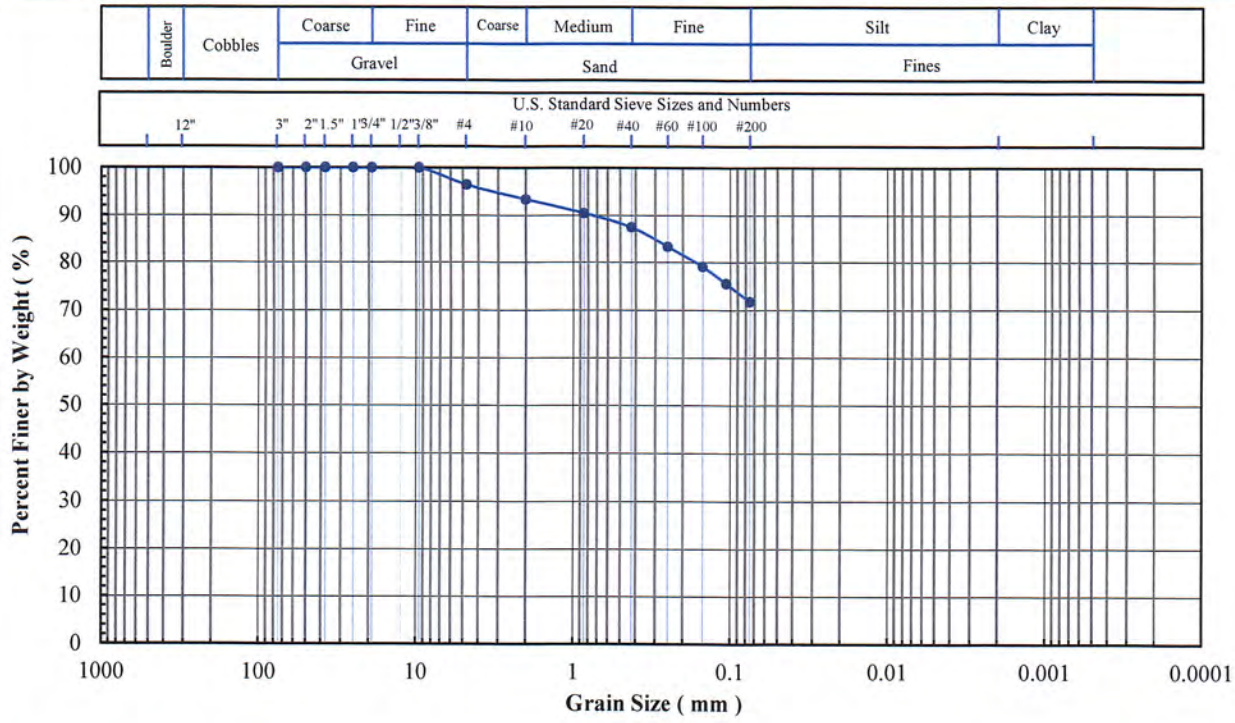
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-6 (46-56')
Lab Sample No:	20L036

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

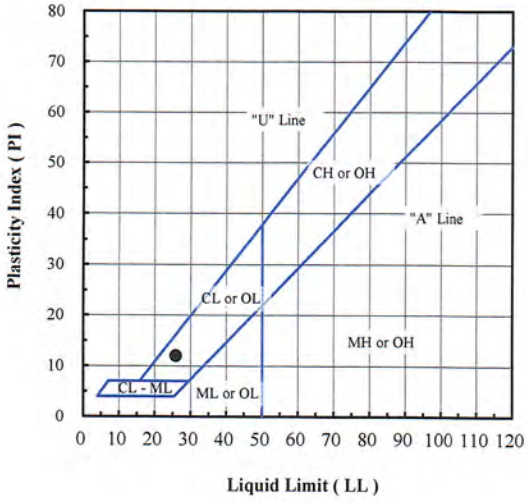


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	96.4
#10	2.00	93.4
#20	0.850	90.5
#40	0.425	87.5
#60	0.250	83.4
#100	0.150	79.1
#140	0.106	75.5
#200	0.075	71.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3.6
Sand (%):	24.7
Fines (%):	71.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B3-6 (46-56')	20L036	13.4	71.7	26	14	12	CL - Lean clay with sand

Note(s):

01-20-2021
AA, VSK

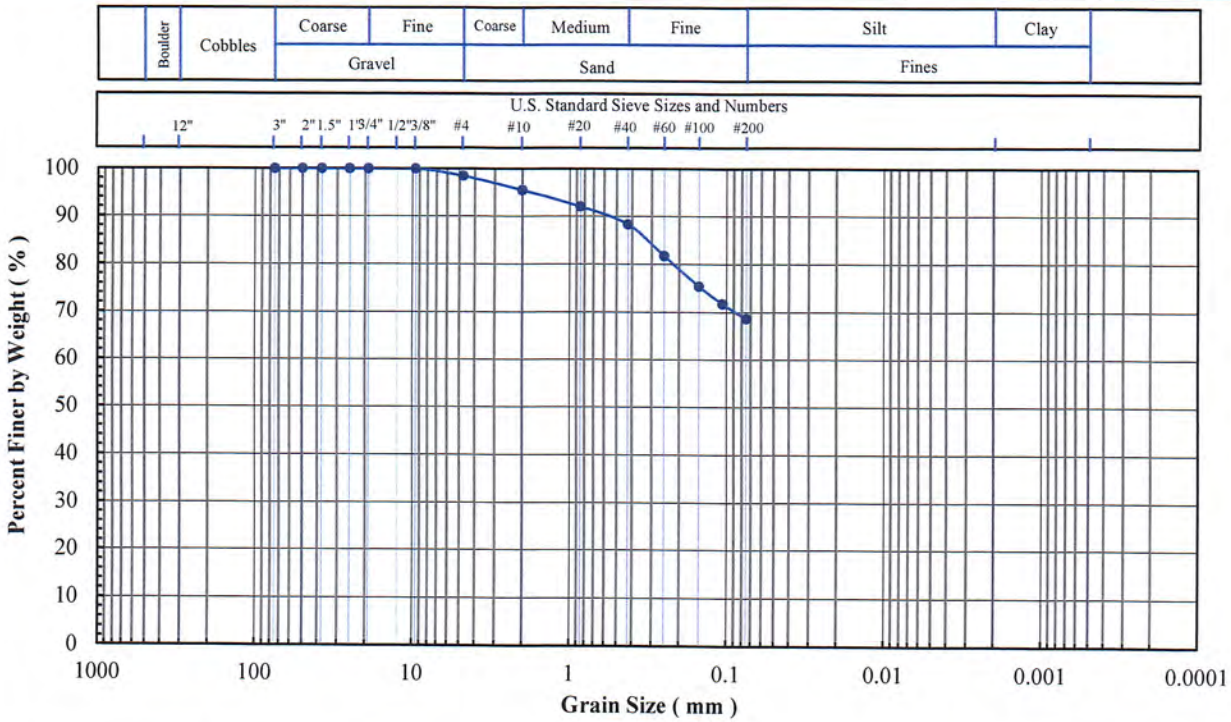
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-7 (56-66')
Lab Sample No:	20L037

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

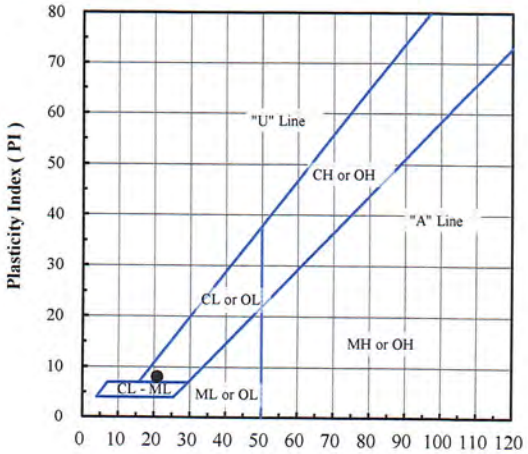


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.5
#10	2.00	95.5
#20	0.850	92.0
#40	0.425	88.3
#60	0.250	81.7
#100	0.150	75.4
#140	0.106	71.7
#200	0.075	68.6

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.5
Sand (%):	29.9
Fines (%):	68.6
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B3-7 (56-66')	20L037	15.1	68.6	21	13	8	CL - Sandy lean clay

Note(s):

01-20-2021
AA, NSR

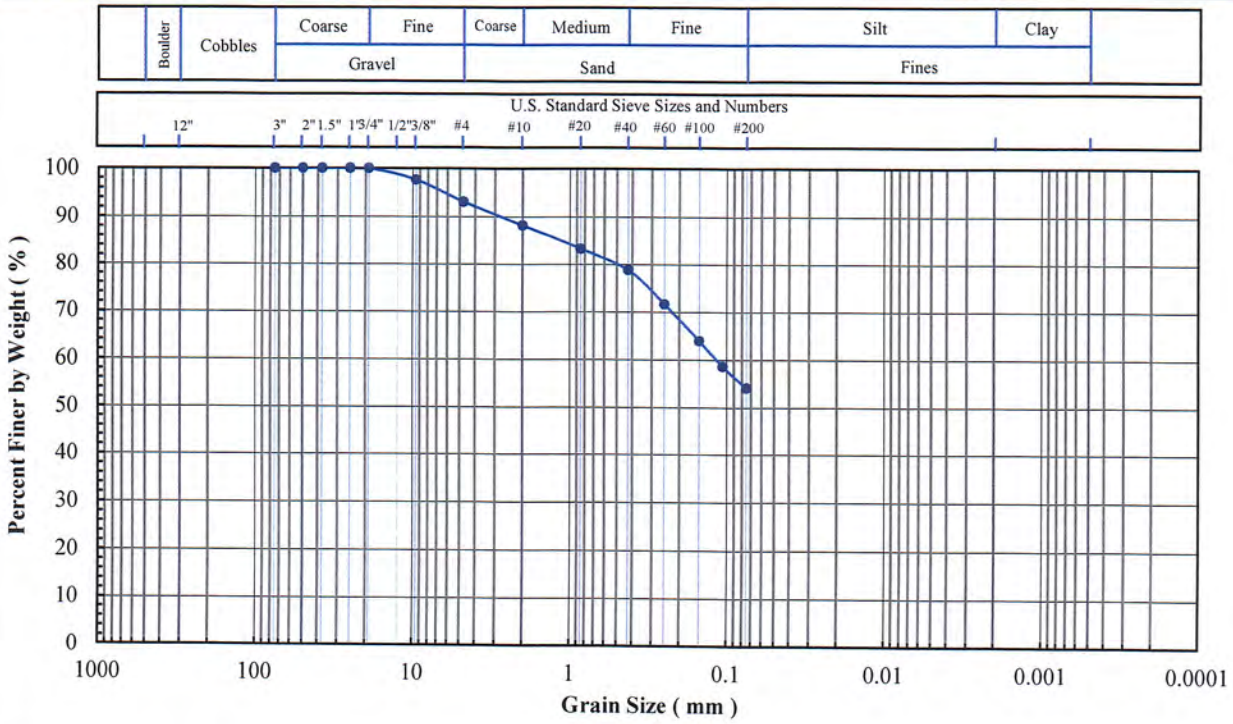
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B3-8 (66-76')
Lab Sample No:	20L038

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

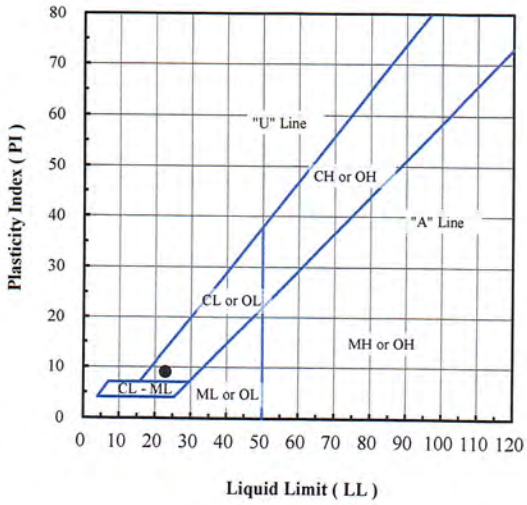


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	98
#4	4.75	93
#10	2.00	88
#20	0.850	83
#40	0.425	79
#60	0.250	72
#100	0.150	64
#140	0.106	59
#200	0.075	54

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	7
Sand (%):	39
Fines (%):	54
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B3-8 (66-76')	20L038	7.8	54	23	14	9	CL - Sandy lean clay

Note(s): Sieve specimen was undersized.

01-20-2021 AA, WSR

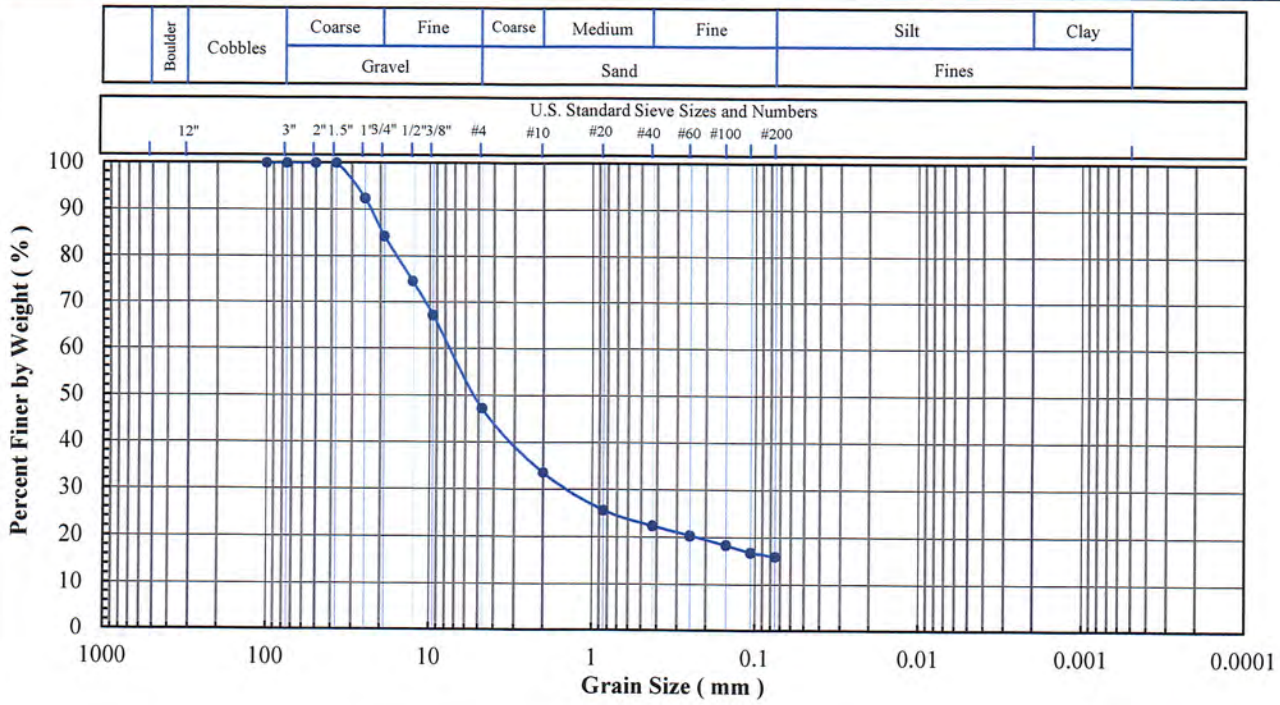
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-1 (0-6')
Lab Sample No:	20L039

ASTM C 136, D 422, D 854, D 1140, D 2216, D 2487, D 4318, D 6913, D 7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



Sieve No.	Size (mm)	% Finer
4"	100	100.0
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	92.4
3/4"	19	84.3
1/2"	13	74.6
3/8"	9.5	67.2
#4	4.75	47.2
#10	2.00	33.5
#20	0.850	25.6
#40	0.425	22.3
#60	0.250	20.3
#100	0.150	18.3
#140	0.106	16.8
#200	0.075	15.9

Gravel (%)	52.8
Sand (%)	31.3
Fines (%)	15.9
Silt (%)	
Clay (%)	

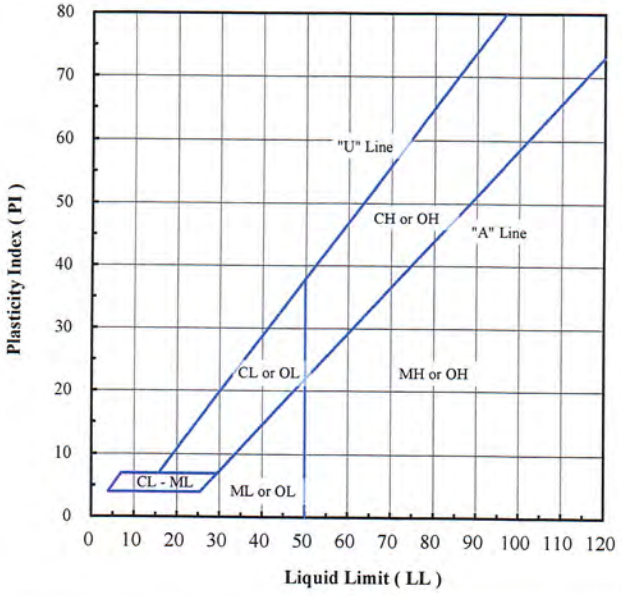
Coeff. Unif. (Cu)	
Coeff. Curv. (Cc)	

Specific Gravity (-)	

Organic Cont. (%)	

Carbonate Cont. (%)	

pH in Water (-)	
pH in CC (-)	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-1 (0-6')	20L039	7.1	15.9	NP	NP	NP	GM - Silty gravel with sand

Note(s): Engineering classification is based on the assumption that the fines are either ML or MH.

01-21-2021
AA, NSR

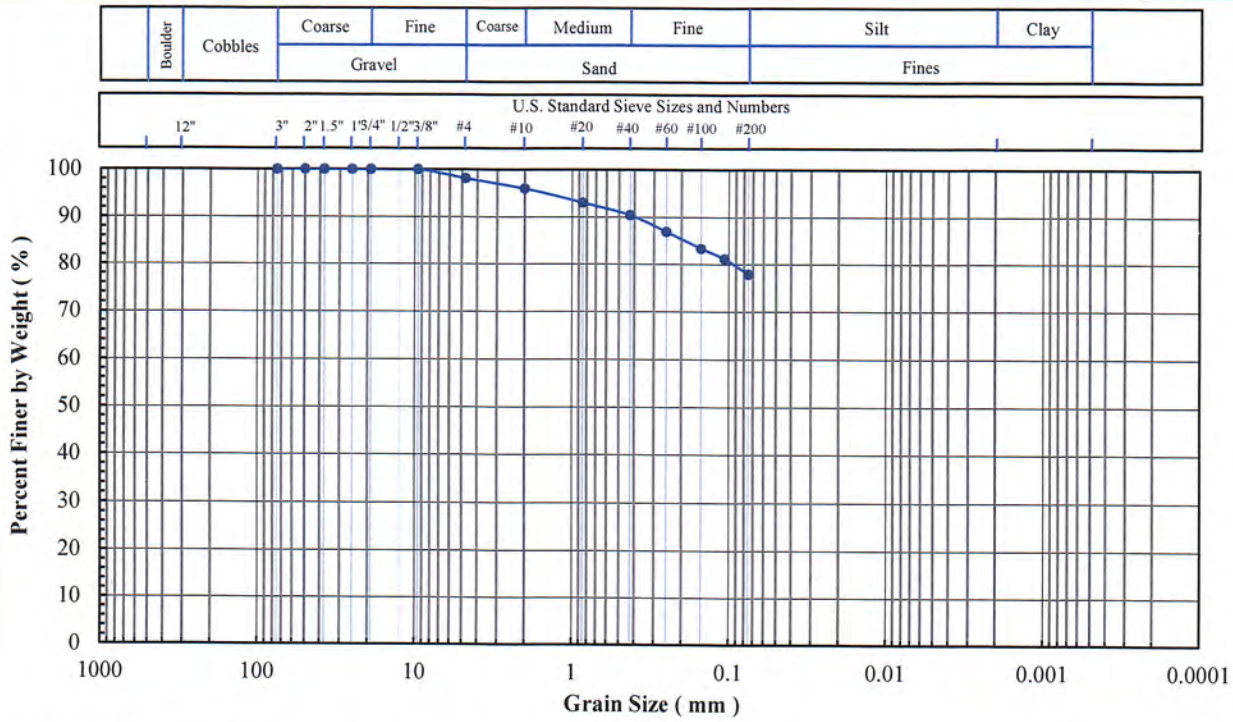
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-4 (21-26')
Lab Sample No:	20L042

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

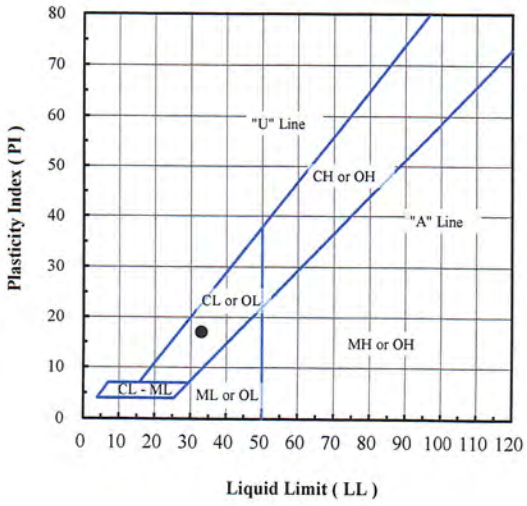


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.1
#10	2.00	96.0
#20	0.850	93.0
#40	0.425	90.4
#60	0.250	86.9
#100	0.150	83.3
#140	0.106	81.1
#200	0.075	77.8

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.9
Sand (%):	20.3
Fines (%):	77.8
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-4 (21-26')	20L042	16.1	77.8	33	16	17	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

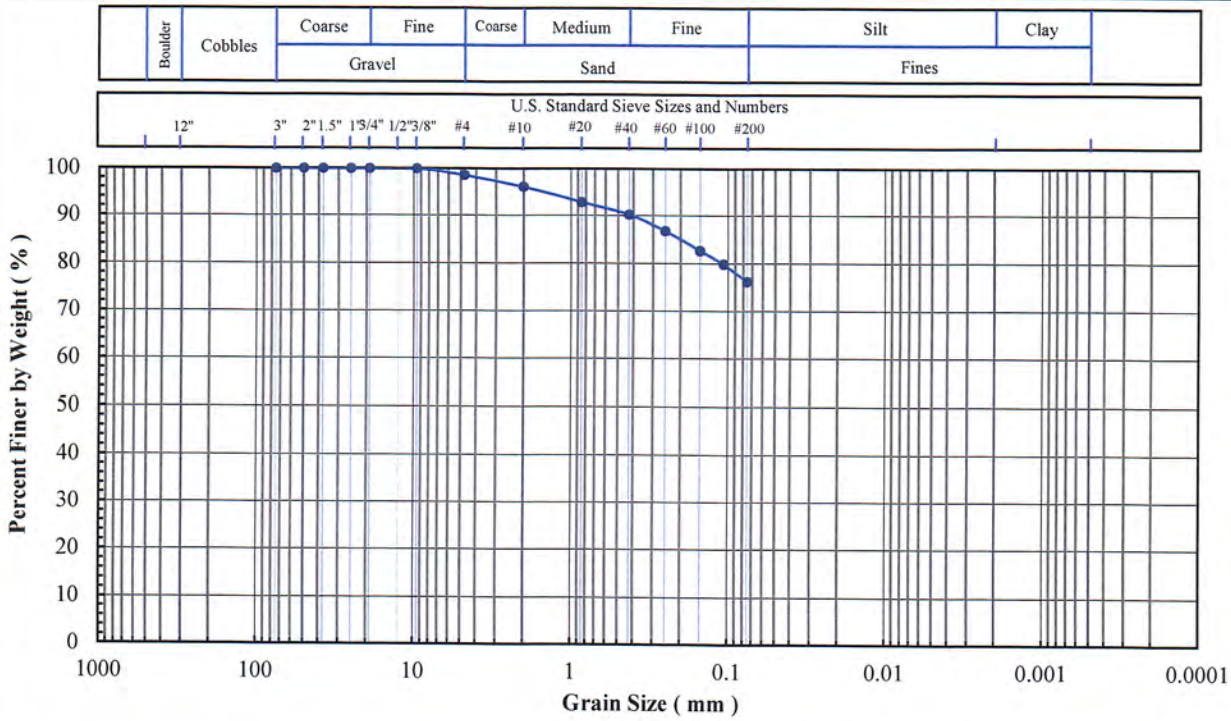
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-6 (30-35')
Lab Sample No:	20L044

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

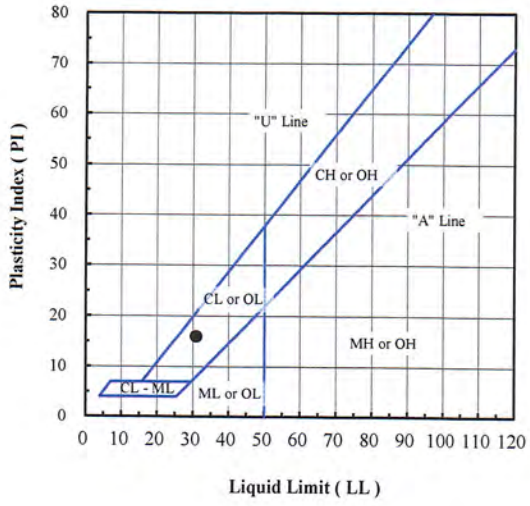


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.6
#10	2.00	96.1
#20	0.850	92.8
#40	0.425	90.2
#60	0.250	86.7
#100	0.150	82.6
#140	0.106	79.8
#200	0.075	76.1

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.4
Sand (%):	22.5
Fines (%):	76.1
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-6 (30-35')	20L044	15.1	76.1	31	15	16	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

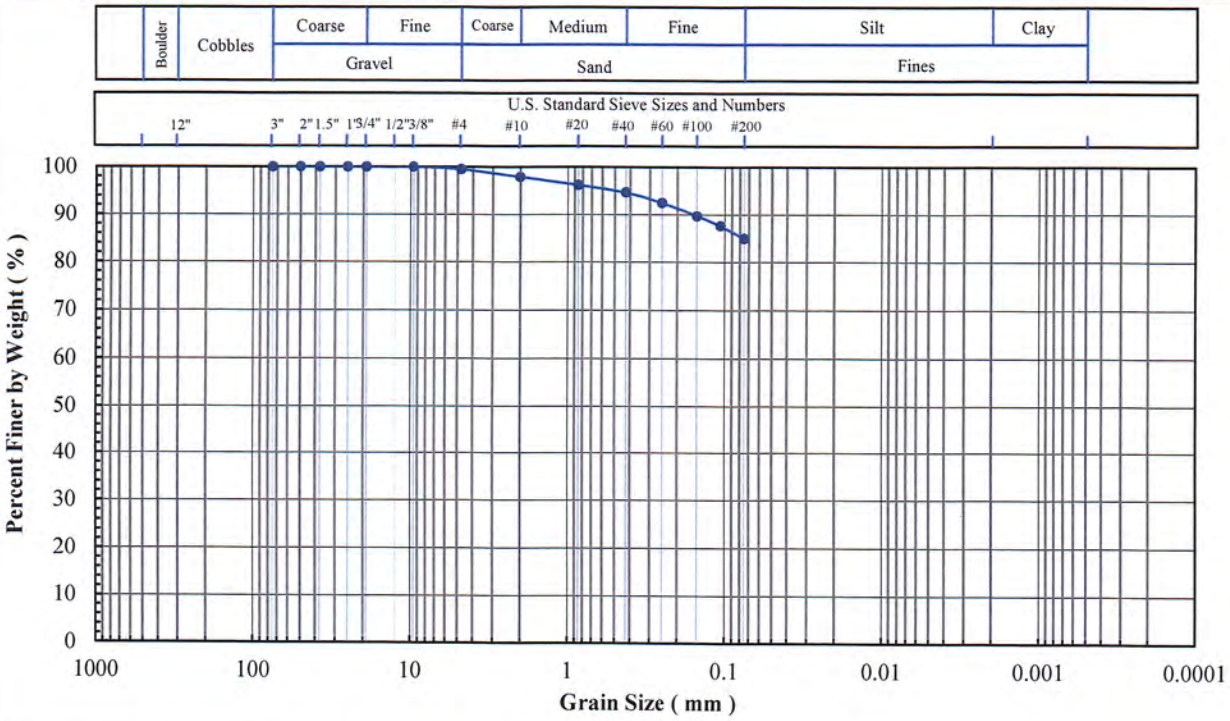
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-9 (46-51')
Lab Sample No:	20L047

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

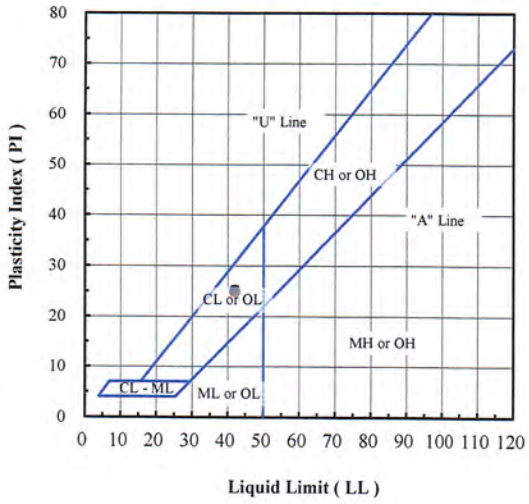


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.5
#10	2.00	97.9
#20	0.850	96.2
#40	0.425	94.7
#60	0.250	92.5
#100	0.150	89.7
#140	0.106	87.6
#200	0.075	84.9

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.5
Sand (%):	14.6
Fines (%):	84.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-9 (46-51')	20L047	18.3	84.9	42	17	25	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

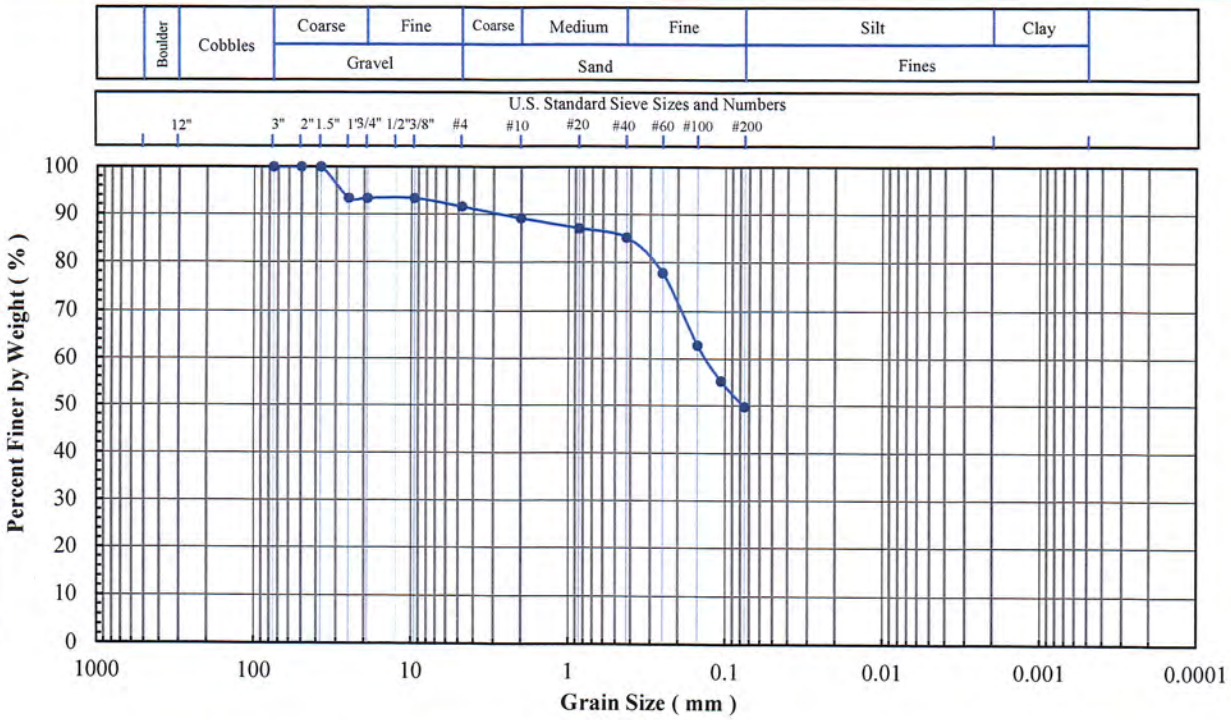
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-12 (63-66')
Lab Sample No:	20L050

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

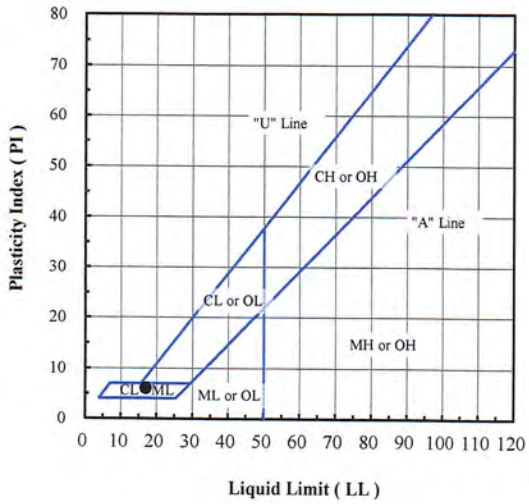


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	93
3/4"	19	93
3/8"	9.5	93
#4	4.75	92
#10	2.00	89
#20	0.850	87
#40	0.425	85
#60	0.250	78
#100	0.150	63
#140	0.106	55
#200	0.075	50

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	8
Sand (%):	42
Fines (%):	50
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-12 (63-66')	20L050	11.1	50	17	11	6	SC-SM - Silty, clayey sand

Note(s): Sieve specimen was undersized.
Engineering classification is based on the assumption that the fines are either CL or ML.

01-21-2021
AA, NSR

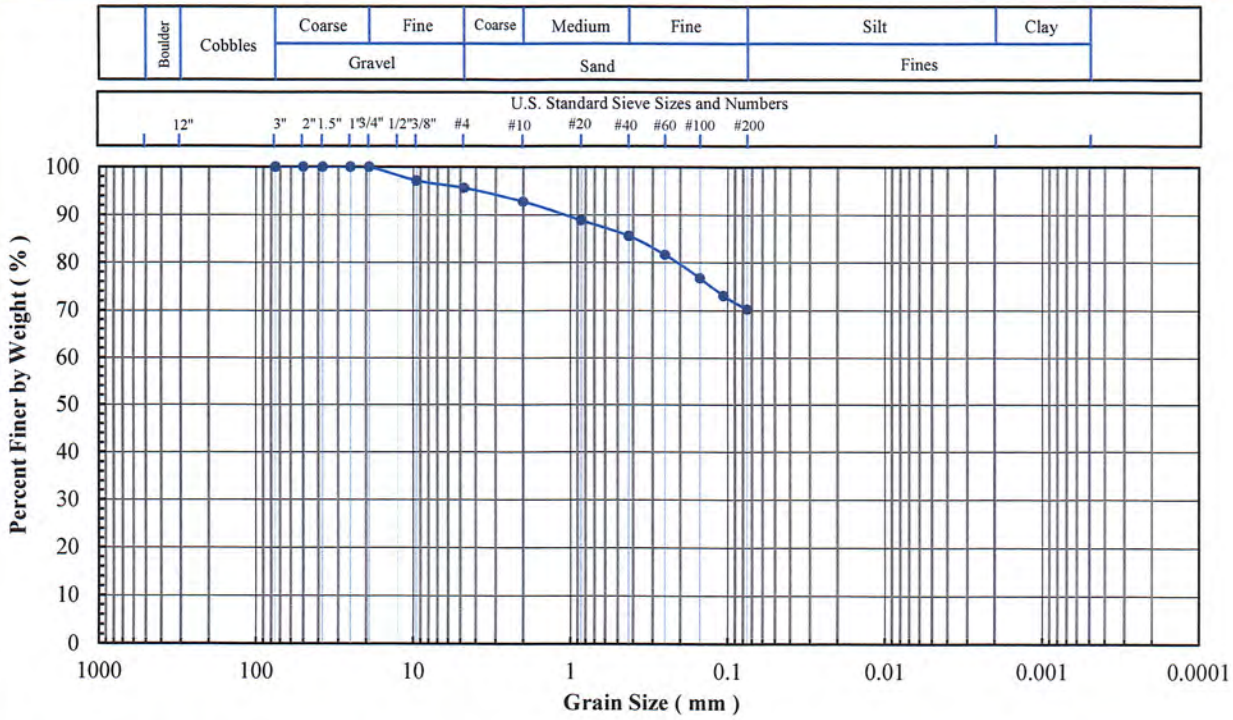
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-ST-1 (15-17')
Lab Sample No:	20L129

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

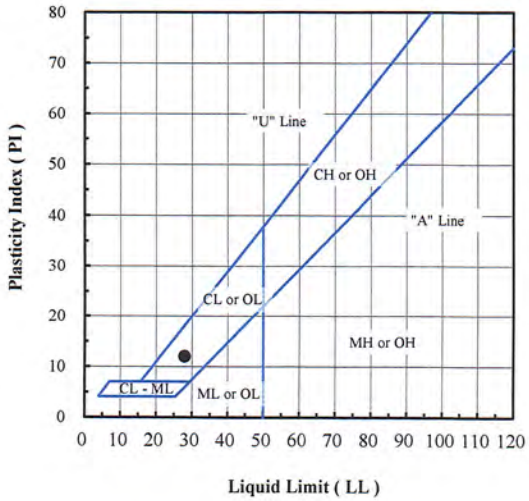


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	97
#4	4.75	96
#10	2.00	93
#20	0.850	89
#40	0.425	86
#60	0.250	82
#100	0.150	77
#140	0.106	73
#200	0.075	70

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	4
Sand (%):	26
Fines (%):	70
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B4-ST-1 (15-17')	20L129	15.8	70	28	16	12	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-26-2021
AA, NSR

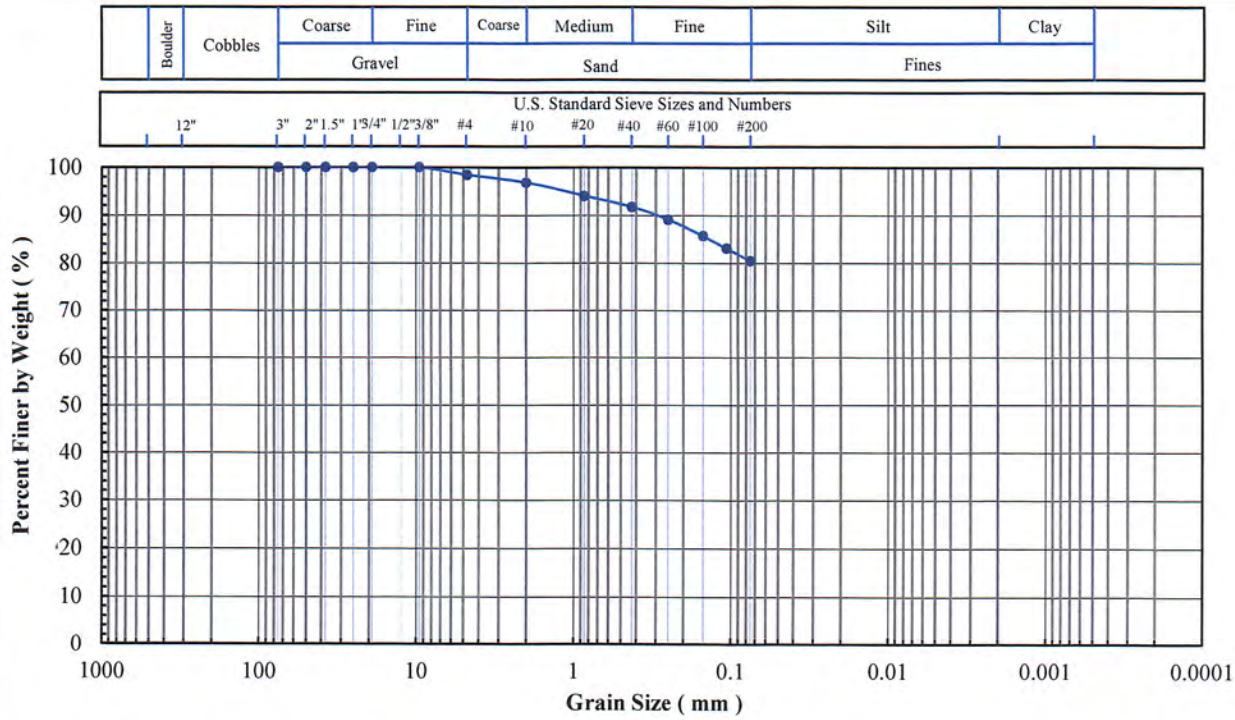
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-ST-2 (40-42')
Lab Sample No:	20L130

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

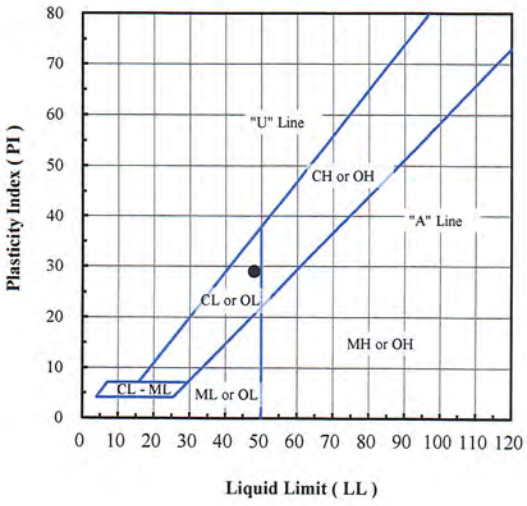


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.4
#10	2.00	96.8
#20	0.850	94.0
#40	0.425	91.7
#60	0.250	89.1
#100	0.150	85.7
#140	0.106	83.1
#200	0.075	80.5

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.6
Sand (%):	17.9
Fines (%):	80.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-ST-2 (40-42')	20L130	16.7	80.5	48	19	29	CL - Lean clay with sand

Note(s):

01-27-2021
AA, NSK

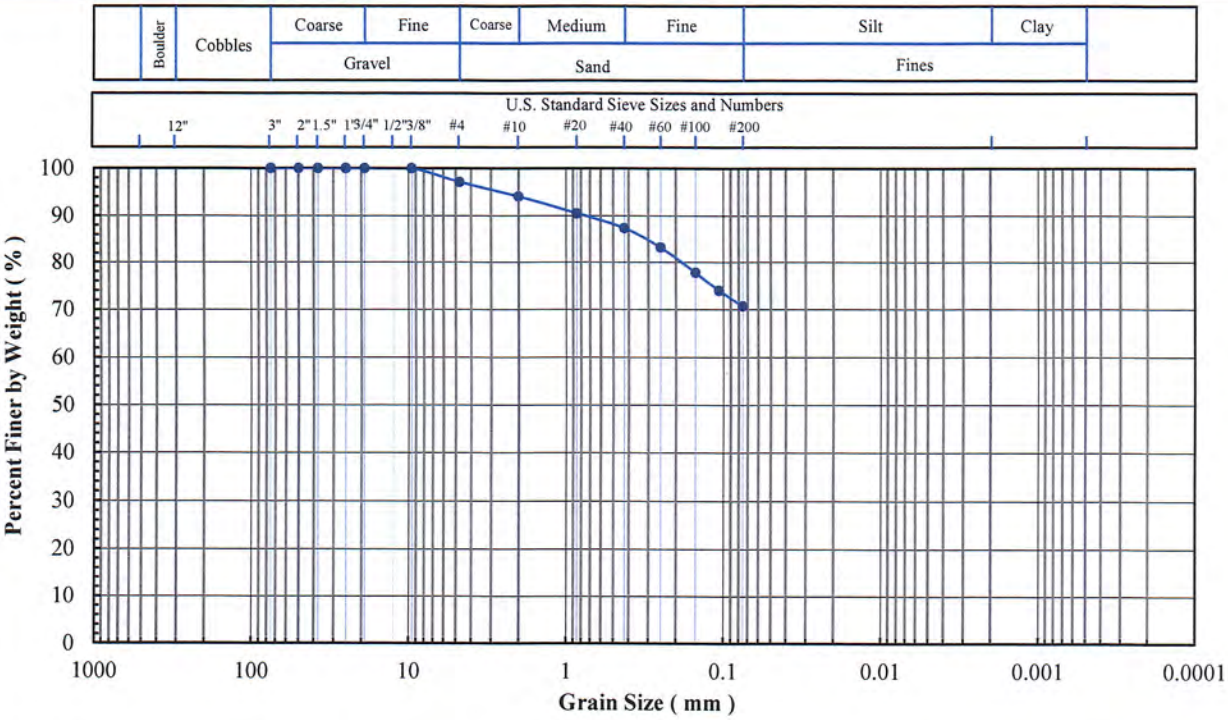
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-ST-3 (55-57.5')
Lab Sample No:	20L131

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

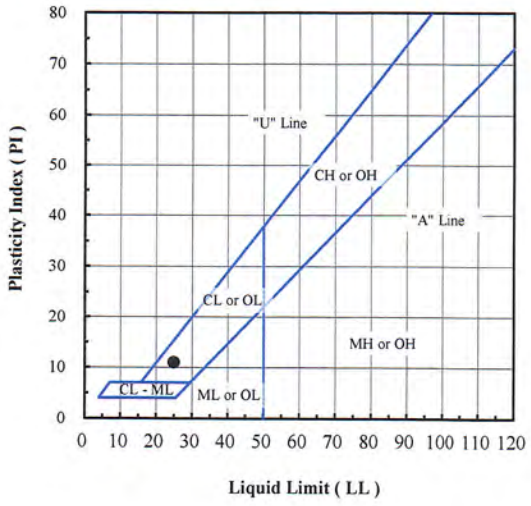


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.1
#10	2.00	94.1
#20	0.850	90.5
#40	0.425	87.4
#60	0.250	83.2
#100	0.150	77.8
#140	0.106	74.0
#200	0.075	70.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.9
Sand (%):	26.4
Fines (%):	70.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-ST-3 (55-57.5')	20L131	14.4	70.7	25	14	11	CL - Lean clay with sand

Note(s):

01-27-2021
AA, NSR

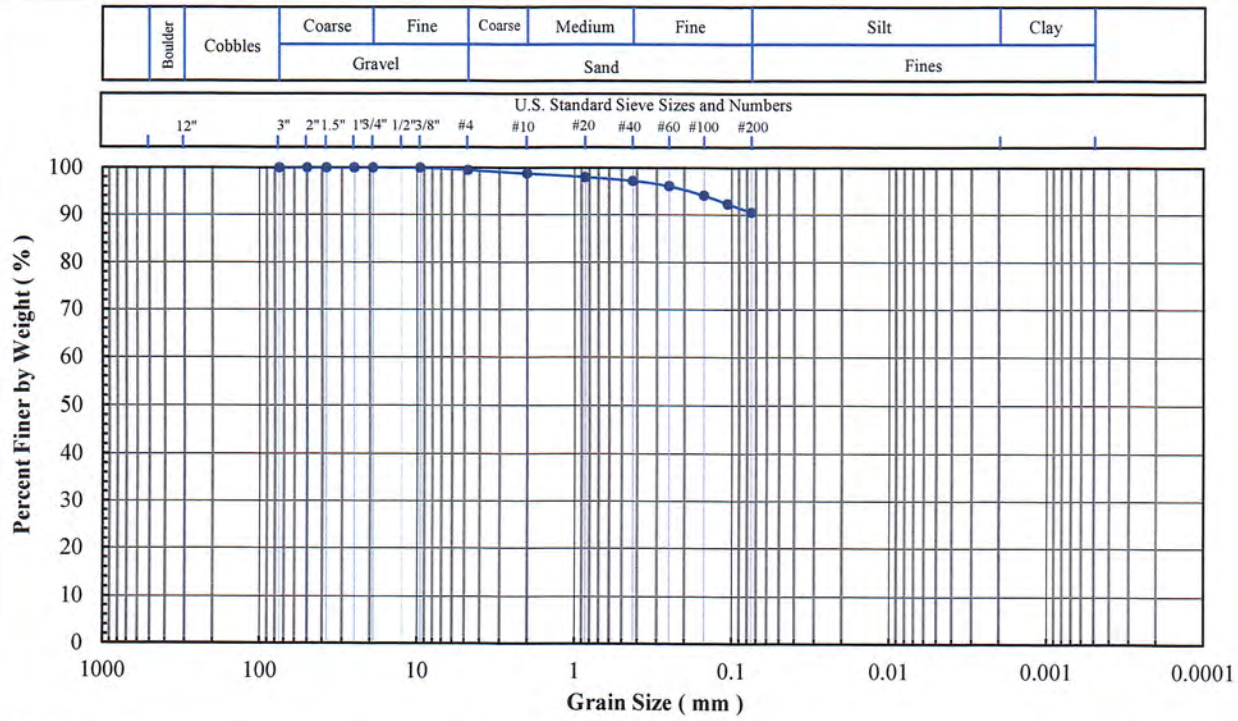
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B4-ST-4 (70-72.5')
Lab Sample No:	20L132

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

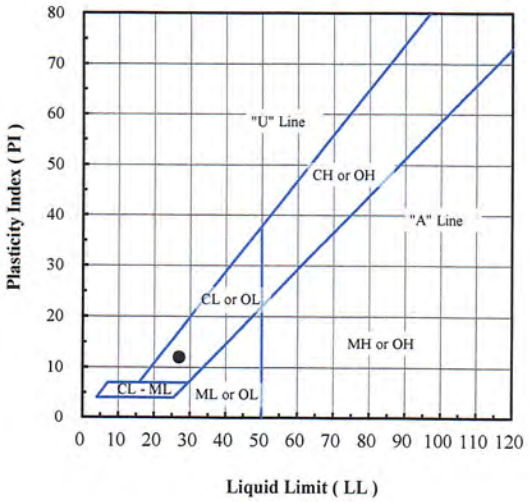


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.5
#10	2.00	98.8
#20	0.850	98.0
#40	0.425	97.2
#60	0.250	96.1
#100	0.150	94.1
#140	0.106	92.3
#200	0.075	90.5

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.5
Sand (%):	9.0
Fines (%):	90.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B4-ST-4 (70-72.5')	20L132	10.8	90.5	27	15	12	CL - Lean clay

Note(s):

01-27-2021
AA, NSM

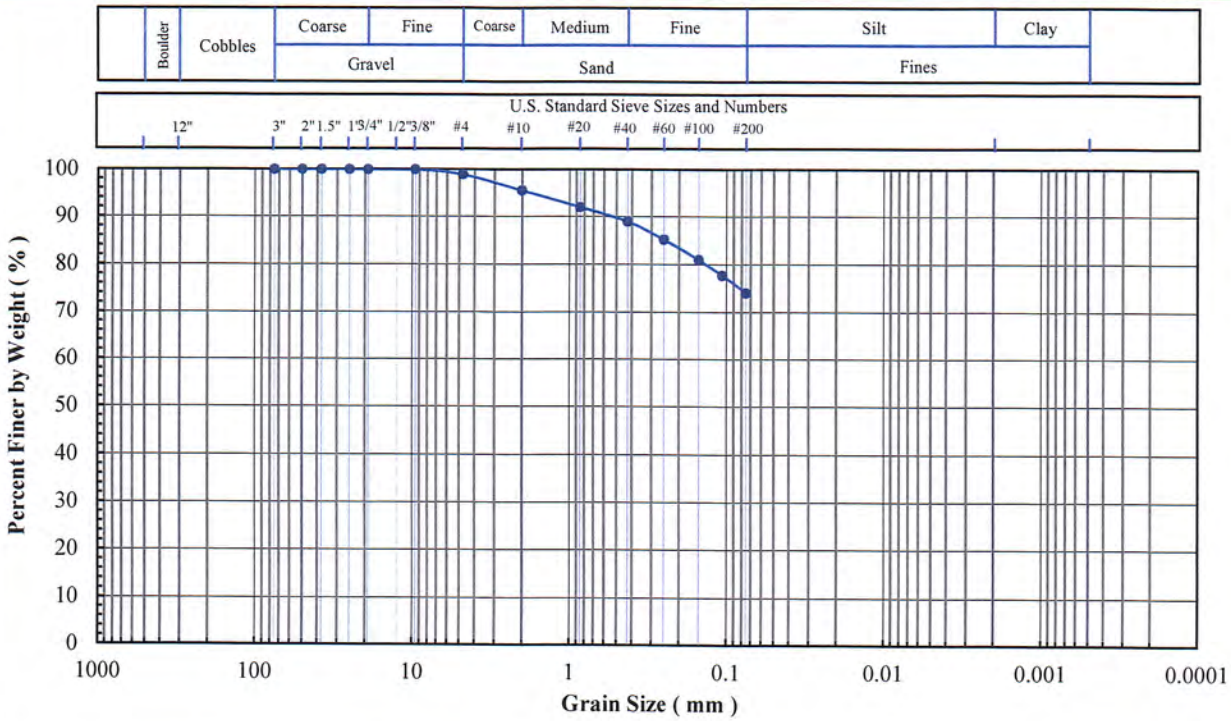
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-2 (6-11')
Lab Sample No:	20L054

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

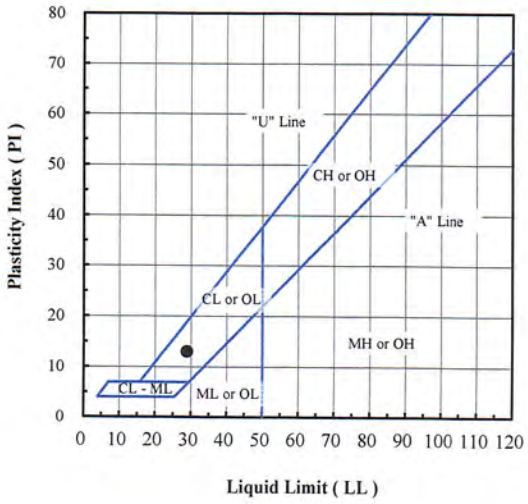


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.9
#10	2.00	95.5
#20	0.850	91.9
#40	0.425	88.9
#60	0.250	85.1
#100	0.150	80.9
#140	0.106	77.7
#200	0.075	74.0

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.1
Sand (%):	24.9
Fines (%):	74.0
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B5-2 (6-11')	20L054	18.9	74.0	29	16	13	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSA

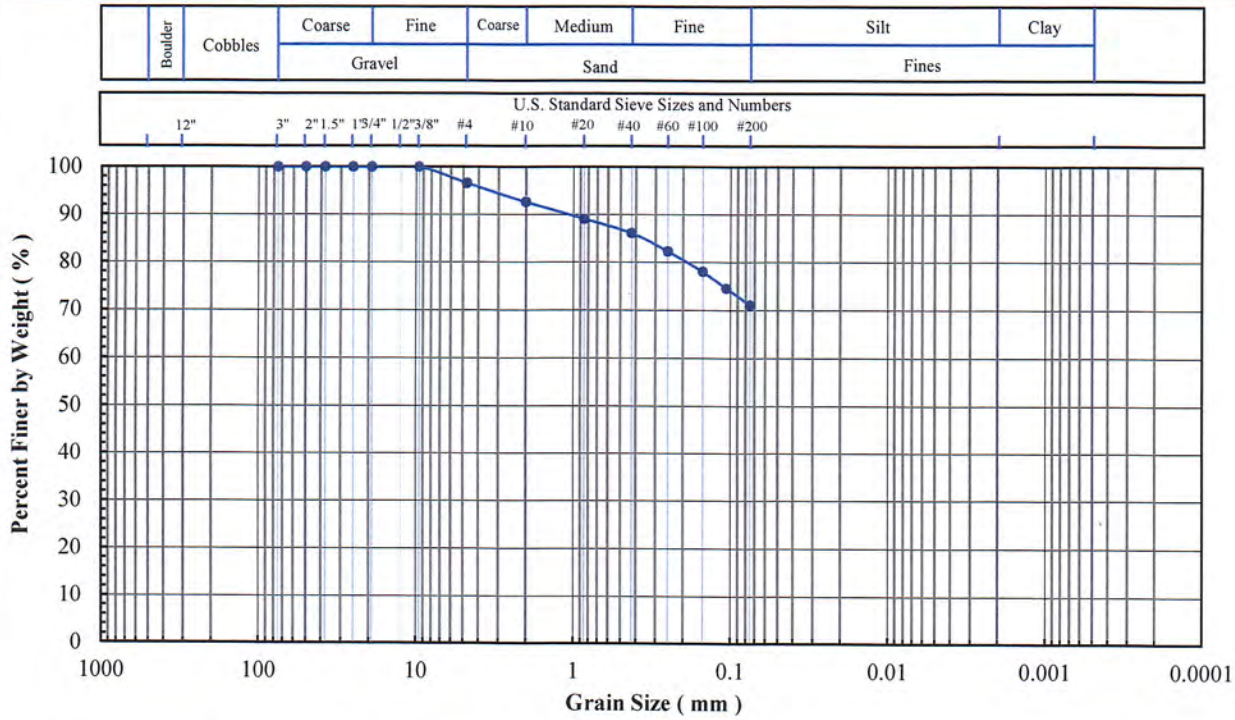
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-4 (16-21')
Lab Sample No:	20L056

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

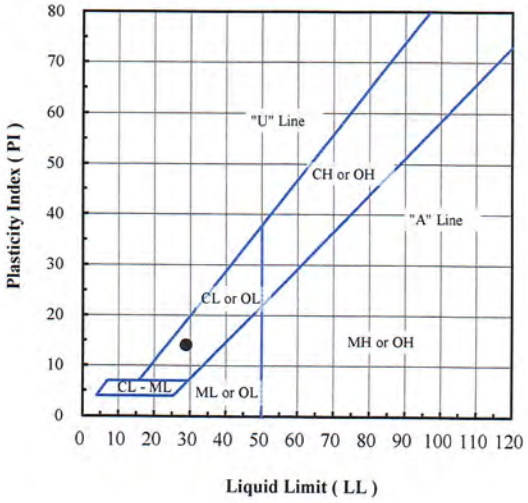


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	96.6
#10	2.00	92.7
#20	0.850	89.1
#40	0.425	86.1
#60	0.250	82.3
#100	0.150	78.0
#140	0.106	74.5
#200	0.075	71.0

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3.4
Sand (%):	25.6
Fines (%):	71.0
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B5-4 (16-21')	20L056	17.9	71.0	29	15	14	CL - Lean clay with sand

Note(s):

01-21-2021
AA, MSR

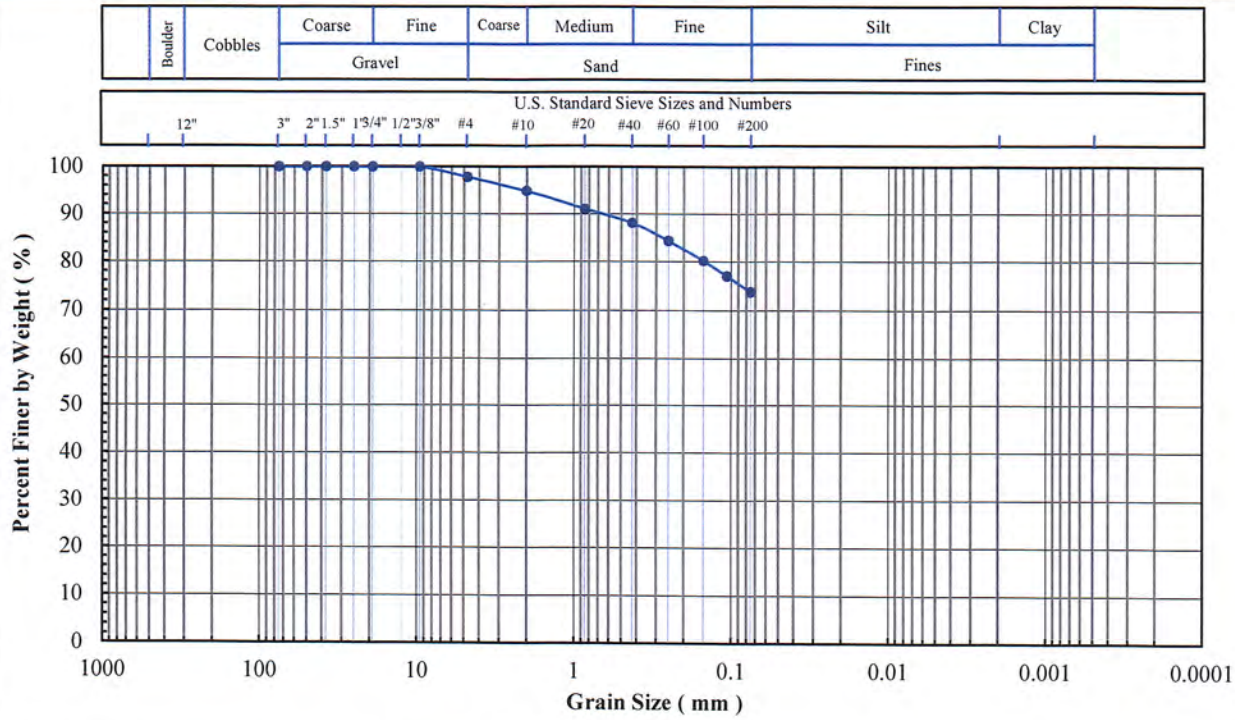
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-6 (26-31')
Lab Sample No:	20L058

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

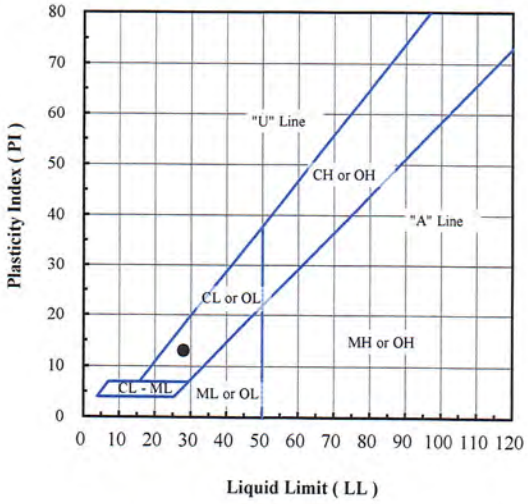


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.8
#10	2.00	94.9
#20	0.850	91.1
#40	0.425	88.1
#60	0.250	84.3
#100	0.150	80.2
#140	0.106	77.0
#200	0.075	73.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.2
Sand (%):	24.1
Fines (%):	73.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B5-6 (26-31')	20L058	20.9	73.7	28	15	13	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

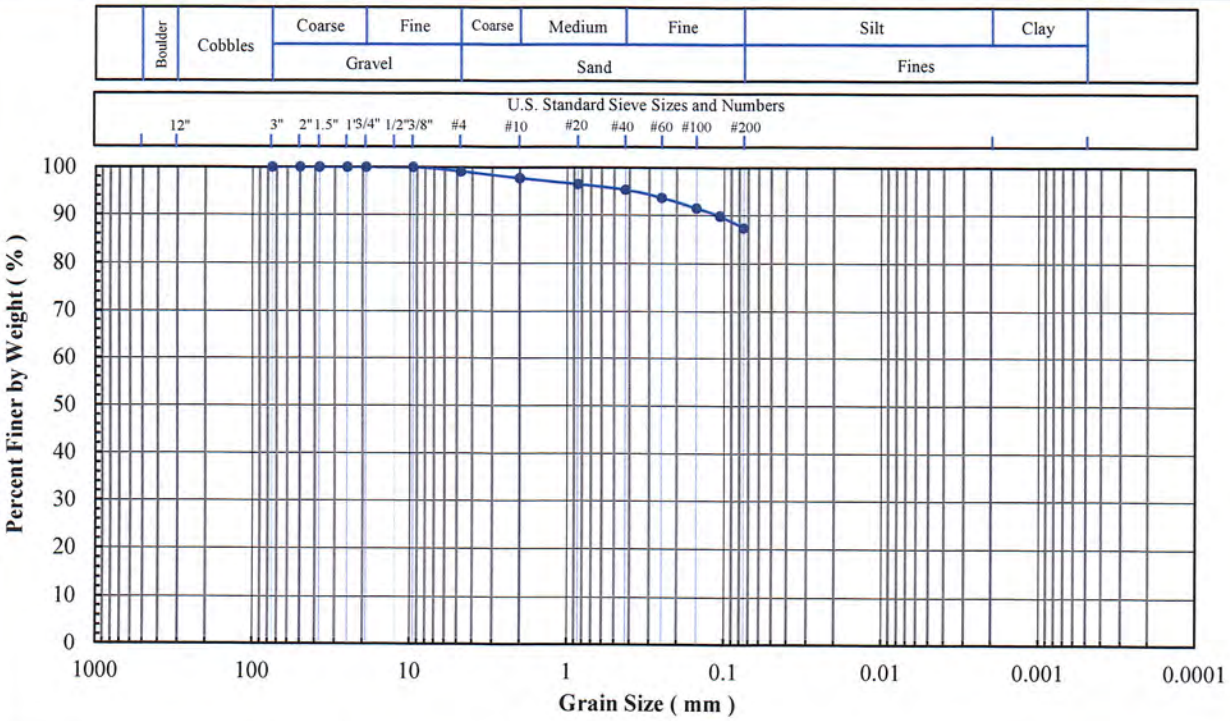
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-8 (36-42')
Lab Sample No:	20L060

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

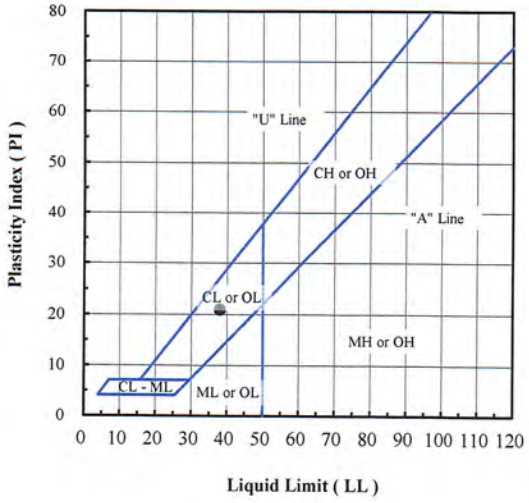


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.1
#10	2.00	97.7
#20	0.850	96.4
#40	0.425	95.3
#60	0.250	93.6
#100	0.150	91.4
#140	0.106	89.8
#200	0.075	87.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.9
Sand (%):	11.8
Fines (%):	87.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B5-8 (36-42')	20L060	20.0	87.3	38	17	21	CL - Lean clay

Note(s):

01-21-2021
AA, NSR

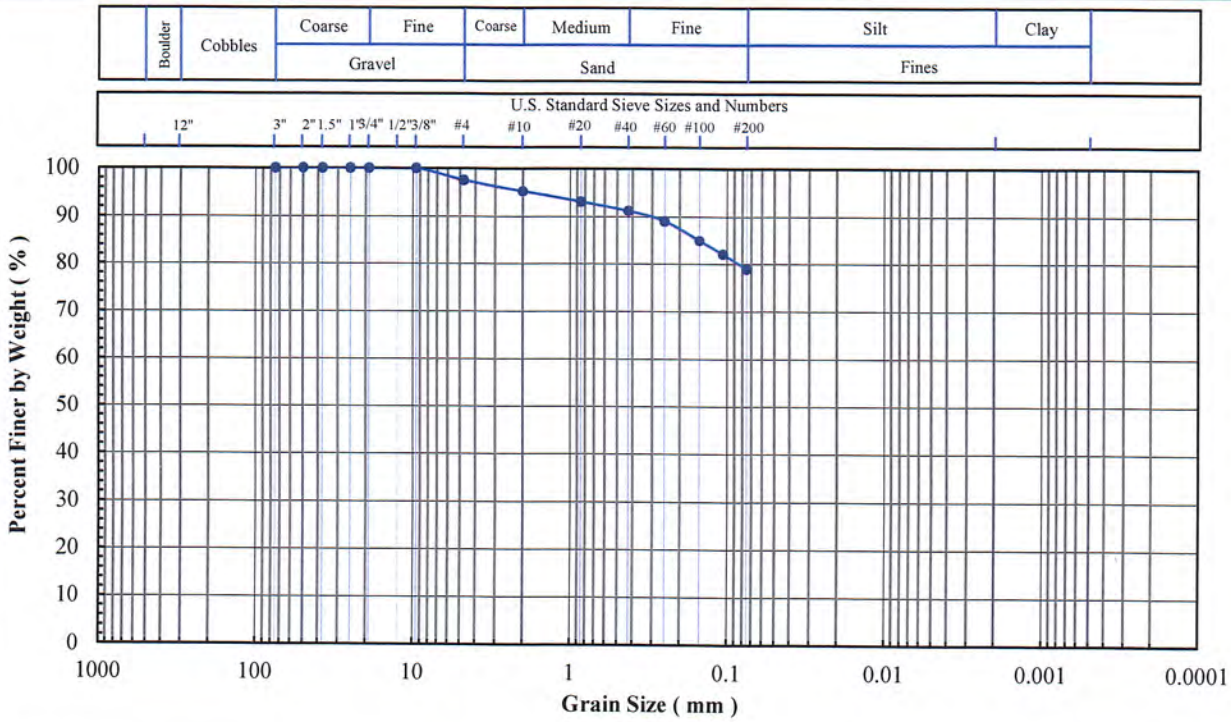
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-10 (46-51')
Lab Sample No:	20L062

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

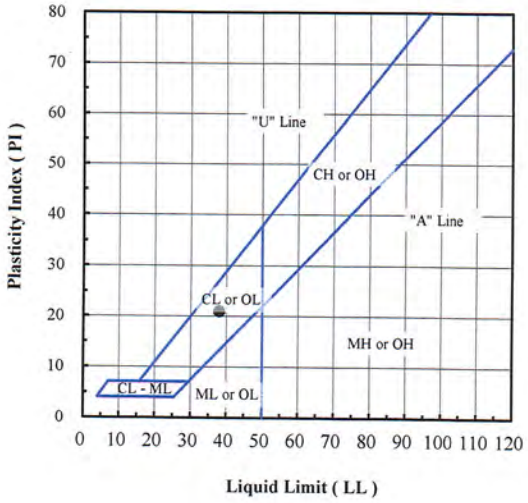


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.5
#10	2.00	95.3
#20	0.850	93.1
#40	0.425	91.2
#60	0.250	89.1
#100	0.150	85.0
#140	0.106	82.1
#200	0.075	78.9

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.5
Sand (%):	18.6
Fines (%):	78.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B5-10 (46-51')	20L062	18.0	78.9	38	17	21	CL - Lean clay with sand

Note(s):

01-21-2021
AA, MSA

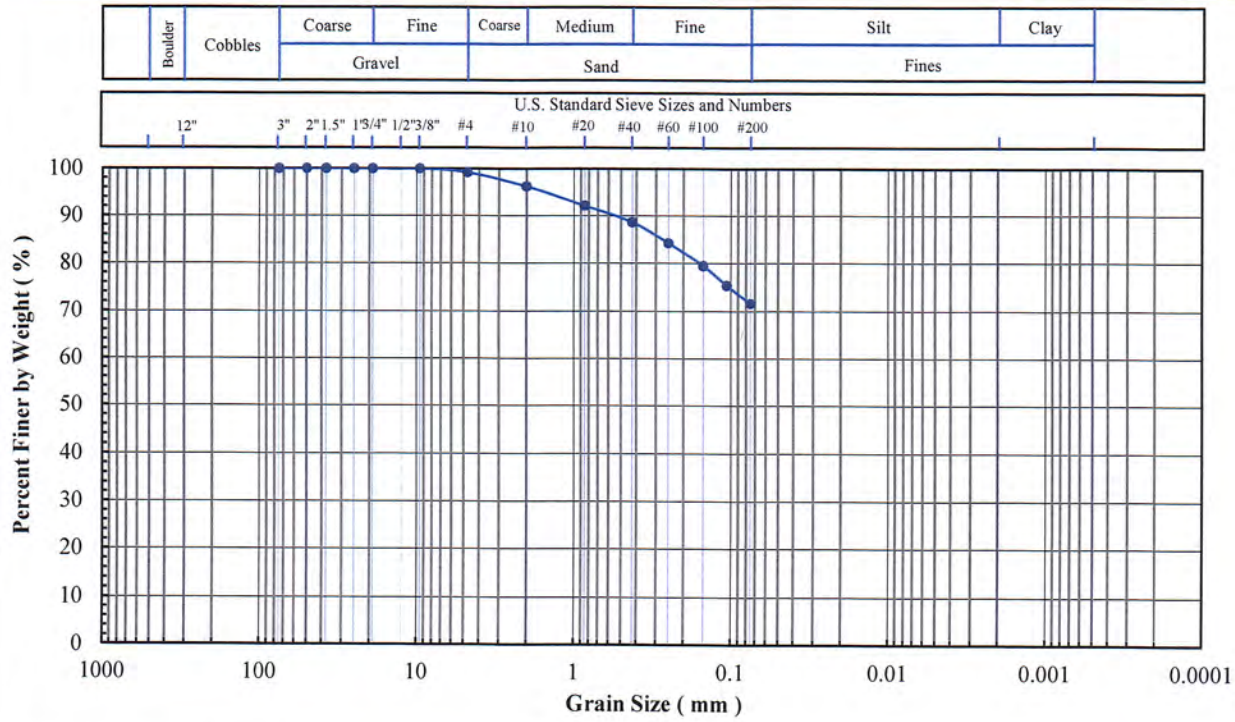
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-11 (51-56')
Lab Sample No:	20L063

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

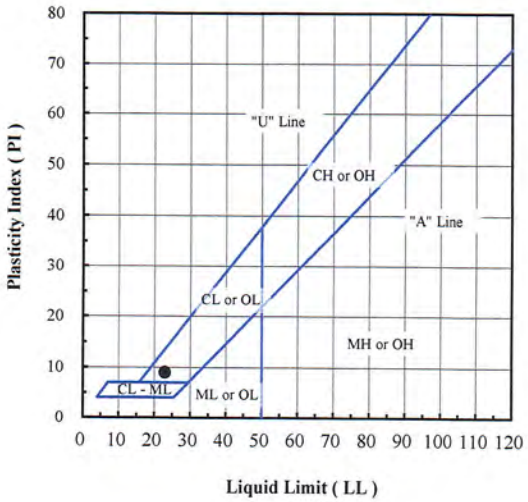


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.2
#10	2.00	96.2
#20	0.850	92.1
#40	0.425	88.6
#60	0.250	84.2
#100	0.150	79.5
#140	0.106	75.4
#200	0.075	71.6

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.8
Sand (%):	27.6
Fines (%):	71.6
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B5-11 (51-56')	20L063	13.8	71.6	23	14	9	CL - Lean clay with sand

Note(s):

01-21-2021
AA, WSA

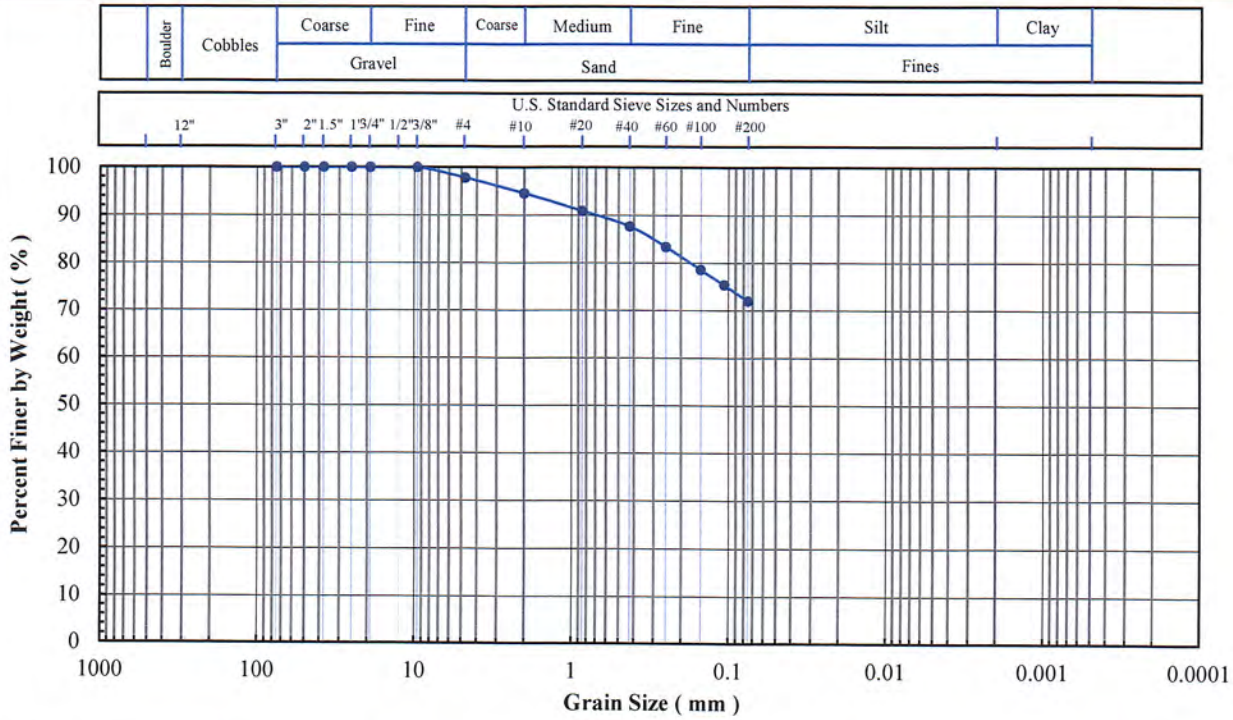
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-13 (61-66')
Lab Sample No:	20L065

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

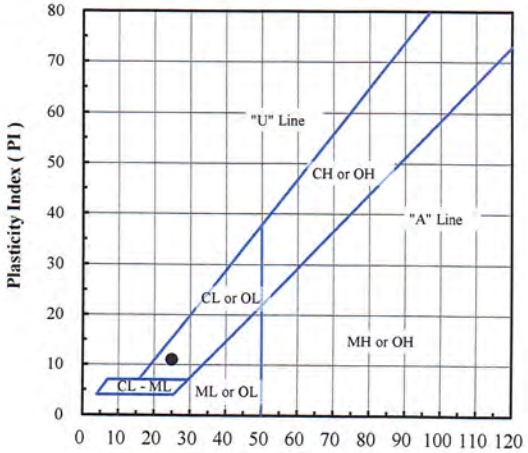


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.8
#10	2.00	94.6
#20	0.850	90.9
#40	0.425	87.7
#60	0.250	83.4
#100	0.150	78.6
#140	0.106	75.4
#200	0.075	72.0

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.2
Sand (%):	25.8
Fines (%):	72.0
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B5-13 (61-66')	20L065	14.3	72.0	25	14	11	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

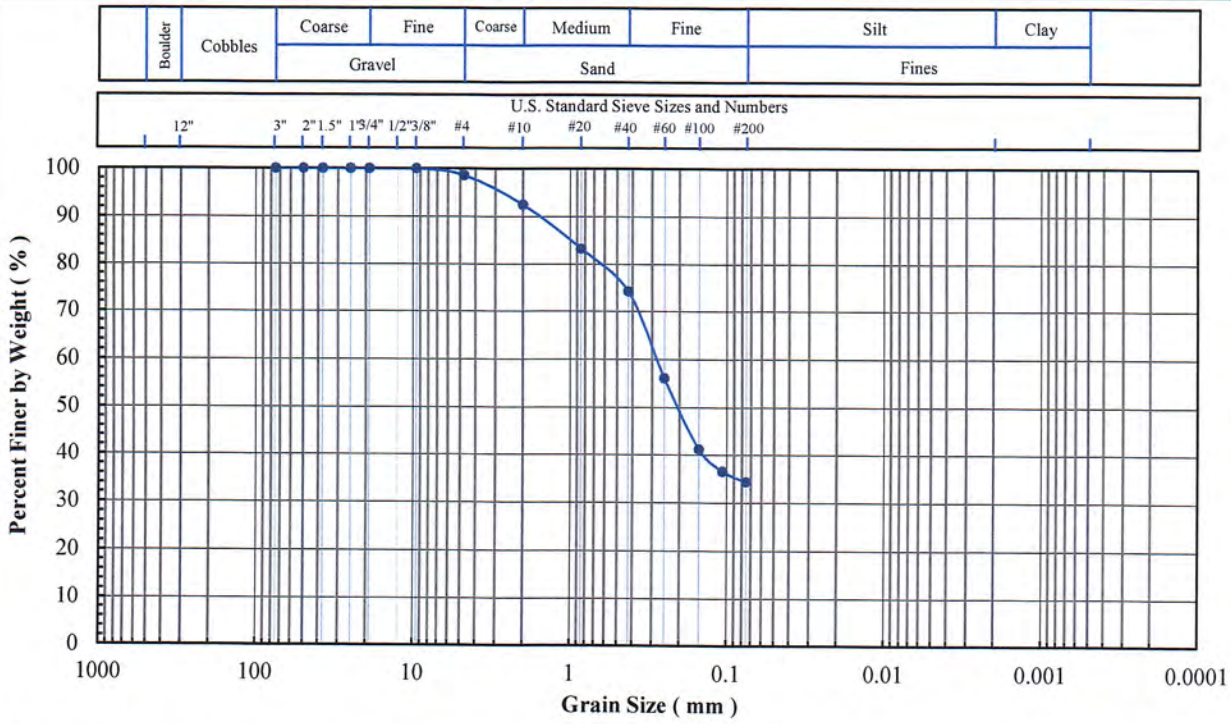
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B5-ST-1 (73.5-76')
Lab Sample No:	20L133

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

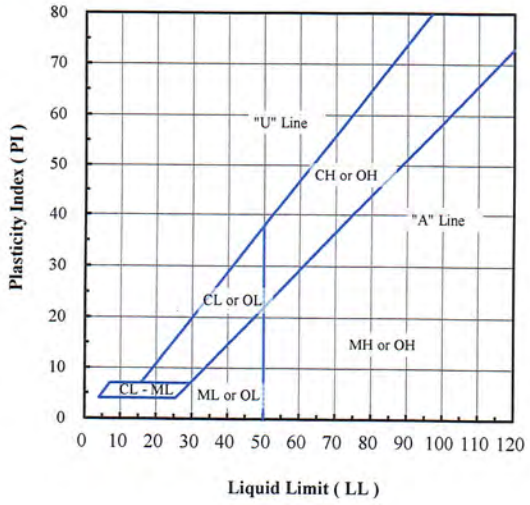


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.6
#10	2.00	92.5
#20	0.850	83.3
#40	0.425	74.2
#60	0.250	56.1
#100	0.150	41.2
#140	0.106	36.6
#200	0.075	34.4

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.4
Sand (%):	64.2
Fines (%):	34.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B5-ST-1 (73.5-76')	20L133	15.4	34.4	NP	NP	NP	SM - Silty sand

Note(s): Engineering classification is based on the assumption that the fines are either ML or MH.

01-29-2021
AA, NSR

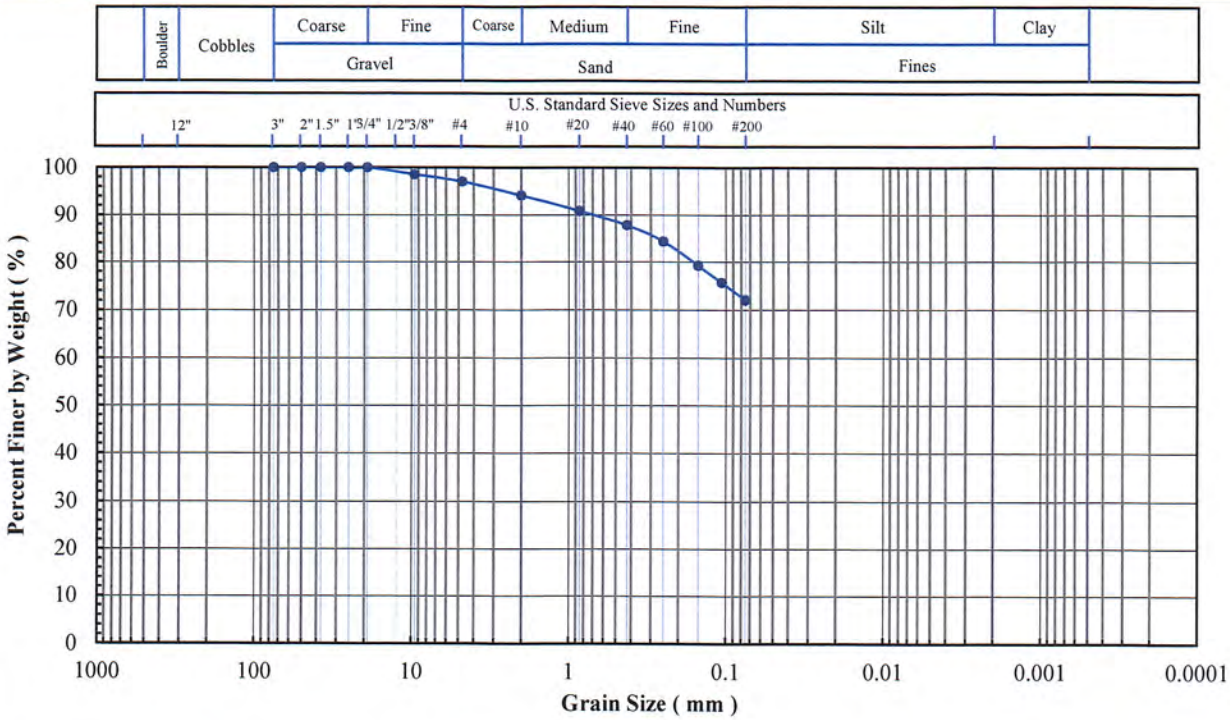
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-2 (6-11')
Lab Sample No:	20L068

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

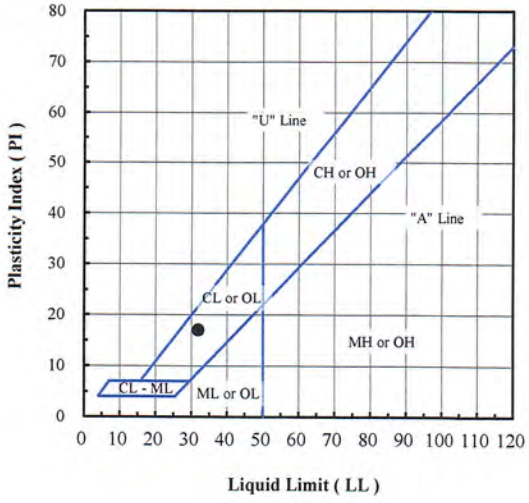


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	99
#4	4.75	97
#10	2.00	94
#20	0.850	91
#40	0.425	88
#60	0.250	84
#100	0.150	79
#140	0.106	76
#200	0.075	72

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3
Sand (%):	25
Fines (%):	72
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B6-2 (6-11')	20L068	16.0	72	32	15	17	CL - Sandy lean clay

Note(s): Sieve specimen was undersized.

01-21-2021
AA, MJR

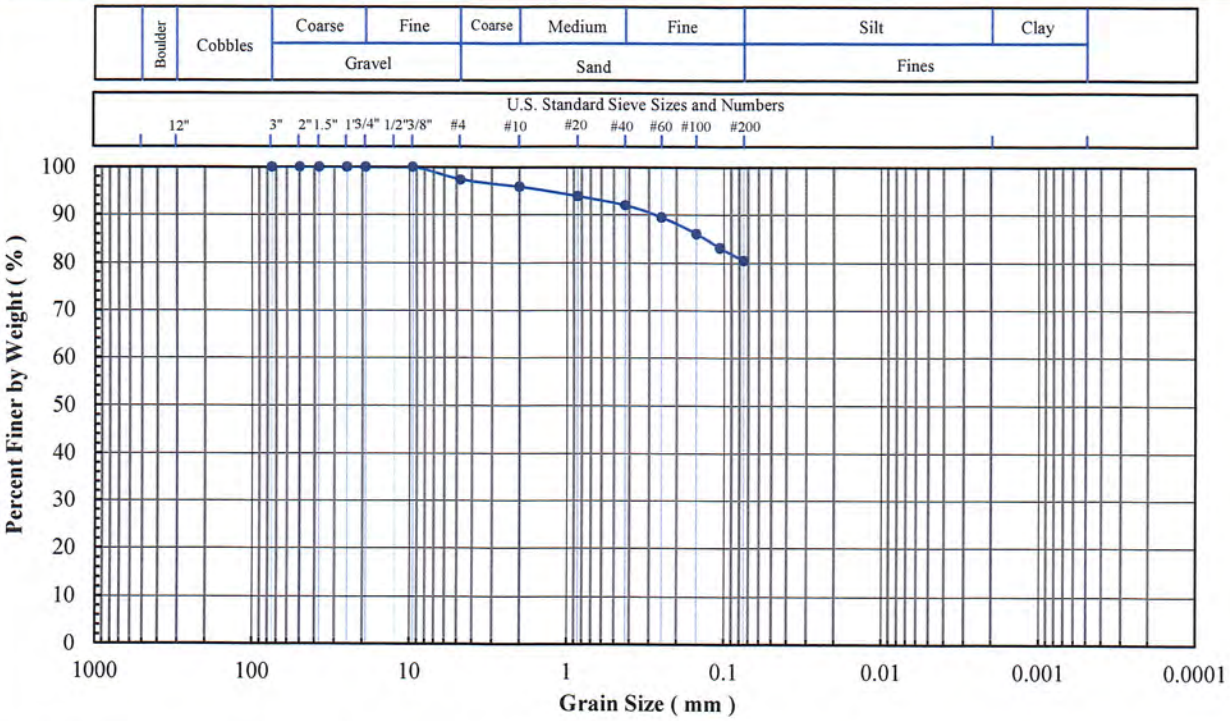
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-4 (16-21')
Lab Sample No:	20L070

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

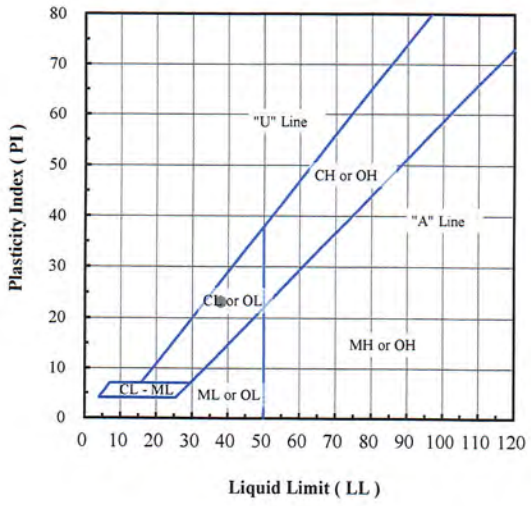


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.3
#10	2.00	95.8
#20	0.850	93.8
#40	0.425	91.9
#60	0.250	89.4
#100	0.150	86.0
#140	0.106	83.1
#200	0.075	80.5

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.7
Sand (%):	16.8
Fines (%):	80.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-4 (16-21')	20L070	19.9	80.5	38	15	23	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

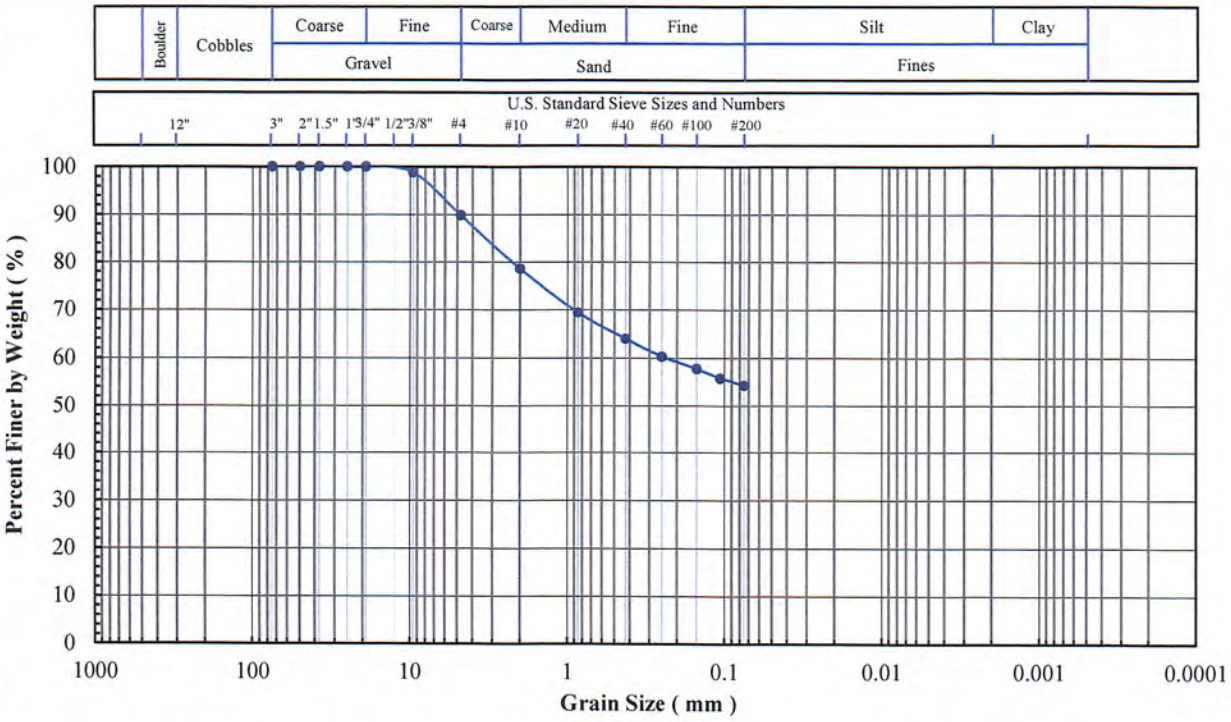
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-7 (31-36')
Lab Sample No:	20L073

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

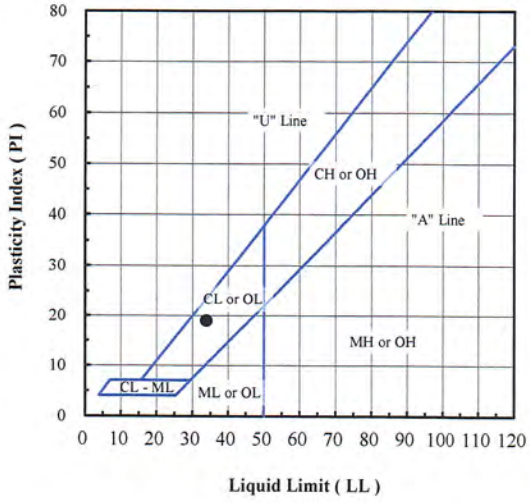


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	99
#4	4.75	90
#10	2.00	79
#20	0.850	69
#40	0.425	64
#60	0.250	60
#100	0.150	58
#140	0.106	56
#200	0.075	54

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	10
Sand (%):	36
Fines (%):	54
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-7 (31-36')	20L073	16.9	54	34	15	19	CL - Sandy lean clay

Note(s): Sieve specimen was undersized.

01-21-2021
AA, WSR

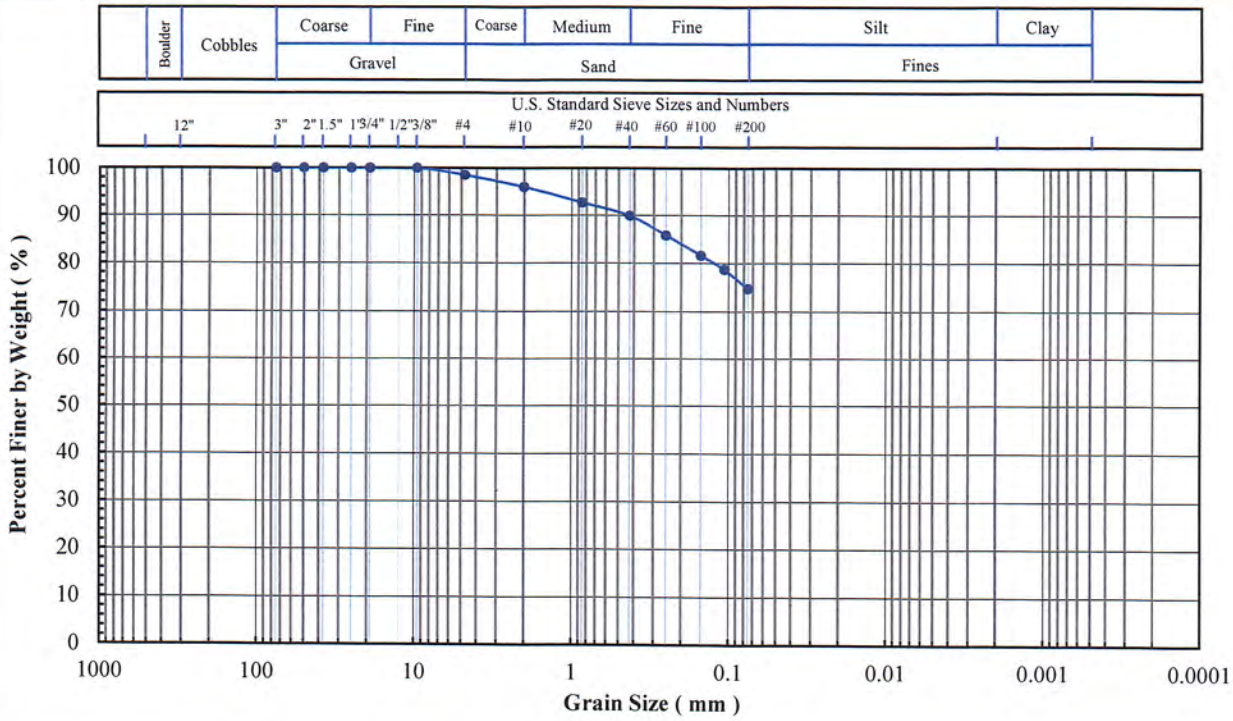
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-10 (45-50')
Lab Sample No:	20L076

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

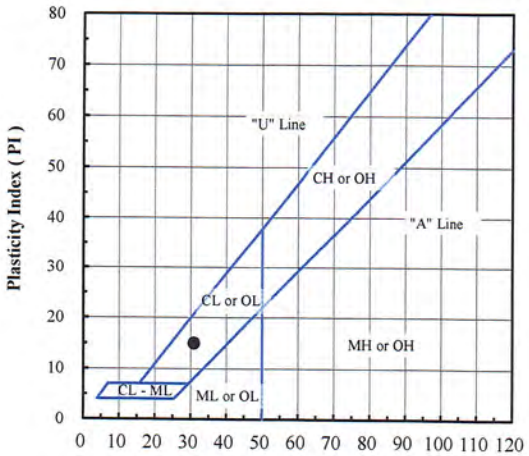


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.5
#10	2.00	96.0
#20	0.850	92.7
#40	0.425	89.9
#60	0.250	85.8
#100	0.150	81.6
#140	0.106	78.7
#200	0.075	74.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.5
Sand (%):	23.8
Fines (%):	74.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-10 (45-50')	20L076	15.7	74.7	31	16	15	CL - Lean clay with sand

Note(s):

01-21-2021
AA, MSK

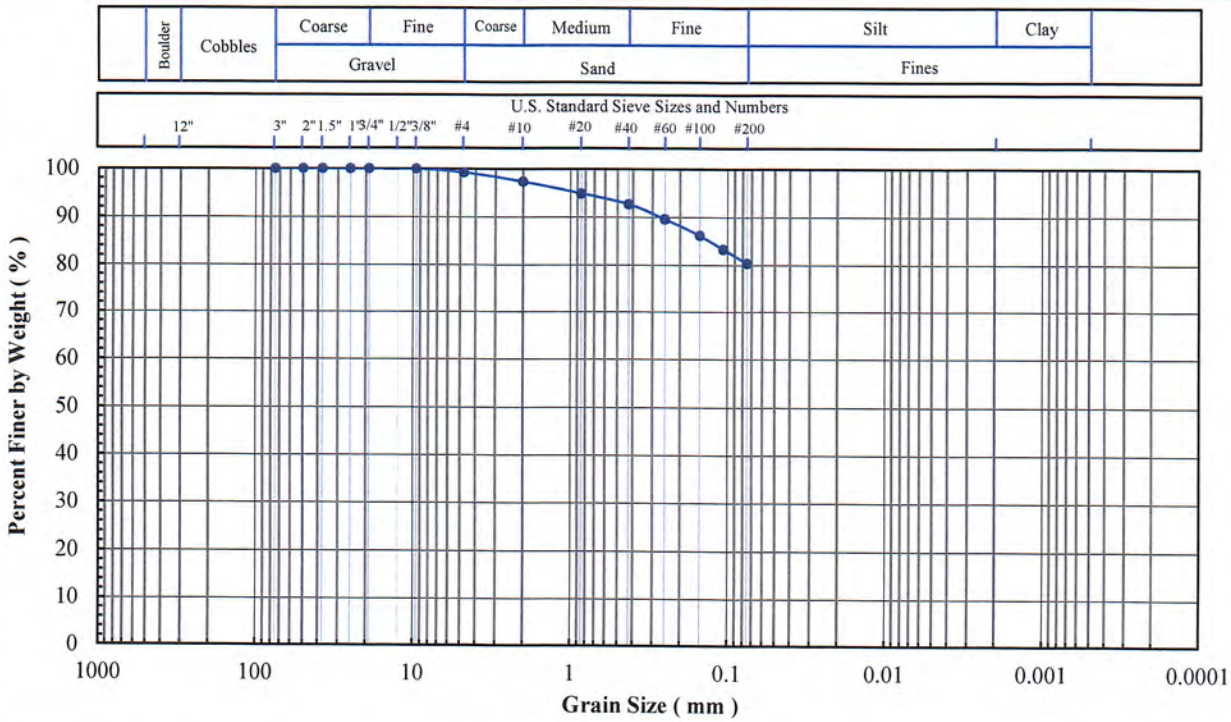
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-13 (60-65')
Lab Sample No:	20L079

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

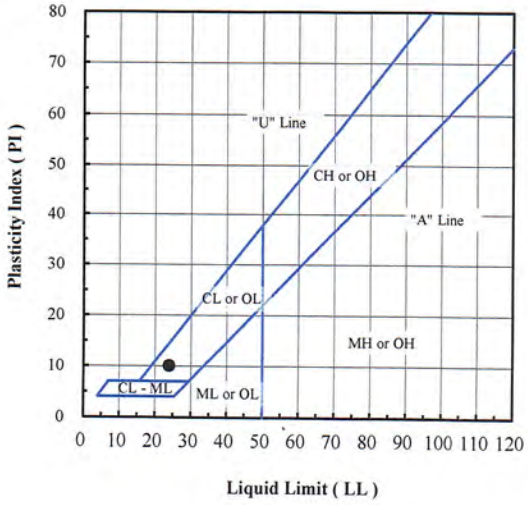


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.2
#10	2.00	97.3
#20	0.850	94.8
#40	0.425	92.6
#60	0.250	89.5
#100	0.150	86.1
#140	0.106	83.2
#200	0.075	80.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.8
Sand (%):	18.9
Fines (%):	80.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-13 (60-65')	20L079	10.2	80.3	24	14	10	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

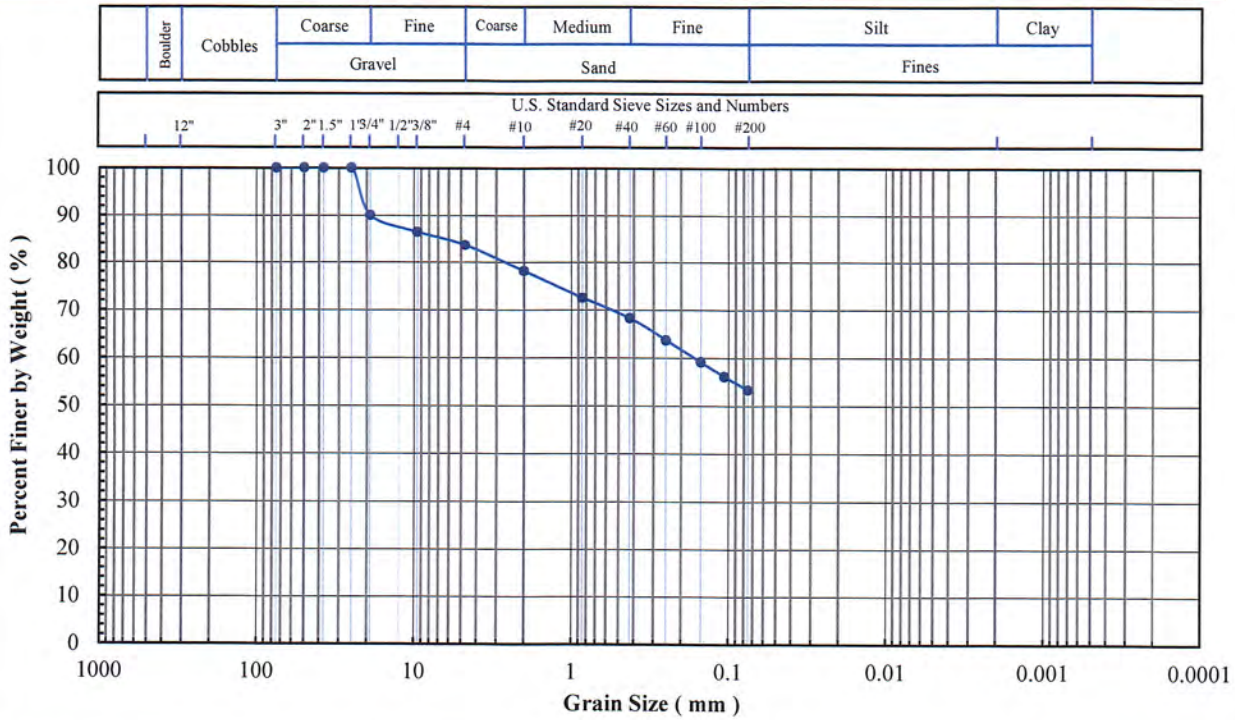
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-15 (70-76')
Lab Sample No:	20L081

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

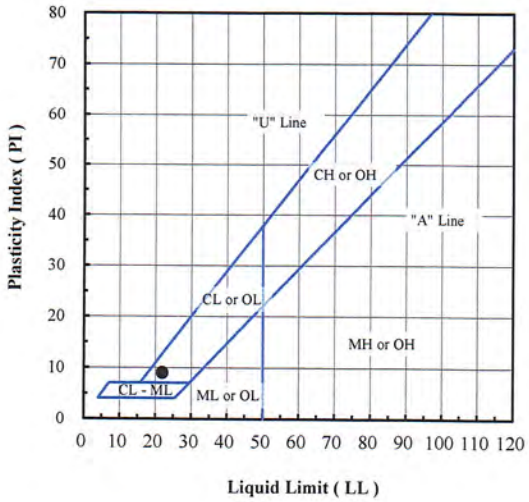


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	90
3/8"	9.5	86
#4	4.75	84
#10	2.00	78
#20	0.850	73
#40	0.425	68
#60	0.250	64
#100	0.150	59
#140	0.106	56
#200	0.075	53

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	16
Sand (%):	31
Fines (%):	53
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-15 (70-76')	20L081	8.0	53	22	13	9	CL - Sandy lean clay with gravel

Note(s): Sieve specimen was undersized.

01-21-2021
AA/WSR

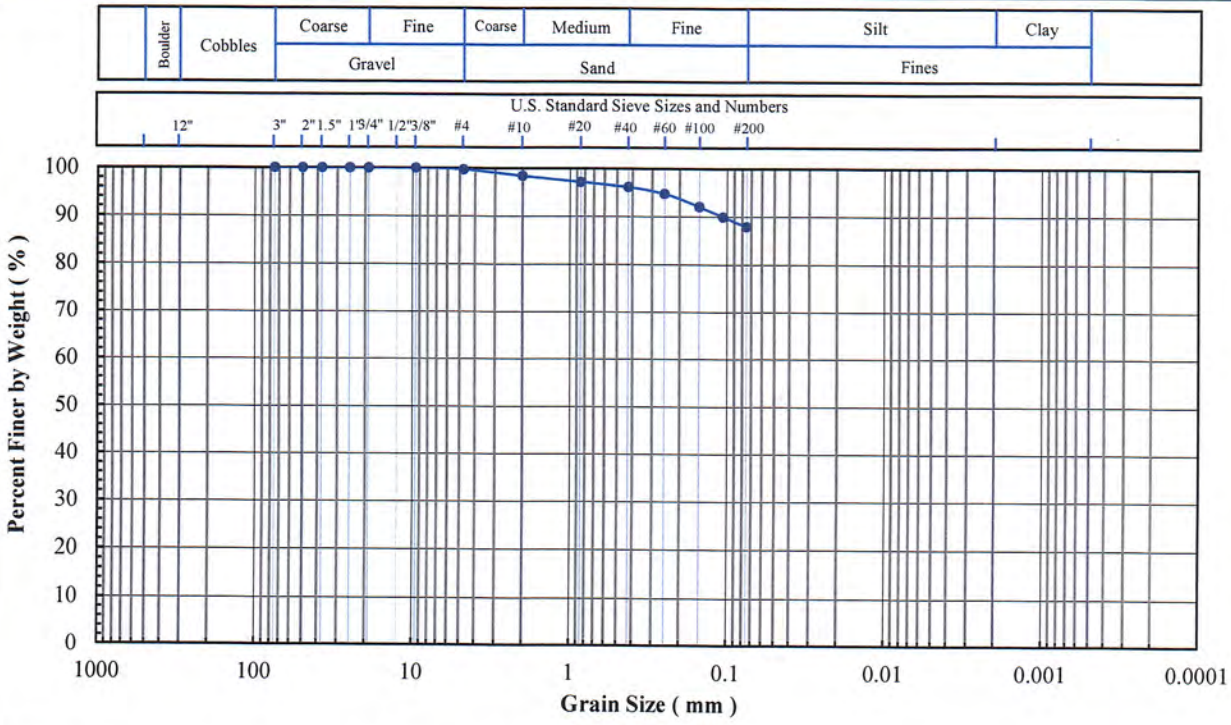
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-ST-1 (25-27')
Lab Sample No:	20L134

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

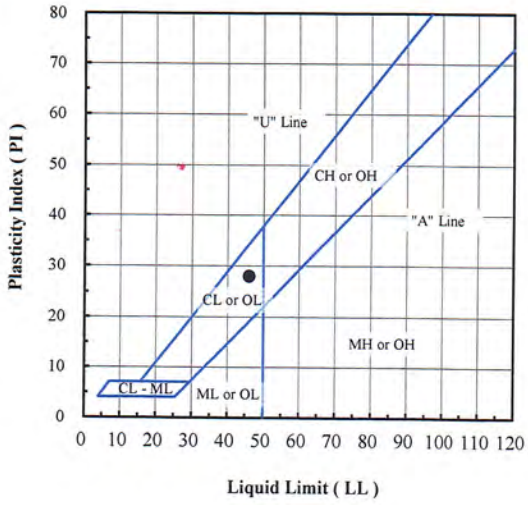


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.7
#10	2.00	98.4
#20	0.850	97.1
#40	0.425	96.1
#60	0.250	94.7
#100	0.150	92.0
#140	0.106	89.9
#200	0.075	87.9

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.3
Sand (%):	11.8
Fines (%):	87.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-ST-1 (25-27')	20L134	18.2	87.9	46	18	28	CL - Lean clay

Note(s):

01-27-2021
AA, NSR

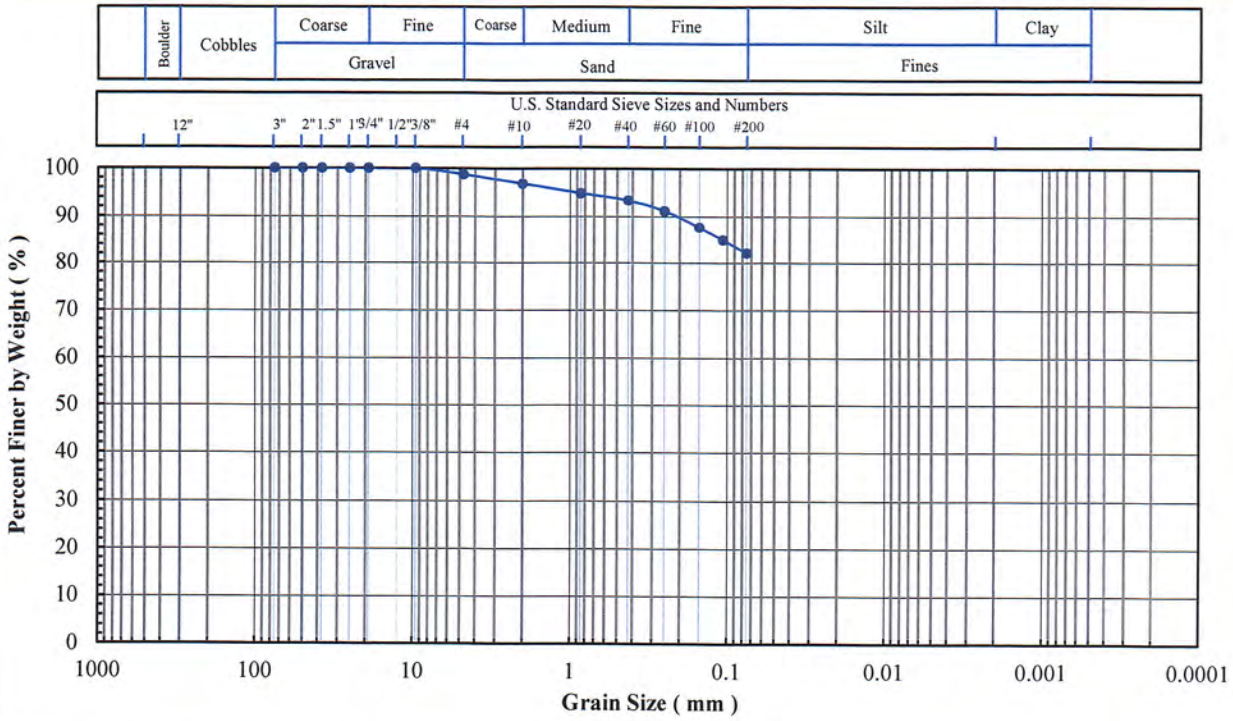
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-ST-2 (40-42.5')
Lab Sample No:	20L135

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

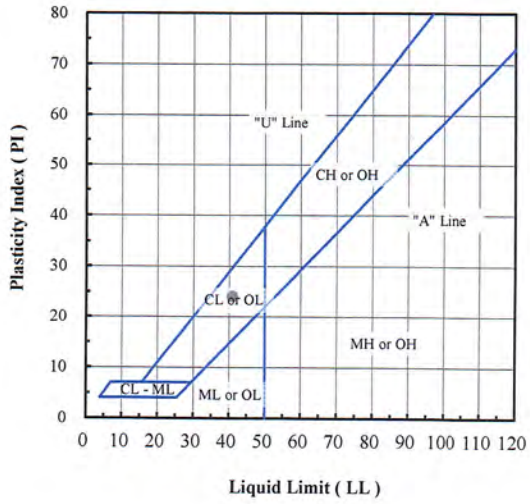


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.7
#10	2.00	96.8
#20	0.850	94.8
#40	0.425	93.3
#60	0.250	91.1
#100	0.150	87.6
#140	0.106	84.9
#200	0.075	82.1

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.3
Sand (%):	16.6
Fines (%):	82.1
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-ST-2 (40-42.5')	20L135	16.6	82.1	41	17	24	CL - Lean clay with sand

Note(s):

01-27-2021 AA, NSR

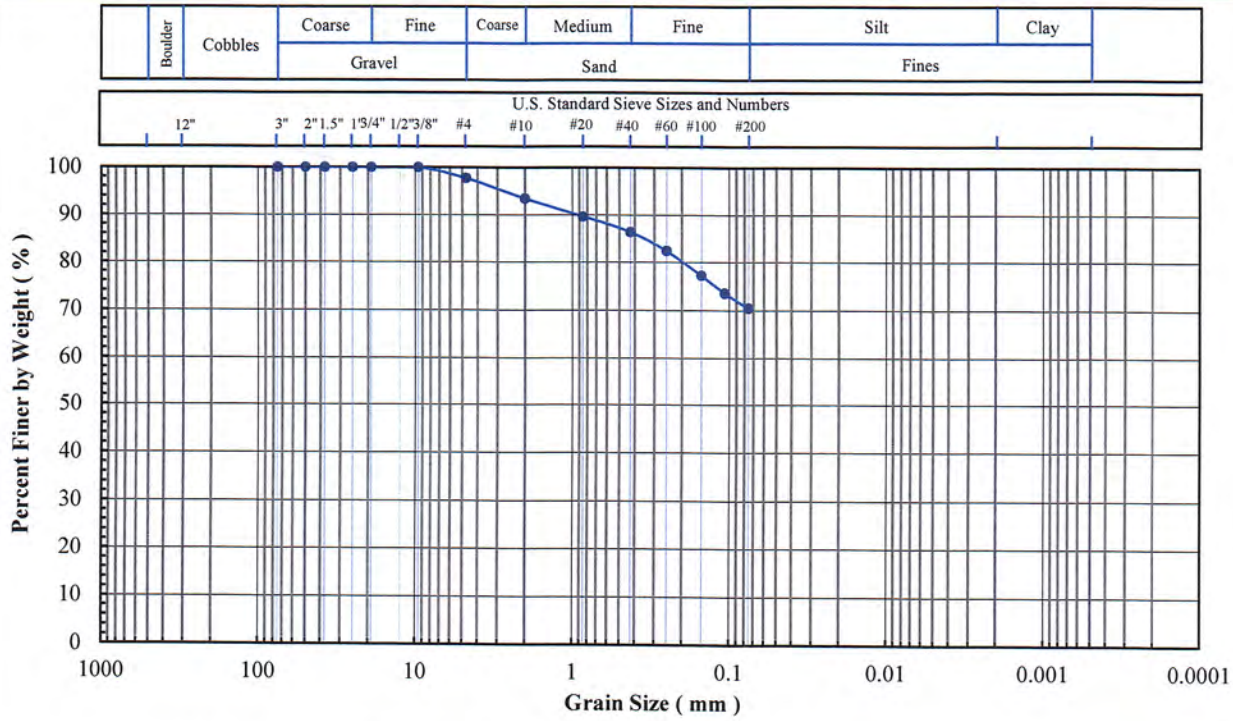
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-ST-3 (55-57.5')
Lab Sample No:	20L136

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

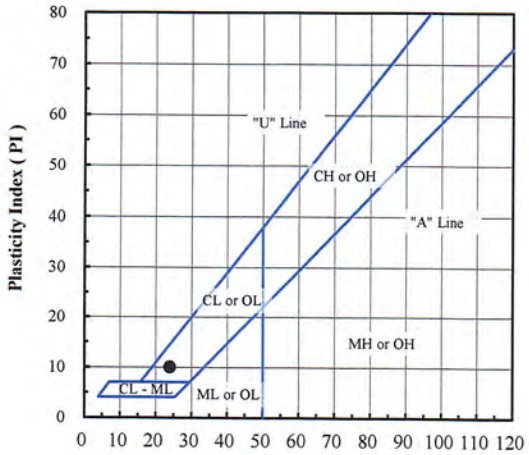


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	97.7
#10	2.00	93.5
#20	0.850	89.7
#40	0.425	86.4
#60	0.250	82.4
#100	0.150	77.2
#140	0.106	73.5
#200	0.075	70.4

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2.3
Sand (%):	27.3
Fines (%):	70.4
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B6-ST-3 (55-57.5')	20L136	13.1	70.4	24	14	10	CL - Lean clay with sand

Note(s):

01-28-2021
AA, NSR

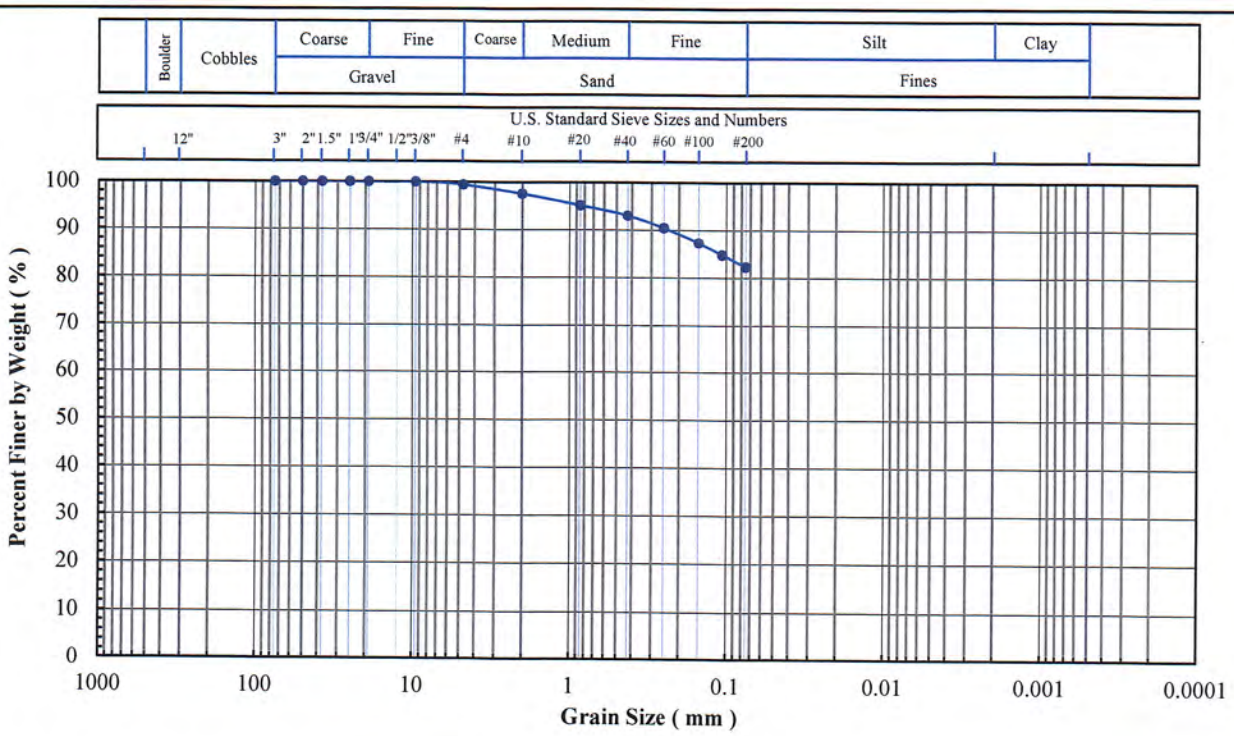
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B6-ST-4 (65-67.5')
Lab Sample No:	20L137

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

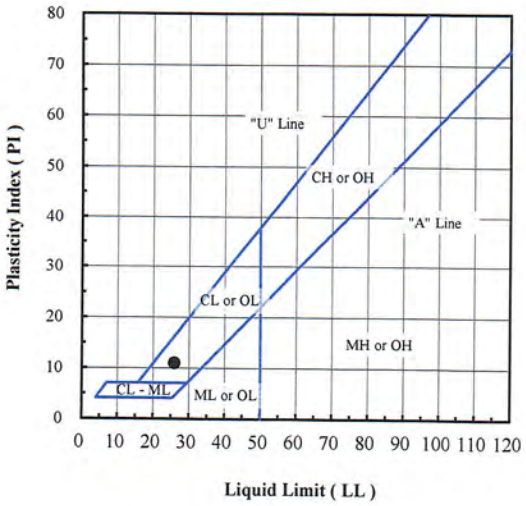


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.4
#10	2.00	97.5
#20	0.850	95.1
#40	0.425	93.0
#60	0.250	90.4
#100	0.150	87.3
#140	0.106	84.8
#200	0.075	82.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.6
Sand (%):	17.1
Fines (%):	82.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B6-ST-4 (65-67.5')	20L137	11.4	82.3	26	15	11	CL - Lean clay with sand

Note(s):

01-28-2021
AA, NSK

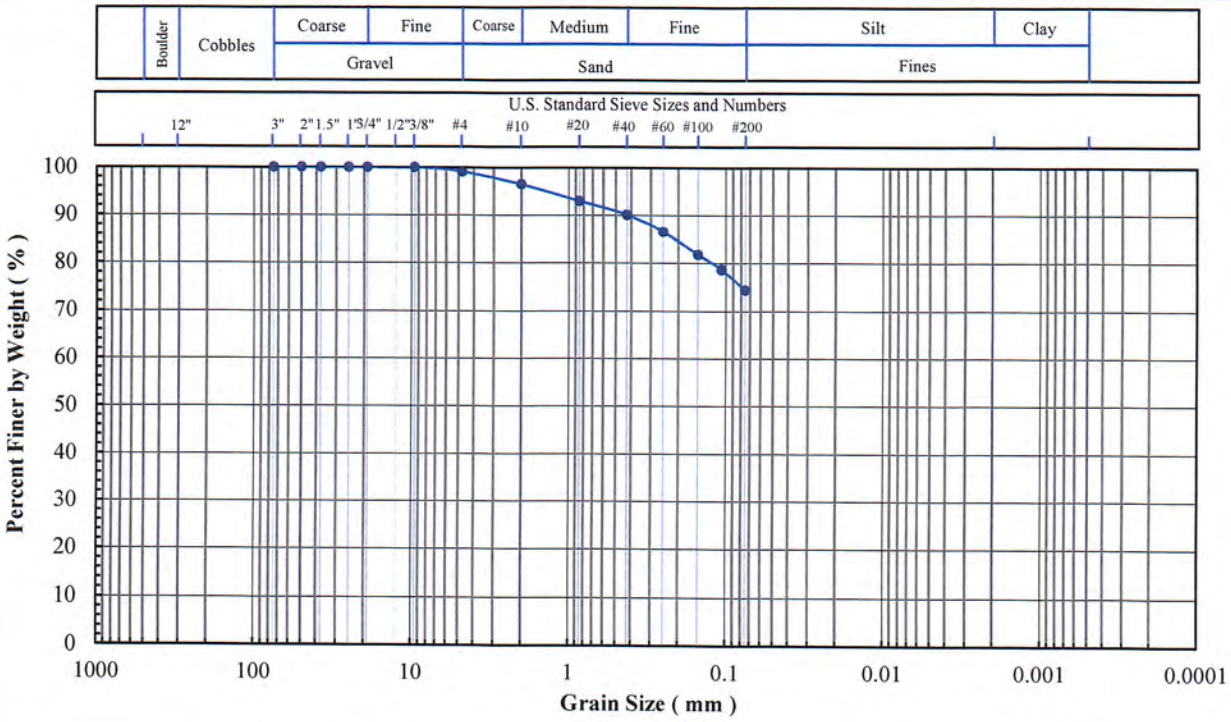
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-1 (0-6')
Lab Sample No:	20L082

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

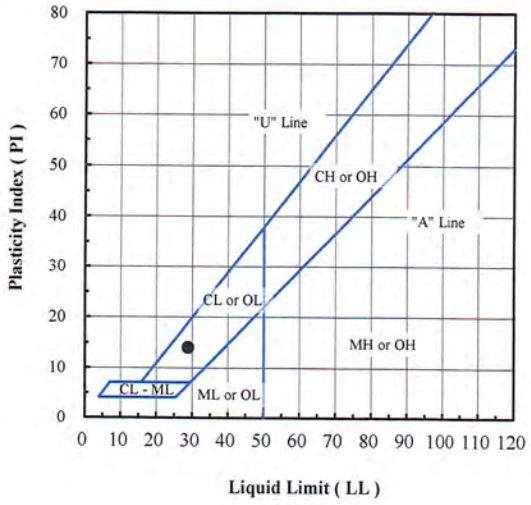


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.1
#10	2.00	96.4
#20	0.850	92.9
#40	0.425	90.0
#60	0.250	86.5
#100	0.150	81.7
#140	0.106	78.6
#200	0.075	74.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.9
Sand (%):	24.8
Fines (%):	74.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B7-1 (0-6')	20L082	14.0	74.3	29	15	14	CL - Lean clay with sand

Note(s):

01-21-2021
AA, WSA

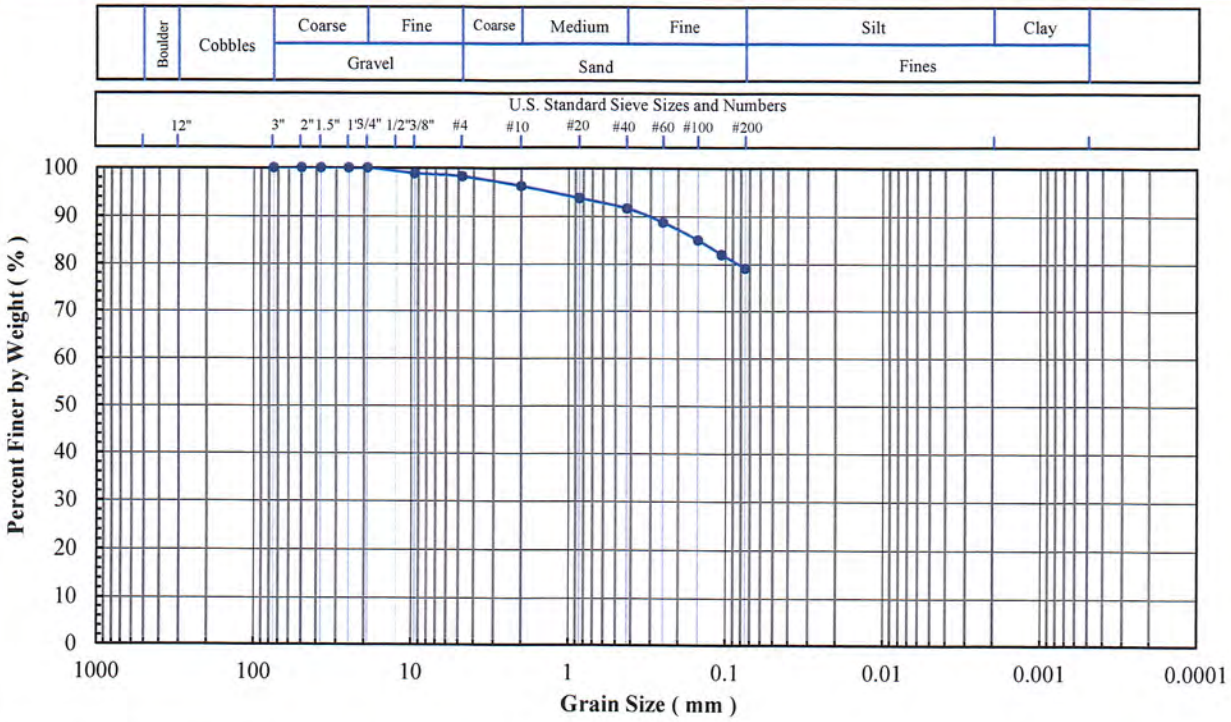
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-3 (11-16')
Lab Sample No:	20L084

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

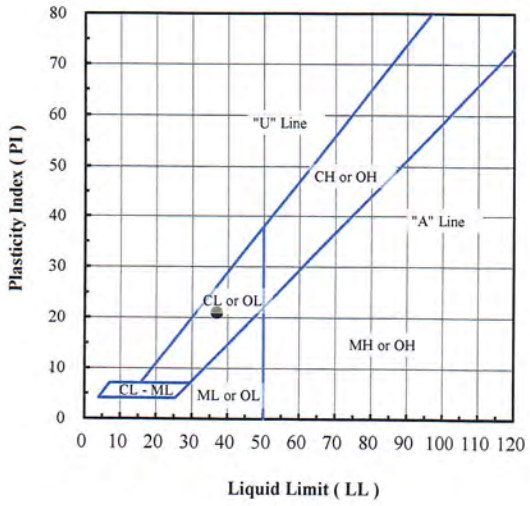


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	99
#4	4.75	98
#10	2.00	96
#20	0.850	94
#40	0.425	92
#60	0.250	89
#100	0.150	85
#140	0.106	82
#200	0.075	79

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2
Sand (%):	19
Fines (%):	79
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B7-3 (11-16')	20L084	17.1	79	37	16	21	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-21-2021 AA, NSK

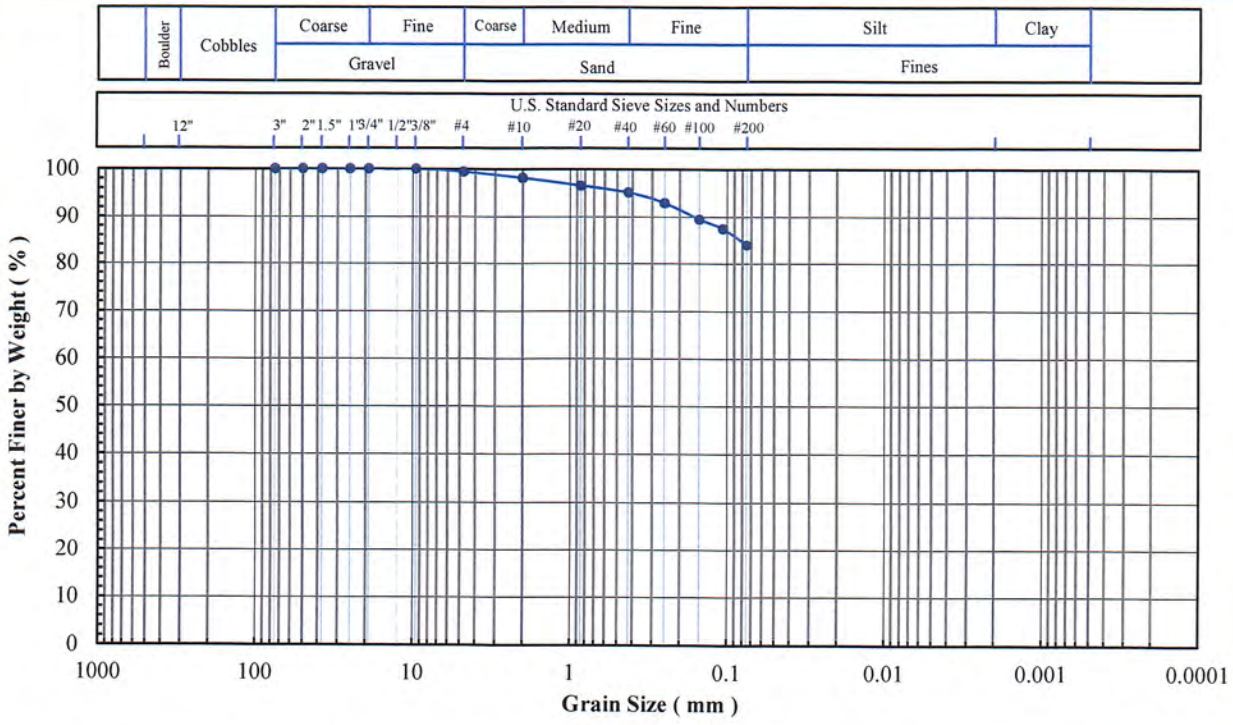
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-5 (21-26')
Lab Sample No:	20L086

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

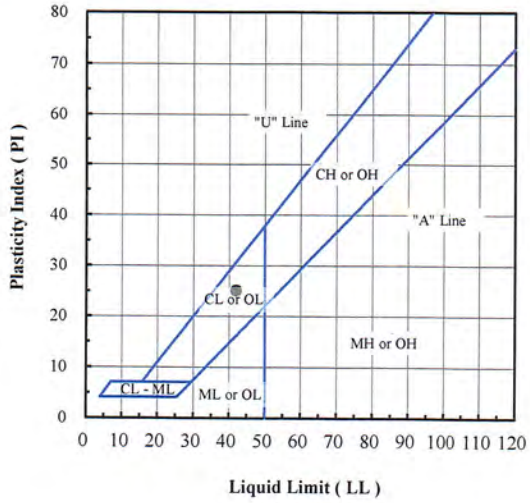


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.4
#10	2.00	98.1
#20	0.850	96.5
#40	0.425	95.1
#60	0.250	92.9
#100	0.150	89.4
#140	0.106	87.4
#200	0.075	83.9

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.6
Sand (%):	15.5
Fines (%):	83.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B7-5 (21-26')	20L086	18.6	83.9	42	17	25	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSK

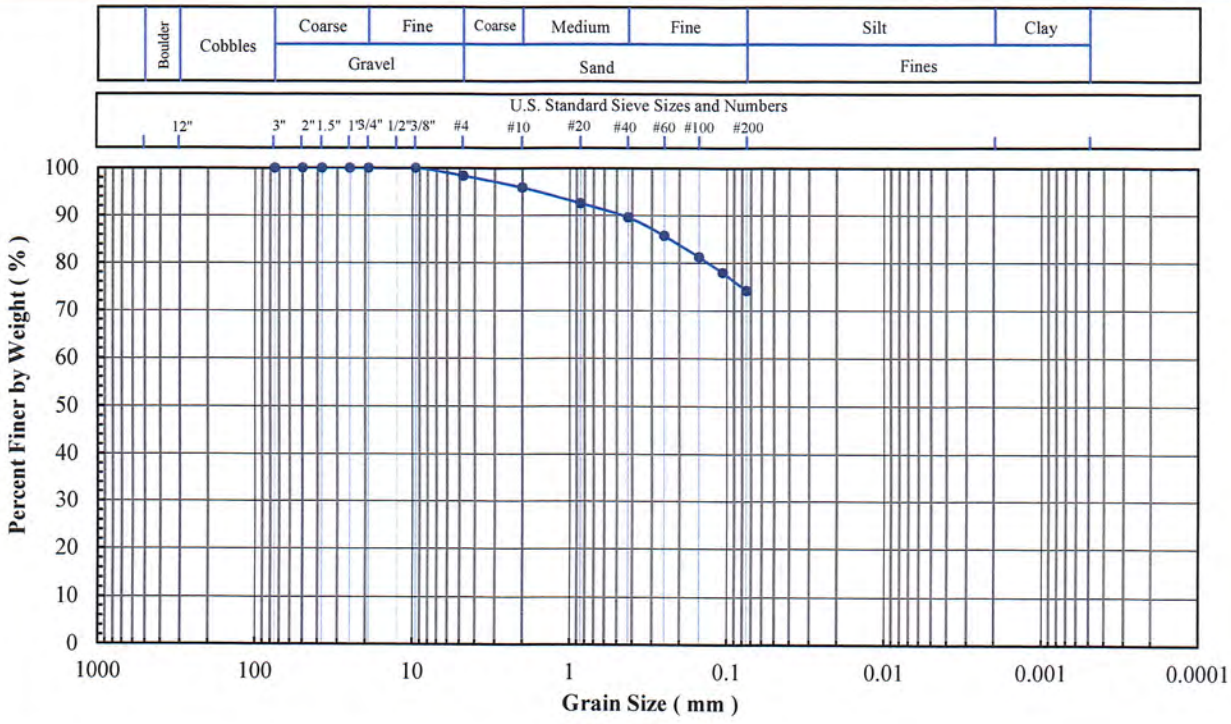
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-7 (31-36')
Lab Sample No:	20L088

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

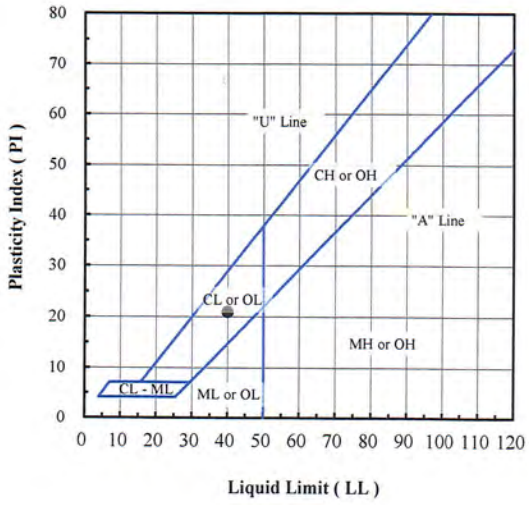


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.3
#10	2.00	95.8
#20	0.850	92.5
#40	0.425	89.5
#60	0.250	85.7
#100	0.150	81.2
#140	0.106	77.9
#200	0.075	74.1

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.7
Sand (%):	24.2
Fines (%):	74.1
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B7-7 (31-36')	20L088	17.5	74.1	40	19	21	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

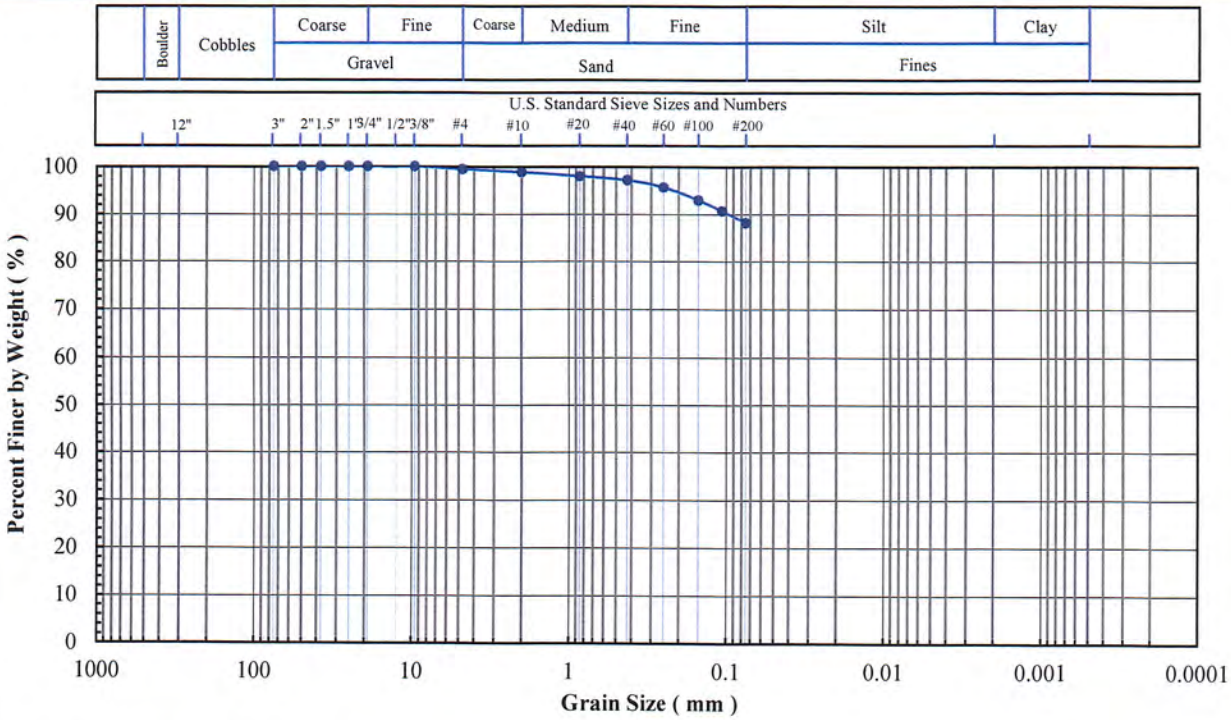
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-9 (41-46')
Lab Sample No:	20L090

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

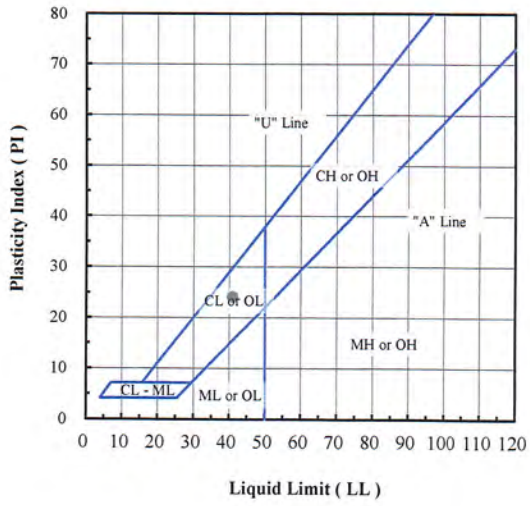


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.4
#10	2.00	98.8
#20	0.850	97.9
#40	0.425	97.1
#60	0.250	95.6
#100	0.150	92.9
#140	0.106	90.6
#200	0.075	88.1

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.6
Sand (%):	11.3
Fines (%):	88.1
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B7-9 (41-46')	20L090	20.2	88.1	41	17	24	CL - Lean clay

Note(s):

01-21-2021 AA, MSR

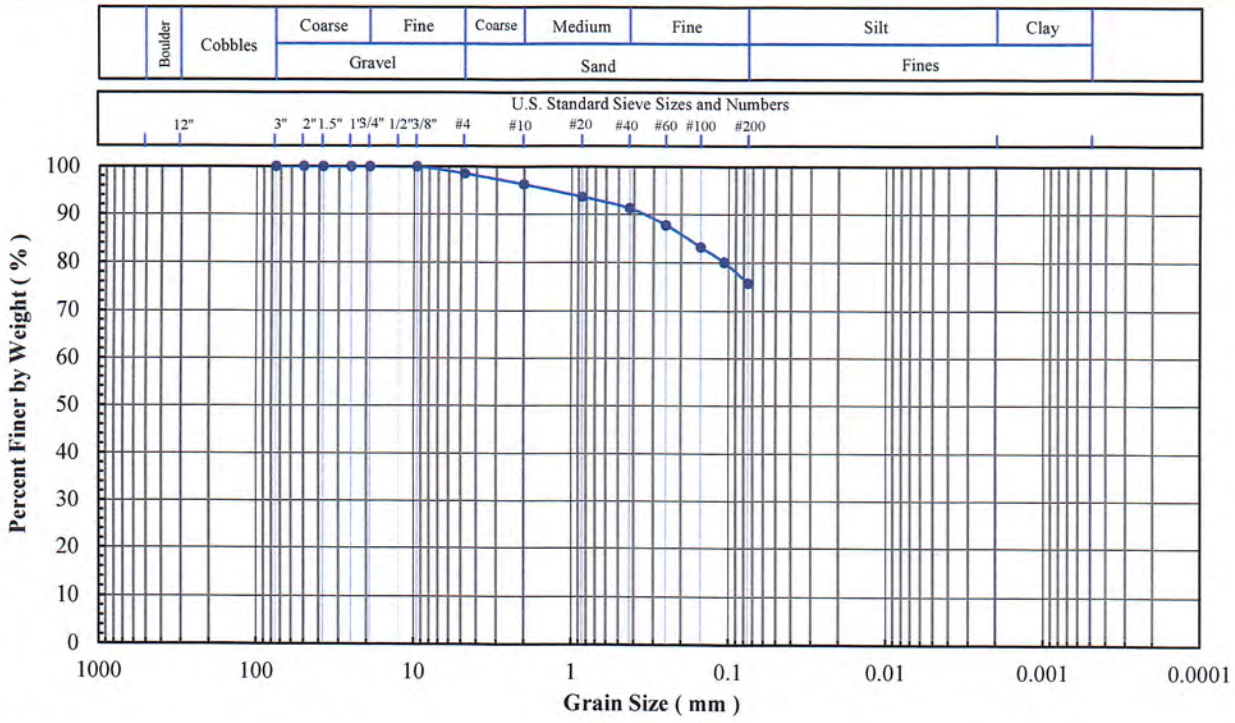
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-12 (56-61')
Lab Sample No:	20L093

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

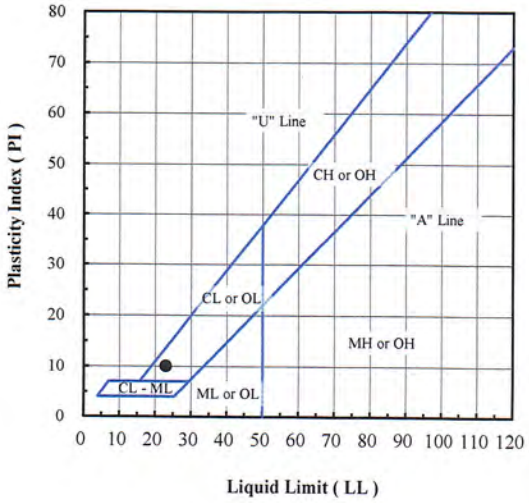


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.5
#10	2.00	96.2
#20	0.850	93.6
#40	0.425	91.2
#60	0.250	87.7
#100	0.150	83.1
#140	0.106	80.0
#200	0.075	75.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.5
Sand (%):	22.8
Fines (%):	75.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B7-12 (56-61')	20L093	12.9	75.7	23	13	10	CL - Lean clay with sand

Note(s):

01-21-2021
AA, NSR

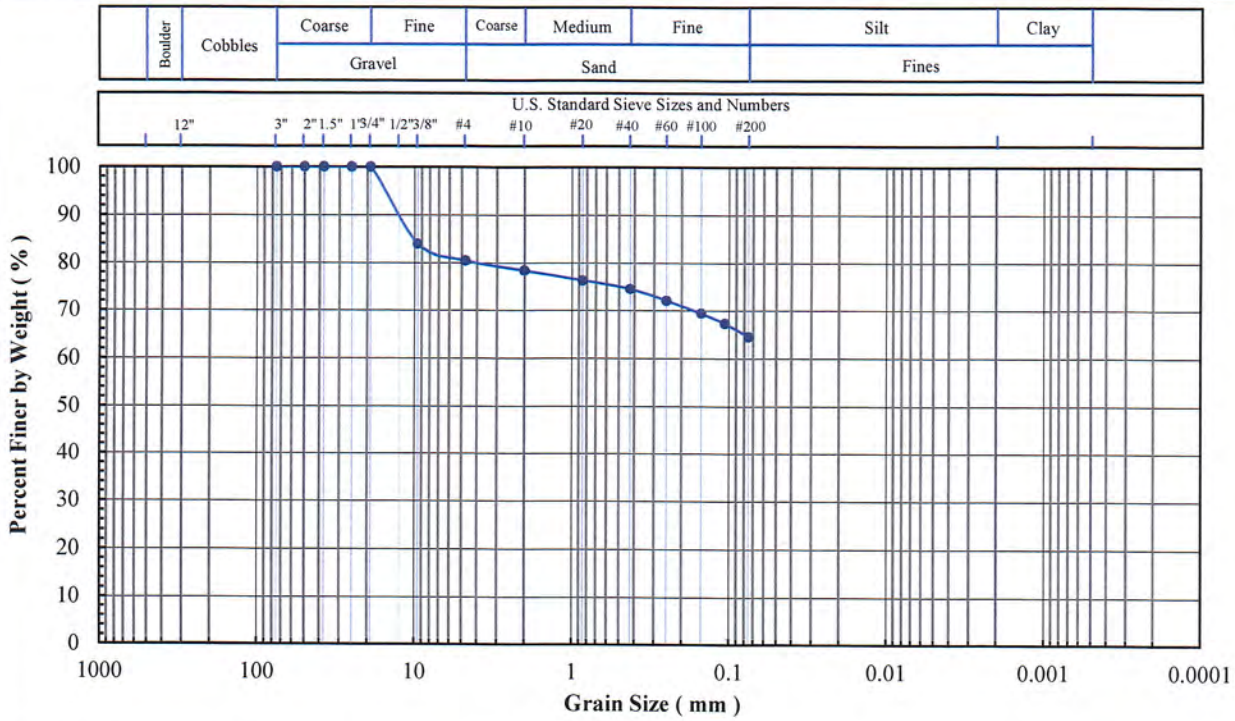
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-15 (71-76')
Lab Sample No:	20L096

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

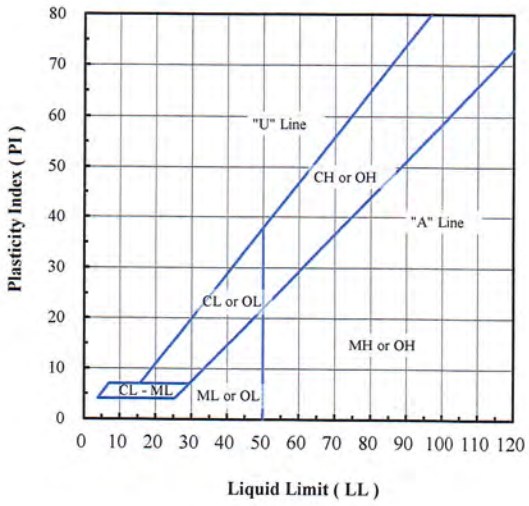


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	84
#4	4.75	81
#10	2.00	78
#20	0.850	76
#40	0.425	75
#60	0.250	72
#100	0.150	69
#140	0.106	67
#200	0.075	64

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	19
Sand (%):	17
Fines (%):	64
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B7-15 (71-76')	20L096	10.0	64	NP	NP	NP	ML - Gravelly silt with sand

Note(s): Sieve specimen was undersized.

01-21-2021
AA, NSR

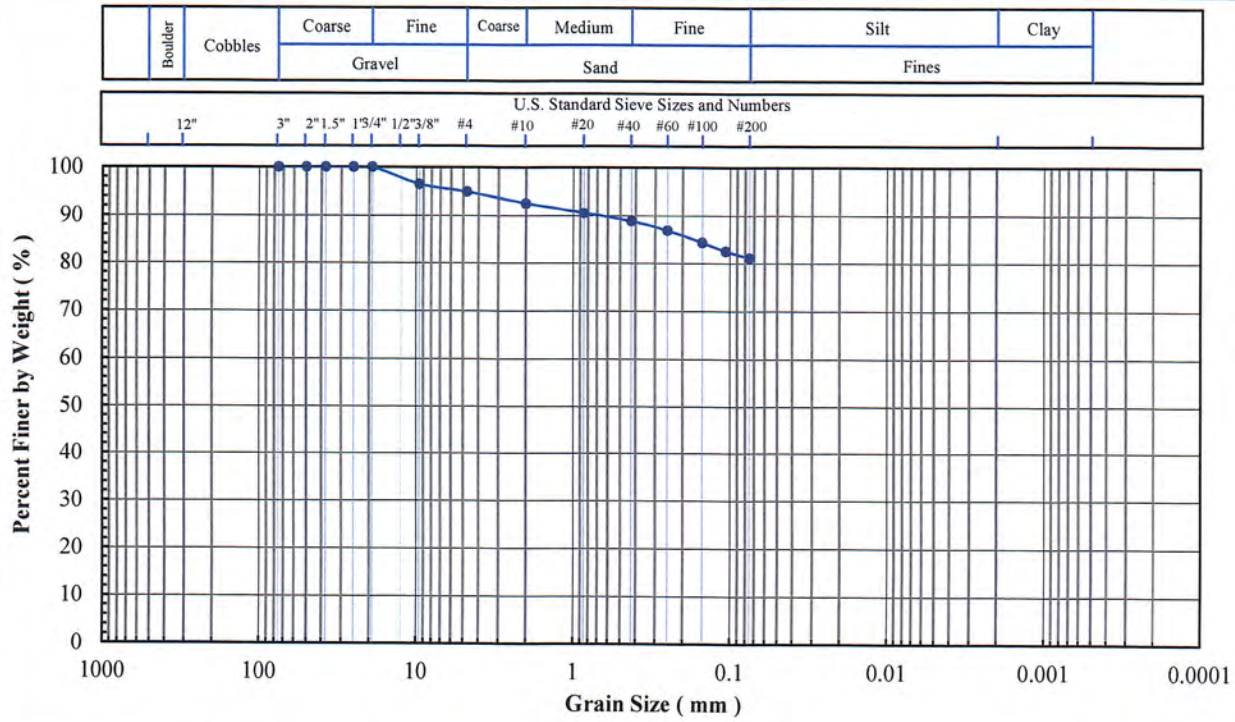
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B7-ST-1 (65-67.5')
Lab Sample No:	20L138

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

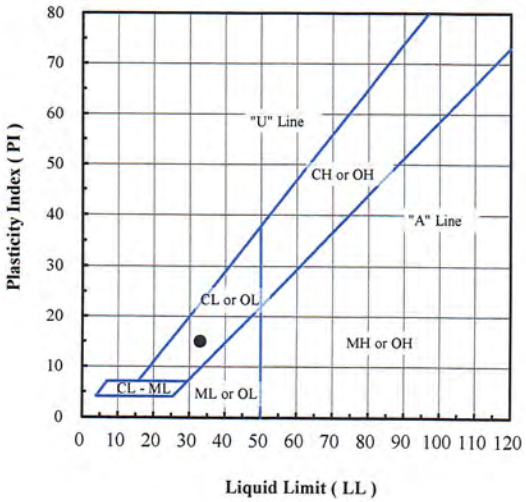


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	96
#4	4.75	95
#10	2.00	93
#20	0.850	91
#40	0.425	89
#60	0.250	87
#100	0.150	84
#140	0.106	83
#200	0.075	81

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	5
Sand (%):	14
Fines (%):	81
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B7-ST-1 (65-67.5')	20L138	13.3	81	33	18	15	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-28-2021 AA, NSR

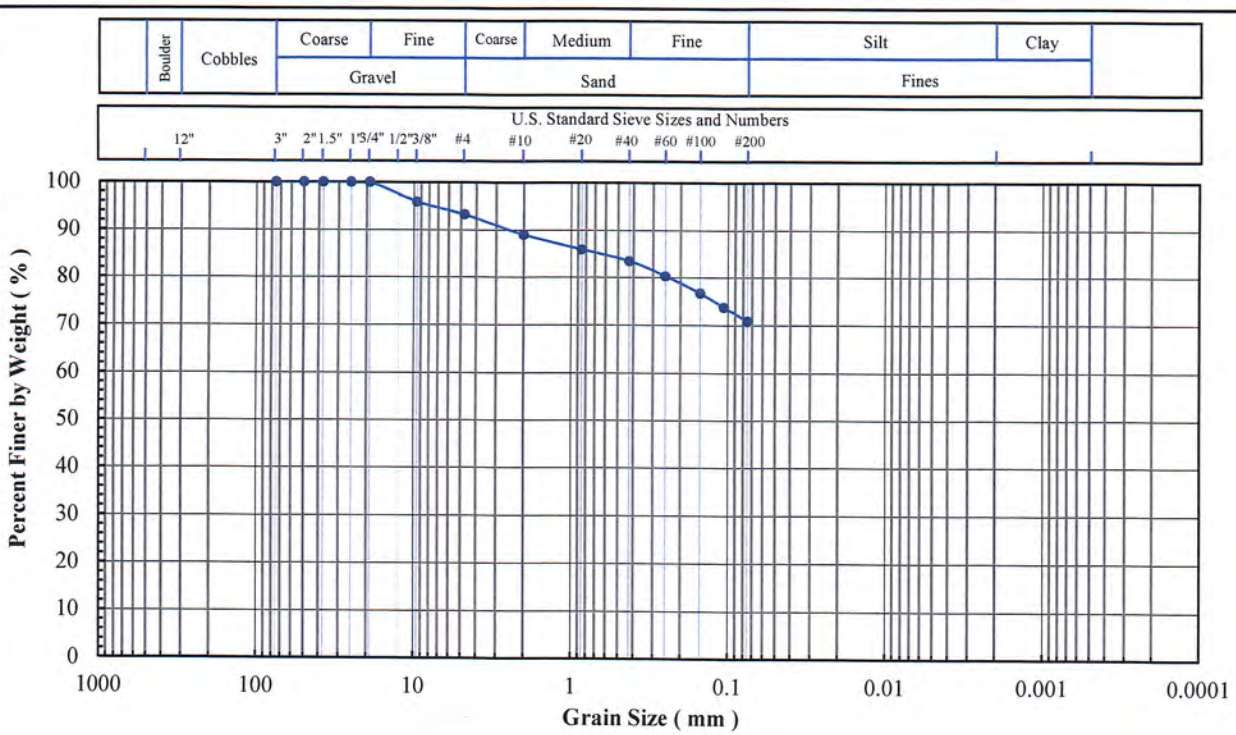
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-2 (6-11')
Lab Sample No:	20L098

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

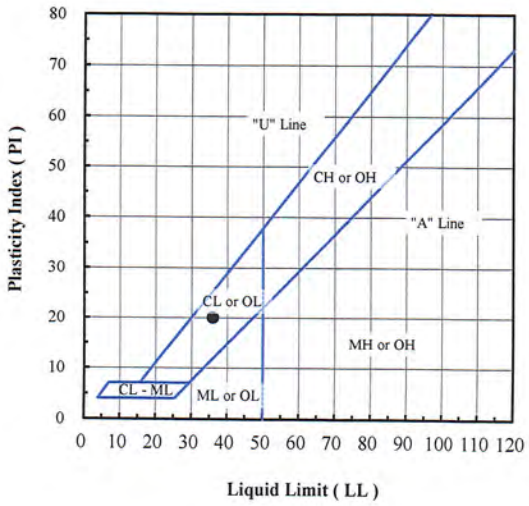


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	96
#4	4.75	93
#10	2.00	89
#20	0.850	86
#40	0.425	83
#60	0.250	80
#100	0.150	77
#140	0.106	74
#200	0.075	71

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	7
Sand (%):	22
Fines (%):	71
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B8-2 (6-11')	20L098	17.2	71	36	16	20	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-22-2021
AA, WSR

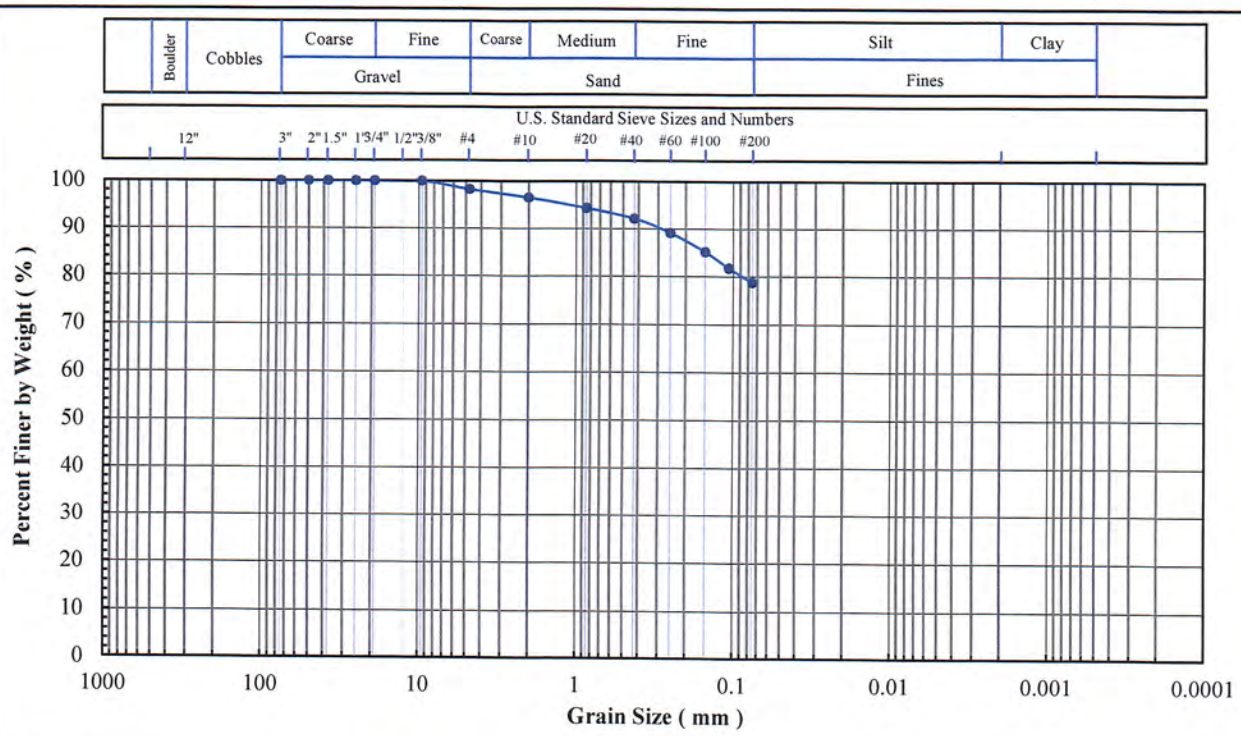
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-4 (16.21')
Lab Sample No:	20L100

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

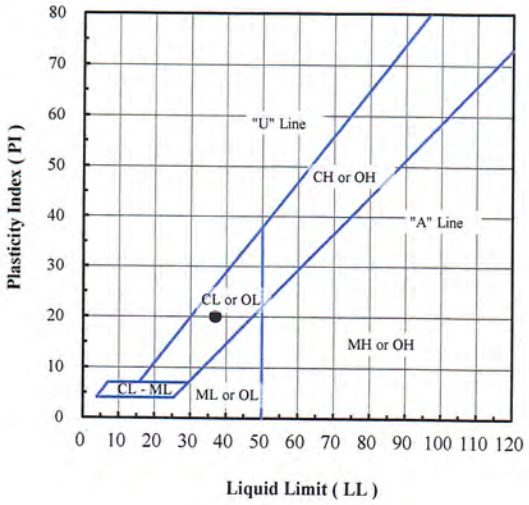


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.2
#10	2.00	96.5
#20	0.850	94.3
#40	0.425	92.1
#60	0.250	89.1
#100	0.150	85.1
#140	0.106	81.7
#200	0.075	78.7

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.8
Sand (%):	19.5
Fines (%):	78.7
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B8-4 (16.21')	20L100	20.4	78.7	37	17	20	CL - Lean clay with sand

Note(s):

01-22-2021
AA, MSR

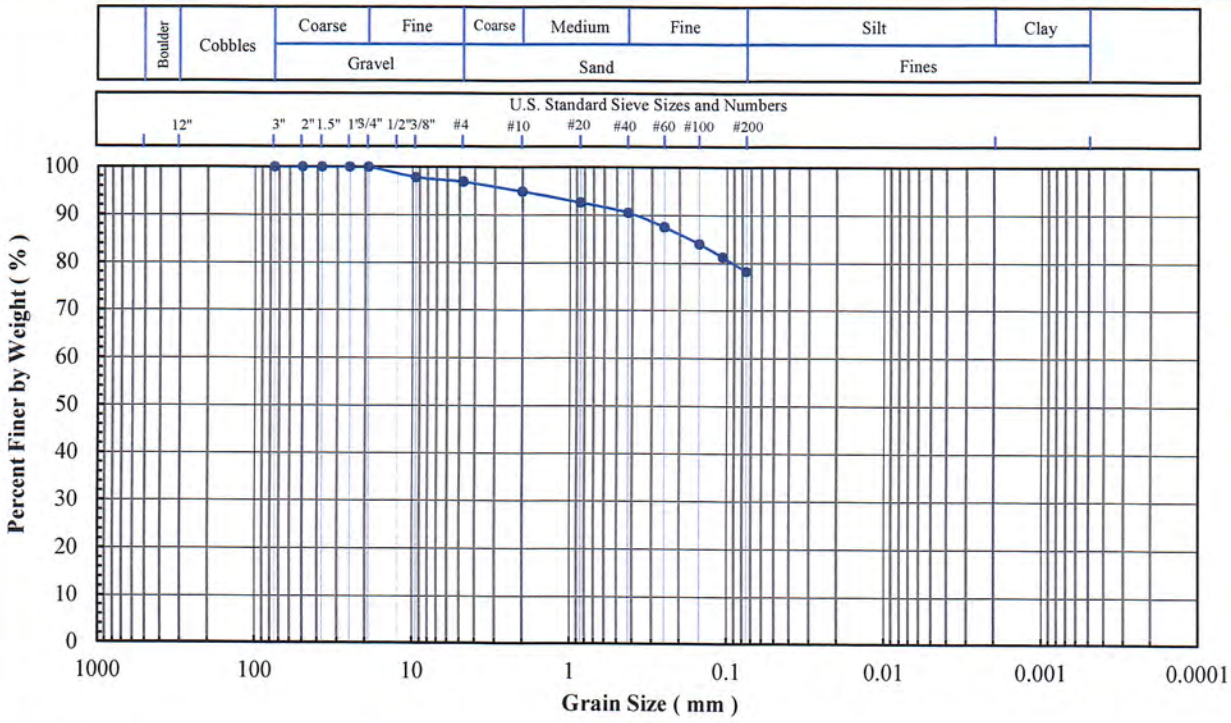
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-6 (21-31')
Lab Sample No:	20L102

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

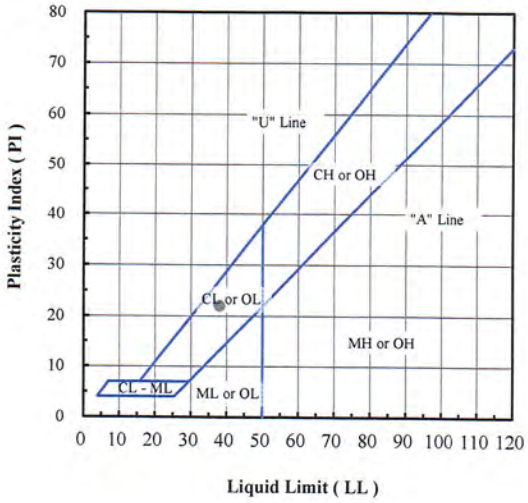


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	98
#4	4.75	97
#10	2.00	95
#20	0.850	93
#40	0.425	91
#60	0.250	88
#100	0.150	84
#140	0.106	81
#200	0.075	78

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	3
Sand (%):	19
Fines (%):	78
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	PL (-)	PI (-)	Engineering Classification
B8-6 (21-31')	20L102	20.5	78	38	16	22	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-22-2021
AA, NSR

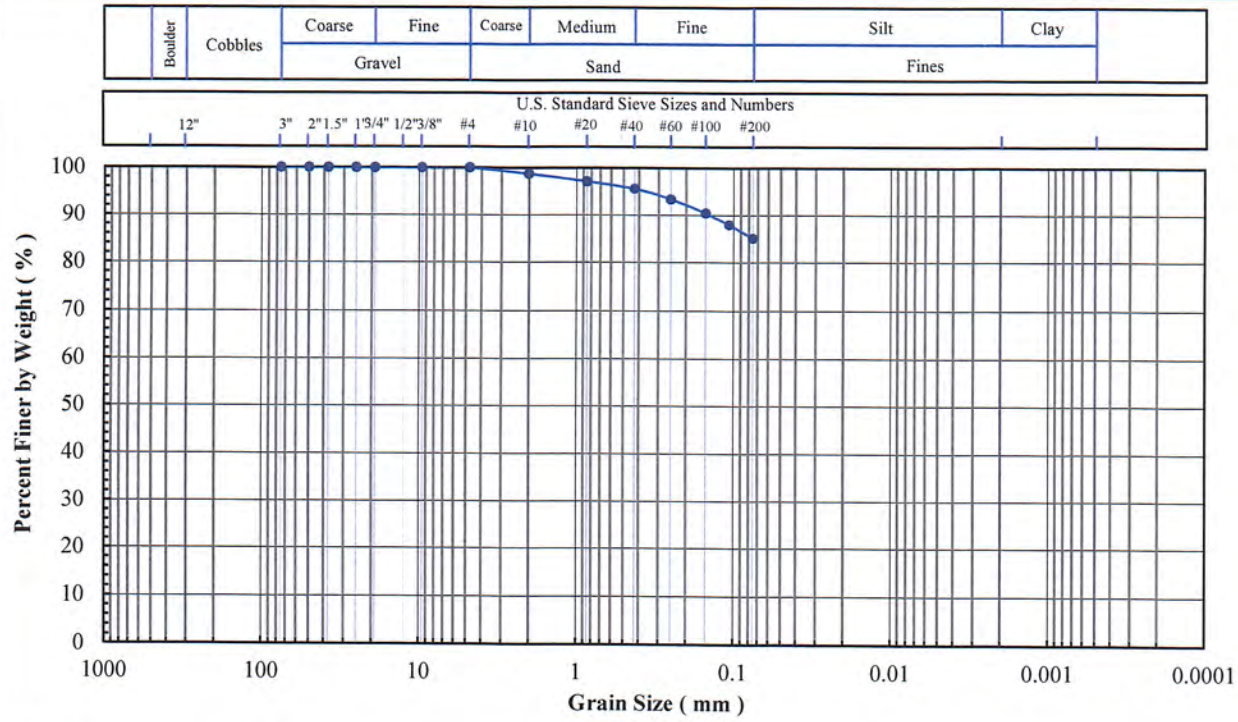
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-8 (36-41')
Lab Sample No:	20L104

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

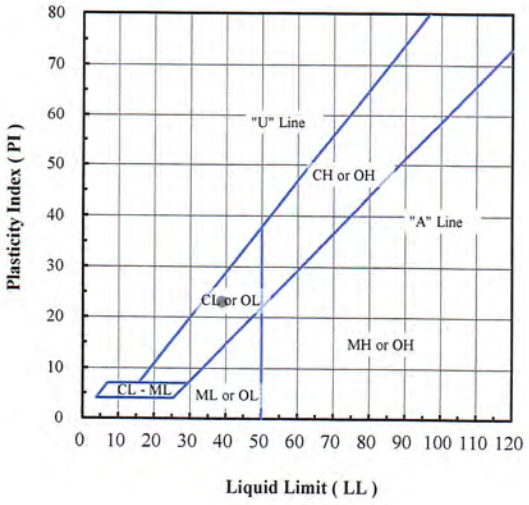


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	100.0
#10	2.00	98.7
#20	0.850	97.1
#40	0.425	95.6
#60	0.250	93.4
#100	0.150	90.4
#140	0.106	87.9
#200	0.075	85.0

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	
Sand (%):	15.0
Fines (%):	85.0
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B8-8 (36-41')	20L104	19.6	85.0	39	16	23	CL - Lean clay with sand

Note(s):

01-22-2021
AA, NSR

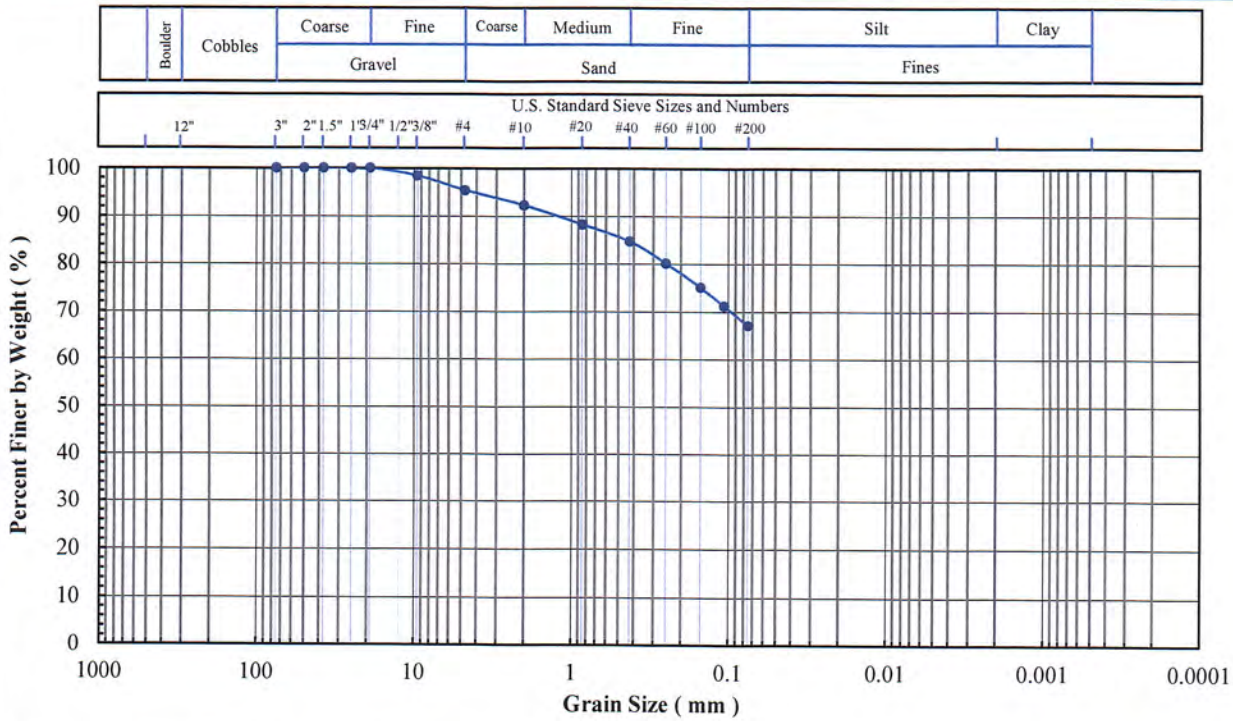
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-10 (46-51')
Lab Sample No:	20L106

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

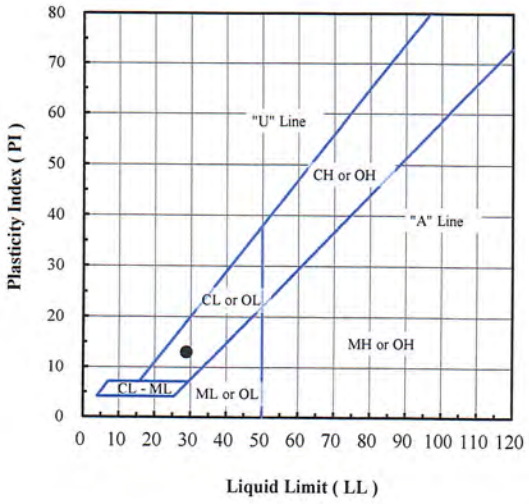


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	98
#4	4.75	95
#10	2.00	92
#20	0.850	88
#40	0.425	85
#60	0.250	80
#100	0.150	75
#140	0.106	71
#200	0.075	67

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	5
Sand (%):	28
Fines (%):	67
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B8-10 (46-51')	20L106	15.8	67	29	16	13	CL - Sandy lean clay

Note(s):

01-22-2021
AA/WSK

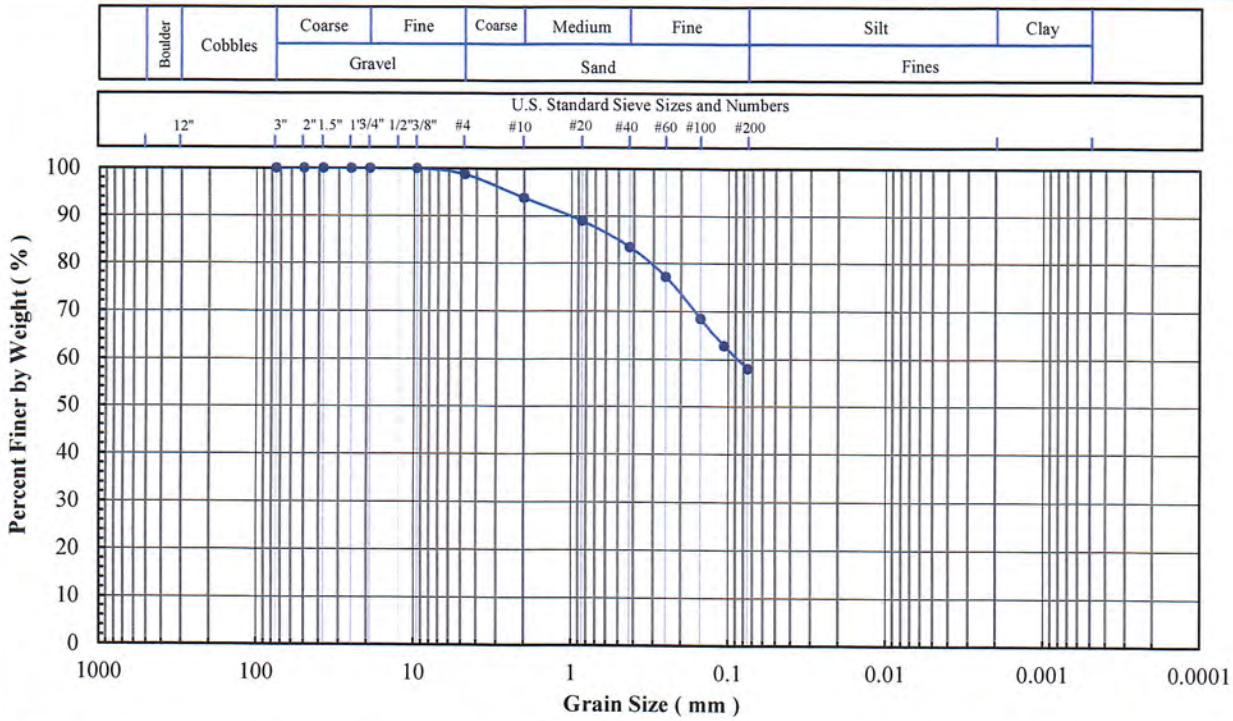
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-12 (56-61')
Lab Sample No:	20L108

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

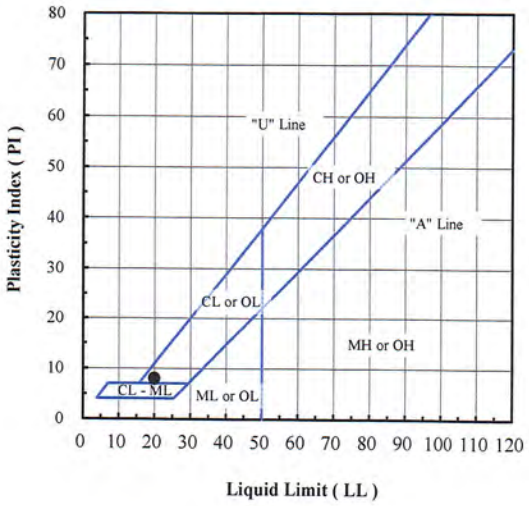


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.7
#10	2.00	93.8
#20	0.850	88.9
#40	0.425	83.4
#60	0.250	77.1
#100	0.150	68.4
#140	0.106	62.7
#200	0.075	57.9

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.3
Sand (%):	40.8
Fines (%):	57.9
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B8-12 (56-61')	20L108	8.5	57.9	20	12	8	CL - Sandy lean clay

Note(s):

01-22-2021
AA, NSR

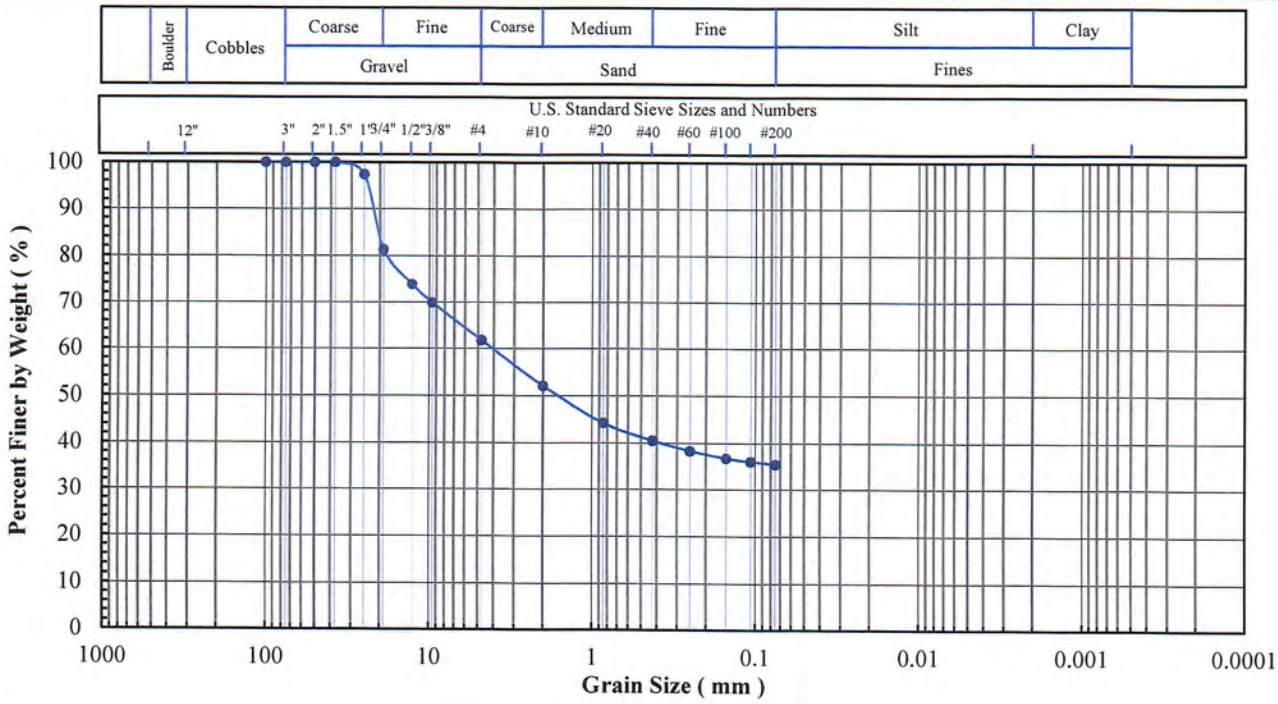
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-15 (66-71')
Lab Sample No:	20L110

ASTM C 136, D 422, D 854, D 1140, D 2216, D 2487, D 4318, D 6913, D 7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



Sieve No.	Size (mm)	% Finer
4"	100	100
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	97
3/4"	19	81
1/2"	13	74
3/8"	9.5	70
#4	4.75	62
#10	2.00	52
#20	0.850	44
#40	0.425	41
#60	0.250	38
#100	0.150	37
#140	0.106	36
#200	0.075	35

Gravel (%)	38
Sand (%)	27
Fines (%)	35
Silt (%)	
Clay (%)	

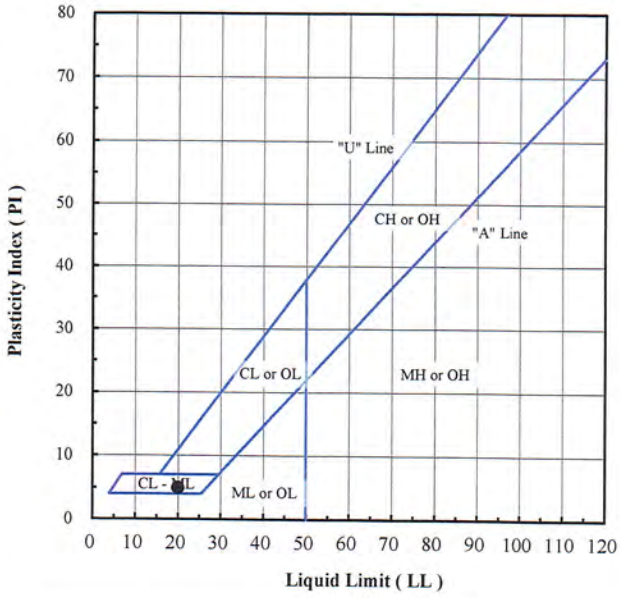
Coeff. Unif. (Cu)	
Coeff. Curv. (Cc)	

Specific Gravity (-)	

Organic Cont. (%)	

Carbonate Cont. (%)	

pH in Water (-)	
pH in CC (-)	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B8-15 (66-71')	20L110	10.2	35	20	15	5	GC-GM - Silty, clayey gravel with sand

Note(s): Engineering classification is based on the assumption that the fines are CL - ML.

01-22-2021
AA, NSR

Excel Geotechnical Testing, Inc.
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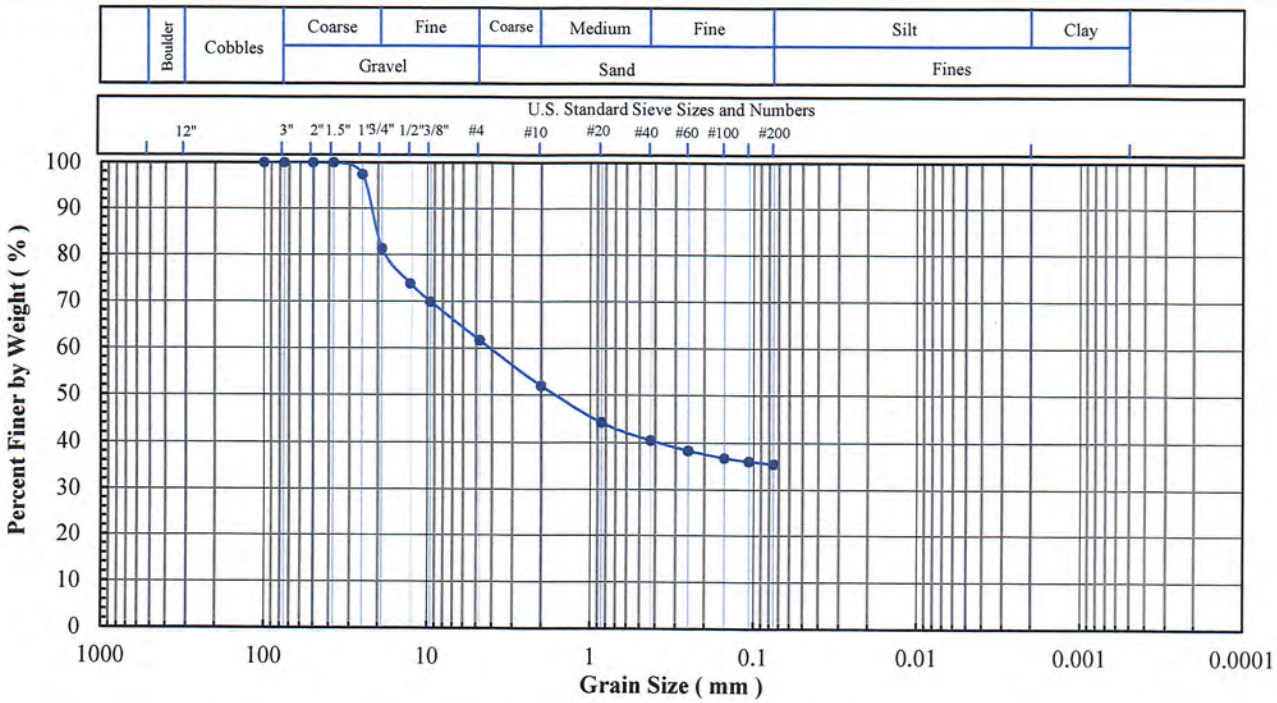
Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B8-14 (66-71')
Lab Sample No:	20L110

ASTM C 136, D 422, D 854, D 1140, D 2216, D 2487, D 4318, D 6913, D 7928

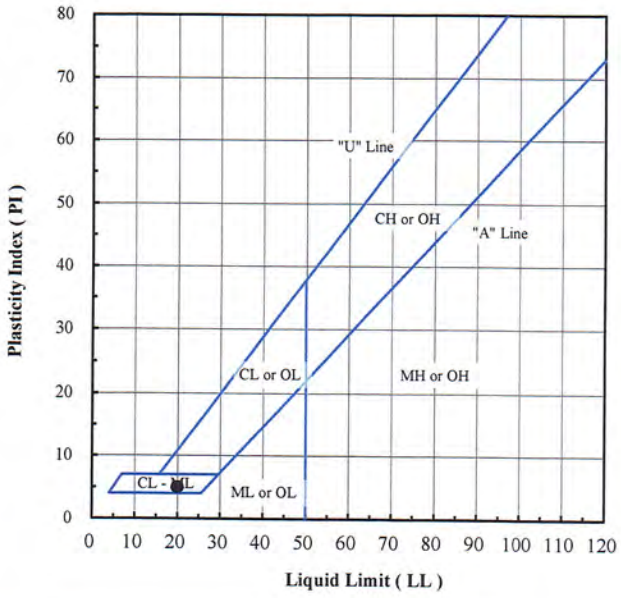
SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Content, Eng. Classification, Atterberg Limits



Sieve No.	Size (mm)	% Finer
4"	100	100
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	97
3/4"	19	81
1/2"	13	74
3/8"	9.5	70
#4	4.75	62
#10	2.00	52
#20	0.850	44
#40	0.425	41
#60	0.250	38
#100	0.150	37
#140	0.106	36
#200	0.075	35

Gravel (%)	38
Sand (%)	27
Fines (%)	35
Silt (%)	
Clay (%)	
Coeff. Unif. (Cu)	
Coeff. Curv. (Cc)	
Specific Gravity (-)	
Organic Cont. (%)	
Carbonate Cont. (%)	
pH in Water (-)	
pH in CC (-)	



Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B8-14 (66-71')	20L110	10.2	35	20	15	5	GC-GM - Silty, clayey gravel with sand

Note(s): Engineering classification is based on the assumption that the fines are CL - ML.

01-26-2021
AA, NSR

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"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
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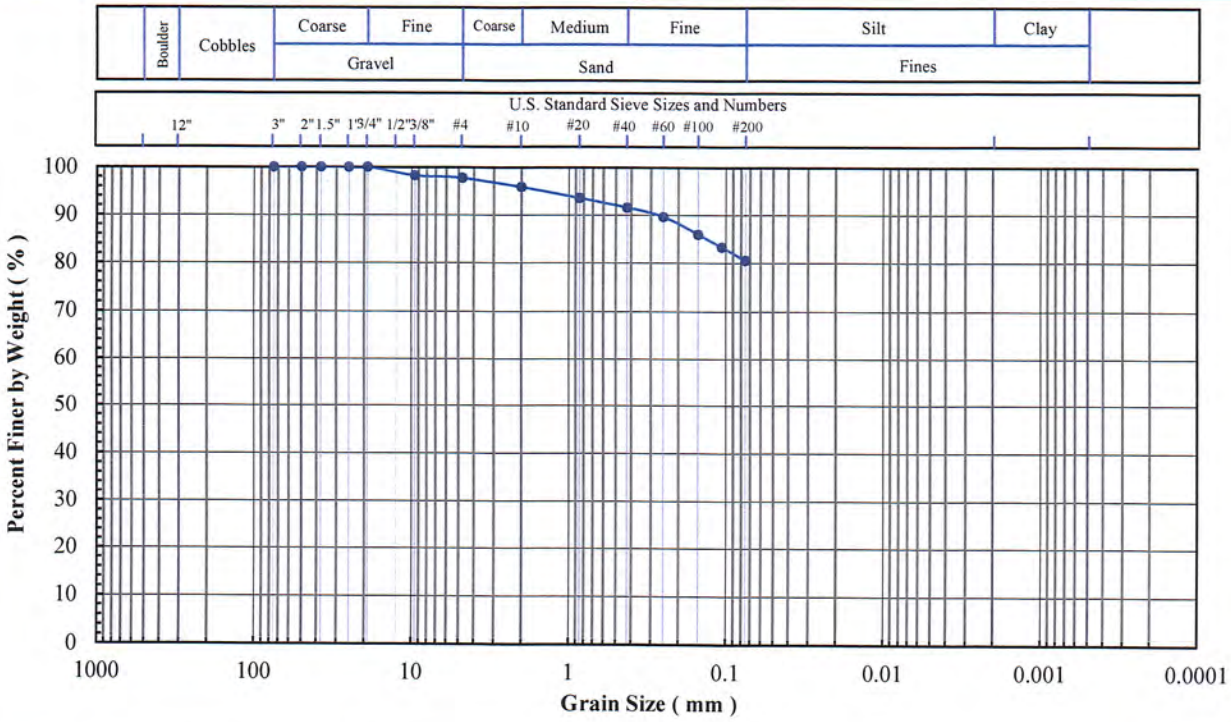
Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B9-04 (16-21')
Lab Sample No:	20L115

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

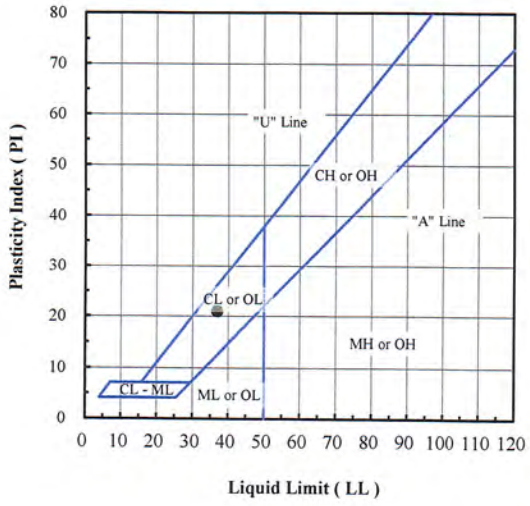


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	98
#4	4.75	98
#10	2.00	96
#20	0.850	94
#40	0.425	92
#60	0.250	90
#100	0.150	86
#140	0.106	83
#200	0.075	81

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	2
Sand (%):	17
Fines (%):	81
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B9-04 (16-21')	20L115	15.3	81	37	16	21	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-22-2021
AA, NSR

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953 Forrest Street, Roswell, Georgia 30075
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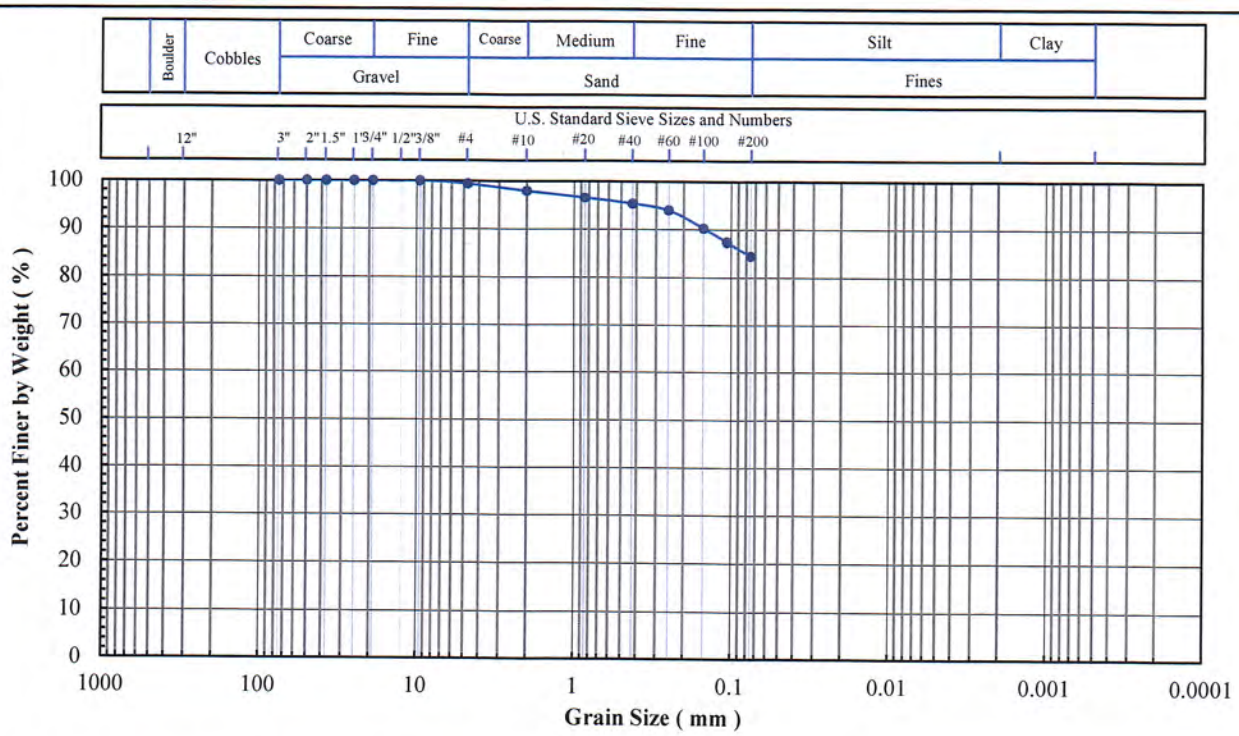
Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B9-8 (36-40')
Lab Sample No:	20L119

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

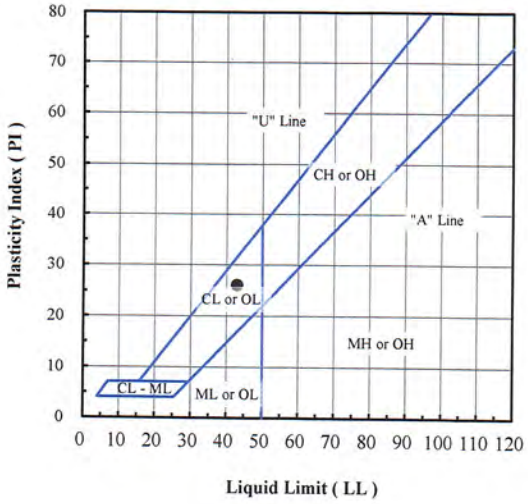


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.4
#10	2.00	97.9
#20	0.850	96.5
#40	0.425	95.3
#60	0.250	93.9
#100	0.150	90.2
#140	0.106	87.4
#200	0.075	84.5

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	0.6
Sand (%):	14.9
Fines (%):	84.5
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B9-8 (36-40')	20L119	23.5	84.5	43	17	26	CL - Lean clay with sand

Note(s):

01-22-2021
AA, MSR

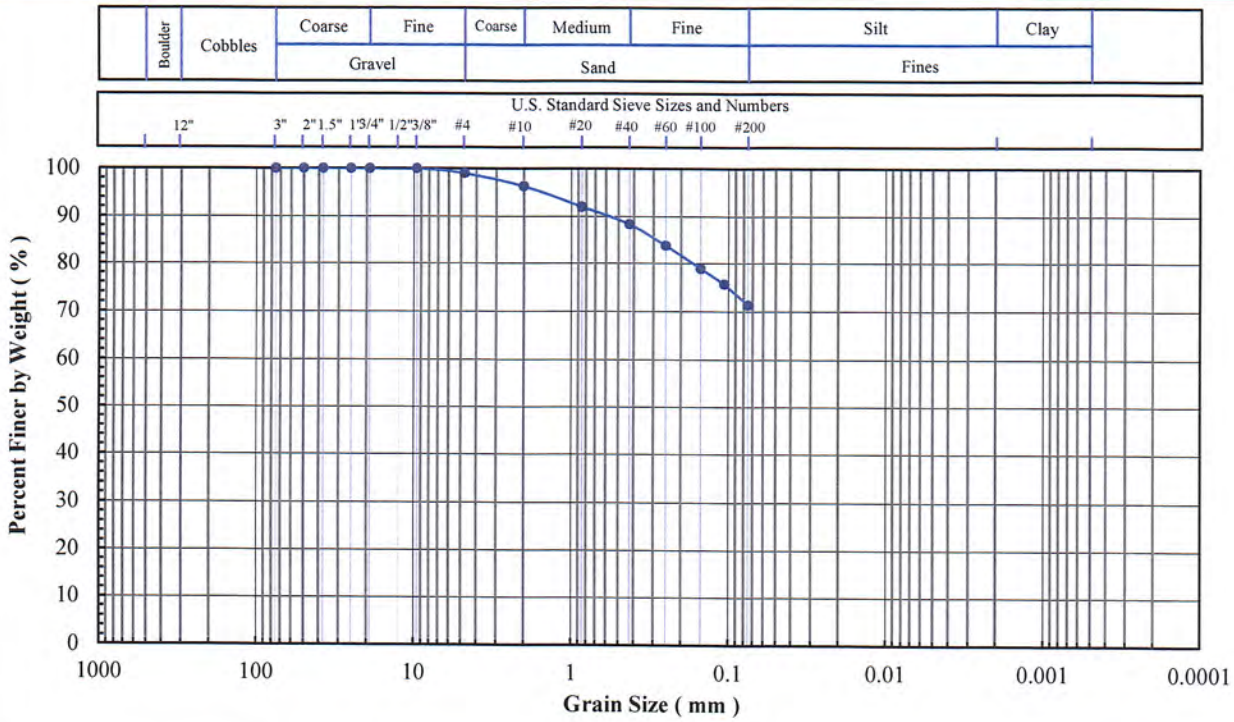
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B9-10 (46-50')
Lab Sample No:	20L121

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

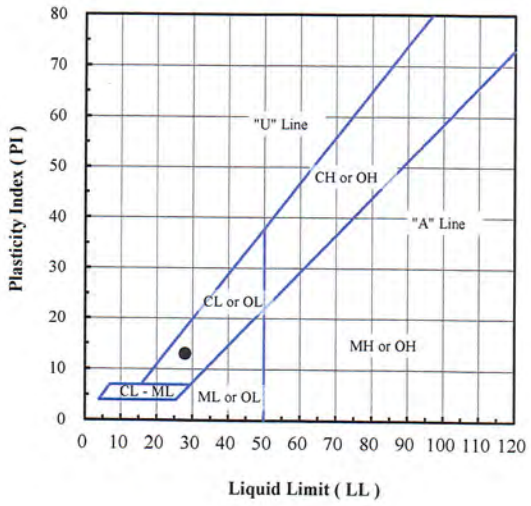


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	99.0
#10	2.00	96.3
#20	0.850	92.0
#40	0.425	88.4
#60	0.250	83.8
#100	0.150	78.9
#140	0.106	75.6
#200	0.075	71.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.0
Sand (%):	27.7
Fines (%):	71.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B9-10 (46-50')	20L121	16.5	71.3	28	15	13	CL - Lean clay with sand

Note(s):

01-22-2021
AA, NSR

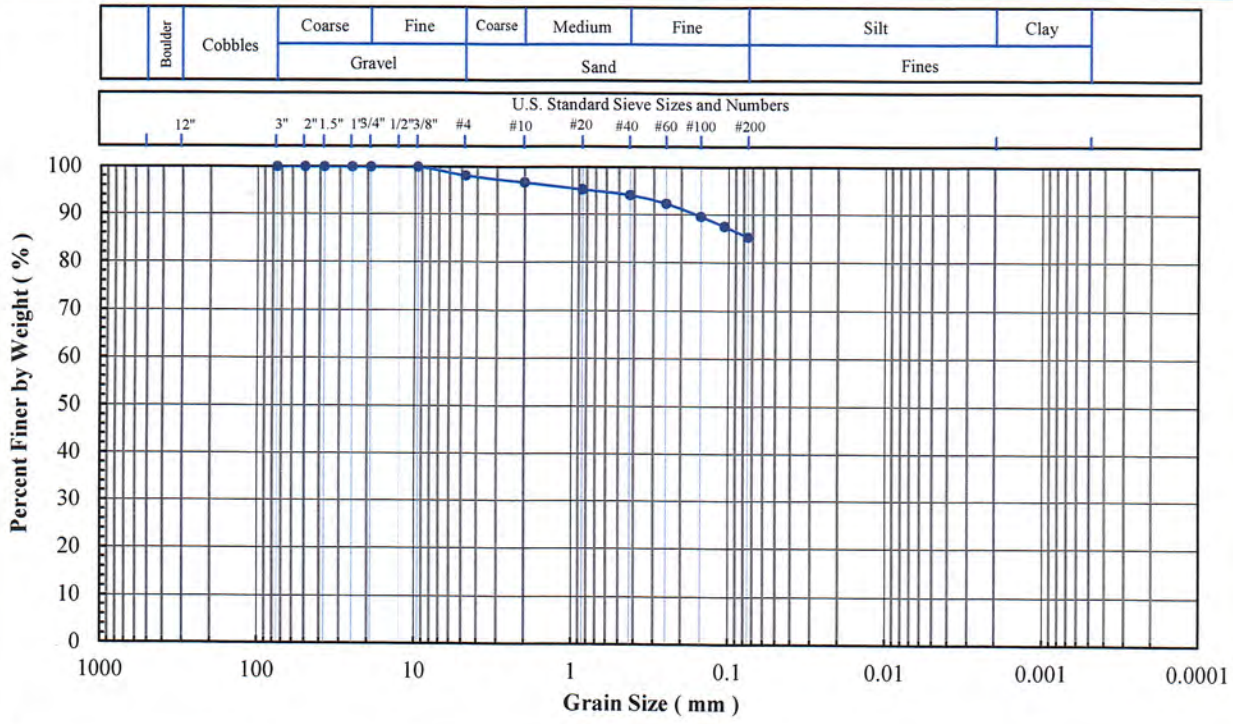
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B9-ST-1 (25-27')
Lab Sample No:	20L139

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

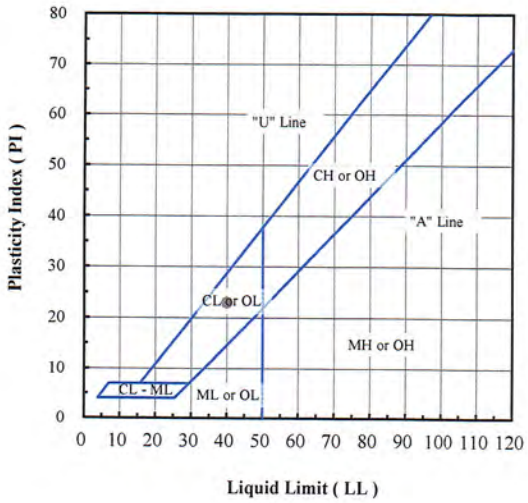


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	100.0
#4	4.75	98.1
#10	2.00	96.7
#20	0.850	95.2
#40	0.425	94.1
#60	0.250	92.3
#100	0.150	89.6
#140	0.106	87.5
#200	0.075	85.3

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	1.9
Sand (%):	12.8
Fines (%):	85.3
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B9-ST-1 (25-27')	20L139	16.8	85.3	40	17	23	CL - Lean Clay

Note(s):

01-29-2021
AA, WSR

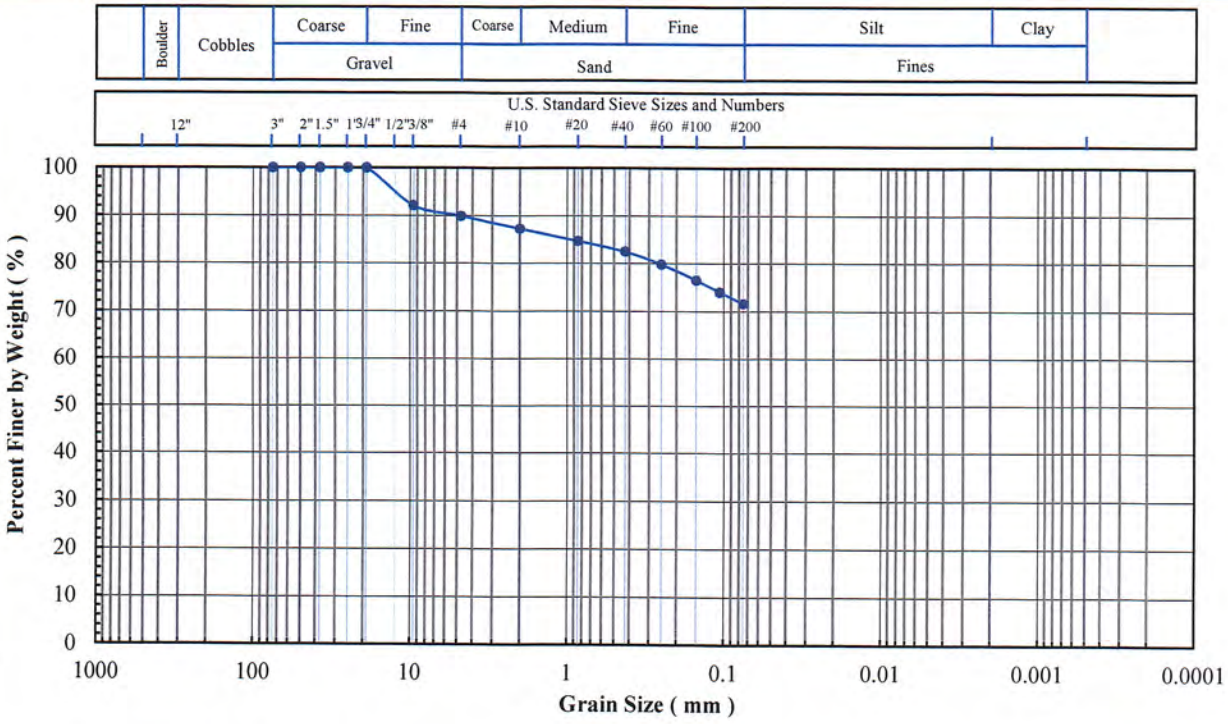
Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B9-ST-2 (40-42')
Lab Sample No:	20L140

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

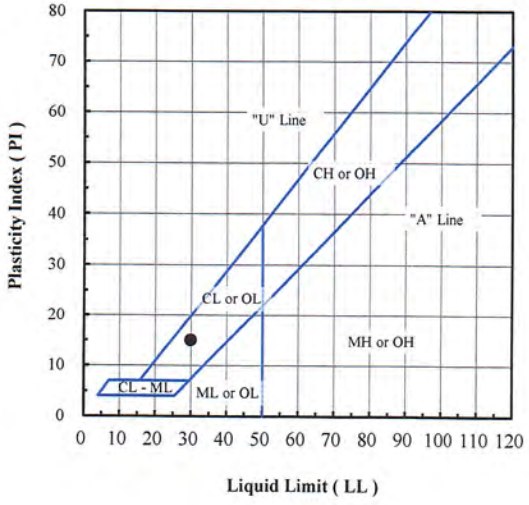


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	92
#4	4.75	90
#10	2.00	87
#20	0.850	85
#40	0.425	83
#60	0.250	80
#100	0.150	77
#140	0.106	74
#200	0.075	72

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	10
Sand (%):	18
Fines (%):	72
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B9-ST-2 (40-42')	20L140	13.1	72	30	15	15	CL - Lean clay with sand

Note(s): Sieve specimen was undersized.

01-29-2021
AA, MSR

Excel Geotechnical Testing, Inc.
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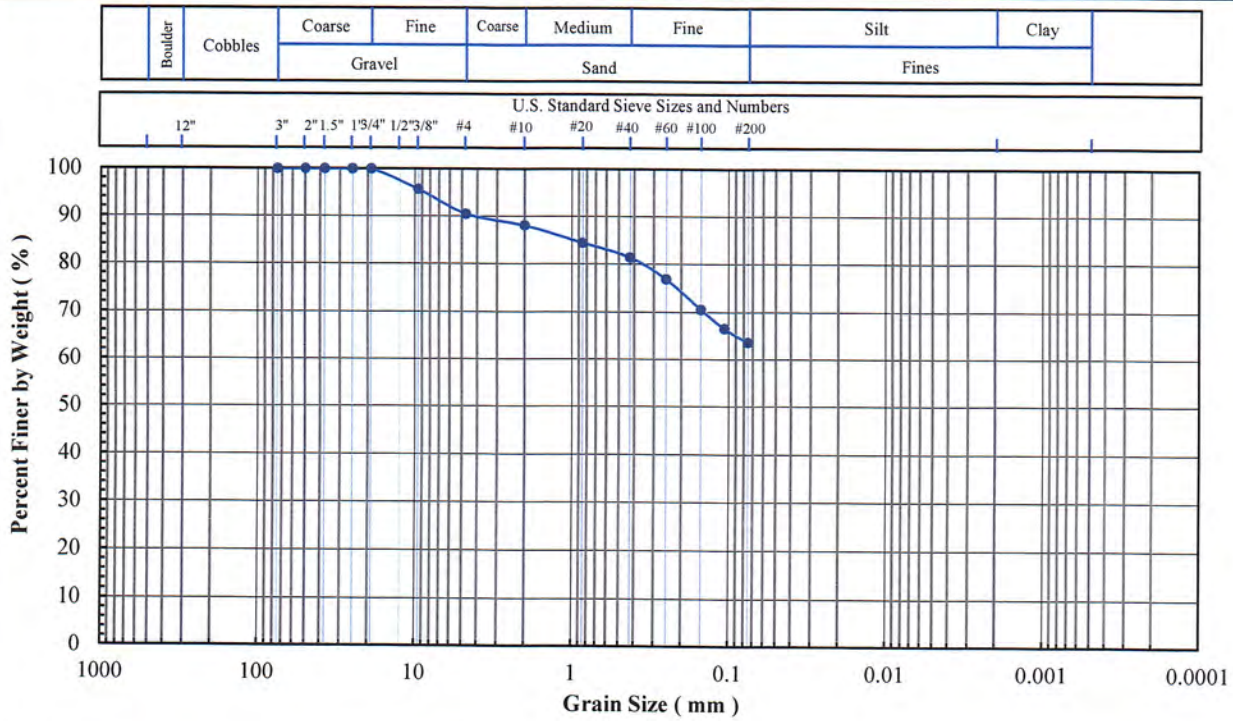
Project Name:	Monroe Ash Basin ALD
Project No:	PN1016
Client Sample ID:	B9-ST-3 (55-57')
Lab Sample No:	20L141

ASTM C136, D422, D854, D1140, D2216, D2487, D2974, D4318, D4373, D6913, D7928

SOIL INDEX PROPERTIES

Grain Size, Spec. Gravity, Moist. Cont, Eng. Classification, Organic Content, Atterberg Limits, Carbonate Content

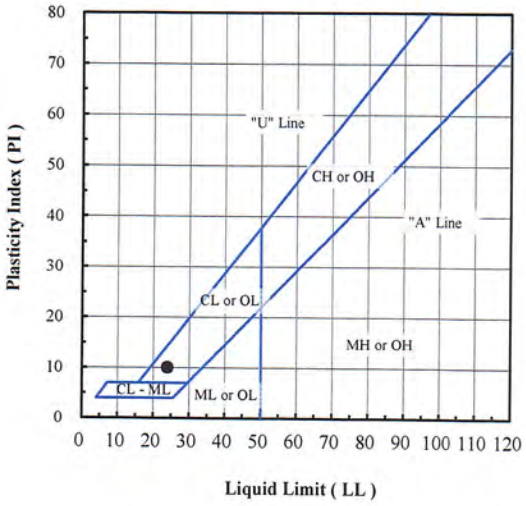


Sieve No.	Size (mm)	% Finer
3"	75	100
2"	50	100
1.5"	37.5	100
1"	25	100
3/4"	19	100
3/8"	9.5	96
#4	4.75	91
#10	2.00	88
#20	0.850	84
#40	0.425	81
#60	0.250	77
#100	0.150	71
#140	0.106	67
#200	0.075	64

Hydrometer Particle Diameter (mm)	% Finer

Gravel (%):	9
Sand (%):	27
Fines (%):	64
Silt (%):	
Clay (%):	

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	

Org. Content (%):	

Carbon. Content (%):	

Client Sample ID.	Lab Sample No:	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits LL (-)	Atterberg Limits PL (-)	Atterberg Limits PI (-)	Engineering Classification
B9-ST-3 (55-57')	20L141	10.8	64	24	14	10	CL - Sandy lean clay

Note(s): Sieve specimen was undersized.

01-29-2021 AA, NSR

Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B1-ST-2 (40-42')
Lab Sample Number:	20L126
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/19/2021

Specimen Type (See Note2) (-)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.58	7.23	108.9	20.1	53.0	50.0	3.0	DDW	12	6.4E-9
	3.55	7.23	110.2	19.7	64.00	50.0	14.0	DDW	14	3.4E-9

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

7-20-2021
ATK, NSR

Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B1-ST-3 (60-62')
Lab Sample Number:	20L127
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/19/2021

Specimen Type (See Note2) (-)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.58	7.19	129.8	10.7	53.0	50.0	3.0	DDW	13	7.2E-8
	3.57	7.16	131.3	10.8	69.00	50.0	19.0	DDW	7	6.8E-9

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

7-20-2021
APK, NSR

Excel Geotechnical Testing, Inc.
"Excellence in Testing"
953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B4-ST-1 (15-17')
Lab Sample Number:	20L129
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/20/2021

Specimen Type (See Note2) (-)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.60	7.26	113.9	16.1	53.0	50.0	3.0	DDW	10	9.2E-9
	3.58	7.27	112.2	18.5	57.00	50.0	7.0	DDW	5	8.4E-9

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

1-20-2021
ATK, NDR

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D 5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B4-ST-3 (55-57.5')
Lab Sample Number:	20L131
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/20/2021

Specimen Type (See Note2)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.61	7.25	127.3	11.4	53.0	50.0	3.0	DDW	8	2.4E-6
	3.57	7.26	128.5	11.2	68.00	50.0	18.0	DDW	8	5.4E-9

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen Type: ST = Shelby Tube, DT = Drive Tube BS = Block Sample, Ot = Others
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

7-20-2021
ARK, NSR

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B5-ST-1 (73.5-76')
Lab Sample Number:	20L133
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/26/2021

Specimen Type (See Note2) (-)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.45	7.37	121.5	15.4	53.0	50.0	3.0	DDW	12	1.1E-6
	3.48	7.20	125.5	12.4	72.00	50.0	22.0	DDW	14	8.1E-8

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

7-20-2021
APK, MSR

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B6-ST-2 (40-42.5')
Lab Sample Number:	20L135
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/21/2021

Specimen Type (See Note2) (-)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.54	7.25	115.9	17.5	53.0	50.0	3.0	DDW	4	6.2E-9
	3.58	7.31	113.3	18.2	64.00	50.0	14.0	DDW	16	2.7E-9

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B7-ST-1 (65-67.5')
Lab Sample Number:	20L138
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/22/2021

Specimen Type (See Note2) (-)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.55	7.22	124.6	13.0	53.0	50.0	3.0	DDW	6	1.9E-8
	3.58	7.28	121.5	14.4	70.00	50.0	20.0	DDW	12	5.8E-9

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

7-20-2021
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FLEXIBLE WALL PERMEABILITY TEST [1]

ASTM D5084

Project Name:	Monroe Ash Basin ALD
Project Number:	PN1016
Client Name:	Geosyntec Consultants
Site Sample ID:	B9-ST-1 (25-27')
Lab Sample Number:	20L139
Material Type:	Soil
Specified Value (cm/sec):	NA
Date Test Started:	1/22/2021

Specimen Type (See Note2) (-)	Specimen Initial Conditions / Specimen Final Conditions				Test Conditions					Hydraulic Conductivity
	Spec. Length (cm)	Spec. Diameter (cm)	Dry Unit Weight (pcf)	Moisture Content (%)	Cell Press. (psi)	Back Press. (psi)	Consolid. Press. (psi)	Permeant Liquid [3] (-)	Average Gradient (-)	(cm/s)
ST	3.56	7.20	115.5	17.2	53.0	50.0	3.0	DDW	6	9.0E-9
	3.57	7.28	112.7	18.6	61.00	50.0	11.0	DDW	14	3.5E-9

Notes:

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen preparation: ST = Shelby Tube, R = Remolded, B = Block Sample.
3. Type of permeant liquid: DTW = Deaired Tap Water, DDW = Deaired Deionized (Distilled) Water

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LAST PAGE

Test Applicability and Limitations:

- The results are applicable only for the materials received at the laboratory and tested which may or may not be representative of the materials at the site.

Storage Policy:

- Uncontaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter the samples will be discarded unless a written request for extended storage is received. A rate of $1.00 per sample per day will be applied after the initial 3 month storage period.

- Contaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter, the samples will be returned to the project manager or his/her designated receiver unless a written request for extended storage is received. A rate of $1.30 per sample per day will be applied after the initial 3 months storage.

APPENDIX K1 – CPT LOGS

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Rig	Cone	Cone Area (cm^2)	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Northing (ft)	Easting (ft)	Refer to Notation Number
CPT20-000	20-61-21655_CP000	02-Dec-2020	C16	567:T1500F15U500	15	25.0	75.13		141685	13397097	
CPT20-002	20-61-21655_CP002	01-Dec-2020	C16	567:T1500F15U500	15	25.0	75.13		141848	13397147	
CPT20-004	20-61-21655_CP004	01-Dec-2020	C16	567:T1500F15U500	15	25.0	75.13		142006	13397236	
CPT20-006	20-61-21655_CP006	01-Dec-2020	C18	568:T1500F15U500	15	25.0	75.21		142105	13397122	3
CPT20-008	20-61-21655_CP008	13-Dec-2020	C18	551:T1500F15U500	15	25.0	63.81		142194	13396905	
CPT20-010	20-61-21655_CP010	02-Dec-2020	C18	568:T1500F15U500	15	25.0	65.29		142267	13396716	
CPT20-012	20-61-21655_CP012	02-Dec-2020	C18	568:T1500F15U500	15	25.0	65.12		142346	13396528	
CPT20-014	20-61-21655_CP014	02-Dec-2020	C18	568:T1500F15U500	15	25.0	75.21		142420	13396346	
CPT20-016	20-61-21655_CP016	02-Dec-2020	C18	568:T1500F15U500	15	25.0	75.05		142493	13396161	
CPT20-018	20-61-21655_CP018	02-Dec-2020	C18	568:T1500F15U500	15	25.0	75.21		142568	13395971	
CPT20-020	20-61-21655_CP020	02-Dec-2020	C18	568:T1500F15U500	15	25.0	74.72		142644	13395785	
CPT20-022	20-61-21655_CP022	03-Dec-2020	C18	551:T1500F15U500	15	25.0	73.82		142715	13395602	
CPT20-024	20-61-21655_CP024	03-Dec-2020	C18	551:T1500F15U500	15	25.0	72.59		142797	13395407	
CPT20-026	20-61-21655_CP026	03-Dec-2020	C18	551:T1500F15U500	15	25.0	70.70		142864	13395239	
CPT20-028	20-61-21655_CP028	13-Dec-2020	C18	551:T1500F15U500	15	25.0	59.55		142938	13395052	
CPT20-030	20-61-21655_CP030	03-Dec-2020	C18	551:T1500F15U500	15	25.0	59.88		143004	13394895	
CPT20-032	20-61-21655_CP032	03-Dec-2020	C18	551:T1500F15U500	15	25.0	59.14		142939	13394710	
CPT20-034	20-61-21655_CP034	03-Dec-2020	C18	551:T1500F15U500	15	25.0	57.41		142785	13394560	
CPT20-036	20-61-21655_CP036	04-Dec-2020	C18	551:T1500F15U500	15	25.0	57.82		142655	13394432	
CPT20-038	20-61-21655_CP038	04-Dec-2020	C18	551:T1500F15U500	15	25.0	58.89		142596	13394252	
CPT20-040	20-61-21655_CP040	04-Dec-2020	C18	551:T1500F15U500	15	25.0	62.25		142693	13394075	
CPT20-042	20-61-21655_CP042	04-Dec-2020	C18	551:T1500F15U500	15	25.0	60.70		142835	13393929	
CPT20-044	20-61-21655_CP044	04-Dec-2020	C18	551:T1500F15U500	15	25.0	57.82		142982	13393790	
CPT20-046	20-61-21655_CP046	05-Dec-2020	C18	551:T1500F15U500	15	25.0	61.27		143108	13393655	
CPT20-048	20-61-21655_CP048	13-Dec-2020	C16	568:T1500F15U500	15	25.0	60.04		143131	13393508	
SCPT20-050	20-61-21655_SP050	05-Dec-2020	C18	551:T1500F15U500	15	25.0	62.58	5	143162	13393217	

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Rig	Cone	Cone Area (cm^2)	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Northing (ft)	Easting (ft)	Refer to Notation Number
CPT20-052	20-61-21655_CP052	05-Dec-2020	C18	551:T1500F15U500	15	25.0	61.52		143174	13393046	
CPT20-054	20-61-21655_CP054	05-Dec-2020	C18	551:T1500F15U500	15	25.0	60.86		143198	13392845	
CPT20-056	20-61-21655_CP056	05-Dec-2020	C18	551:T1500F15U500	15	25.0	62.83		143212	13392641	
CPT20-058	20-61-21655_CP058	06-Dec-2020	C18	551:T1500F15U500	15	25.0	59.38		143229	13392449	
CPT20-060	20-61-21655_CP060	06-Dec-2020	C18	551:T1500F15U500	15	25.0	59.88		143248	13392268	
CPT20-062	20-61-21655_CP062	06-Dec-2020	C18	551:T1500F15U500	15	25.0	60.12		143281	13392058	
CPT20-064	20-61-21655_CP064	06-Dec-2020	C18	551:T1500F15U500	15	25.0	64.06		143336	13391874	
CPT20-066	20-61-21655_CP066	06-Dec-2020	C18	551:T1500F15U500	15	25.0	60.45		143404	13391672	
CPT20-068	20-61-21655_CP068	13-Dec-2020	C16	568:T1500F15U500	15	25.0	59.05		143440	13391531	
CPT20-070	20-61-21655_CP070	02-Dec-2020	C16	567:T1500F15U500	15	25.0	52.33		143314	13391366	
CPT20-072	20-61-21655_CP072	02-Dec-2020	C16	567:T1500F15U500	15	25.0	65.78		143165	13391247	
CPT20-074	20-61-21655_CP074	02-Dec-2020	C16	567:T1500F15U500	15	25.0	66.44		143014	13391154	
CPT20-076	20-61-21655_CP076	03-Dec-2020	C16	567:T1500F15U500	15	25.0	66.27		142838	13391033	
CPT20-078	20-61-21655_CP078	03-Dec-2020	C16	567:T1500F15U500	15		5.25		142629	13390894	4
CPT20-078B	20-61-21655_CP078B	03-Dec-2020	C16	567:T1500F15U500	15	25.0	61.84		142643	13390903	
CPT20-080	20-61-21655_CP080	03-Dec-2020	C16	567:T1500F15U500	15	25.0	67.26		142497	13390784	
CPT20-082	20-61-21655_CP082	03-Dec-2020	C16	567:T1500F15U500	15		6.73		142345	13390678	4
CPT20-082B	20-61-21655_CP082B	03-Dec-2020	C16	675:T1500F15U500	15	25.0	66.11		142344	13390669	
CPT20-084	20-61-21655_CP084	03-Dec-2020	C16	675:T1500F15U500	15	25.0	67.91		142185	13390553	
CPT20-086	20-61-21655_CP086	04-Dec-2020	C16	675:T1500F15U500	15	25.0	68.57		141994	13390446	
CPT20-088	20-61-21655_CP088	04-Dec-2020	C16	675:T1500F15U500	15		5.09		141837	13390373	4
CPT20-088B	20-61-21655_CP088B	04-Dec-2020	C16	675:T1500F15U500	15	25.0	67.75		141843	13390373	
CPT20-090	20-61-21655_CP090	04-Dec-2020	C16	675:T1500F15U500	15	25.0	60.04		141754	13390528	
CPT20-092	20-61-21655_CP092	05-Dec-2020	C16	675:T1500F15U500	15	25.0	66.93		141703	13390714	
CPT20-094	20-61-21655_CP094	05-Dec-2020	C16	513:T1500F15U500	15	25.0	63.81		141591	13390889	
SCPT20-096	20-61-21655_SP096	05-Dec-2020	C16	513:T1500F15U500	15	25.0	60.86	5	141475	13391090	

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Rig	Cone	Cone Area (cm^2)	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Northing (ft)	Easting (ft)	Refer to Notation Number
CPT20-098	20-61-21655_CP098	05-Dec-2020	C16	513:T1500F15U500	15	25.0	66.44		141442	13391262	
CPT20-100	20-61-21655_CP100	06-Dec-2020	C16	513:T1500F15U500	15	25.0	53.48		141368	13391479	
CPT20-102	20-61-21655_CP102	06-Dec-2020	C16	513:T1500F15U500	15	25.0	57.58		141297	13391656	
CPT20-104	20-61-21655_CP104	06-Dec-2020	C16	513:T1500F15U500	15	25.0	57.58		141174	13391805	
CPT20-106	20-61-21655_CP106	06-Dec-2020	C16	513:T1500F15U500	15	25.0	55.28		140981	13391734	
CPT20-108	20-61-21655_CP108	06-Dec-2020	C16	513:T1500F15U500	15	25.0	59.55		140801	13391655	
CPT20-110	20-61-21655_CP110	06-Dec-2020	C16	513:T1500F15U500	15	25.0	56.76		140617	13391584	
CPT20-110B	20-61-21655_CP110B	07-Dec-2020	C16	513:T1500F15U500	15	25.0	61.02		140610	13391577	
CPT20-112	20-61-21655_CP112	06-Dec-2020	C16	513:T1500F15U500	15	25.0	52.33		140443	13391653	
SCPT20-114	20-61-21655_SP114	06-Dec-2020	C16	513:T1500F15U500	15	25.0	53.15	4	140335	13391822	
CPT20-116	20-61-21655_CP116	06-Dec-2020	C16	513:T1500F15U500	15	25.0	61.35		140233	13391996	
CPT20-118	20-61-21655_CP118	07-Dec-2020	C16	513:T1500F15U500	15	25.0	58.56		140123	13392169	
CPT20-120	20-61-21655_CP120	07-Dec-2020	C16	513:T1500F15U500	15	25.0	60.70		140017	13392339	
CPT20-122	20-61-21655_CP122	07-Dec-2020	C16	513:T1500F15U500	15	25.0	62.01		139912	13392507	
CPT20-124	20-61-21655_CP124	08-Dec-2020	C16	513:T1500F15U500	15	25.0	70.87		139802	13392678	
CPT20-126	20-61-21655_CP126	08-Dec-2020	C16	513:T1500F15U500	15	25.0	71.52		139694	13392854	
CPT20-128	20-61-21655_CP128	08-Dec-2020	C16	513:T1500F15U500	15	25.0	73.49		139593	13393024	
CPT20-130	20-61-21655_CP130	08-Dec-2020	C16	513:T1500F15U500	15	25.0	64.14		139484	13393198	
CPT20-132	20-61-21655_CP132	08-Dec-2020	C16	513:T1500F15U500	15	25.0	70.37		139378	13393362	
CPT20-134	20-61-21655_CP134	14-Dec-2020	C16	568:T1500F15U500	15	25.0	67.09		139281	13393532	
CPT20-136	20-61-21655_CP136	14-Dec-2020	C18	551:T1500F15U500	15	25.0	75.13		139166	13393704	
CPT20-138	20-61-21655_CP138	14-Dec-2020	C18	551:T1500F15U500	15	25.0	72.51		139110	13393797	
CPT20-140	20-61-21655_CP140	13-Dec-2020	C18	551:T1500F15U500	15	25.0	75.13		139141	13393971	
CPT20-142	20-61-21655_CP142	14-Dec-2020	C18	551:T1500F15U500	15	25.0	65.53		139293	13394120	
CPT20-144	20-61-21655_CP144	14-Dec-2020	C18	551:T1500F15U500	15	25.0	70.46		139326	13394303	
CPT20-146	20-61-21655_CP146	14-Dec-2020	C18	551:T1500F15U500	15	25.0	66.35		139290	13394504	

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Rig	Cone	Cone Area (cm^2)	Assumed Phreatic Surface[1] (ft)	Final Depth (ft)	Shear Wave Velocity Tests	Northing (ft)	Easting (ft)	Refer to Notation Number
CPT20-148	20-61-21655_CP148	14-Dec-2020	C18	551:T1500F15U500	15	25.0	62.50		139269	13394705	
CPT20-150	20-61-21655_CP150	14-Dec-2020	C16	568:T1500F15U500	15	25.0	65.94		139340	13394900	
CPT20-152	20-61-21655_CP152	08-Dec-2020	C18	551:T1500F15U500	15	25.0	60.53		139451	13395043	
CPT20-154	20-61-21655_CP154	08-Dec-2020	C18	551:T1500F15U500	15	25.0	68.49		139579	13395198	
CPT20-156	20-61-21655_CP156	08-Dec-2020	C18	551:T1500F15U500	15	25.0	69.64		139707	13395357	
CPT20-158	20-61-21655_CP158	08-Dec-2020	C18	551:T1500F15U500	15	25.0	60.61		139832	13395506	
CPT20-160	20-61-21655_CP160	08-Dec-2020	C18	551:T1500F15U500	15	25.0	66.93		139960	13395666	
CPT20-162	20-61-21655_CP162	08-Dec-2020	C18	551:T1500F15U500	15	25.0	66.27		140089	13395835	
CPT20-164	20-61-21655_CP164	08-Dec-2020	C18	551:T1500F15U500	15	25.0	68.49		140210	13395988	
CPT20-166	20-61-21655_CP166	08-Dec-2020	C18	551:T1500F15U500	15	25.0	68.41		140336	13396145	
CPT20-168	20-61-21655_CP168	08-Dec-2020	C18	551:T1500F15U500	15	25.0	69.72		140461	13396297	
CPT20-170	20-61-21655_CP170	07-Dec-2020	C18	551:T1500F15U500	15	25.0	68.24		140603	13396441	
CPT20-172	20-61-21655_CP172	07-Dec-2020	C18	551:T1500F15U500	15	25.0	70.70		140759	13396566	
CPT20-174	20-61-21655_CP174	07-Dec-2020	C18	551:T1500F15U500	15	25.0	73.24		140916	13396693	
CPT20-176	20-61-21655_CP176	07-Dec-2020	C18	551:T1500F15U500	15	25.0	69.72		141071	13396820	
CPT20-178	20-61-21655_CP178	07-Dec-2020	C18	551:T1500F15U500	15	25.0	69.80		141268	13396939	
SCPT20-180	20-61-21655_SP180	07-Dec-2020	C18	551:T1500F15U500	15	25.0	67.17	5	141428	13397002	
Totals	95 soundings						6001.32	19			

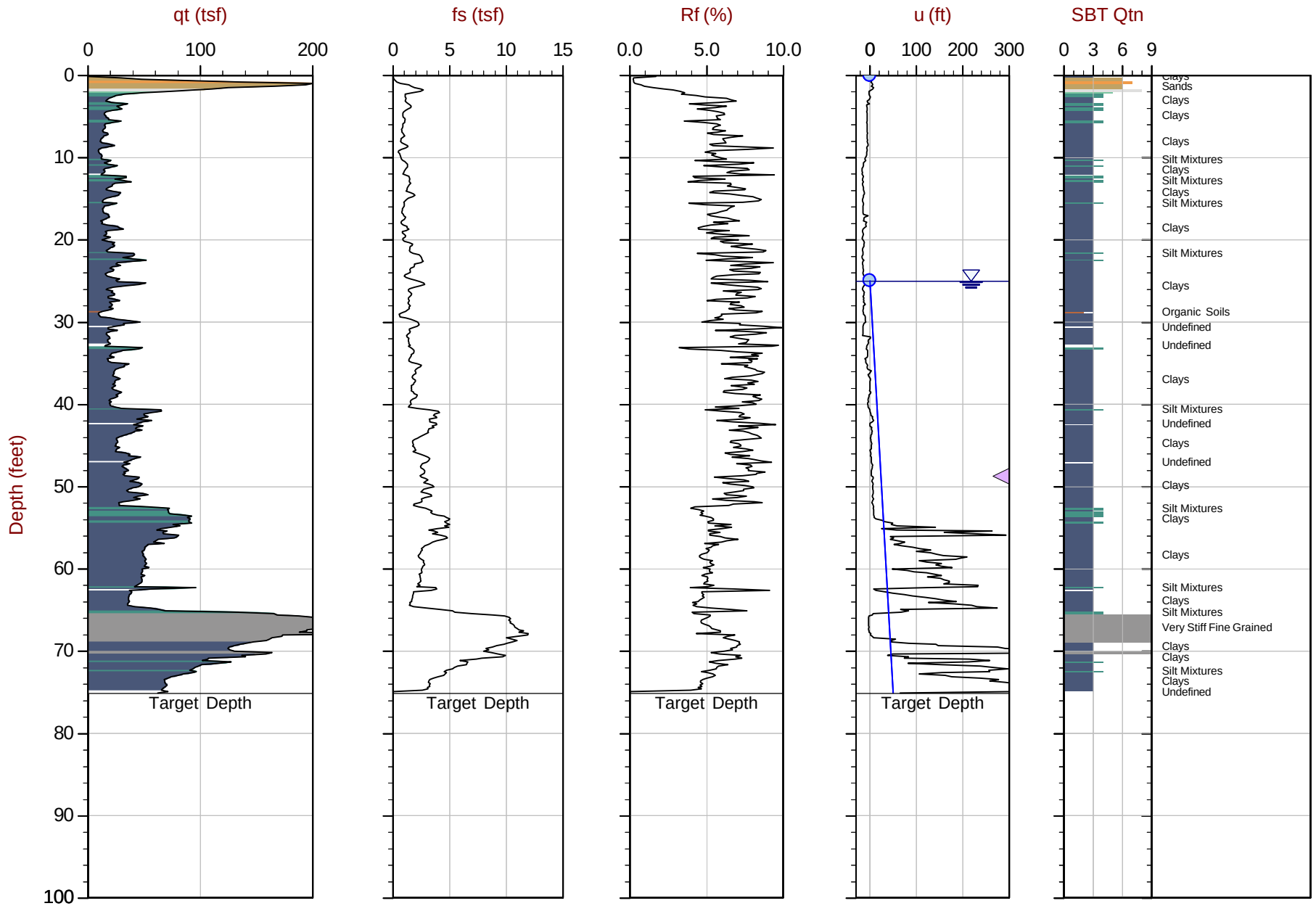
1. The assumed phreatic surface was provided by the client. Hydrostatic condictions were assumed for the calculated parameters.
2. Coordinates were acquired using a MR-350 GlobalSat GPS Receiver in datum: WGS84 / UTM Zone 17 North and were converted to Michigan State Plane South, NAD83 (international feet).
3. No pore pressure data from 16.300m- 22.925m (53.48ft - 75.21ft) due to equipment issues.
4. No clear phreatic surface detected.

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-02 10:20
Site: DTE Monroe Power Plant

Sounding: CPT20-000
Cone: 567:T1500F15U500



Max Depth: 22.900 m / 75.13 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP000.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141685ft E: 13397097ft
Sheet No: 1 of 1

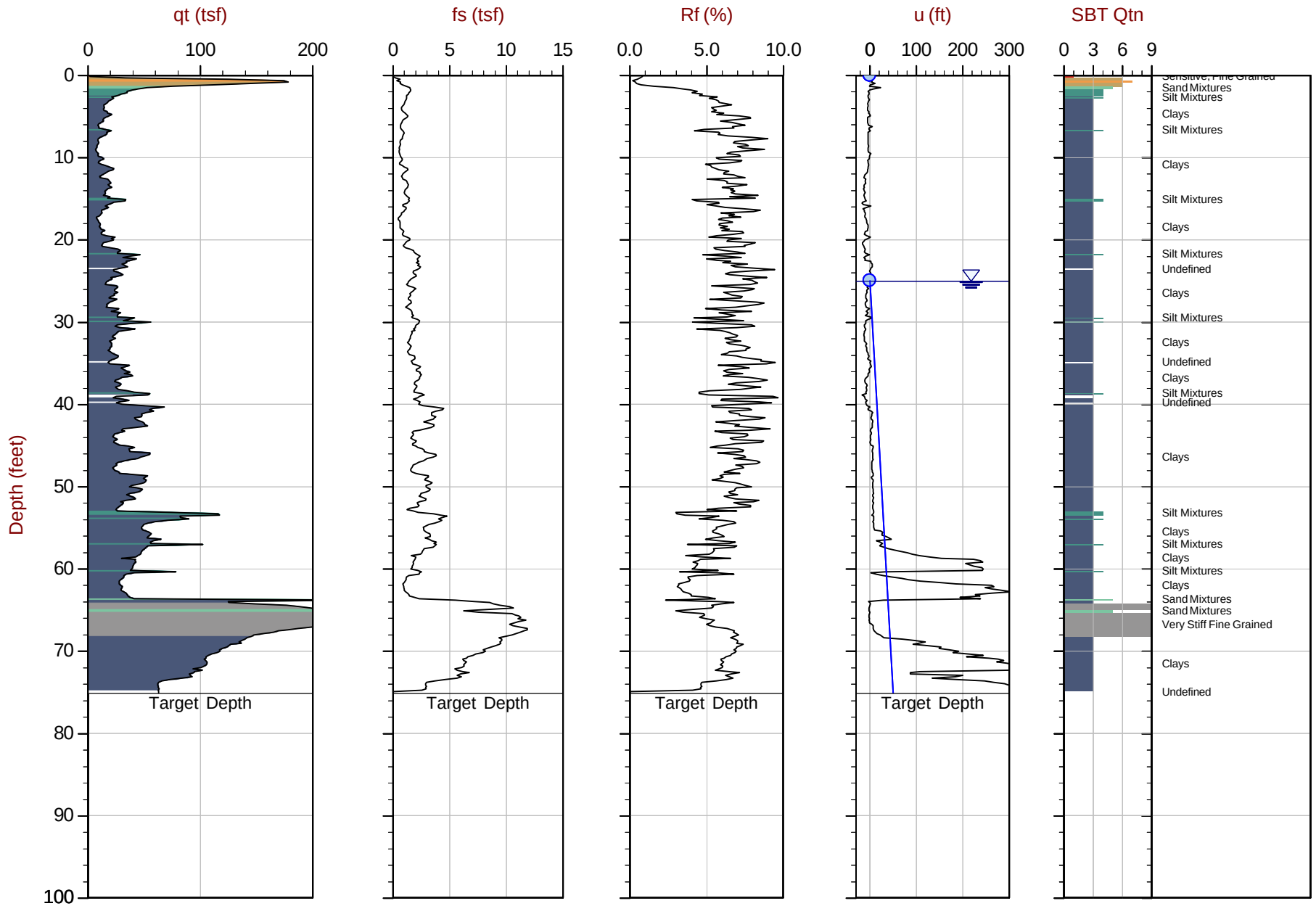
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-01 15:09
Site: DTE Monroe Power Plant

Sounding: CPT20-002
Cone: 567:T1500F15U500



Max Depth: 22.900 m / 75.13 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP002.COR
Unit Wt: SBTQtn (PKR2009)

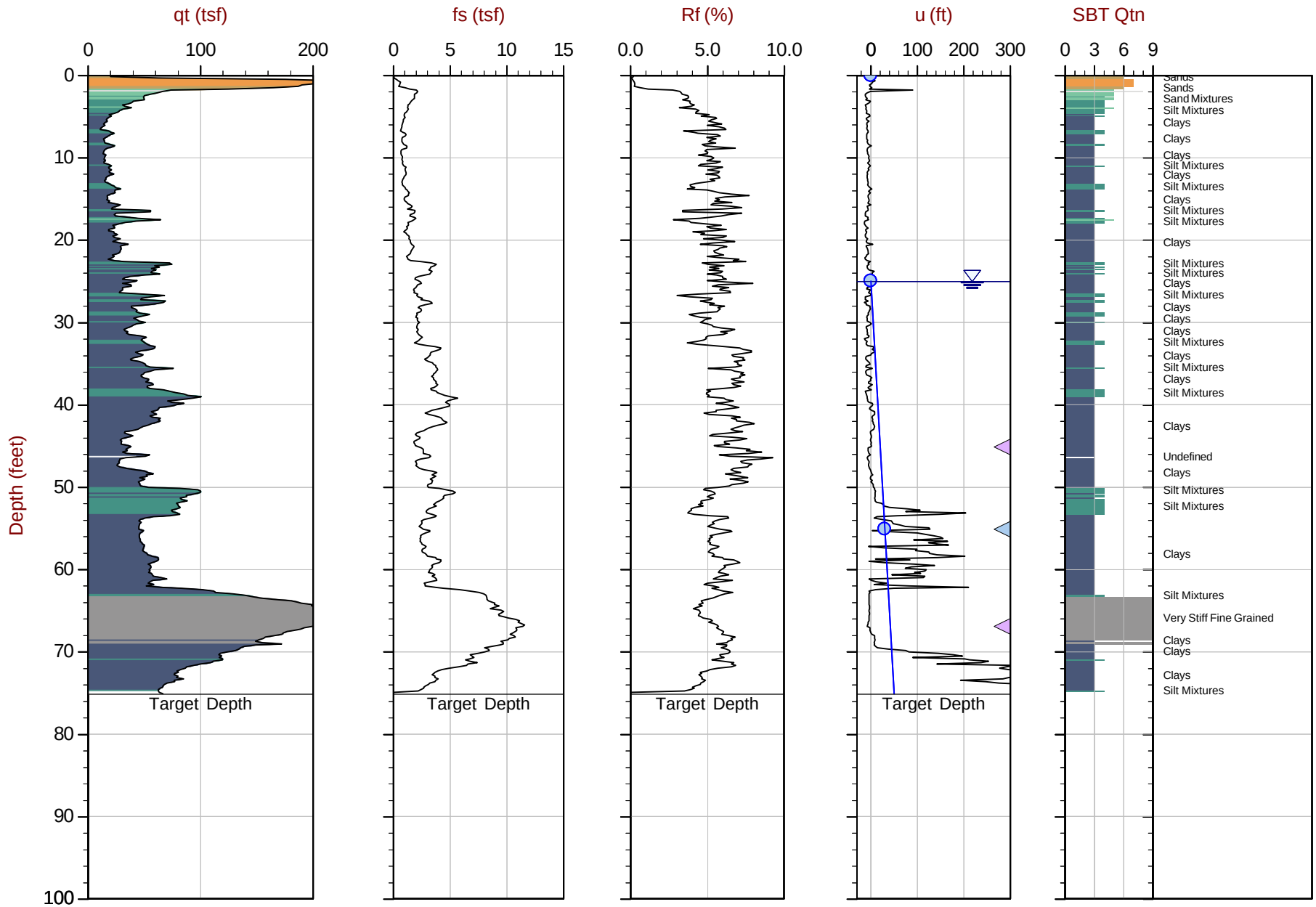
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141848ft E: 13397147ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-01 13:06
Site: DTE Monroe Power Plant

Sounding: CPT20-004
Cone: 567:T1500F15U500



Max Depth: 22.900 m / 75.13 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP004.COR
Unit Wt: SBTQtn (PKR2009)

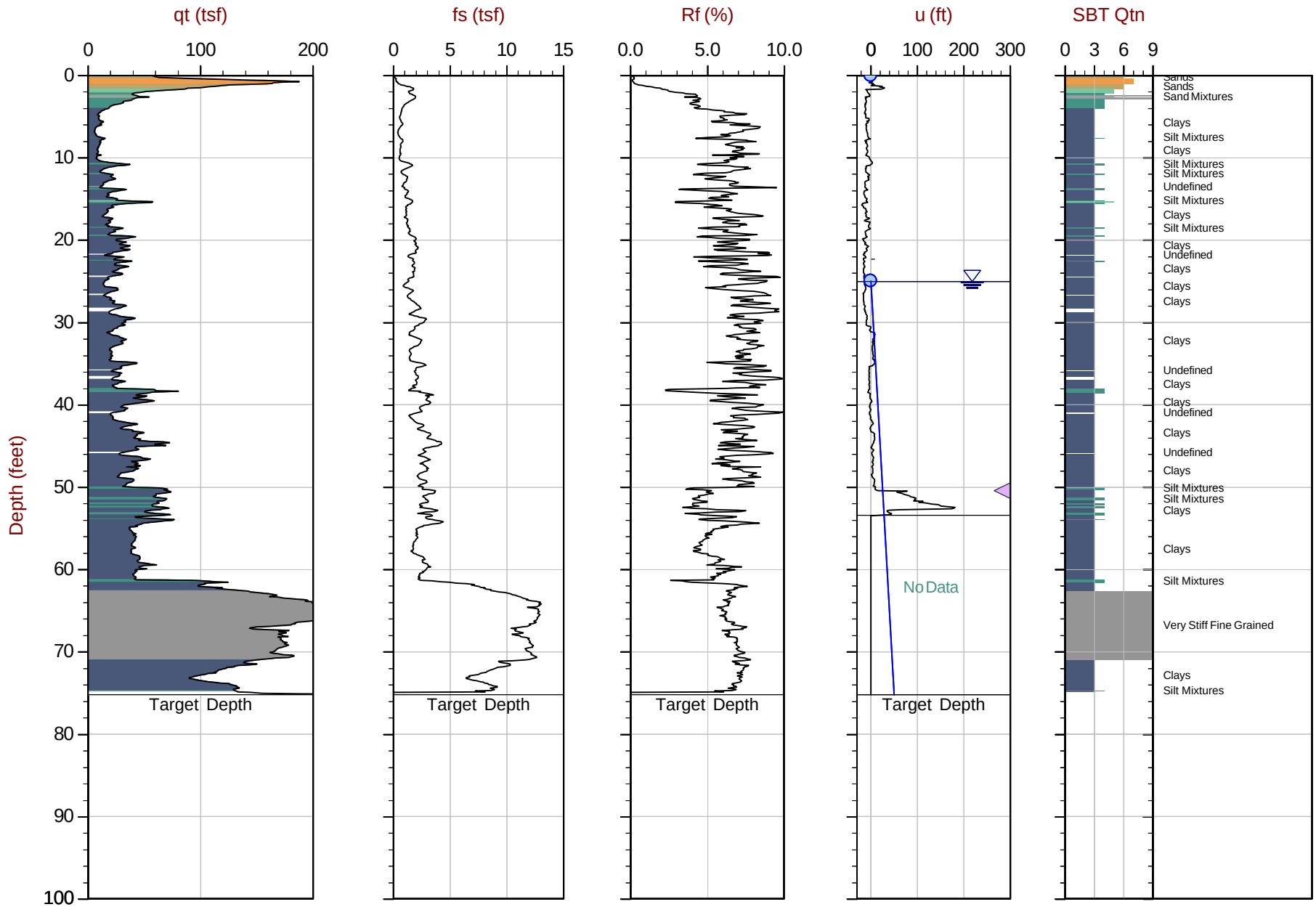
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142006ft E: 13397236ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-01 13:15
Site: DTE Monroe Power Plant

Sounding: CPT20-006
Cone: 568:T1500F15U500



Max Depth: 22.925 m / 75.21 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP006.COR
Unit Wt: SBTQtn (PKR2009)

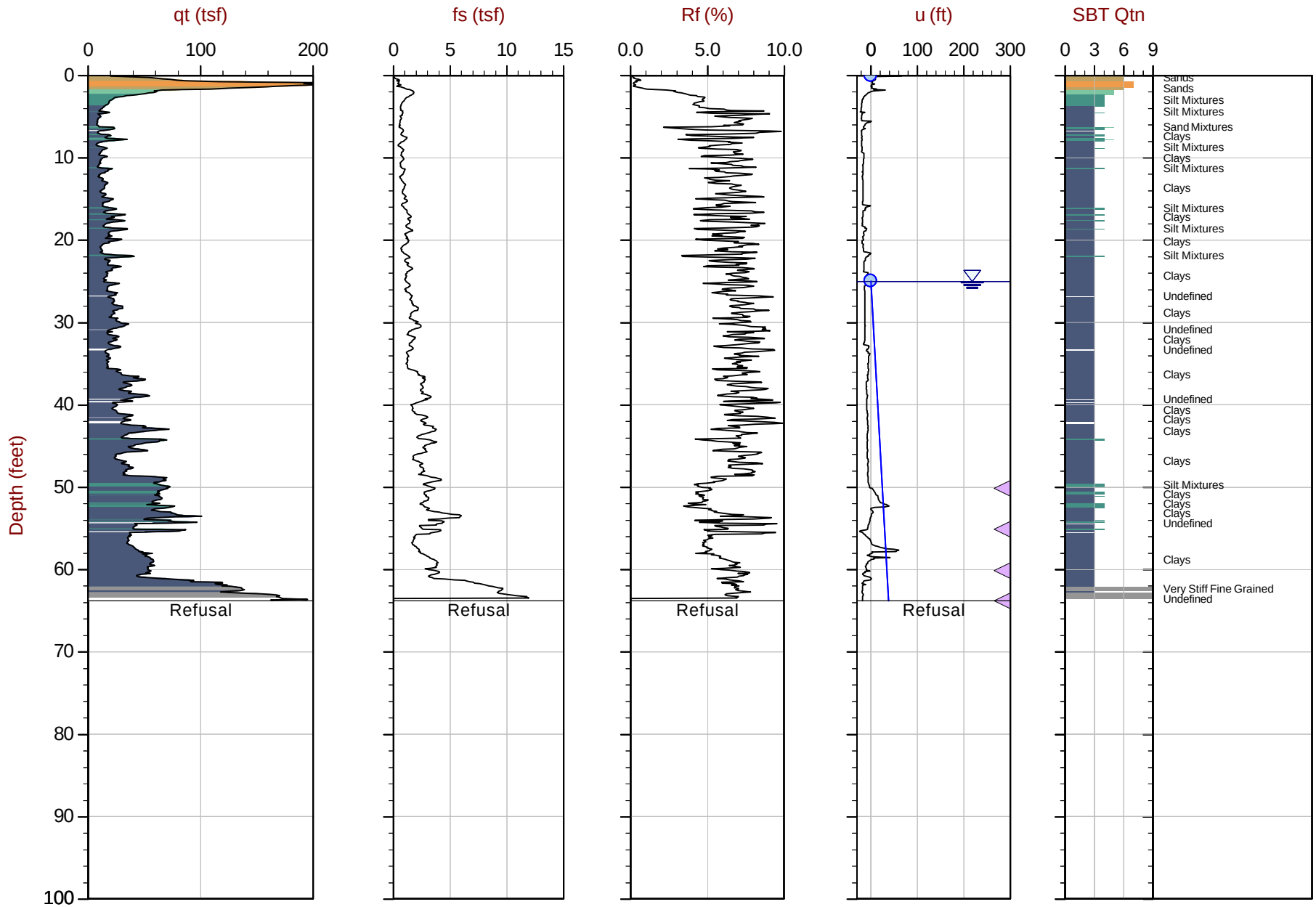
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142105ft E: 13397122ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-13 08:23
Site: DTE Monroe Power Plant

Sounding: CPT20-008
Cone: 551:T1500F15U500



Max Depth: 19.450 m / 63.81 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP008.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142194ft E: 13396905ft
Sheet No: 1 of 1

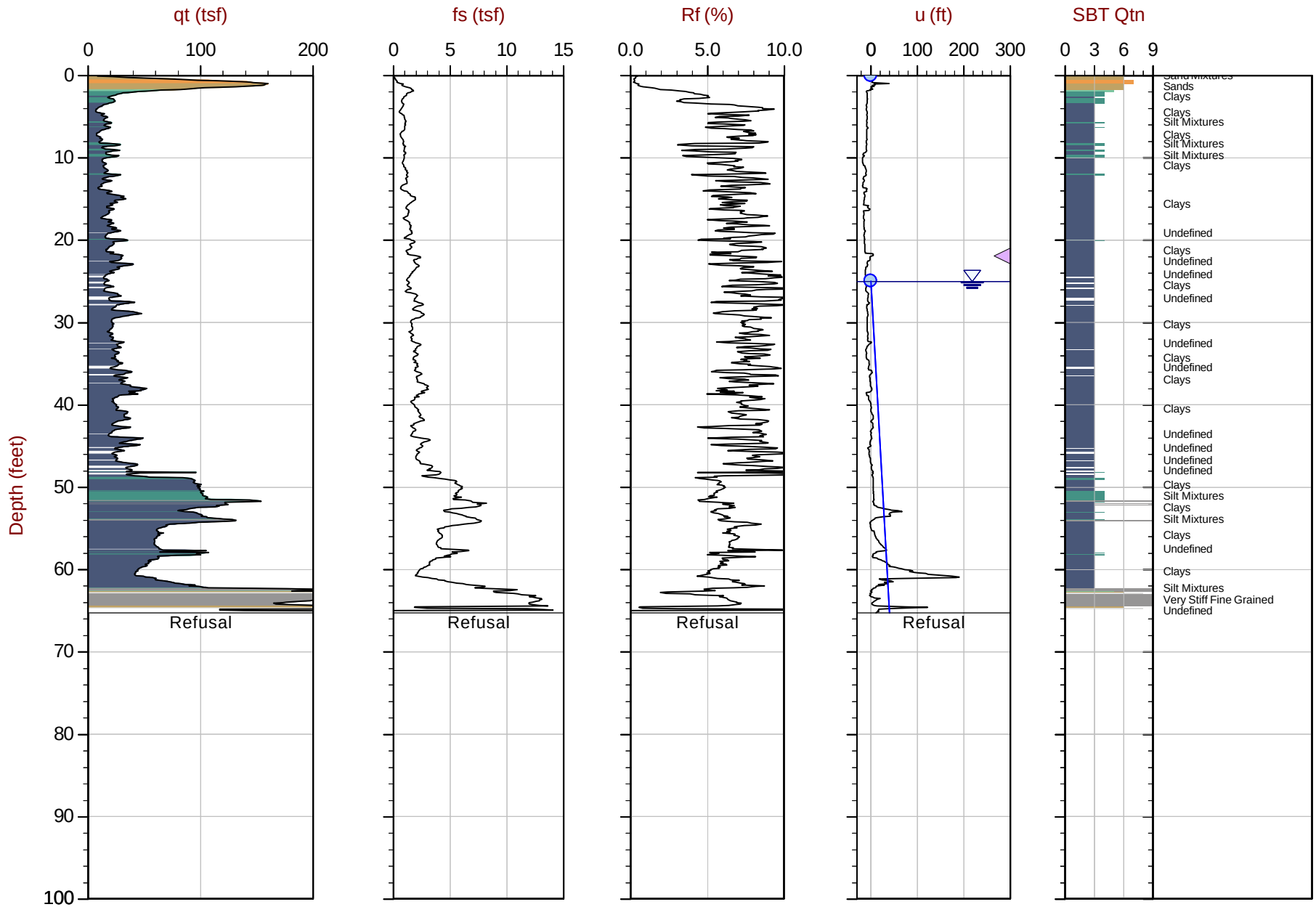
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-02 10:04
Site: DTE Monroe Power Plant

Sounding: CPT20-010
Cone: 568:T1500F15U500



Max Depth: 19.900 m / 65.29 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP010.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142267ft E: 13396716ft
Sheet No: 1 of 1

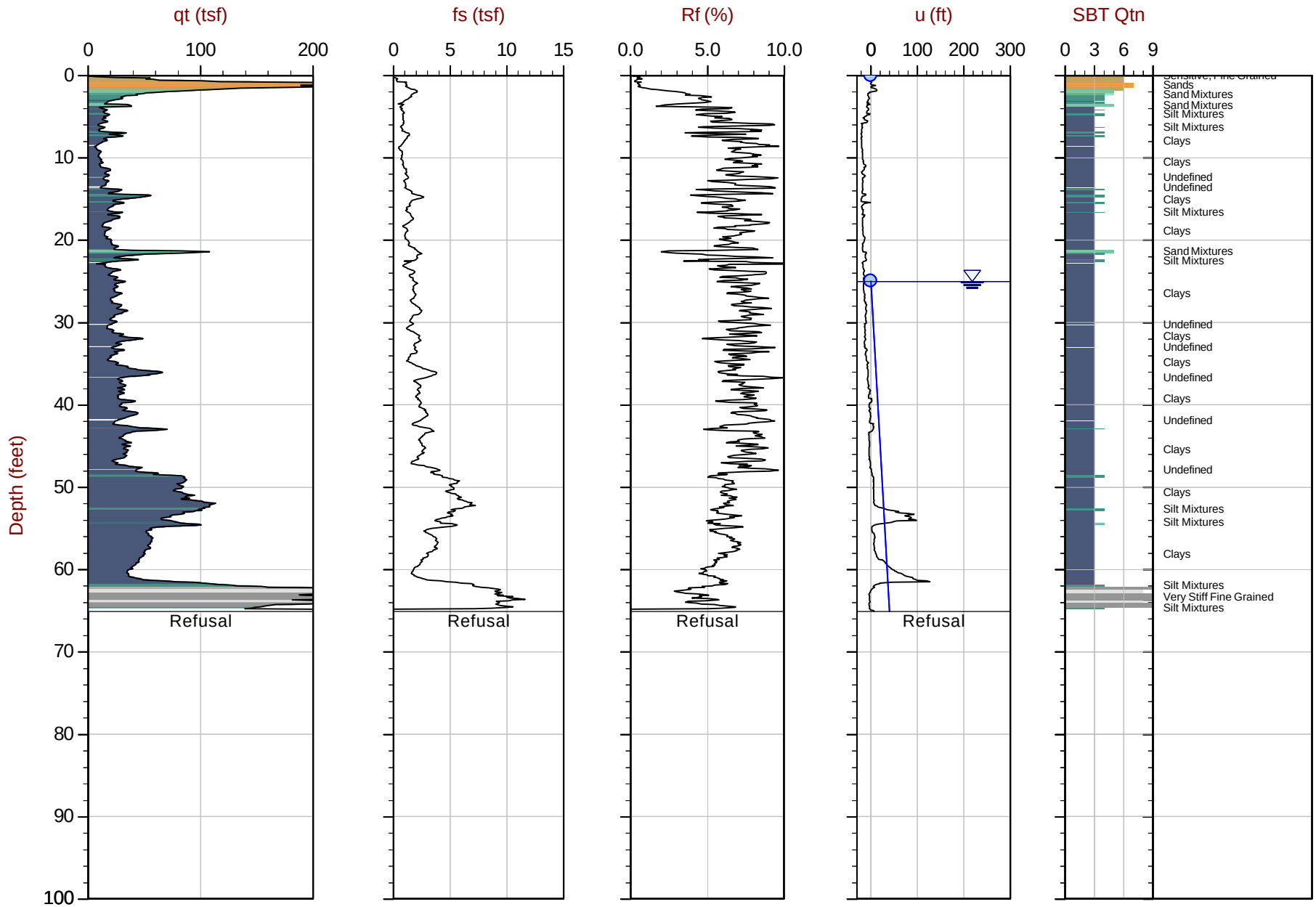
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-02 11:14
Site: DTE Monroe Power Plant

Sounding: CPT20-012
Cone: 568:T1500F15U500



Max Depth: 19.850 m / 65.12 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP012.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142346ft E: 13396528ft
Sheet No: 1 of 1

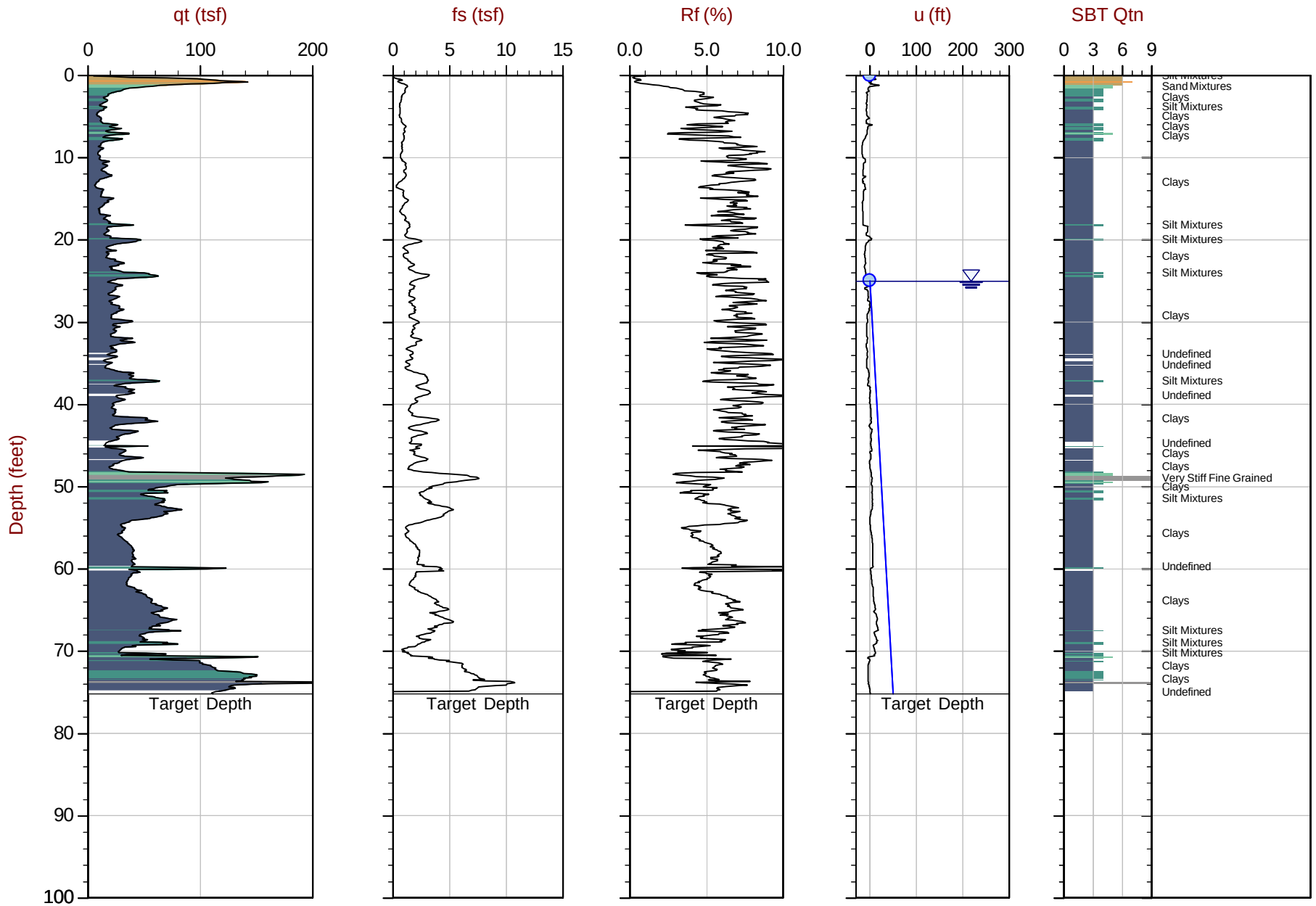
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-02 12:25
Site: DTE Monroe Power Plant

Sounding: CPT20-014
Cone: 568:T1500F15U500



Max Depth: 22.925 m / 75.21 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP014.COR
Unit Wt: SBTQtn (PKR2009)

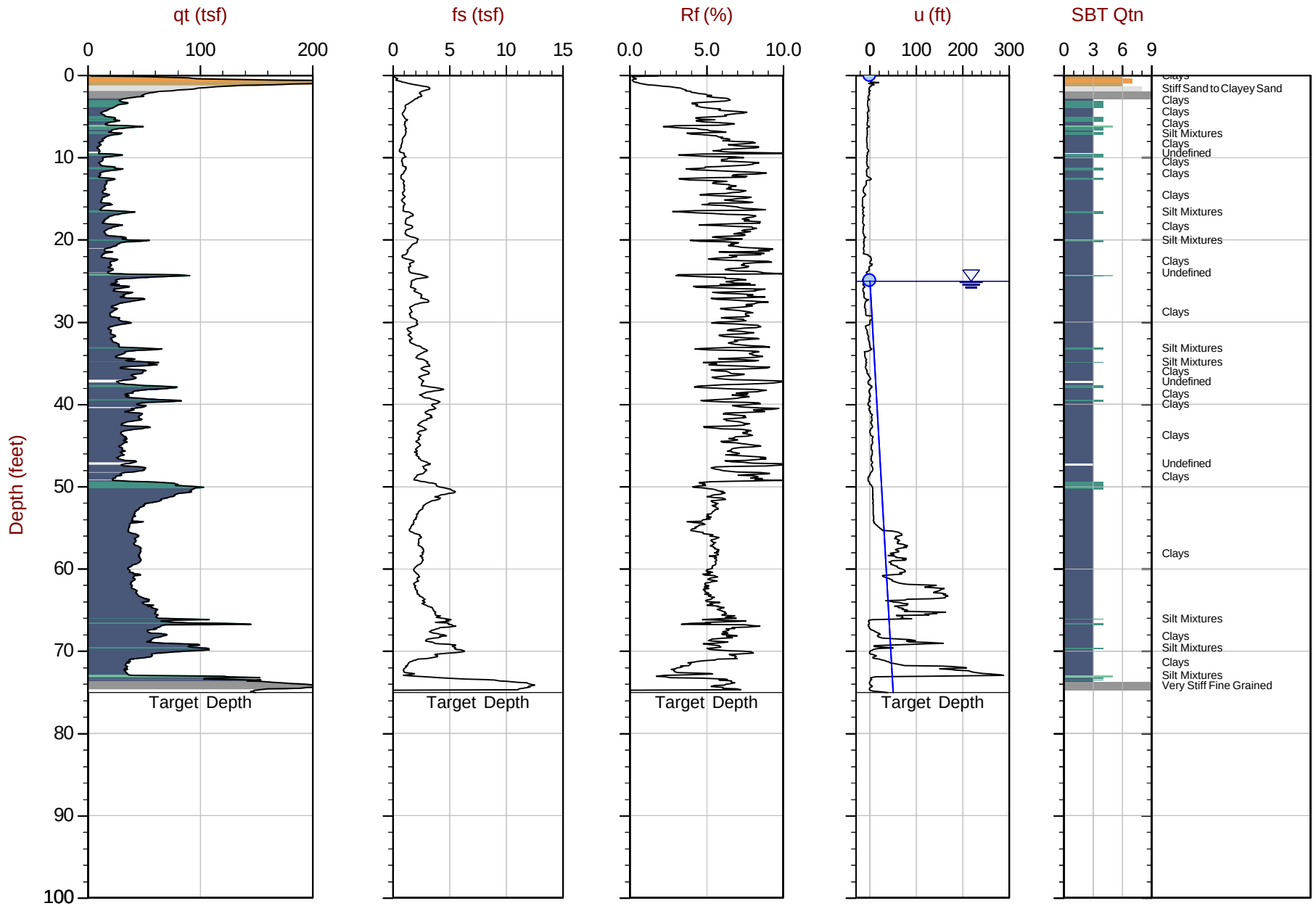
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142420ft E: 13396346ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-02 13:21
Site: DTE Monroe Power Plant

Sounding: CPT20-016
Cone: 568:T1500F15U500



Max Depth: 22.875 m / 75.05 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP016.COR
Unit Wt: SBTQtn (PKR2009)

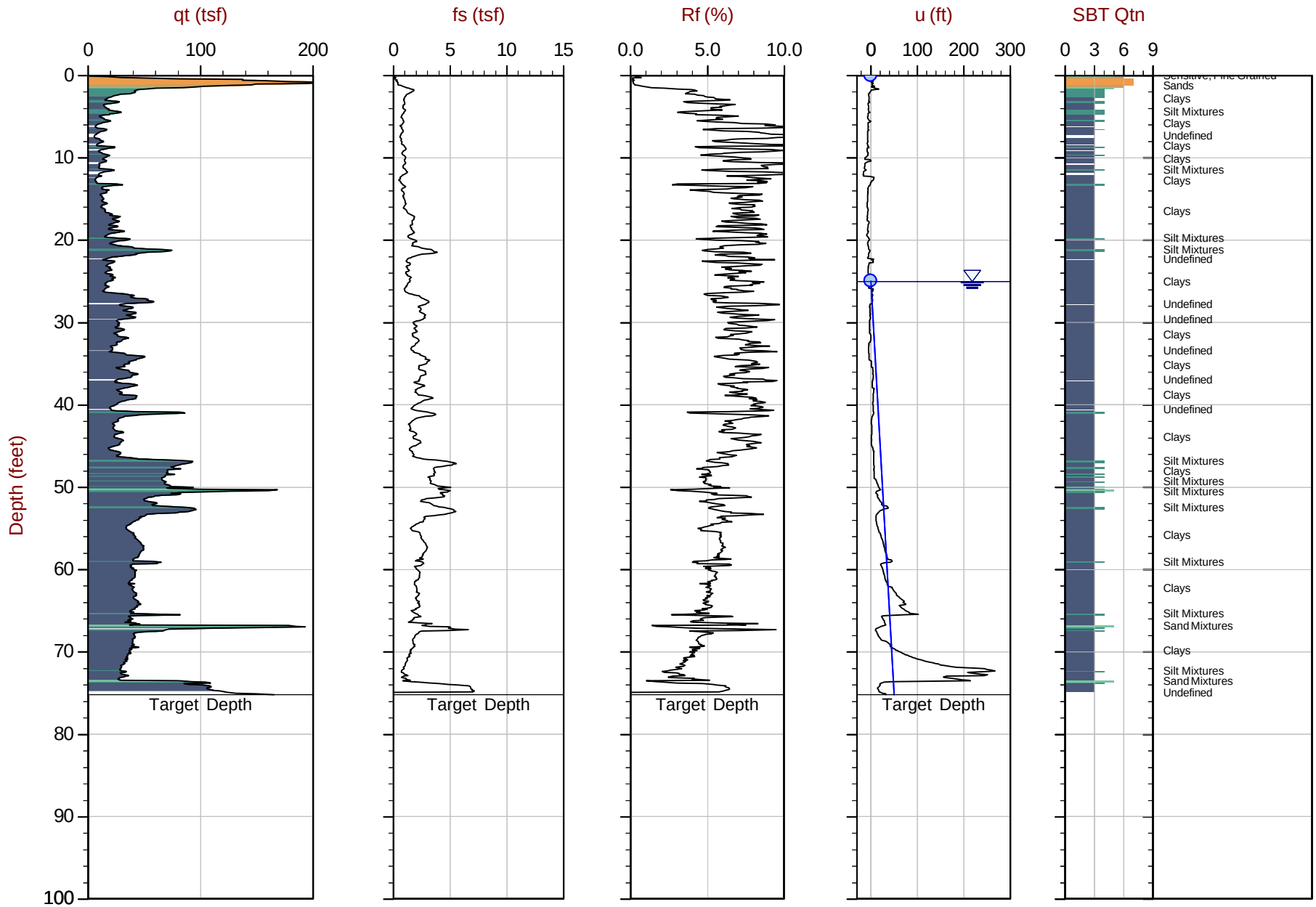
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142493ft E: 13396161ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-02 14:15
Site: DTE Monroe Power Plant

Sounding: CPT20-018
Cone: 568:T1500F15U500



Max Depth: 22.925 m / 75.21 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP018.COR
Unit Wt: SBTQtn (PKR2009)

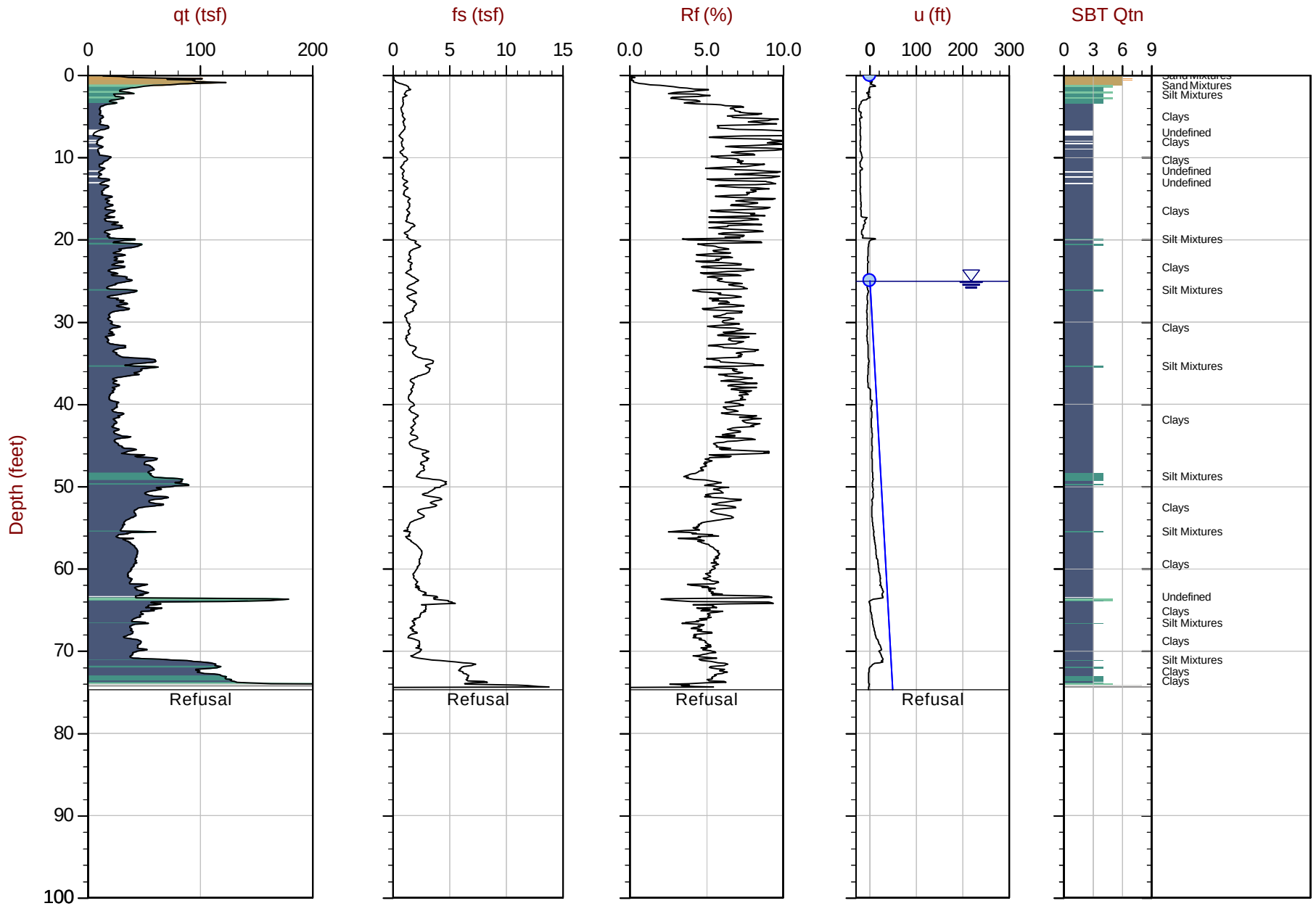
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142568ft E: 13395971ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-02 15:22
Site: DTE Monroe Power Plant

Sounding: CPT20-020
Cone: 568:T1500F15U500



Max Depth: 22.775 m / 74.72 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP020.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142644ft E: 13395785ft
Sheet No: 1 of 1

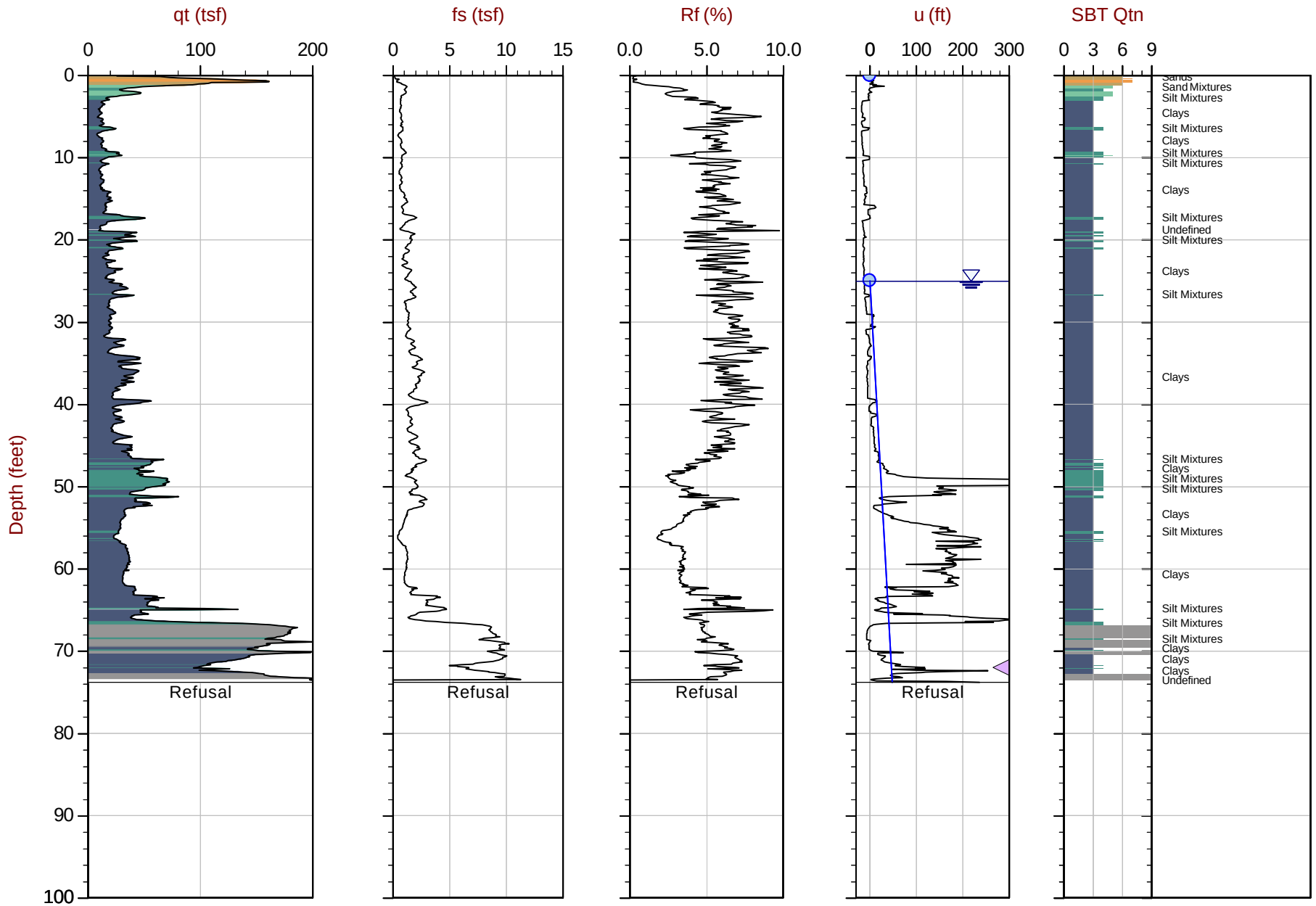
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-03 08:59
Site: DTE Monroe Power Plant

Sounding: CPT20-022
Cone: 551:T1500F15U500



Max Depth: 22.500 m / 73.82 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP022.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142715ft E: 13395602ft
Sheet No: 1 of 1

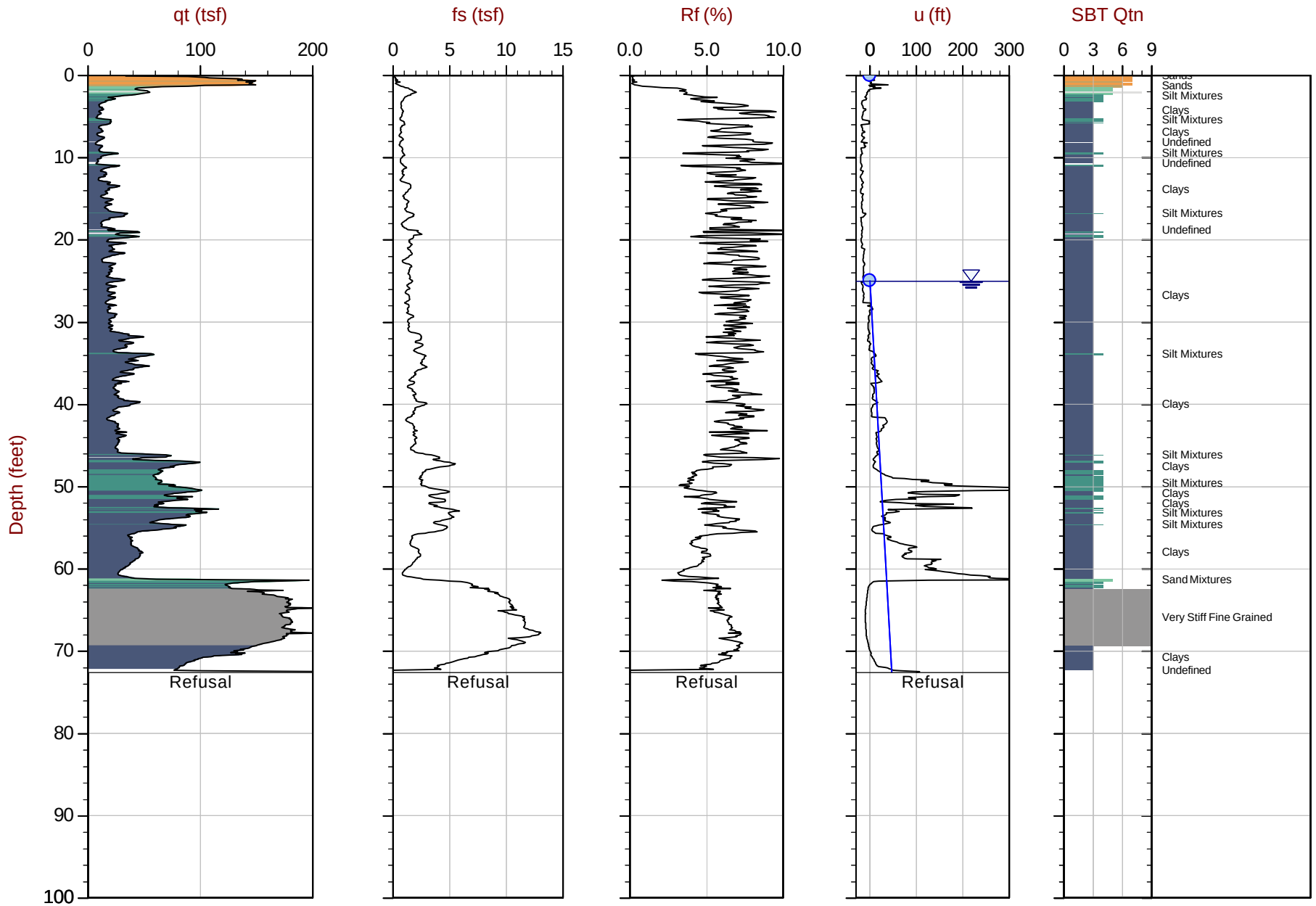
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-03 10:09
Site: DTE Monroe Power Plant

Sounding: CPT20-024
Cone: 551:T1500F15U500



Max Depth: 22.125 m / 72.59 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP024.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142797ft E: 13395407ft
Sheet No: 1 of 1

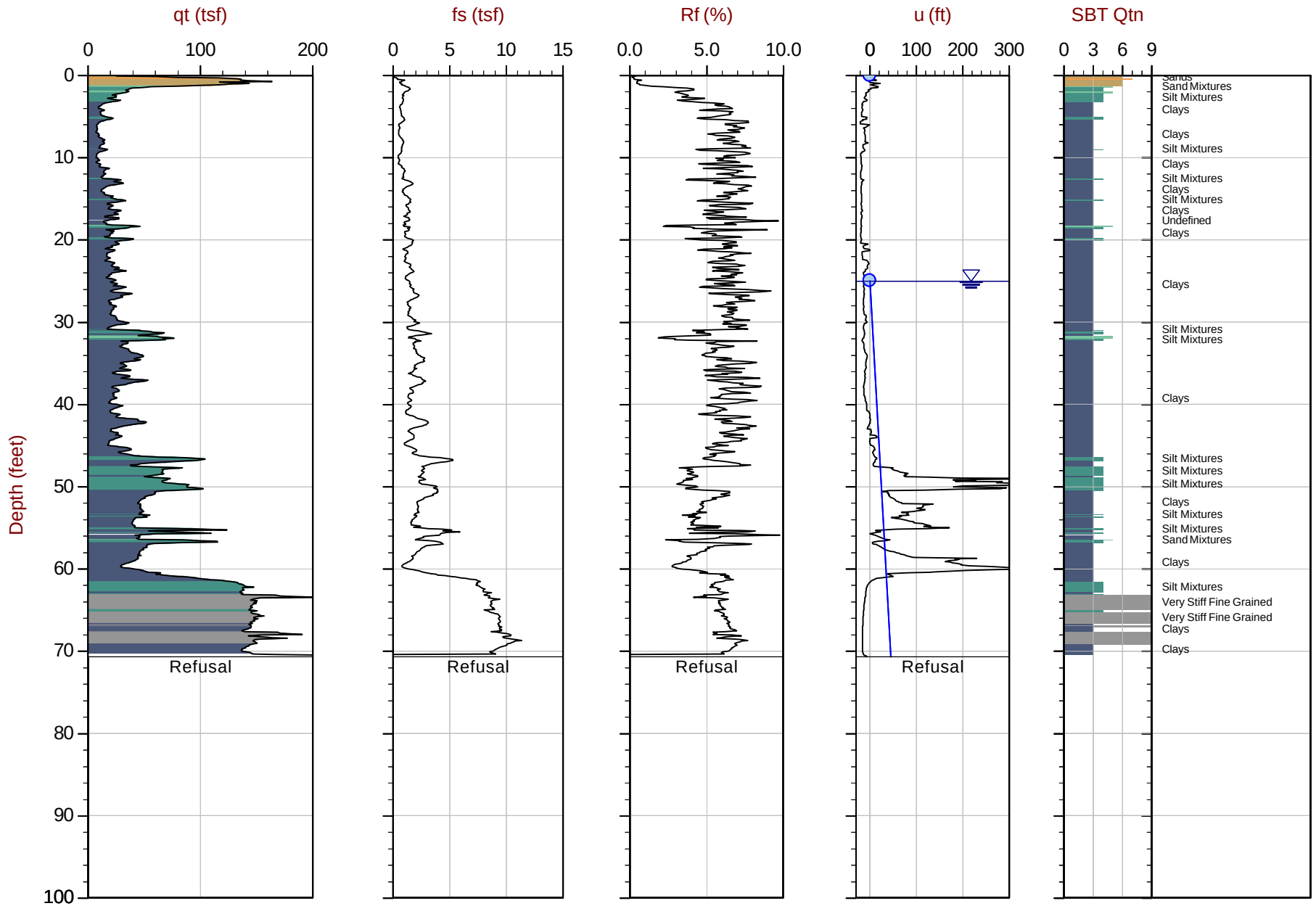
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-03 11:13
Site: DTE Monroe Power Plant

Sounding: CPT20-026
Cone: 551:T1500F15U500



Max Depth: 21.550 m / 70.70 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP026.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142864ft E: 13395239ft
Sheet No: 1 of 1

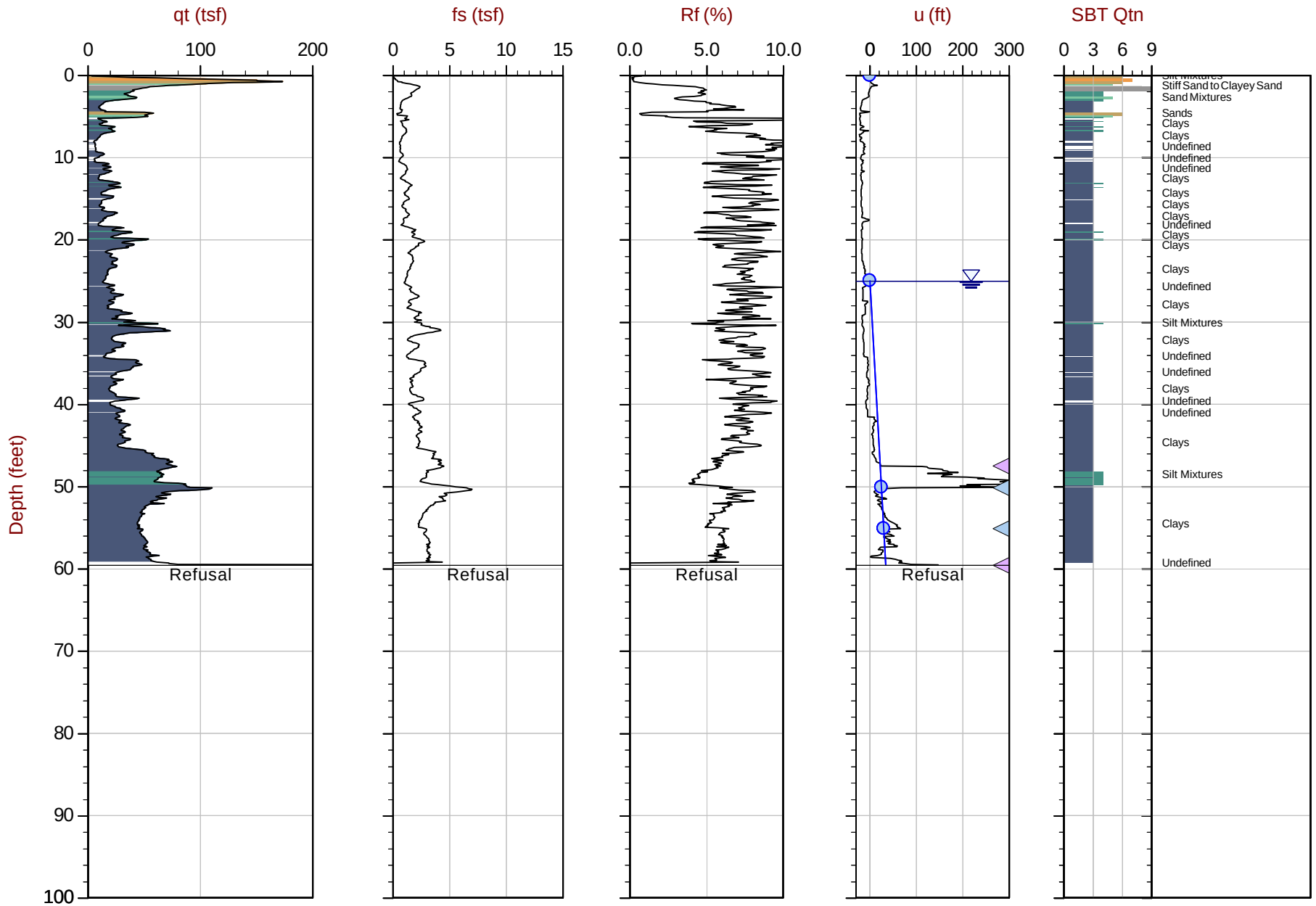
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-13 12:08
Site: DTE Monroe Power Plant

Sounding: CPT20-028
Cone: 551:T1500F15U500



Max Depth: 18.150 m / 59.55 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP028.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142938ft E: 13395052ft
Sheet No: 1 of 1

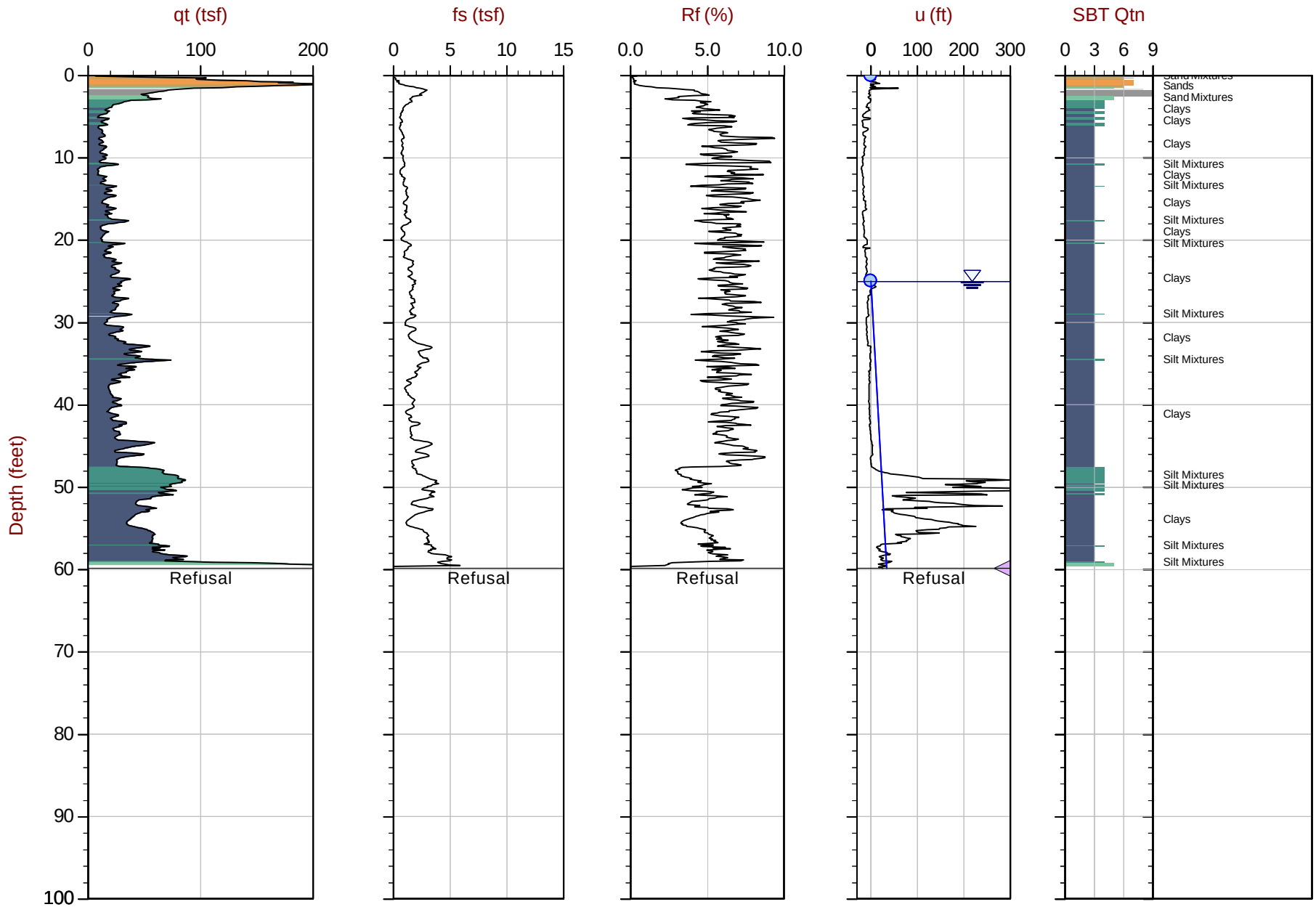
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-03 12:31
Site: DTE Monroe Power Plant

Sounding: CPT20-030
Cone: 551:T1500F15U500



Max Depth: 18.250 m / 59.87 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP030.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143004ft E: 13394895ft
Sheet No: 1 of 1

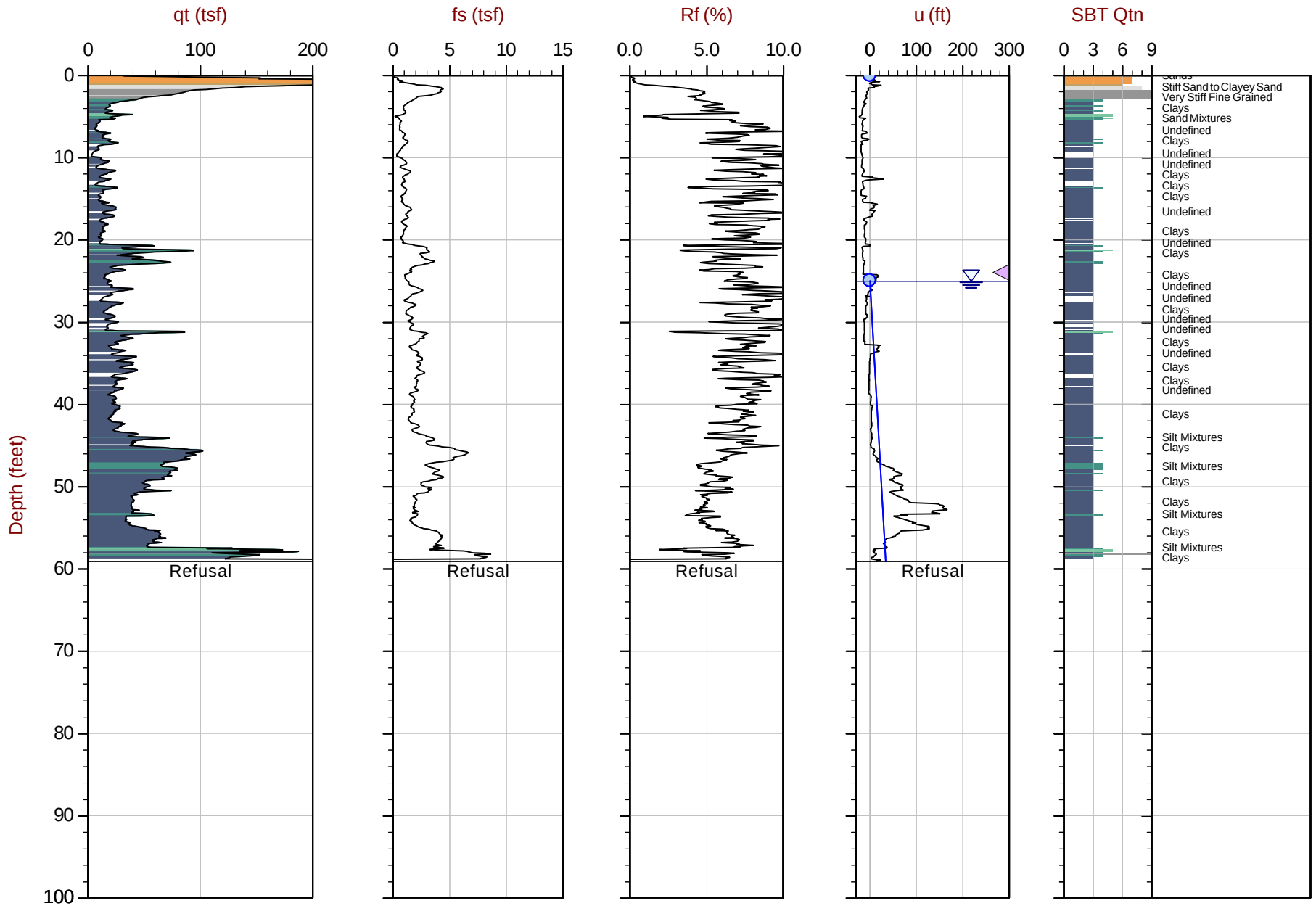
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-03 13:26
Site: DTE Monroe Power Plant

Sounding: CPT20-032
Cone: 551:T1500F15U500



Max Depth: 18.025 m / 59.14 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP032.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142939ft E: 13394710ft
Sheet No: 1 of 1

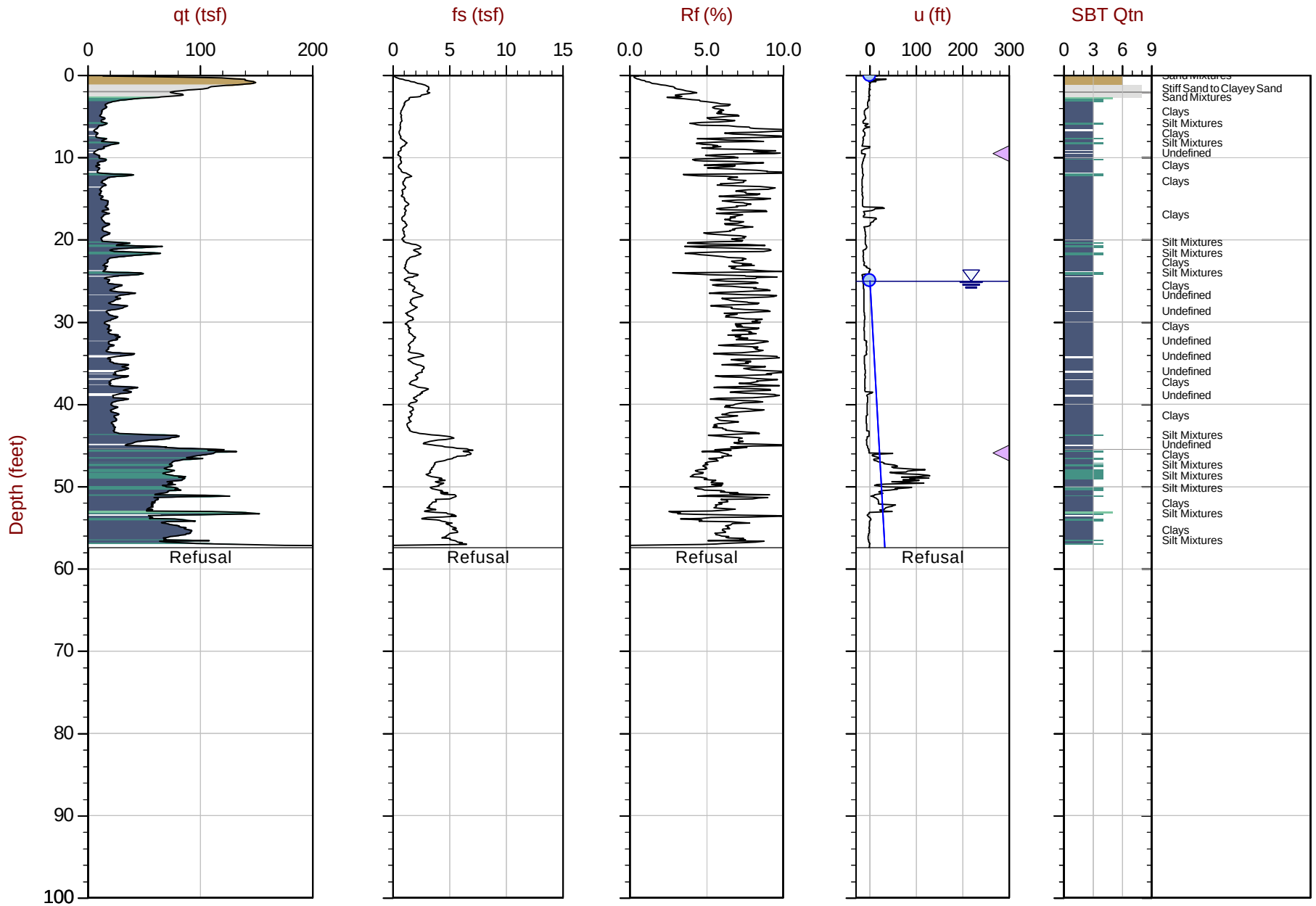
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-03 14:24
Site: DTE Monroe Power Plant

Sounding: CPT20-034
Cone: 551:T1500F15U500



Max Depth: 17.500 m / 57.41 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP034.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142785ft E: 13394560ft
Sheet No: 1 of 1

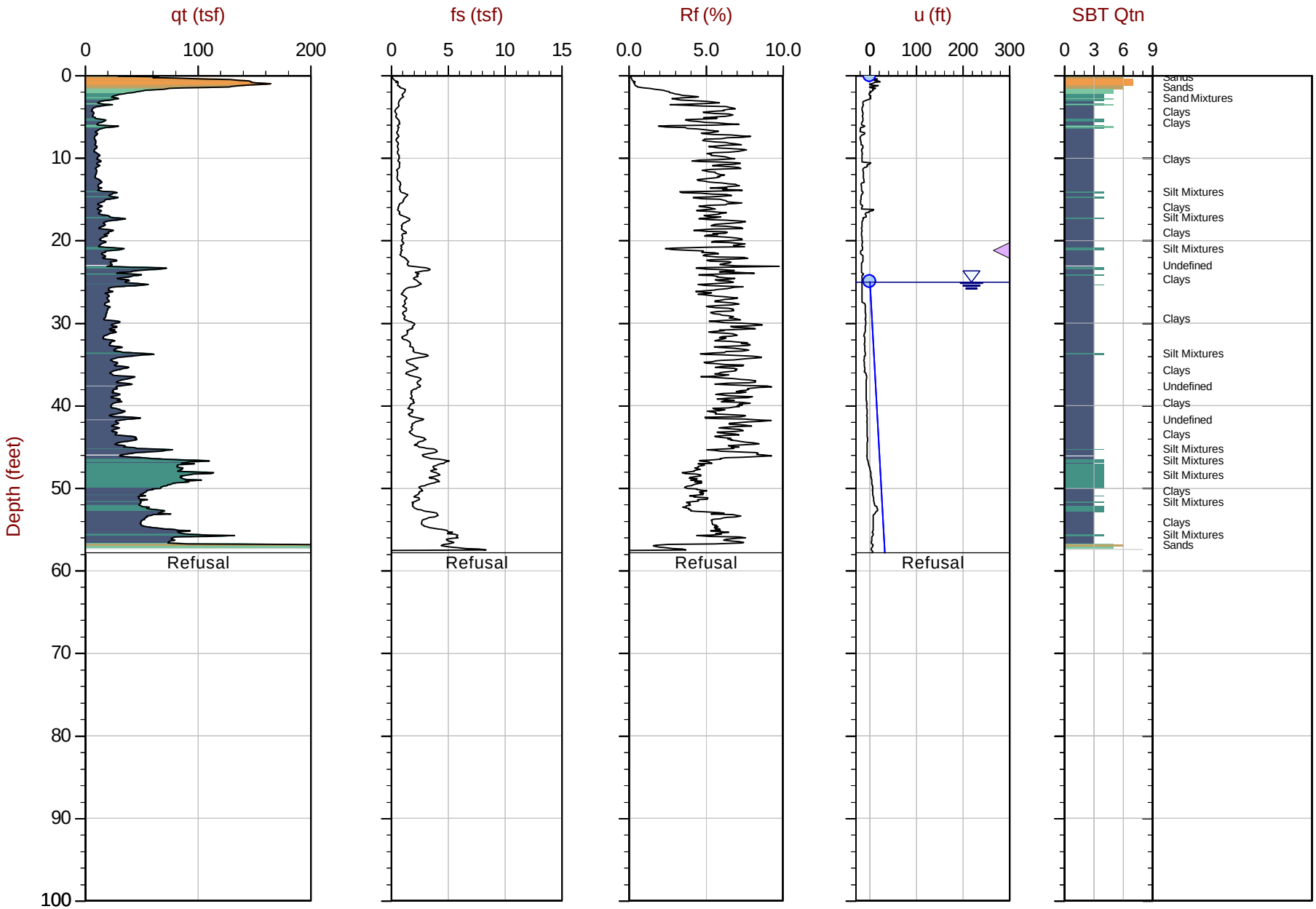
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-04 09:07
Site: DTE Monroe Power Plant

Sounding: CPT20-036
Cone: 551:T1500F15U500



Max Depth: 17.625 m / 57.82 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP036.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142655ft E: 13394432ft
Sheet No: 1 of 1

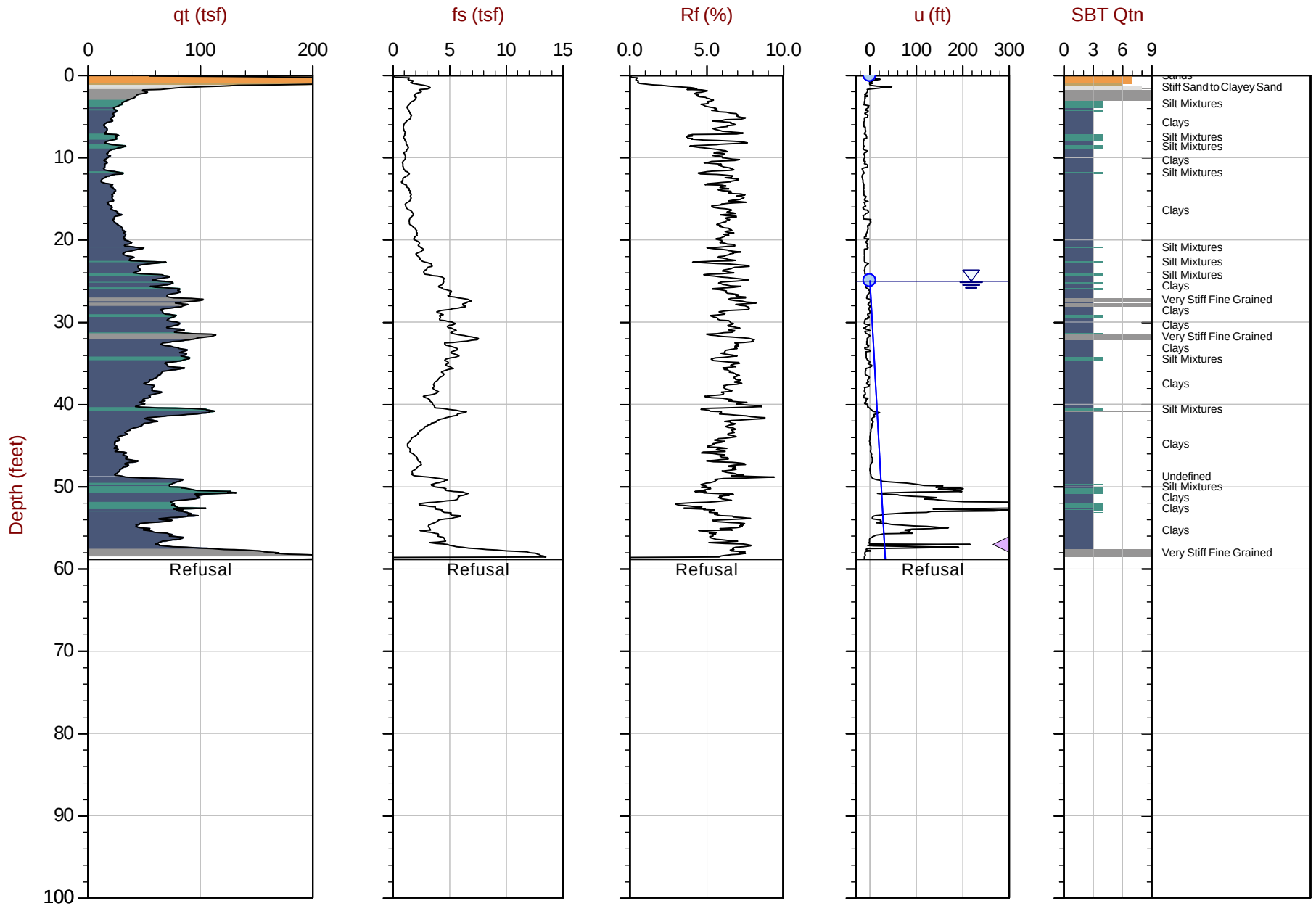
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-04 10:59
Site: DTE Monroe Power Plant

Sounding: CPT20-038
Cone: 551:T1500F15U500



Max Depth: 17.950 m / 58.89 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP038.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142596ft E: 13394252ft
Sheet No: 1 of 1

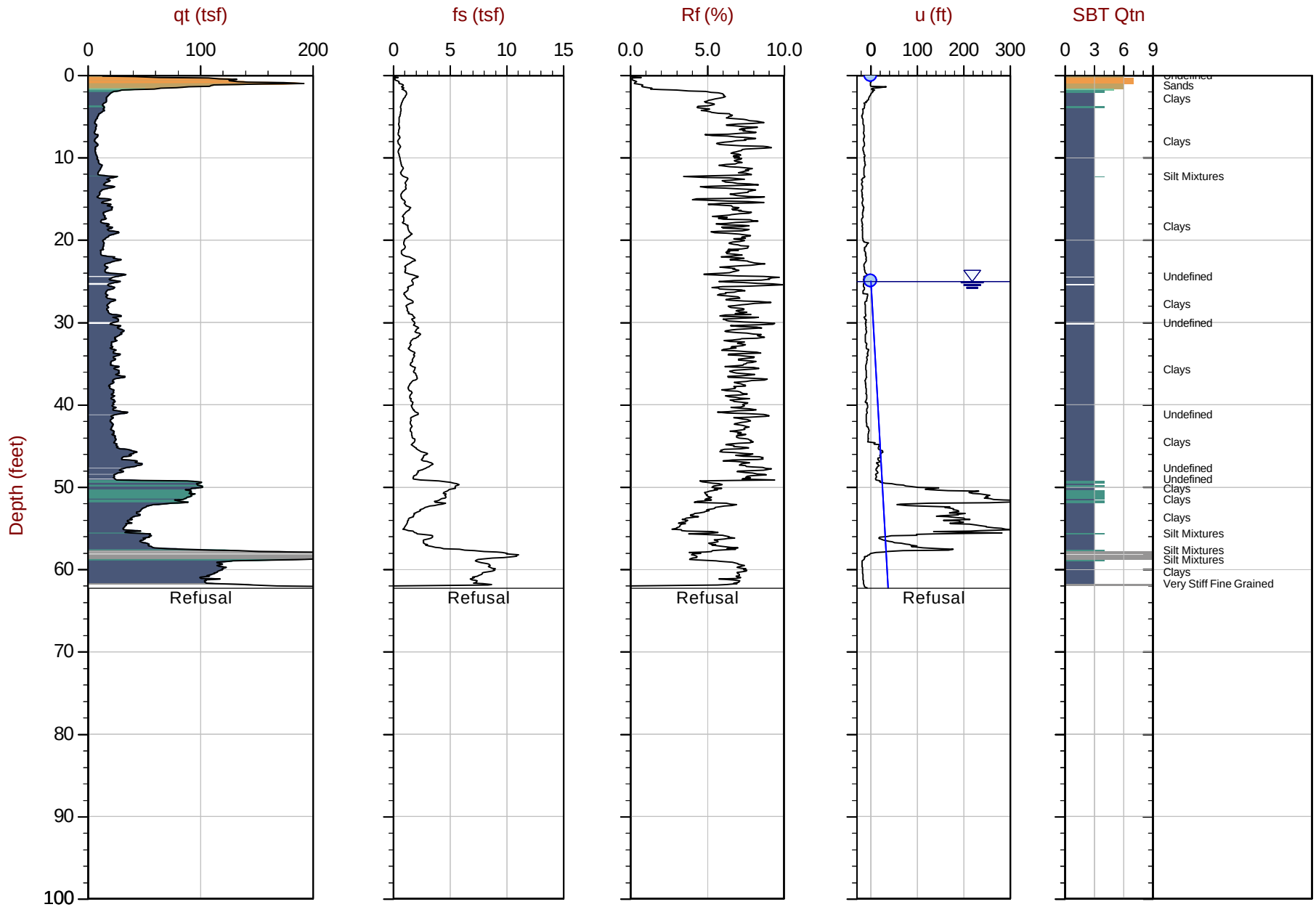
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-04 12:50
Site: DTE Monroe Power Plant

Sounding: CPT20-040
Cone: 551:T1500F15U500



Max Depth: 18.975 m / 62.25 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP040.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142693ft E: 13394075ft
Sheet No: 1 of 1

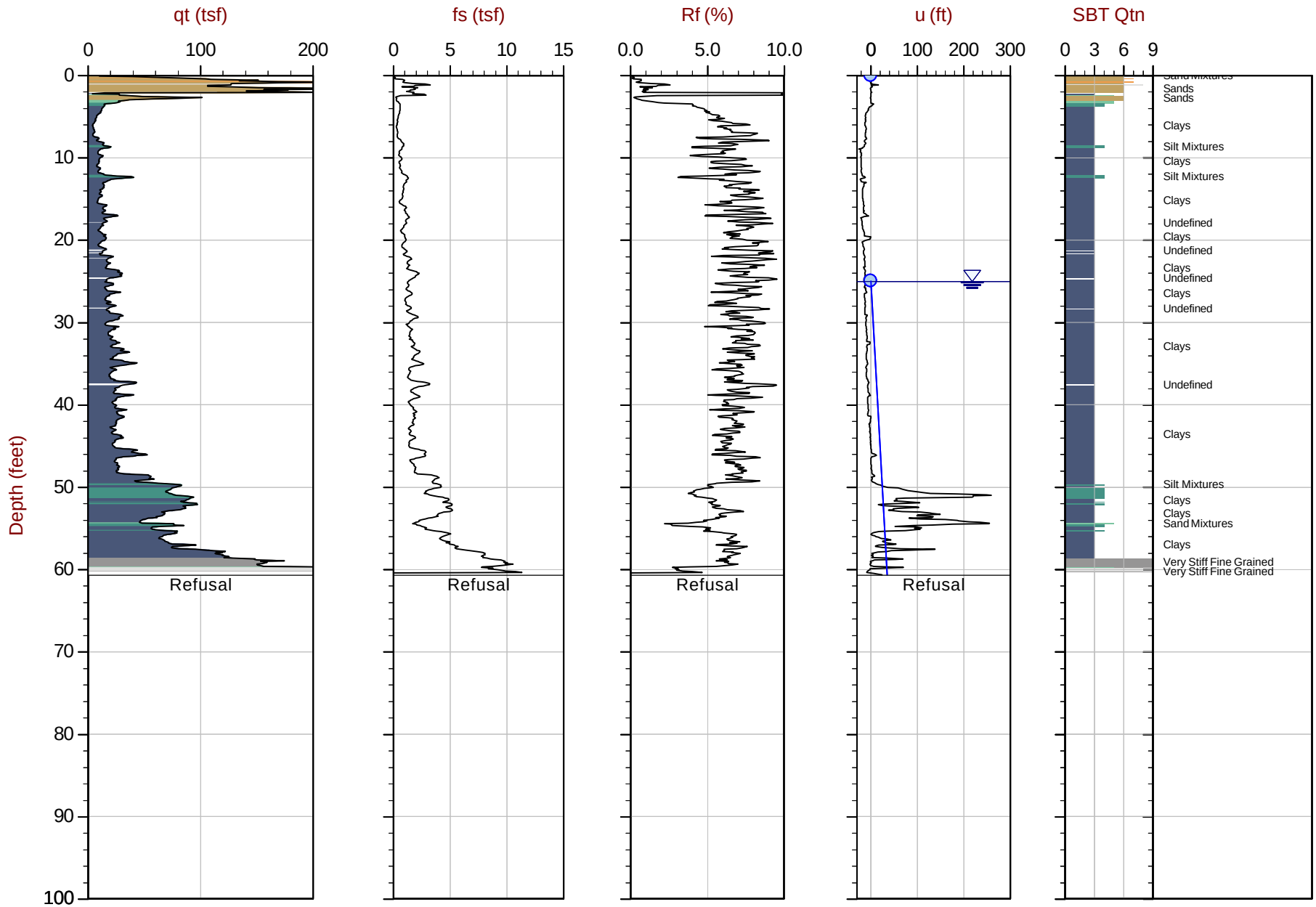
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-04 13:47
Site: DTE Monroe Power Plant

Sounding: CPT20-042
Cone: 551:T1500F15U500



Max Depth: 18.500 m / 60.69 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP042.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142835ft E: 13393929ft
Sheet No: 1 of 1

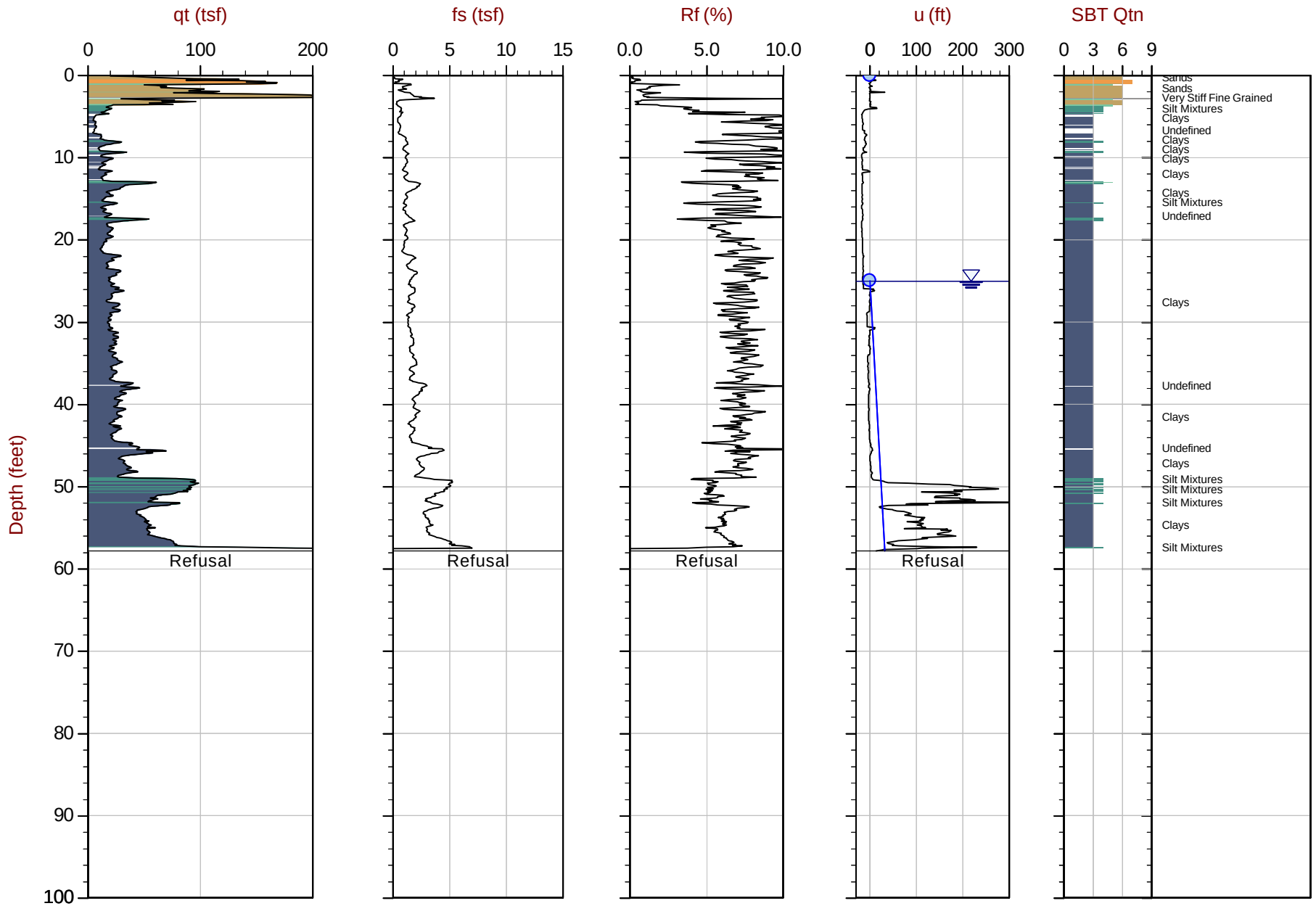
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-04 14:41
Site: DTE Monroe Power Plant

Sounding: CPT20-044
Cone: 551:T1500F15U500



Max Depth: 17.625 m / 57.82 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP044.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142982ft E: 13393790ft
Sheet No: 1 of 1

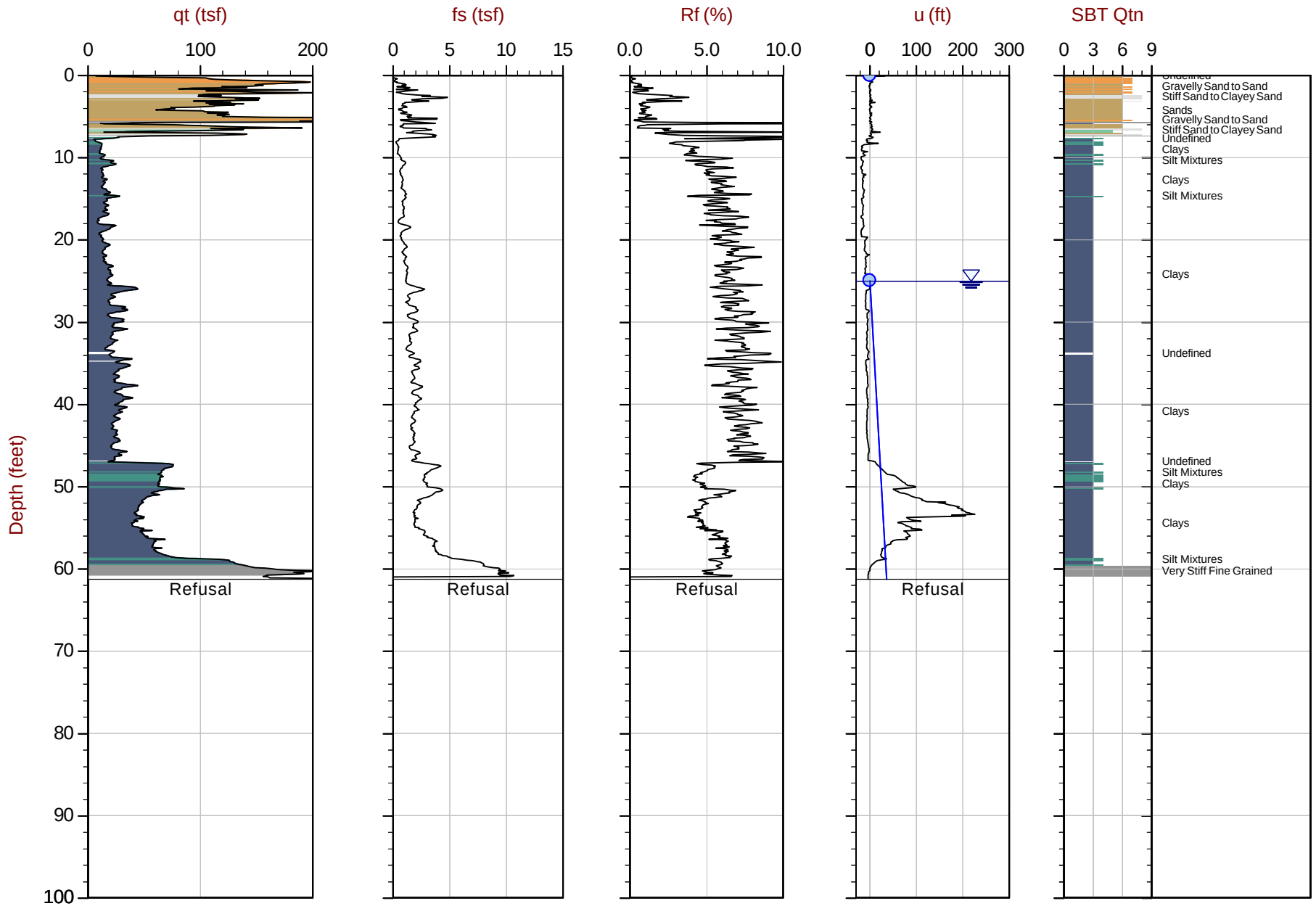
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-05 08:36
Site: DTE Monroe Power Plant

Sounding: CPT20-046
Cone: 551:T1500F15U500



Max Depth: 18.675 m / 61.27 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP046.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143108ft E: 13393655ft
Sheet No: 1 of 1

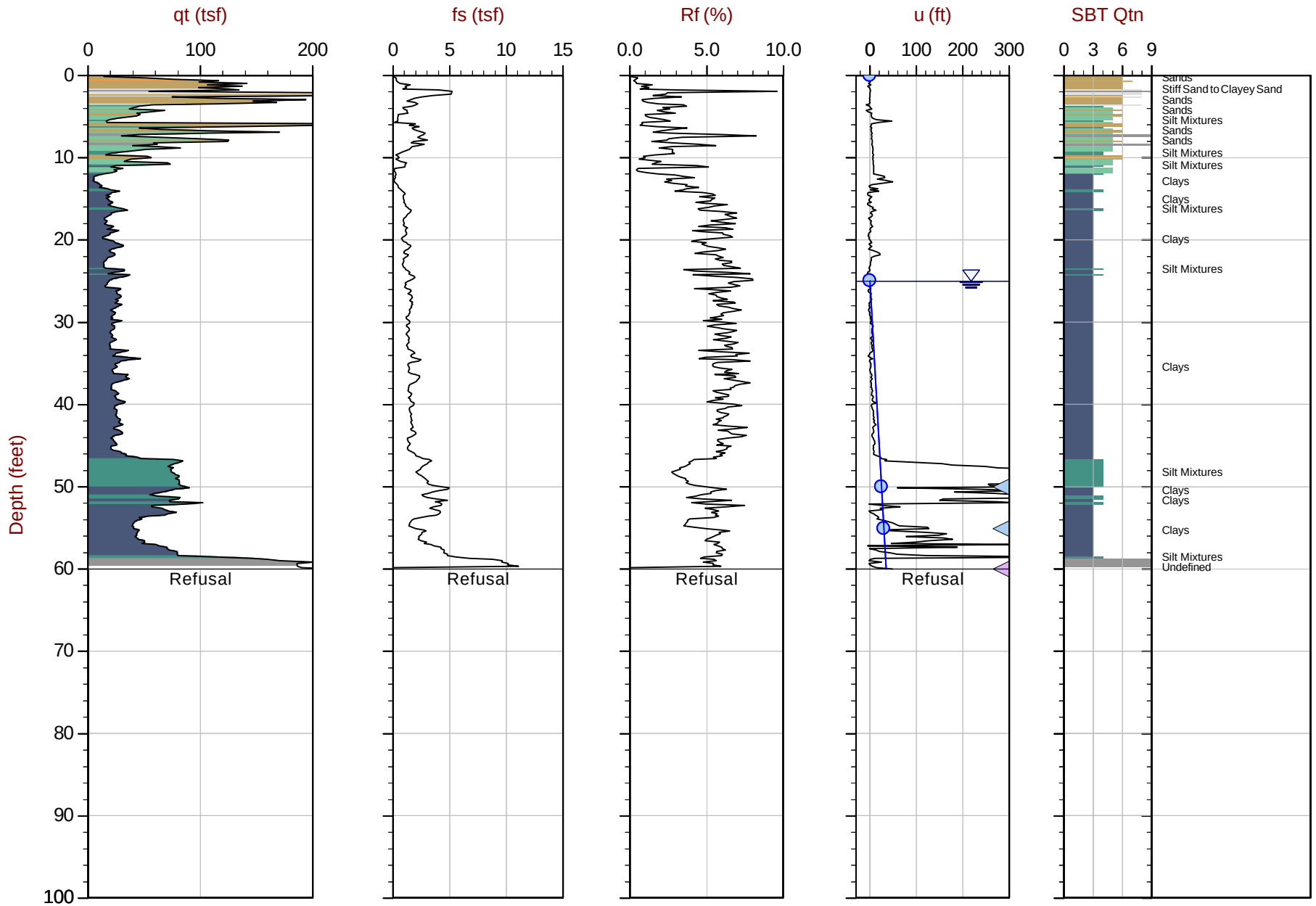
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-13 12:22
Site: DTE Monroe Power Plant

Sounding: CPT20-048
Cone: 568:T1500F15U500



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP048.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143131ft E: 13393508ft
Sheet No: 1 of 1

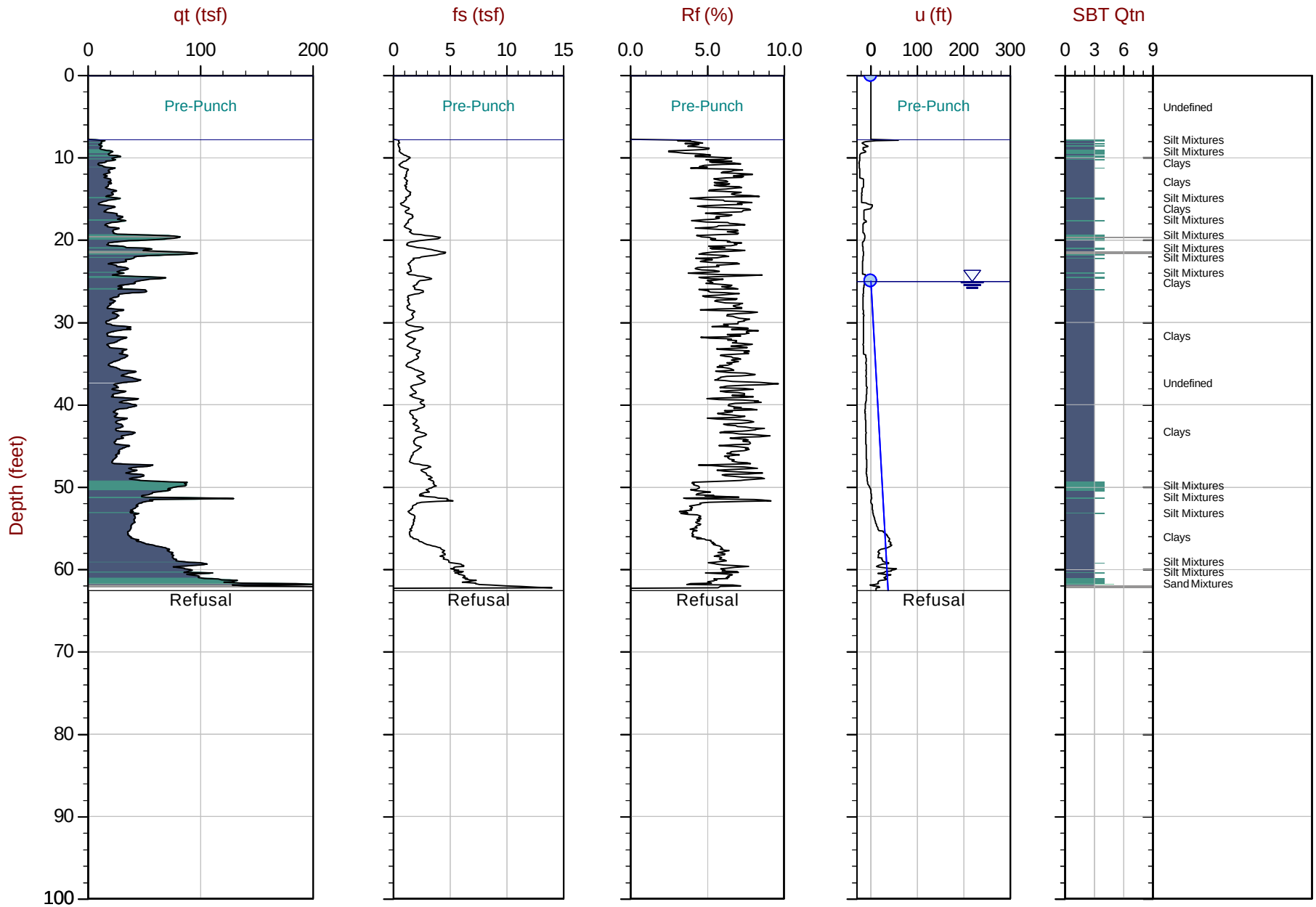
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-05 10:01
Site: DTE Monroe Power Plant

Sounding: SCPT20-050
Cone: 551:T1500F15U500



Max Depth: 19.075 m / 62.58 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_SP050.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143162ft E: 13393217ft
Sheet No: 1 of 1

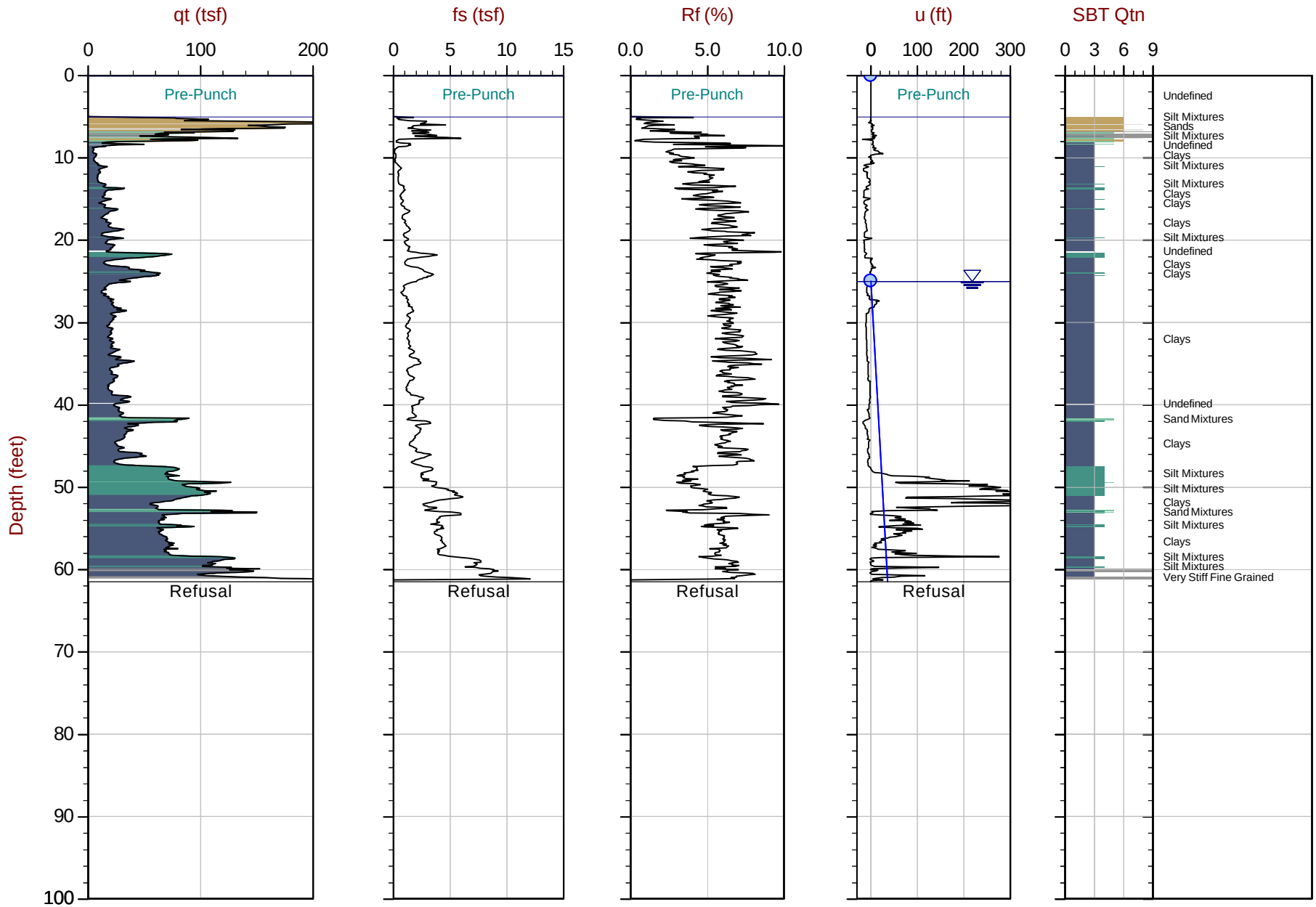
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-05 11:17
Site: DTE Monroe Power Plant

Sounding: CPT20-052
Cone: 551:T1500F15U500



Max Depth: 18.750 m / 61.52 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP052.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143174ft E: 13393046ft
Sheet No: 1 of 1

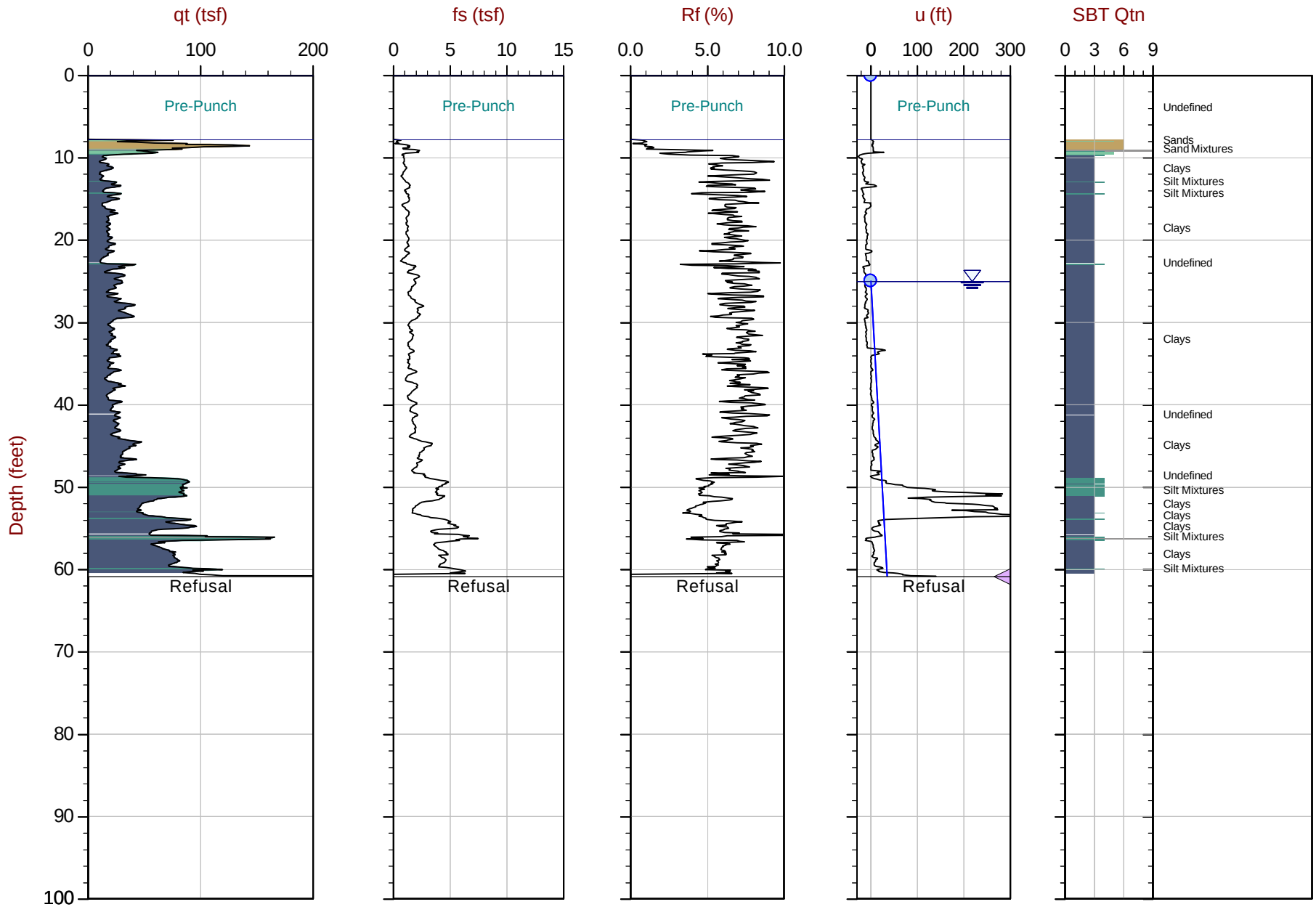
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-05 12:28
Site: DTE Monroe Power Plant

Sounding: CPT20-054
Cone: 551:T1500F15U500



Max Depth: 18.550 m / 60.86 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP054.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143198ft E: 13392845ft
Sheet No: 1 of 1

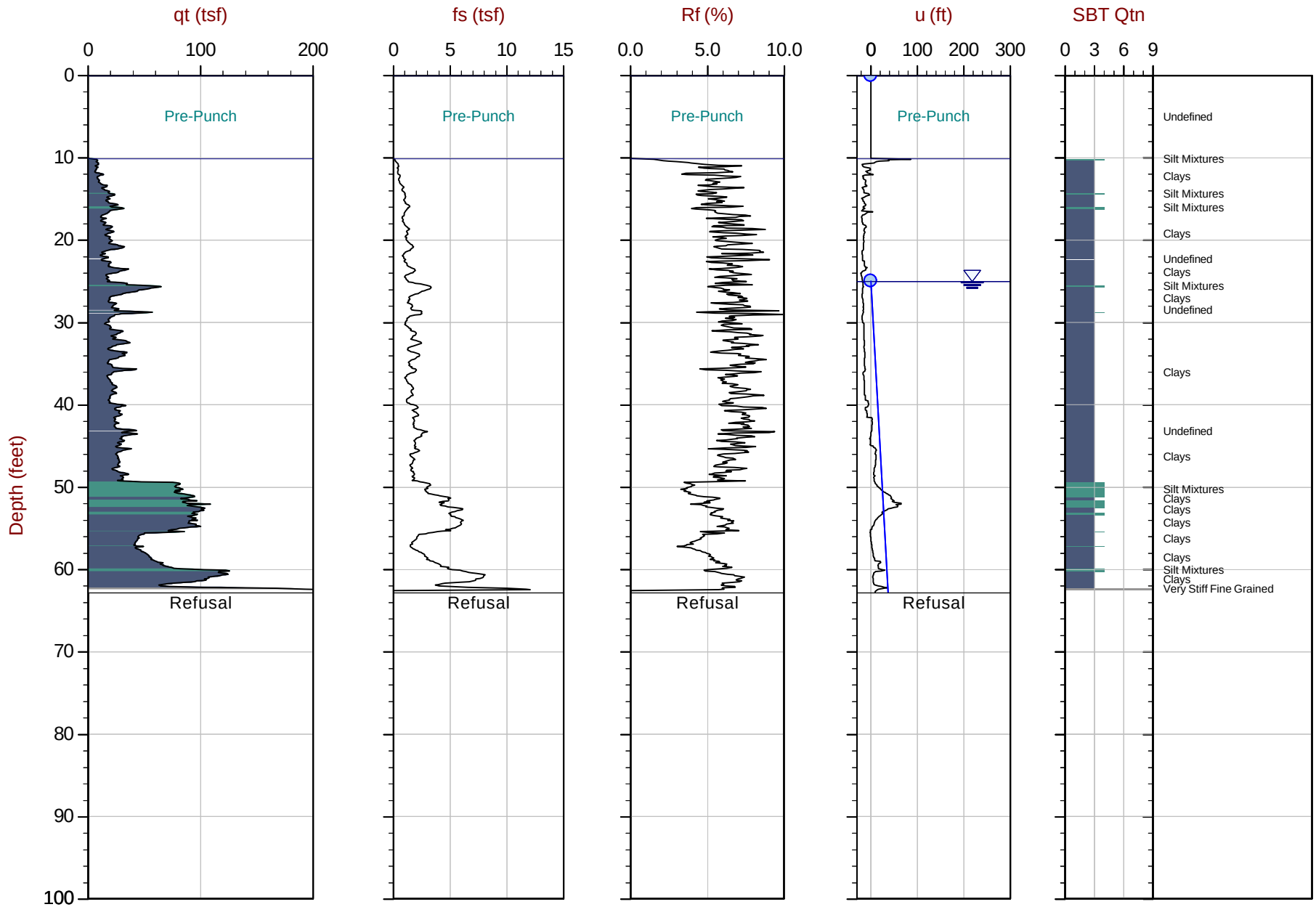
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-05 13:29
Site: DTE Monroe Power Plant

Sounding: CPT20-056
Cone: 551:T1500F15U500



Max Depth: 19.150 m / 62.83 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP056.COR
Unit Wt: SBTQtn (PKR2009)

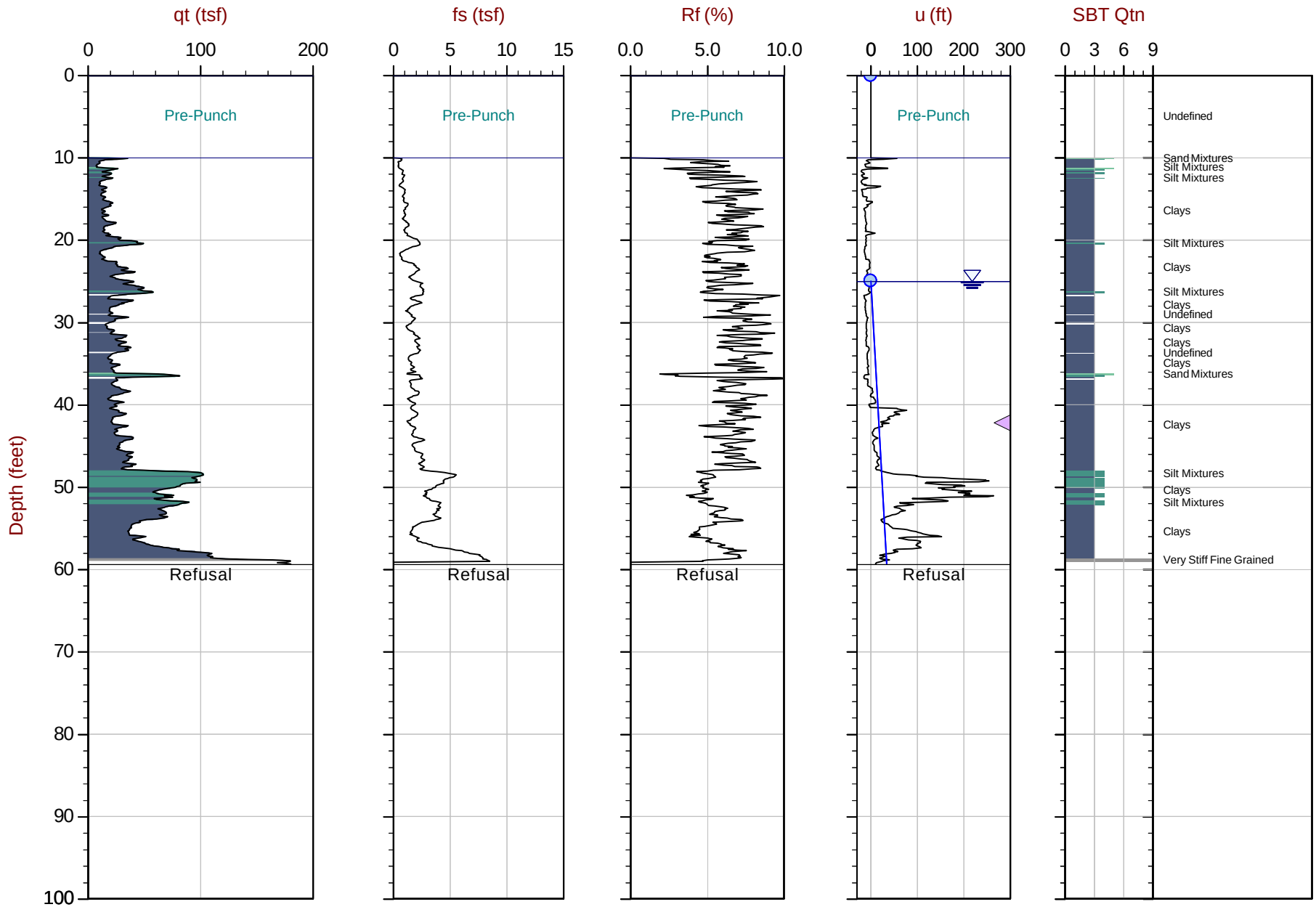
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143212ft E: 13392641ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-06 13:22
Site: DTE Monroe Power Plant

Sounding: CPT20-058
Cone: 551:T1500F15U500



Max Depth: 18.100 m / 59.38 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP058.COR
Unit Wt: SBTQtn (PKR2009)

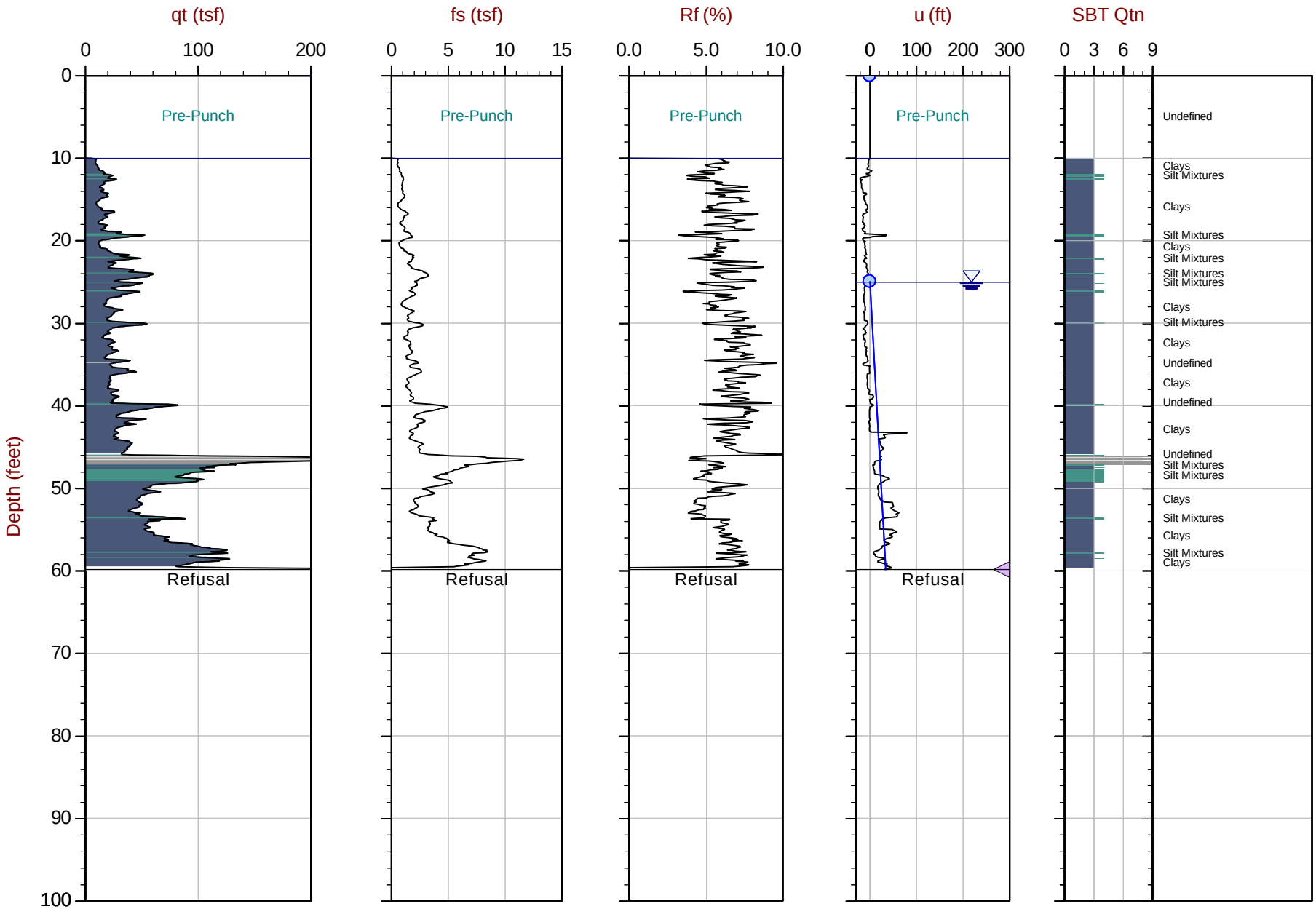
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143229ft E: 13392449ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-06 12:21
Site: DTE Monroe Power Plant

Sounding: CPT20-060
Cone: 551:T1500F15U500



Max Depth: 18.250 m / 59.87 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP060.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143248ft E: 13392268ft
Sheet No: 1 of 1

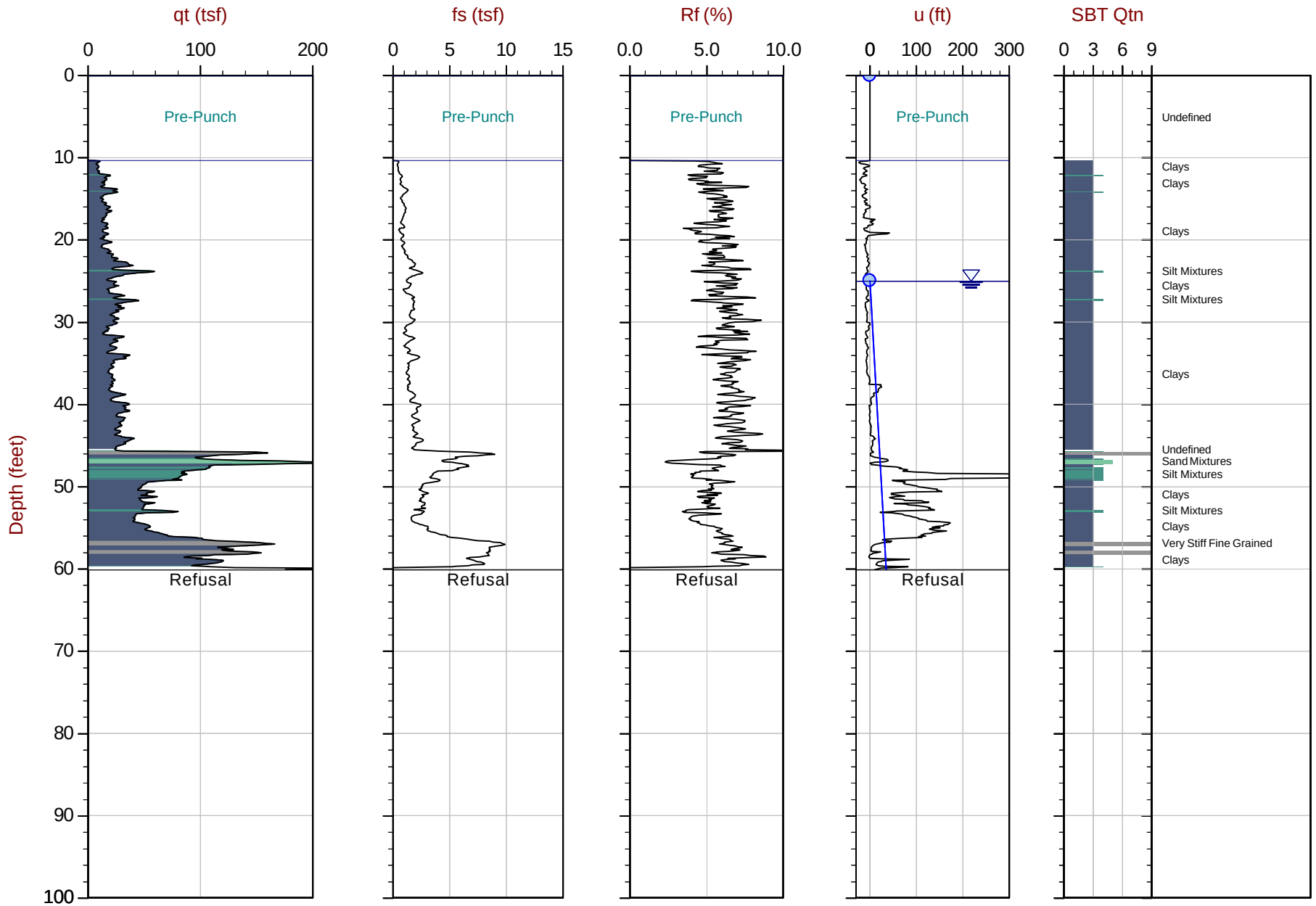
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-06 11:16
Site: DTE Monroe Power Plant

Sounding: CPT20-062
Cone: 551:T1500F15U500



Max Depth: 18.325 m / 60.12 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP062.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143281ft E: 13392058ft
Sheet No: 1 of 1

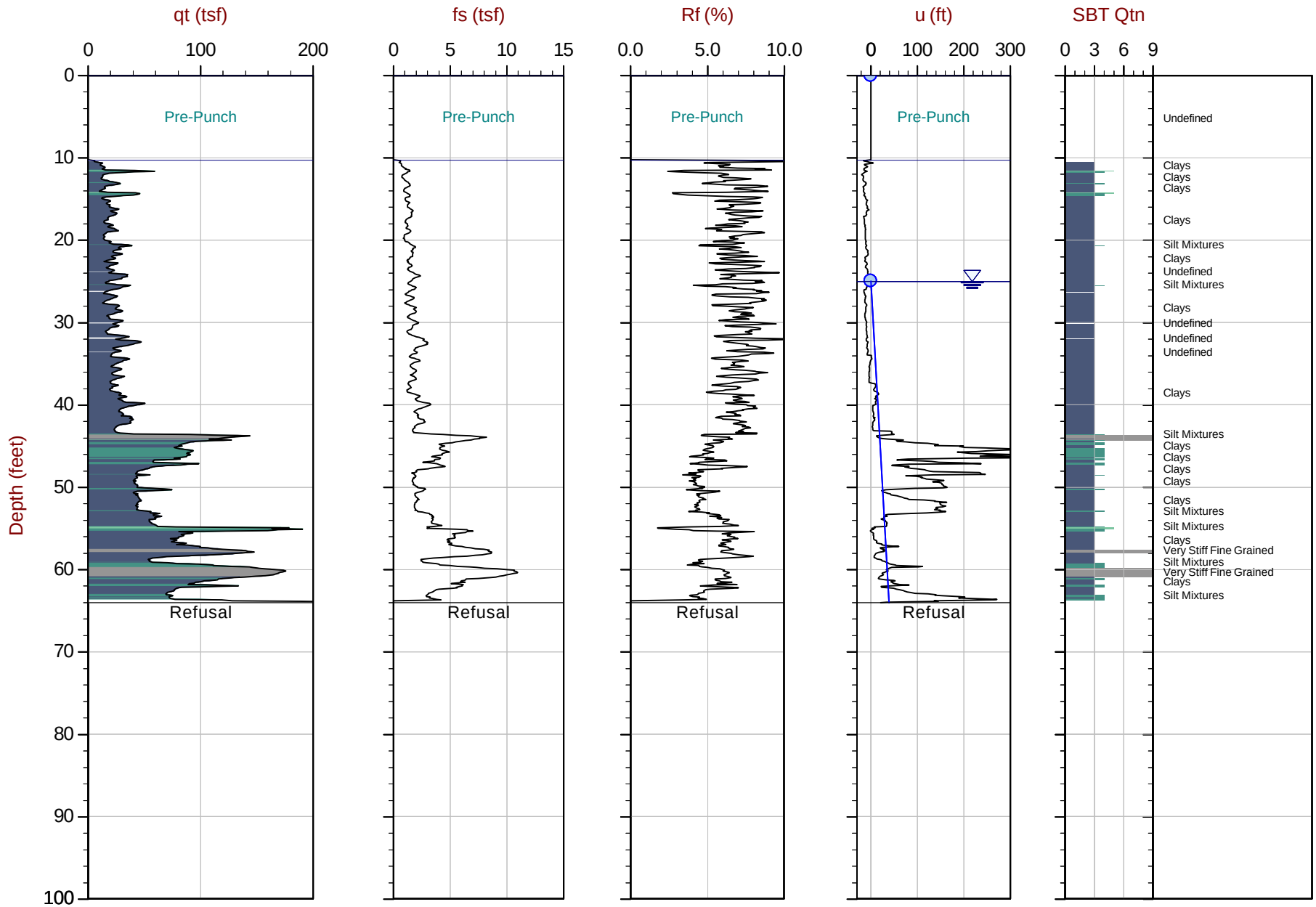
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-06 10:05
Site: DTE Monroe Power Plant

Sounding: CPT20-064
Cone: 551:T1500F15U500



Max Depth: 19.525 m / 64.06 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP064.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143336ft E: 13391874ft
Sheet No: 1 of 1

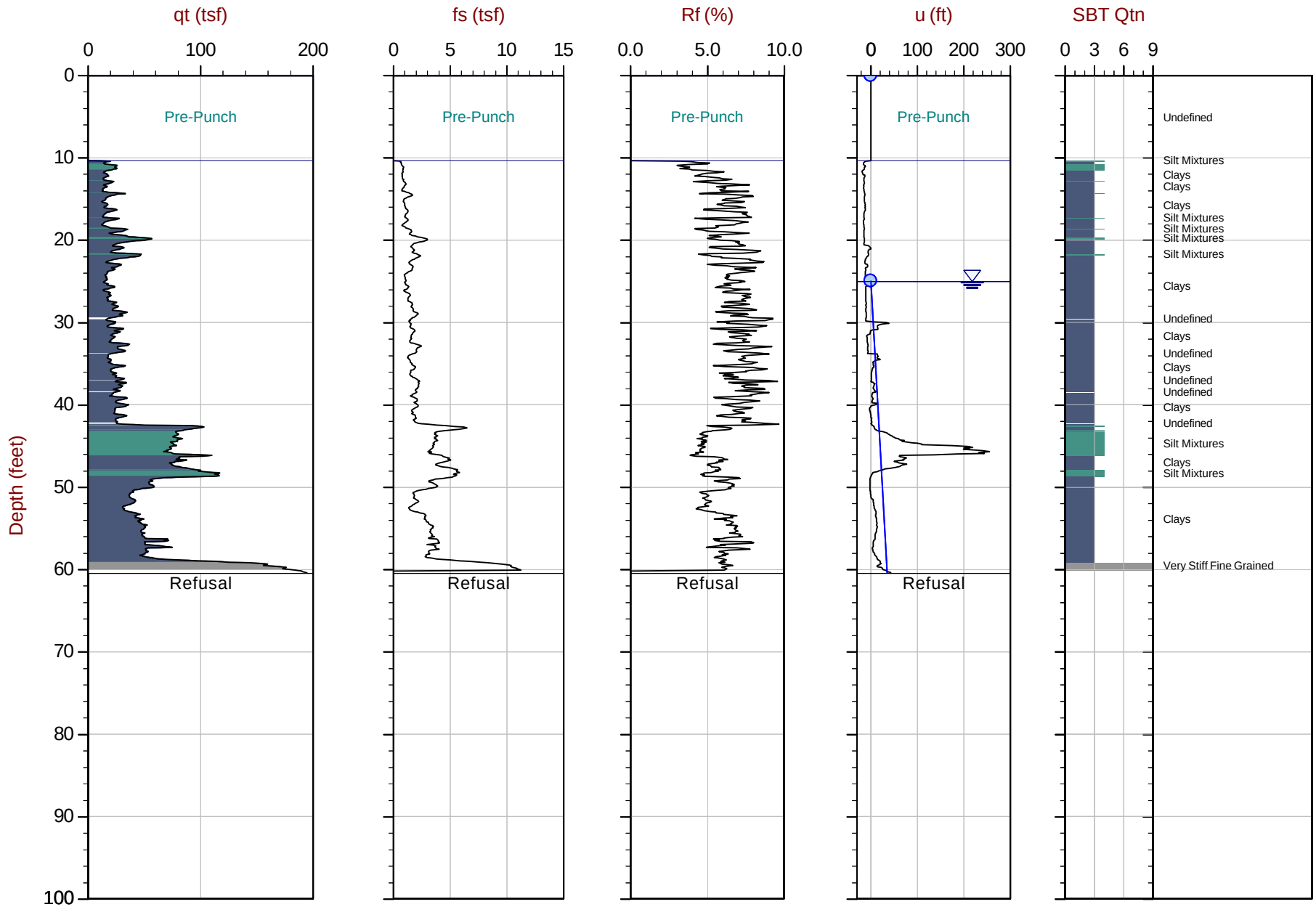
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-06 09:06
Site: DTE Monroe Power Plant

Sounding: CPT20-066
Cone: 551:T1500F15U500



Max Depth: 18.425 m / 60.45 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP066.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143404ft E: 13391672ft
Sheet No: 1 of 1

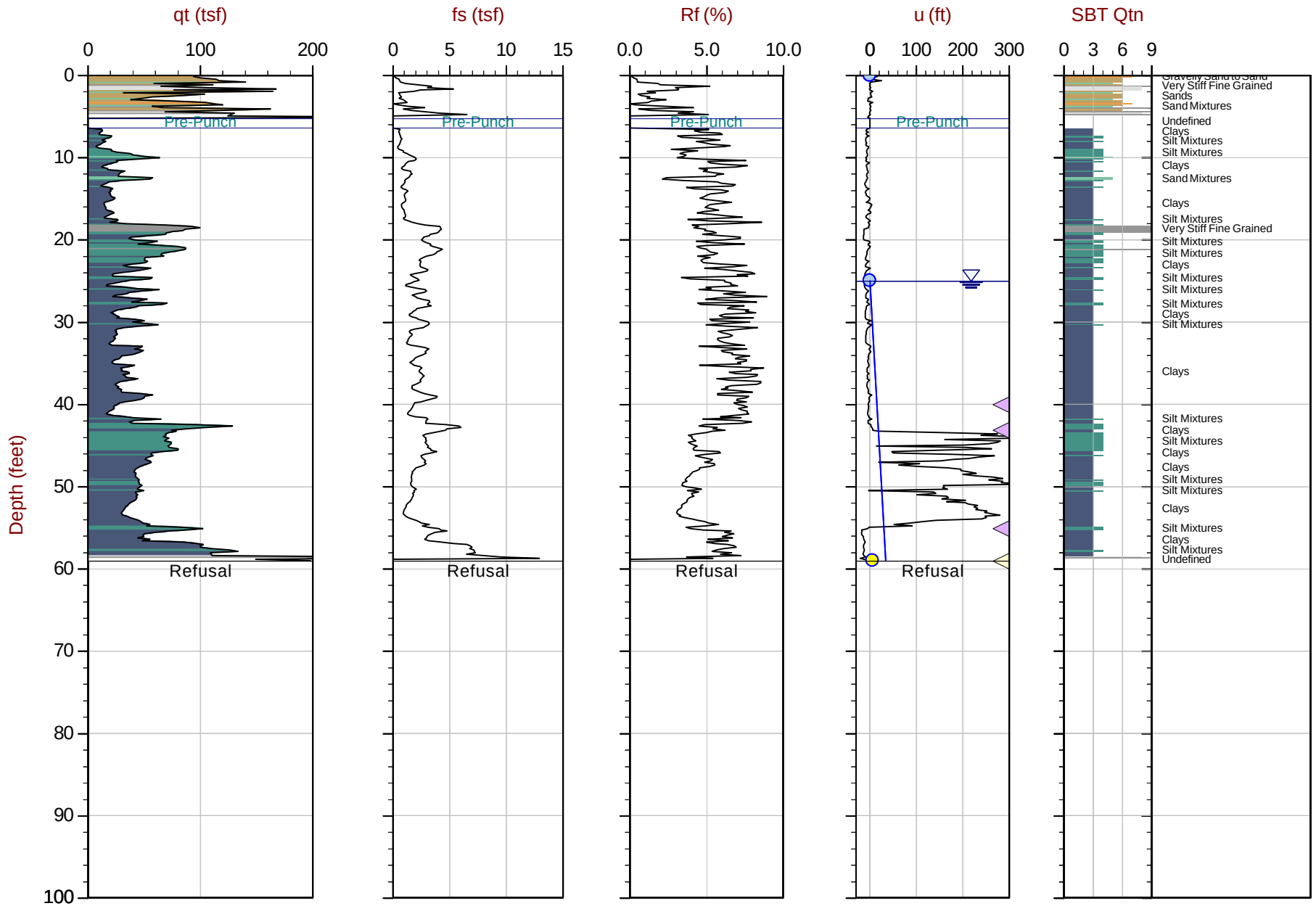
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-13 08:36
Site: DTE Monroe Power Plant

Sounding: CPT20-068
Cone: 568:T1500F15U500



Max Depth: 18.000 m / 59.05 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP068.COR
Unit Wt: SBTQtn (PKR2009)

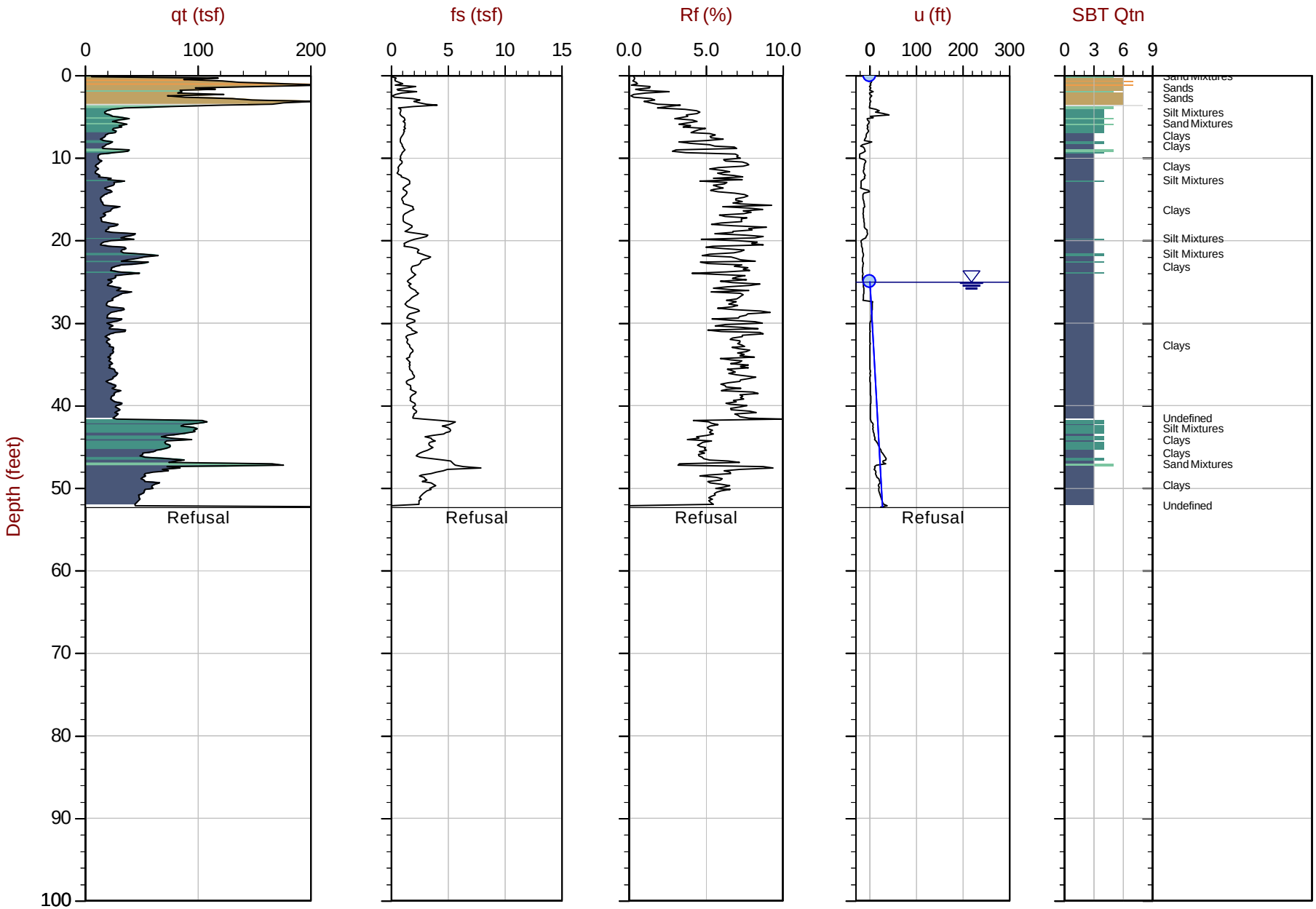
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143440ft E: 13391531ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-02 12:13
Site: DTE Monroe Power Plant

Sounding: CPT20-070
Cone: 567:T1500F15U500



Max Depth: 15.950 m / 52.33 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP070.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143314ft E: 13391366ft
Sheet No: 1 of 1

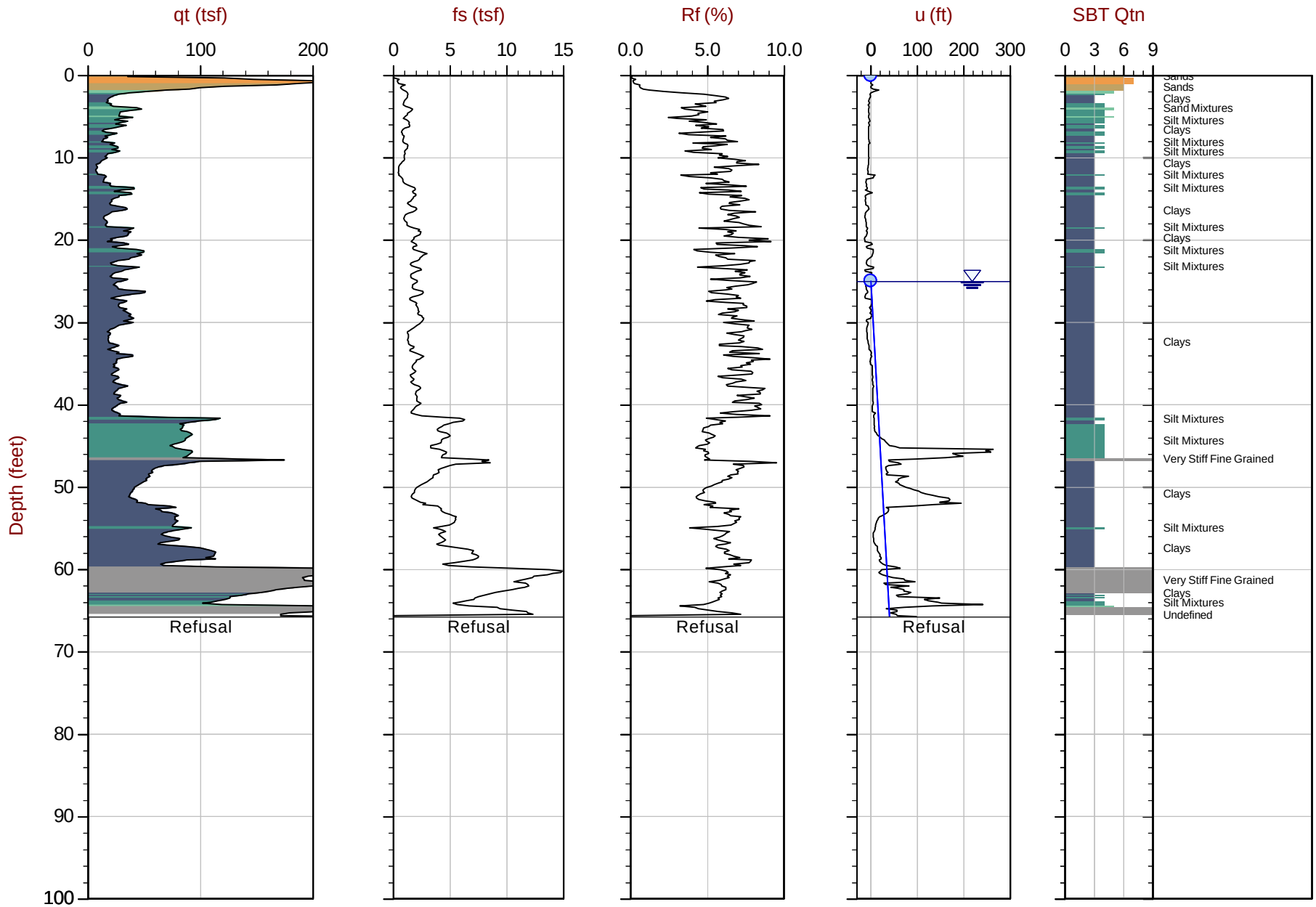
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-02 13:28
Site: DTE Monroe Power Plant

Sounding: CPT20-072
Cone: 567:T1500F15U500



Max Depth: 20.050 m / 65.78 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP072.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143165ft E: 13391247ft
Sheet No: 1 of 1

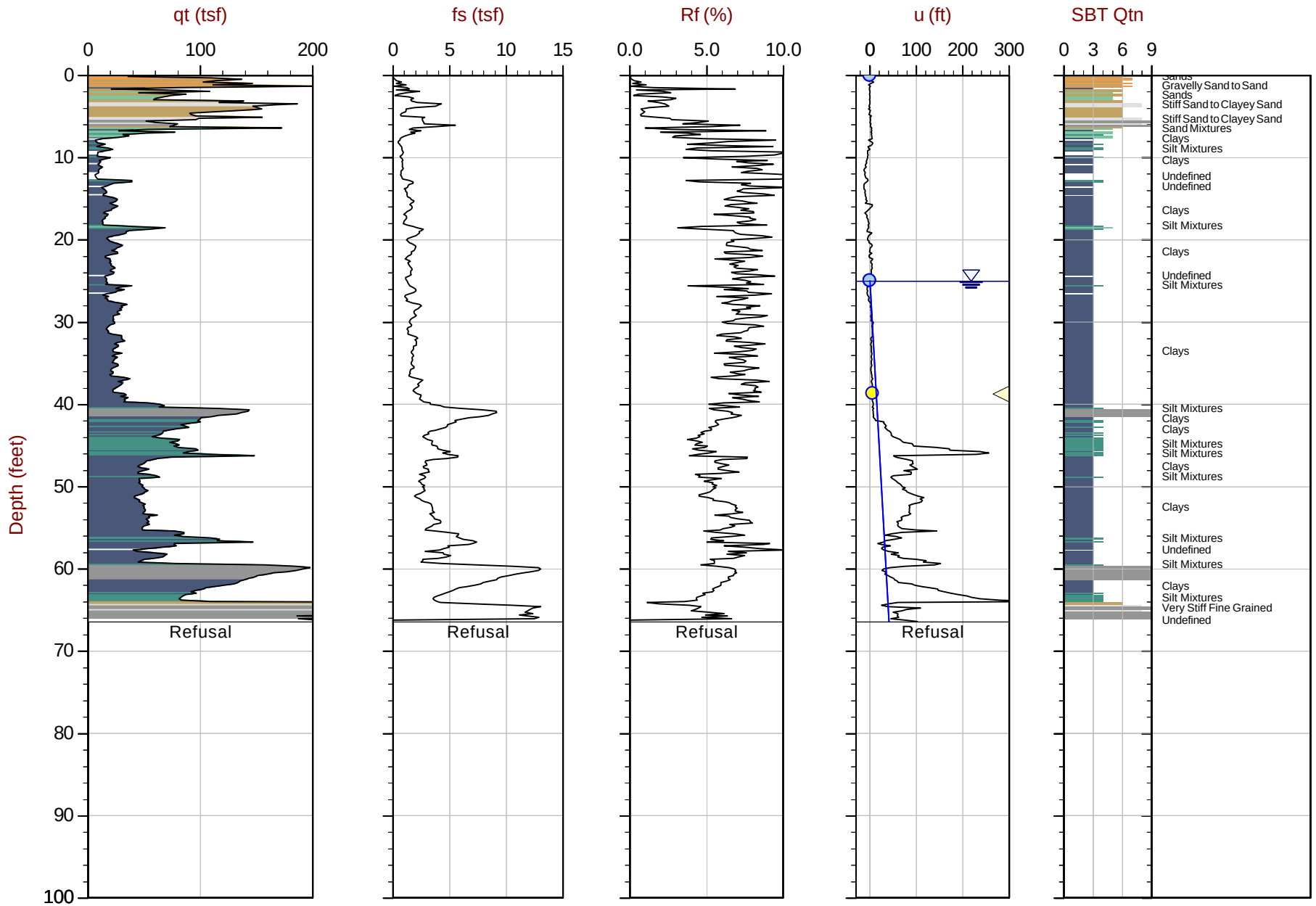
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-02 14:17
Site: DTE Monroe Power Plant

Sounding: CPT20-074
Cone: 567:T1500F15U500



Max Depth: 20.250 m / 66.44 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP074.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 143014ft E: 13391154ft
Sheet No: 1 of 1

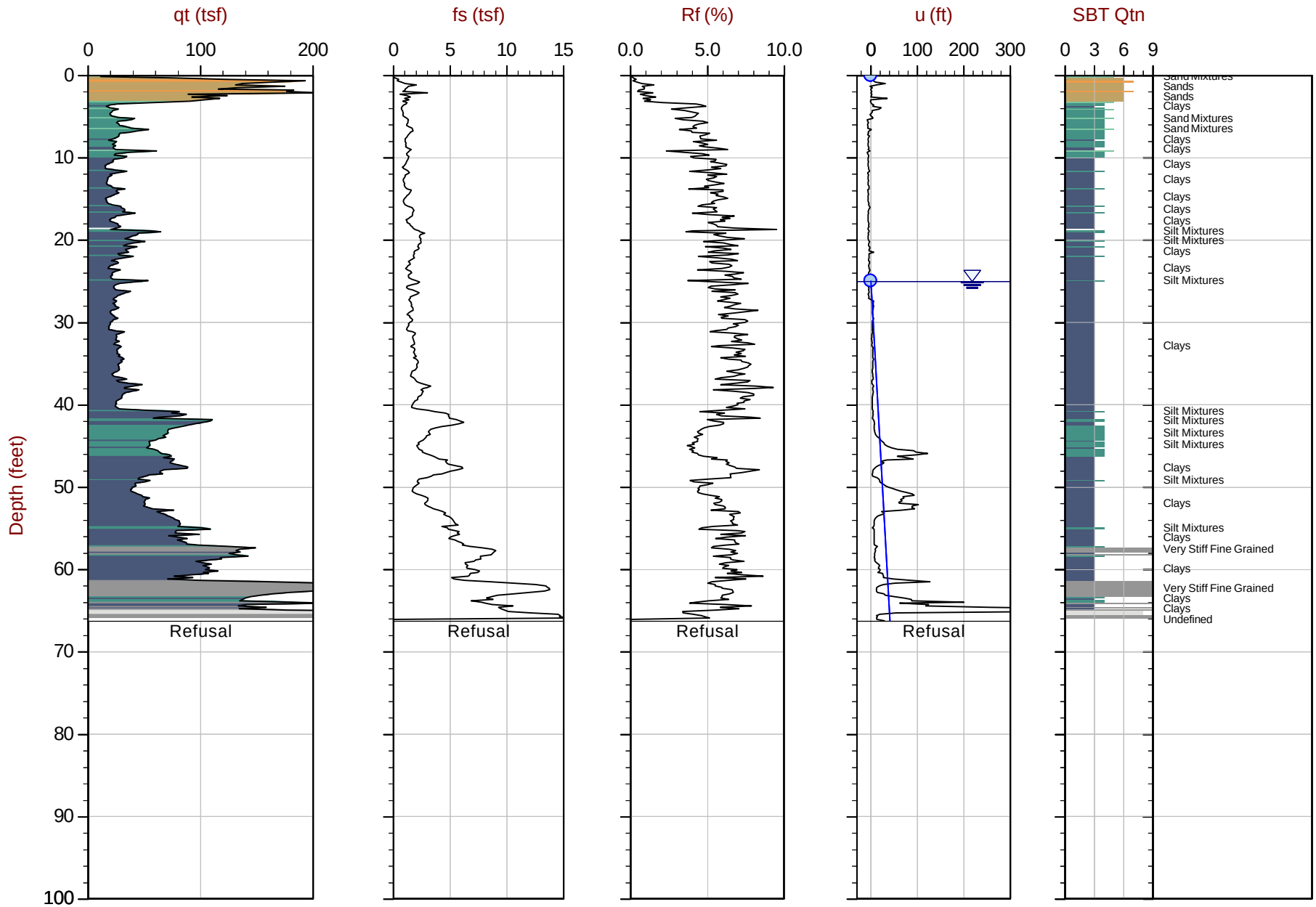
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-03 08:32
Site: DTE Monroe Power Plant

Sounding: CPT20-076
Cone: 567:T1500F15U500



Max Depth: 20.200 m / 66.27 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP076.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142838ft E: 13391033ft
Sheet No: 1 of 1

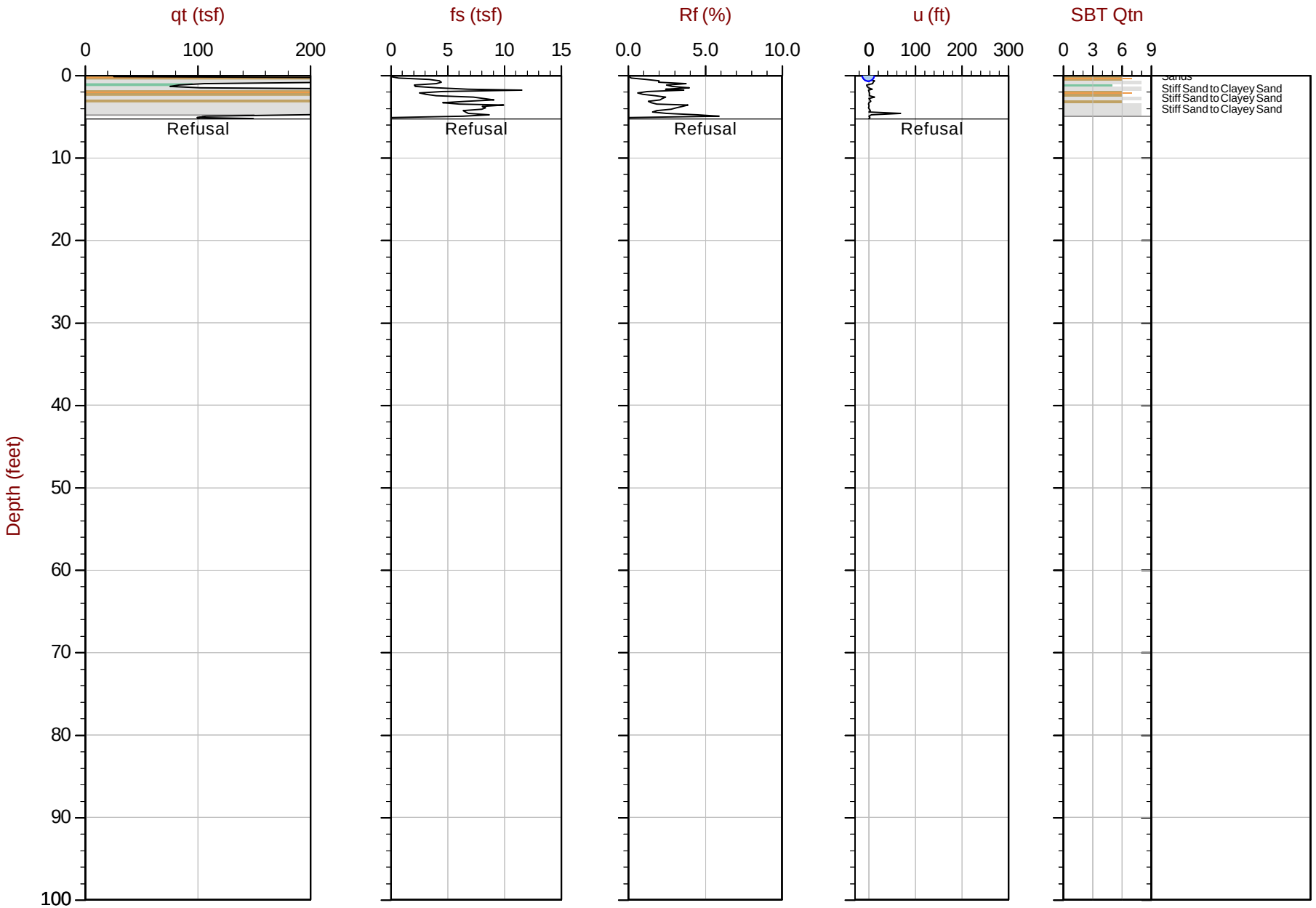
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-03 09:53
Site: DTE Monroe Power Plant

Sounding: CPT20-078
Cone: 567:T1500F15U500



Max Depth: 1.600 m / 5.25 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP078.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142629ft E: 13390894ft
Sheet No: 1 of 1

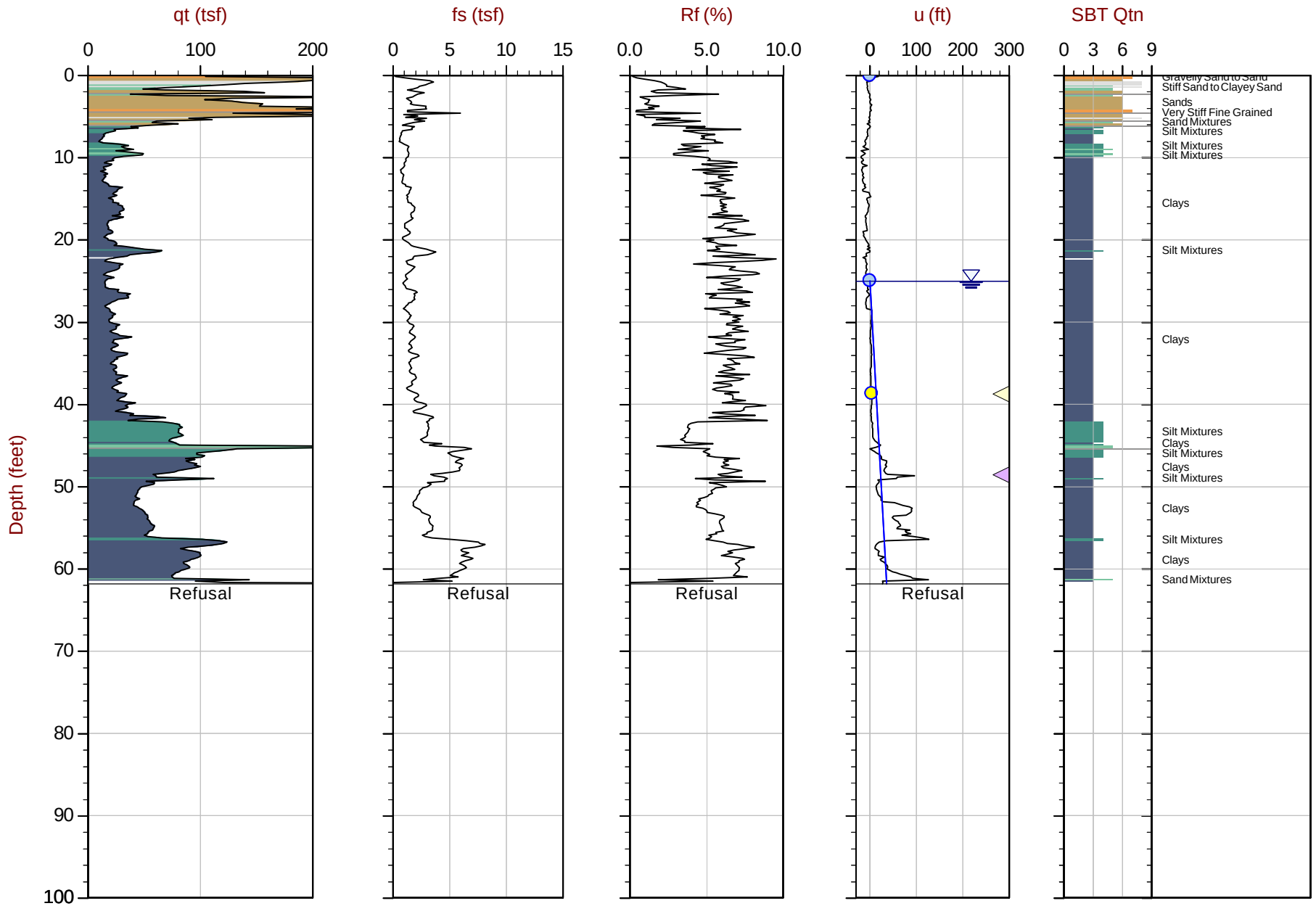
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-03 10:17
Site: DTE Monroe Power Plant

Sounding: CPT20-078B
Cone: 567:T1500F15U500



Max Depth: 18.850 m / 61.84 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP078B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142643ft E: 13390903ft
Sheet No: 1 of 1

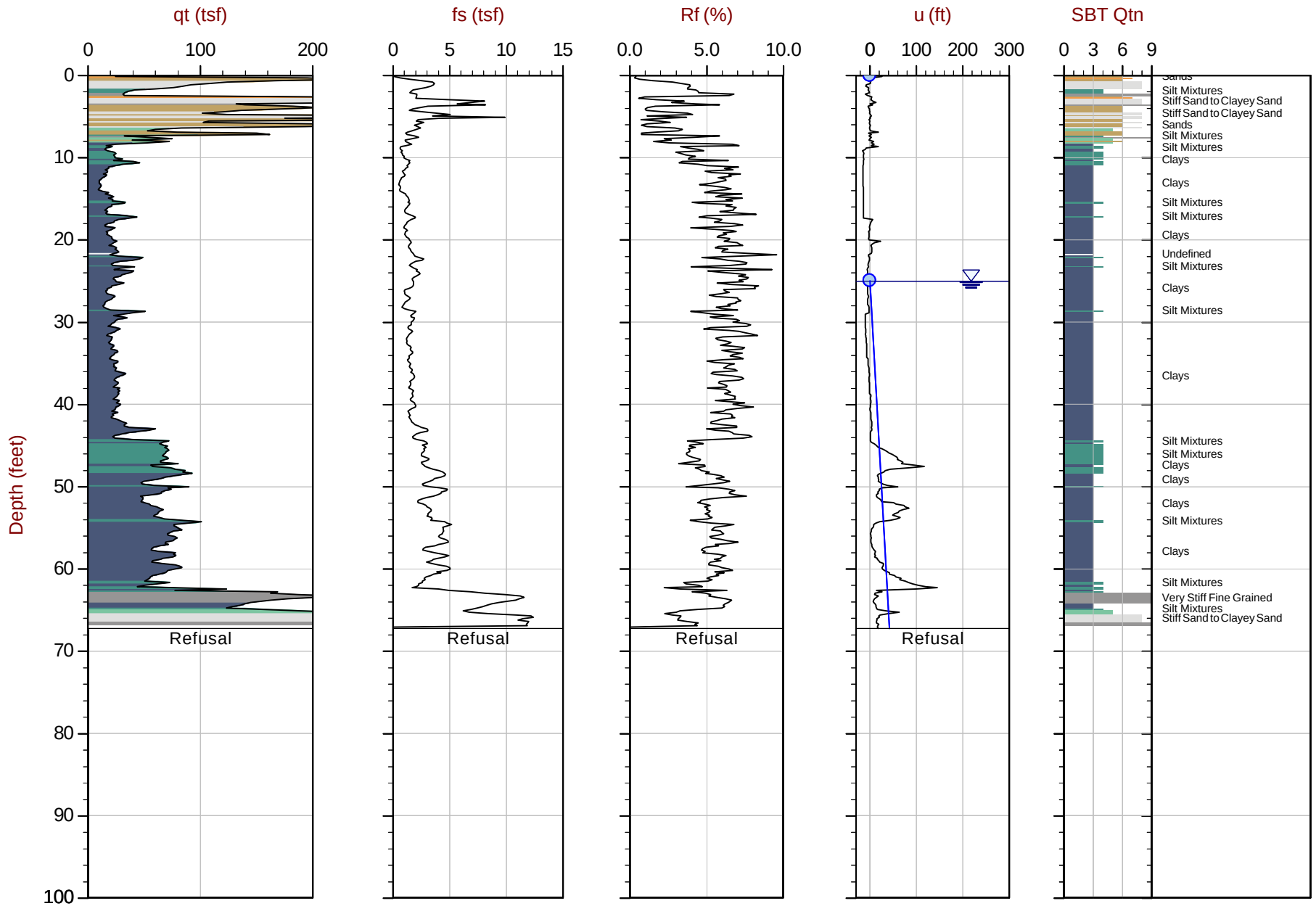
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-03 11:17
Site: DTE Monroe Power Plant

Sounding: CPT20-080
Cone: 567:T1500F15U500



Max Depth: 20.500 m / 67.26 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP080.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142497ft E: 13390784ft
Sheet No: 1 of 1

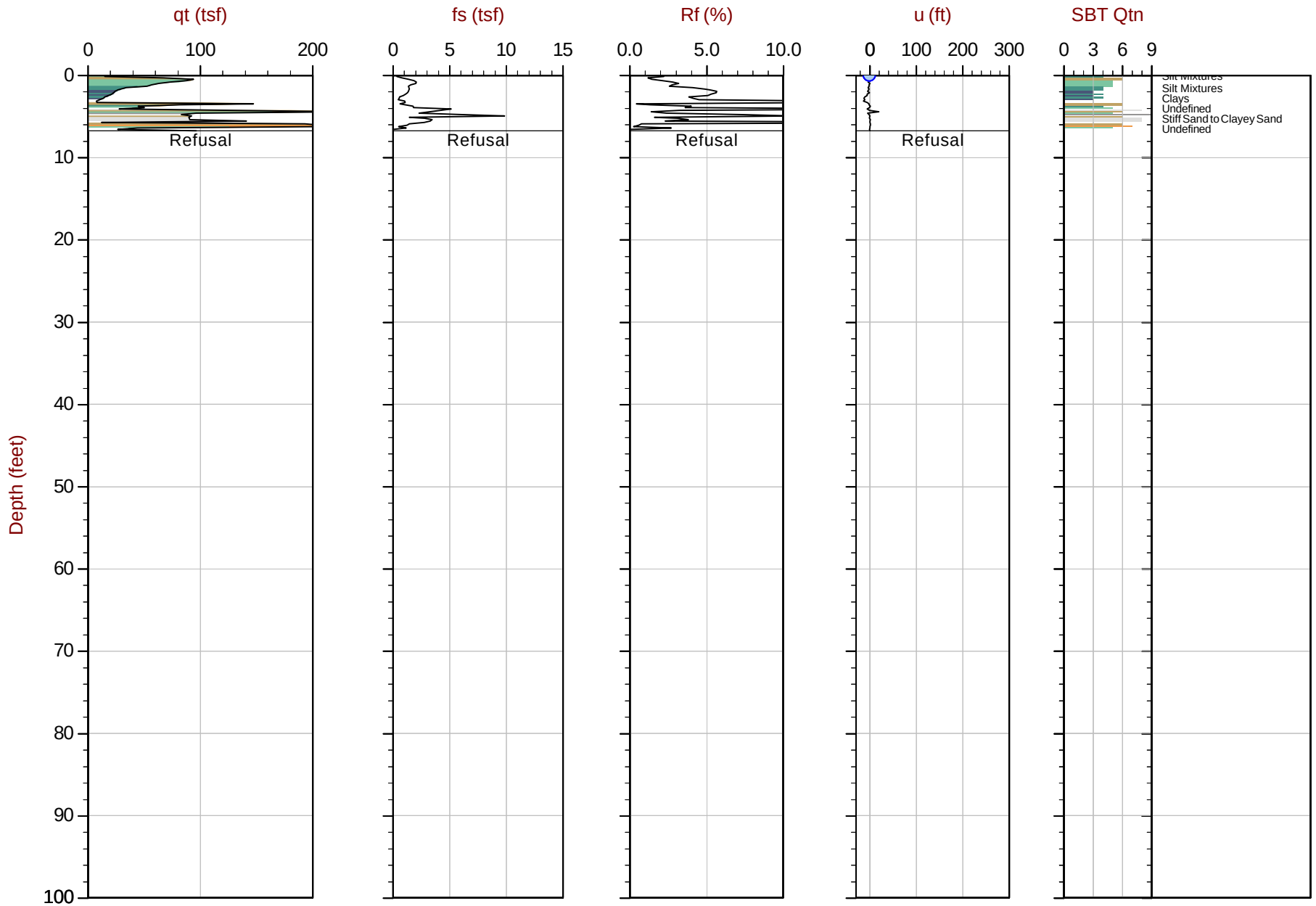
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-03 12:35
Site: DTE Monroe Power Plant

Sounding: CPT20-082
Cone: 567:T1500F15U500



Max Depth: 2.050 m / 6.73 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP082.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142345ft E: 13390678ft
Sheet No: 1 of 1

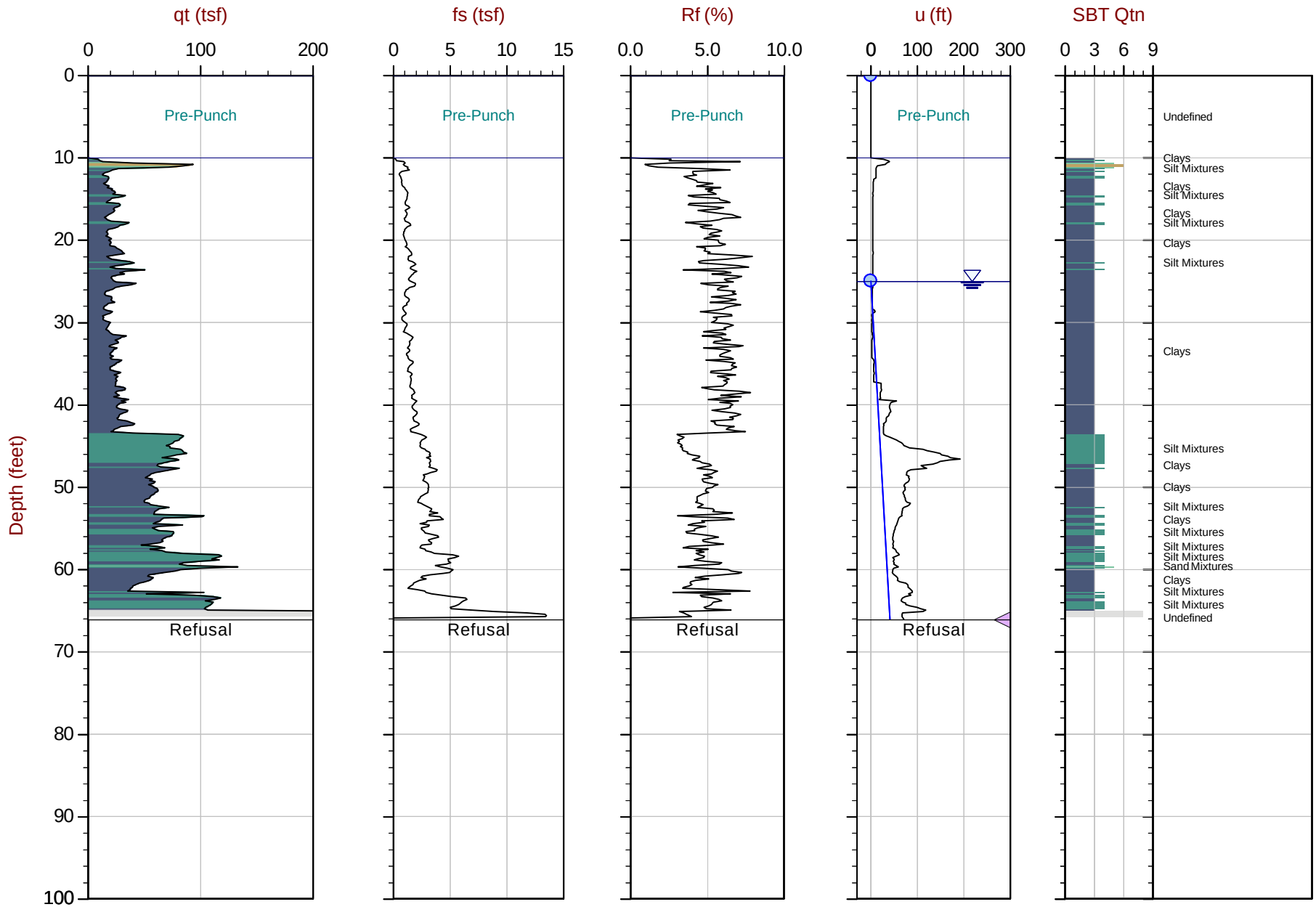
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-03 13:35
Site: DTE Monroe Power Plant

Sounding: CPT20-082B
Cone: 675:T1500F15U500



Max Depth: 20.150 m / 66.11 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP082B.COR
Unit Wt: SBTQtn (PKR2009)

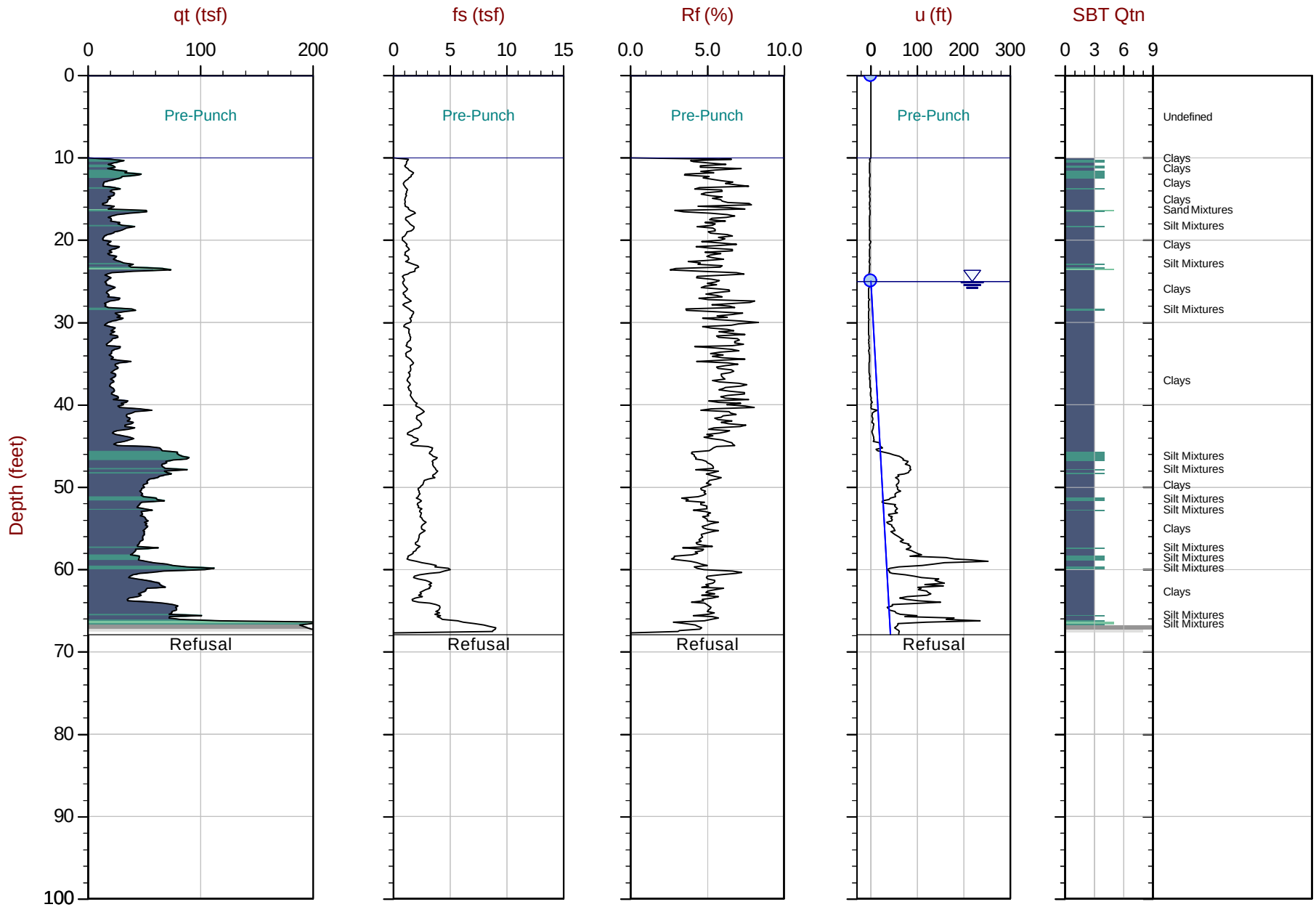
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142344ft E: 13390669ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-03 15:18
Site: DTE Monroe Power Plant

Sounding: CPT20-084
Cone: 675:T1500F15U500



Max Depth: 20.700 m / 67.91 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP084.COR
Unit Wt: SBTQtn (PKR2009)

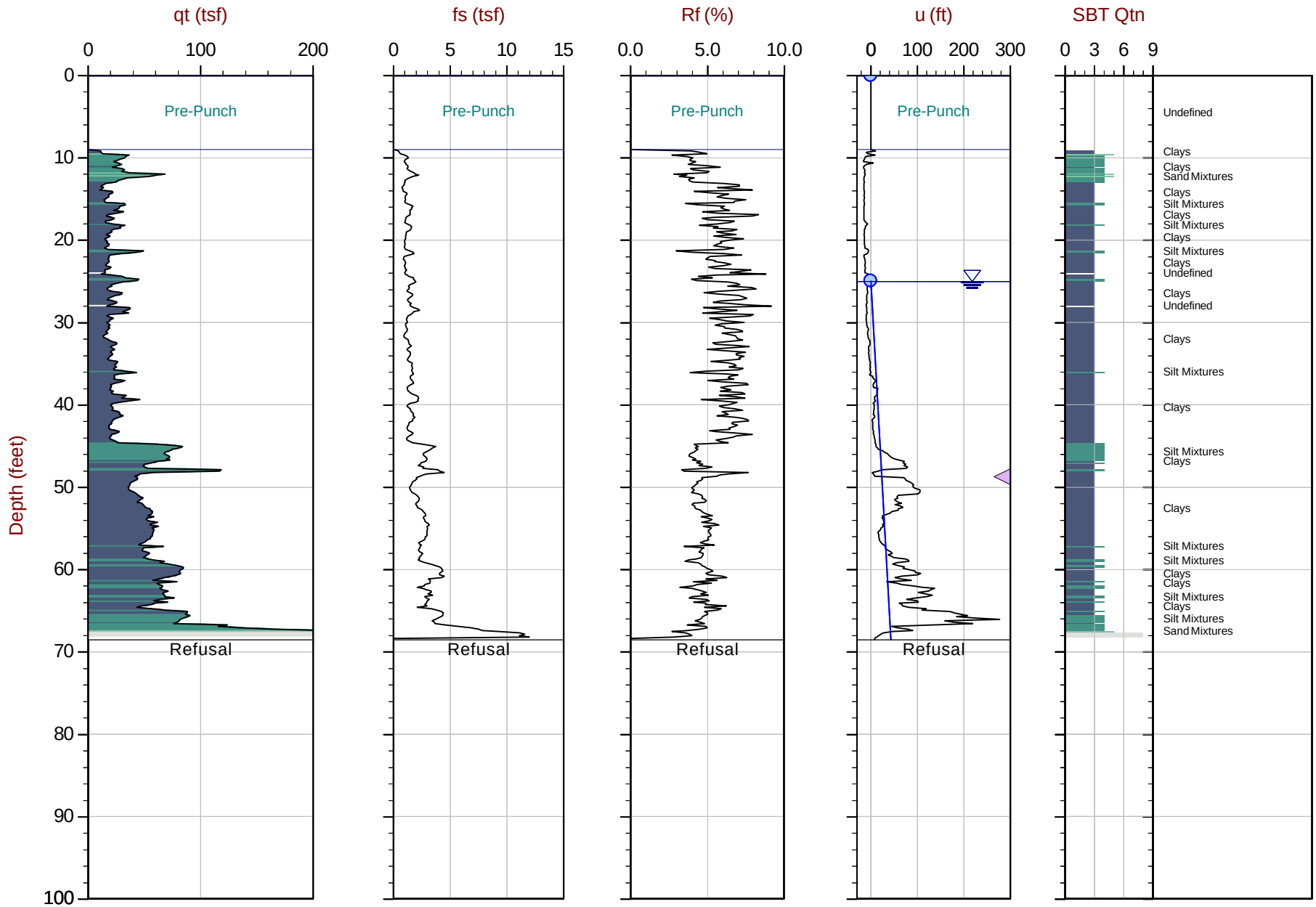
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 142185ft E: 13390553ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-04 08:46
Site: DTE Monroe Power Plant

Sounding: CPT20-086
Cone: 675:T1500F15U500



Max Depth: 20.900 m / 68.57 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

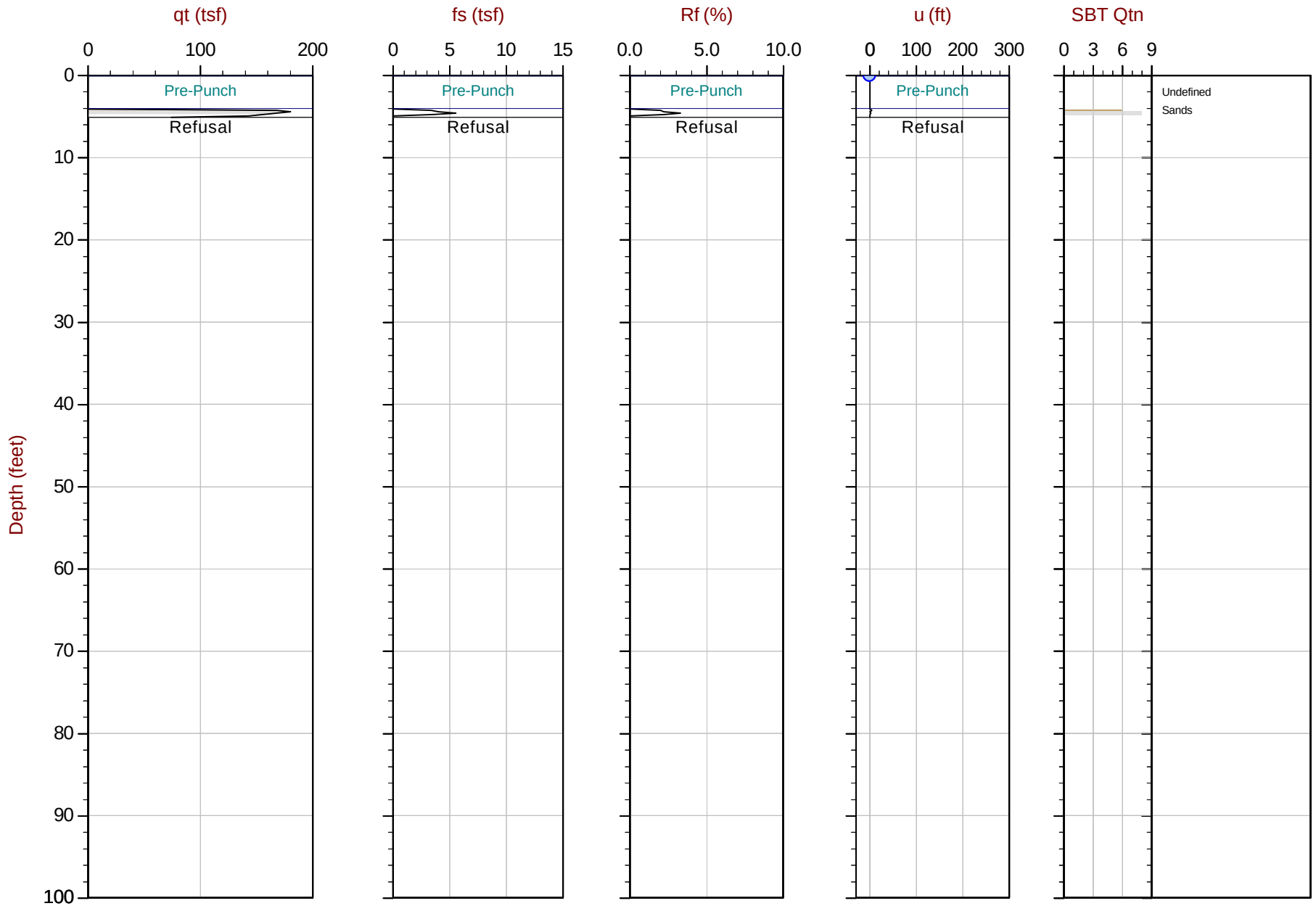
File: 20-61-21655_CP086.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141994ft E: 13390446ft
Sheet No: 1 of 1

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-04 09:52
Site: DTE Monroe Power Plant

Sounding: CPT20-088
Cone: 675:T1500F15U500



Max Depth: 1.550 m / 5.09 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP088.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141837ft E: 13390373ft
Sheet No: 1 of 1

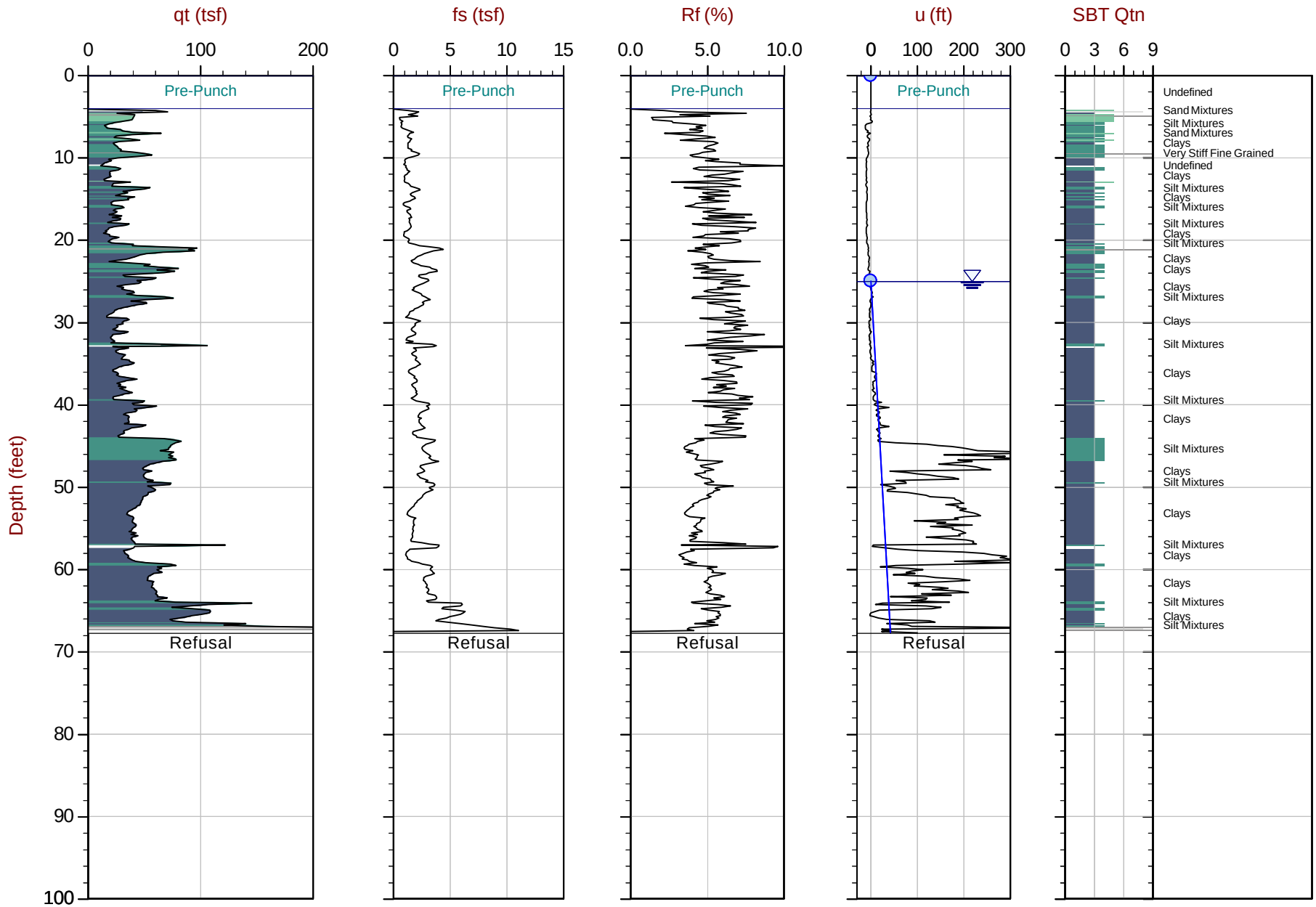
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-04 10:17
Site: DTE Monroe Power Plant

Sounding: CPT20-088B
Cone: 675:T1500F15U500



Max Depth: 20.650 m / 67.75 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP088B.COR
Unit Wt: SBTQtn (PKR2009)

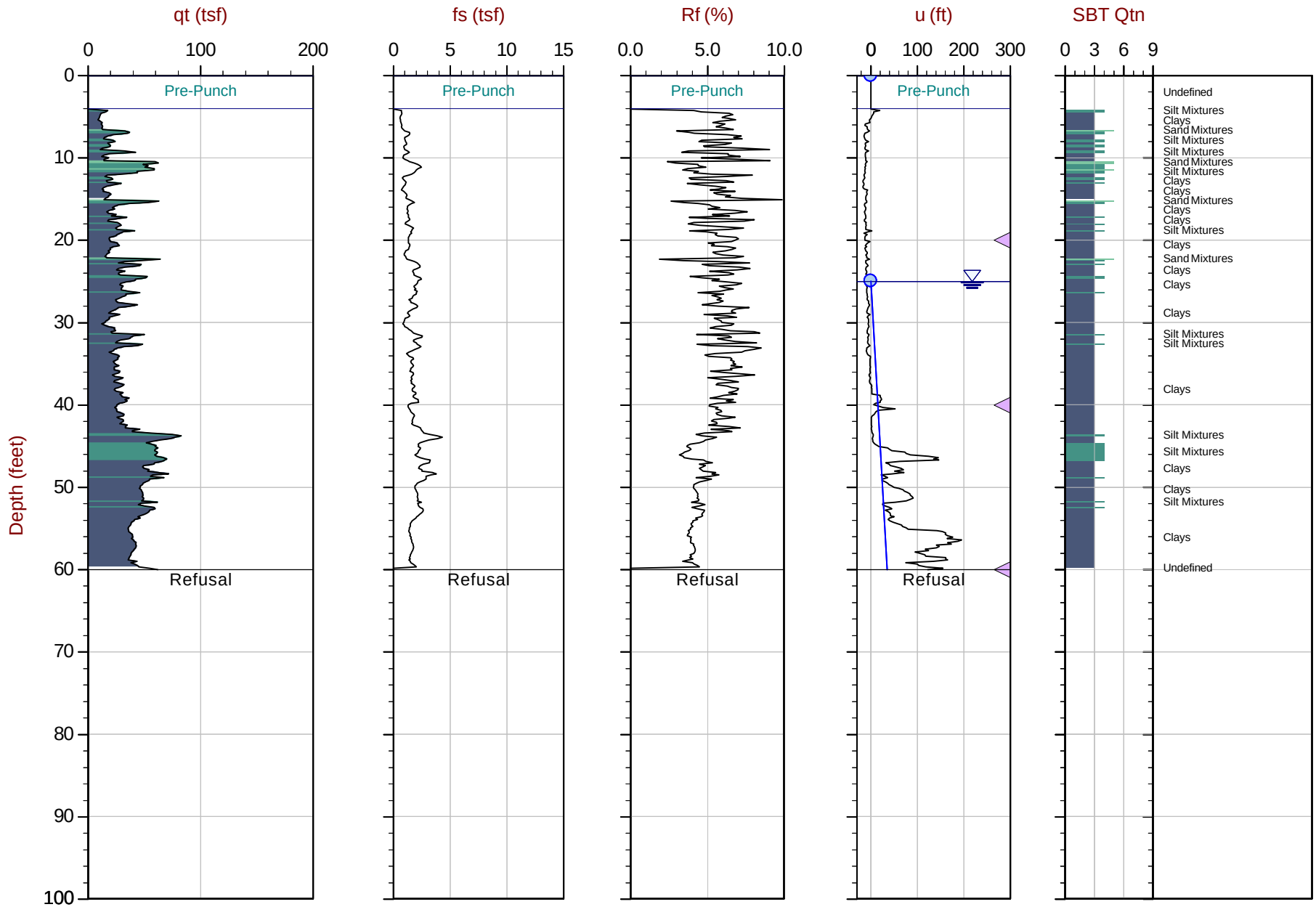
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141843ft E: 13390373ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-04 11:17
Site: DTE Monroe Power Plant

Sounding: CPT20-090
Cone: 675:T1500F15U500



Max Depth: 18.300 m / 60.04 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP090.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141754ft E: 13390528ft
Sheet No: 1 of 1

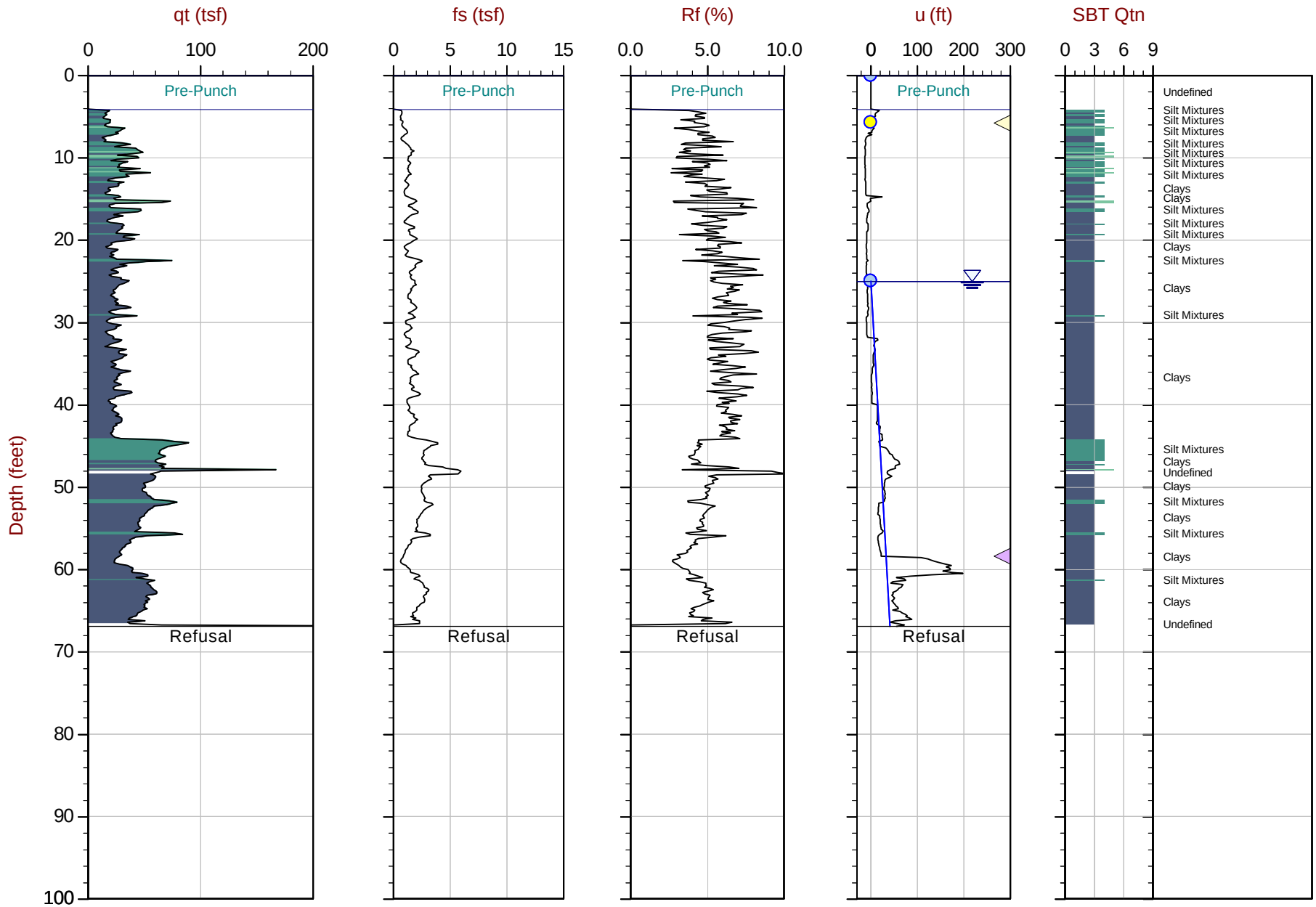
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-05 09:32
Site: DTE Monroe Power Plant

Sounding: CPT20-092
Cone: 675:T1500F15U500



Max Depth: 20.400 m / 66.93 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP092.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141703ft E: 13390714ft
Sheet No: 1 of 1

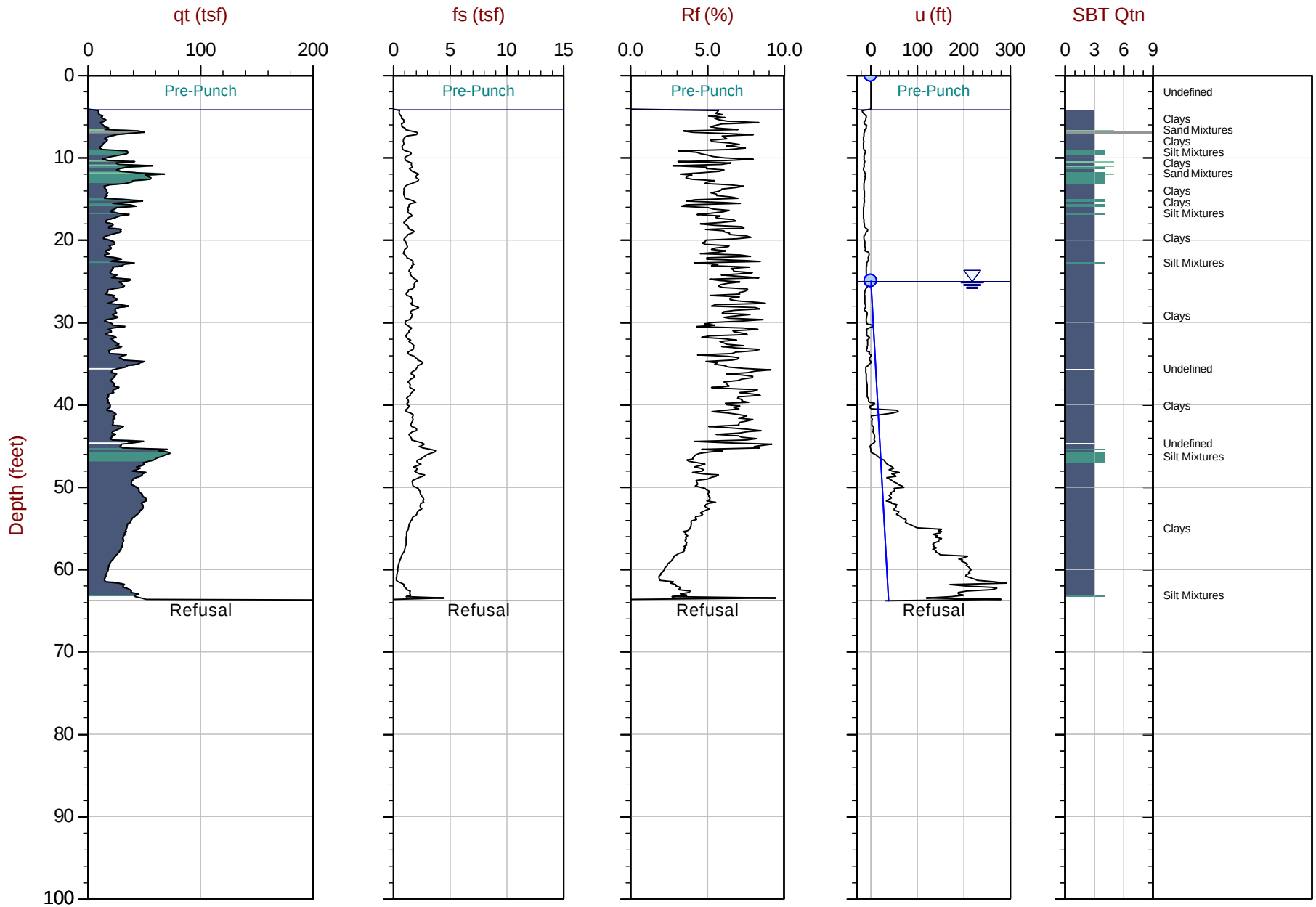
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-05 10:56
Site: DTE Monroe Power Plant

Sounding: CPT20-094
Cone: 513:T1500F15U500



Max Depth: 19.450 m / 63.81 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP094.COR
Unit Wt: SBTQtn (PKR2009)

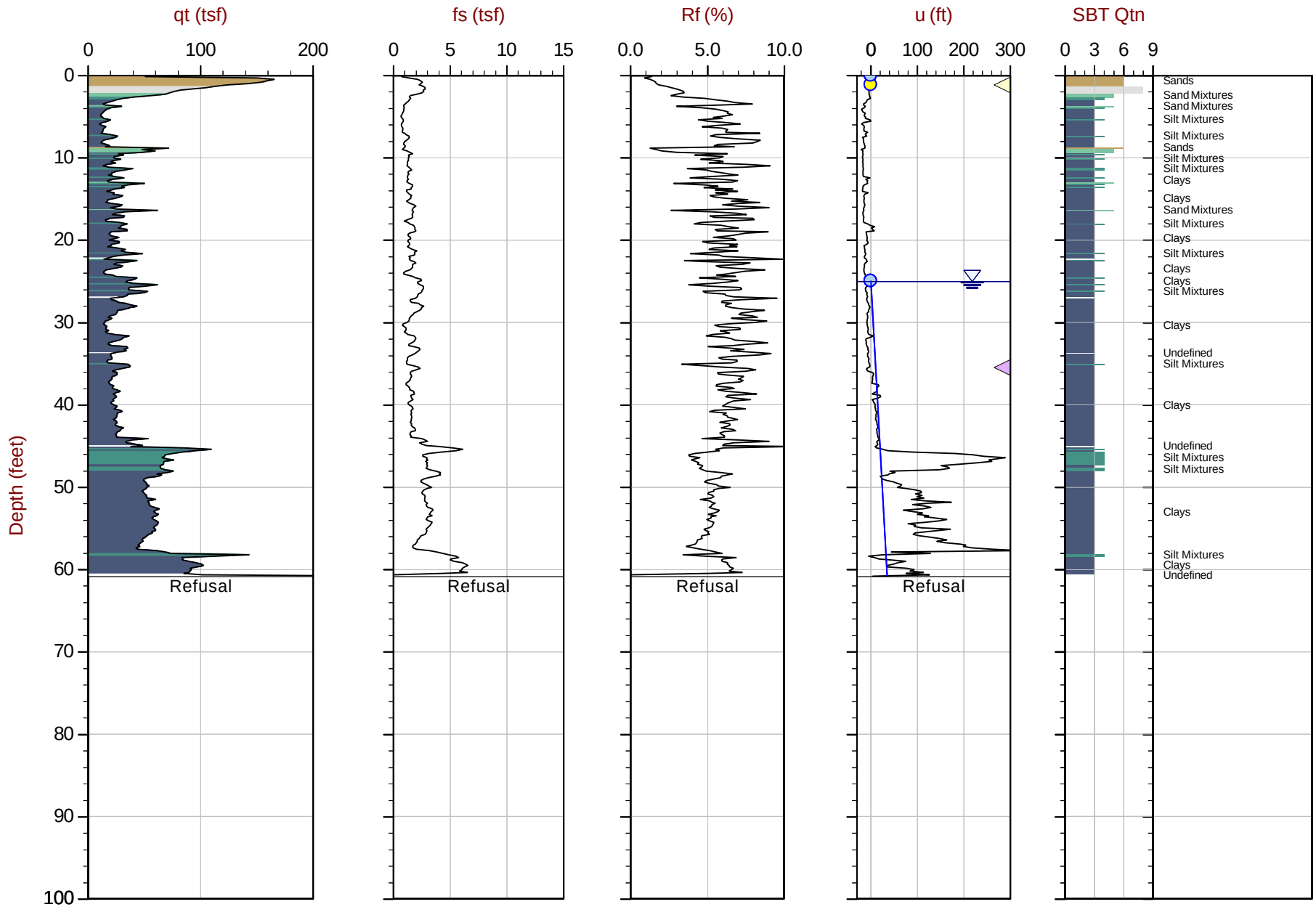
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141591ft E: 13390889ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-05 11:51
Site: DTE Monroe Power Plant

Sounding: SCPT20-096
Cone: 513:T1500F15U500



Max Depth: 18.550 m / 60.86 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_SP096.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141475ft E: 13391090ft
Sheet No: 1 of 1

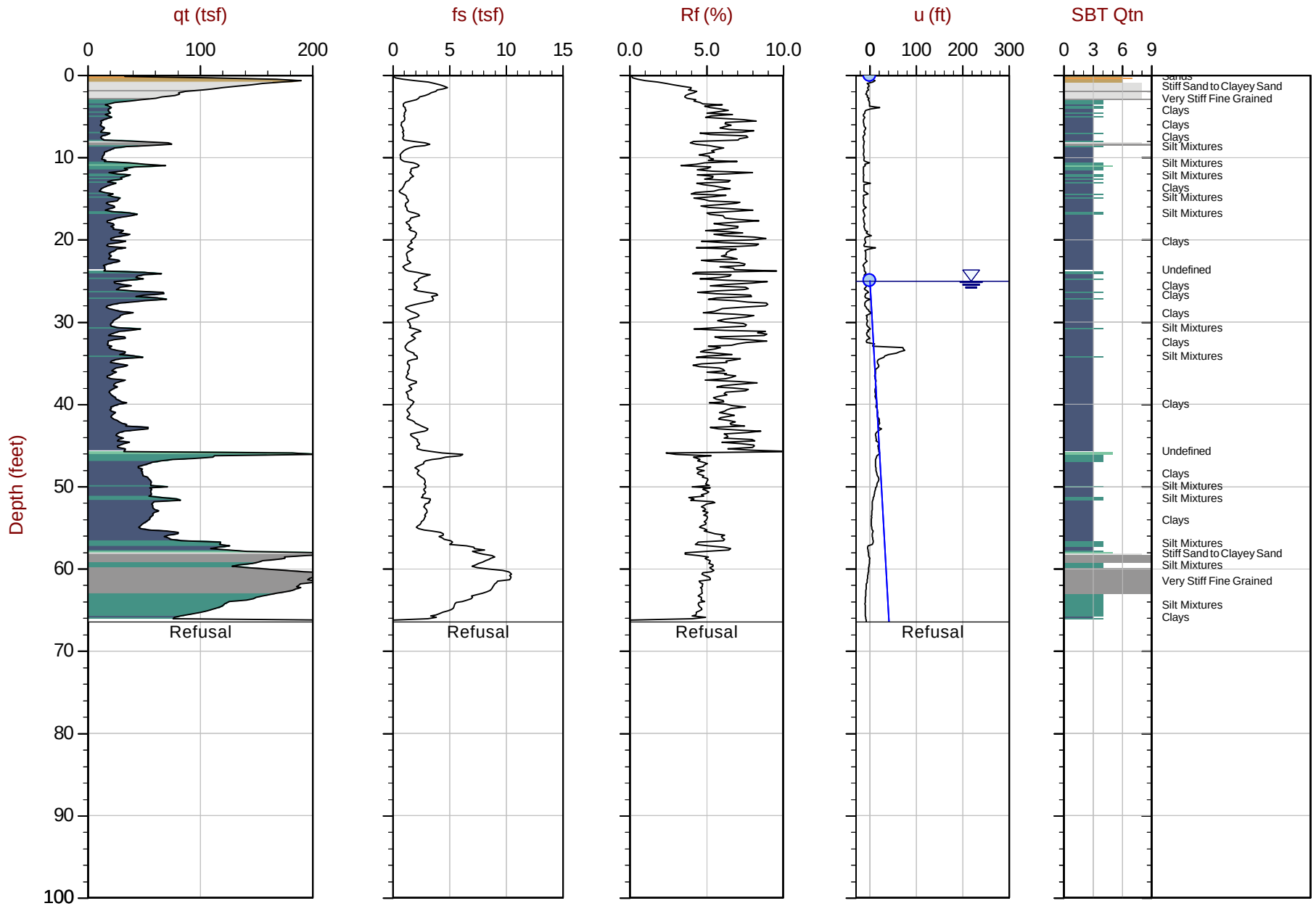
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-05 13:33
Site: DTE Monroe Power Plant

Sounding: CPT20-098
Cone: 513:T1500F15U500



Max Depth: 20.250 m / 66.44 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP098.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141442ft E: 13391262ft
Sheet No: 1 of 1

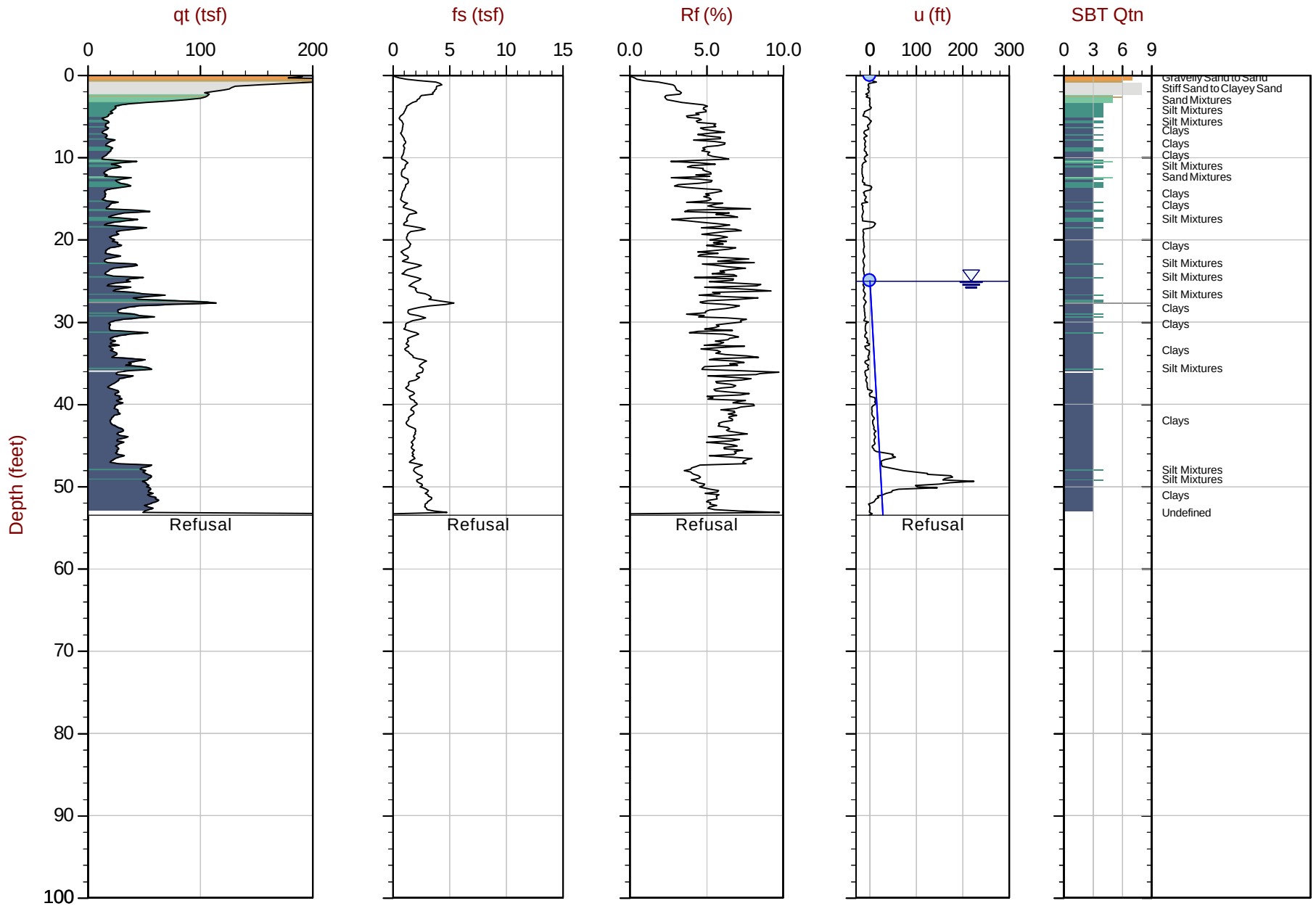
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 08:46
Site: DTE Monroe Power Plant

Sounding: CPT20-100
Cone: 513:T1500F15U500



Max Depth: 16.300 m / 53.48 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP100.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141368ft E: 13391479ft
Sheet No: 1 of 1

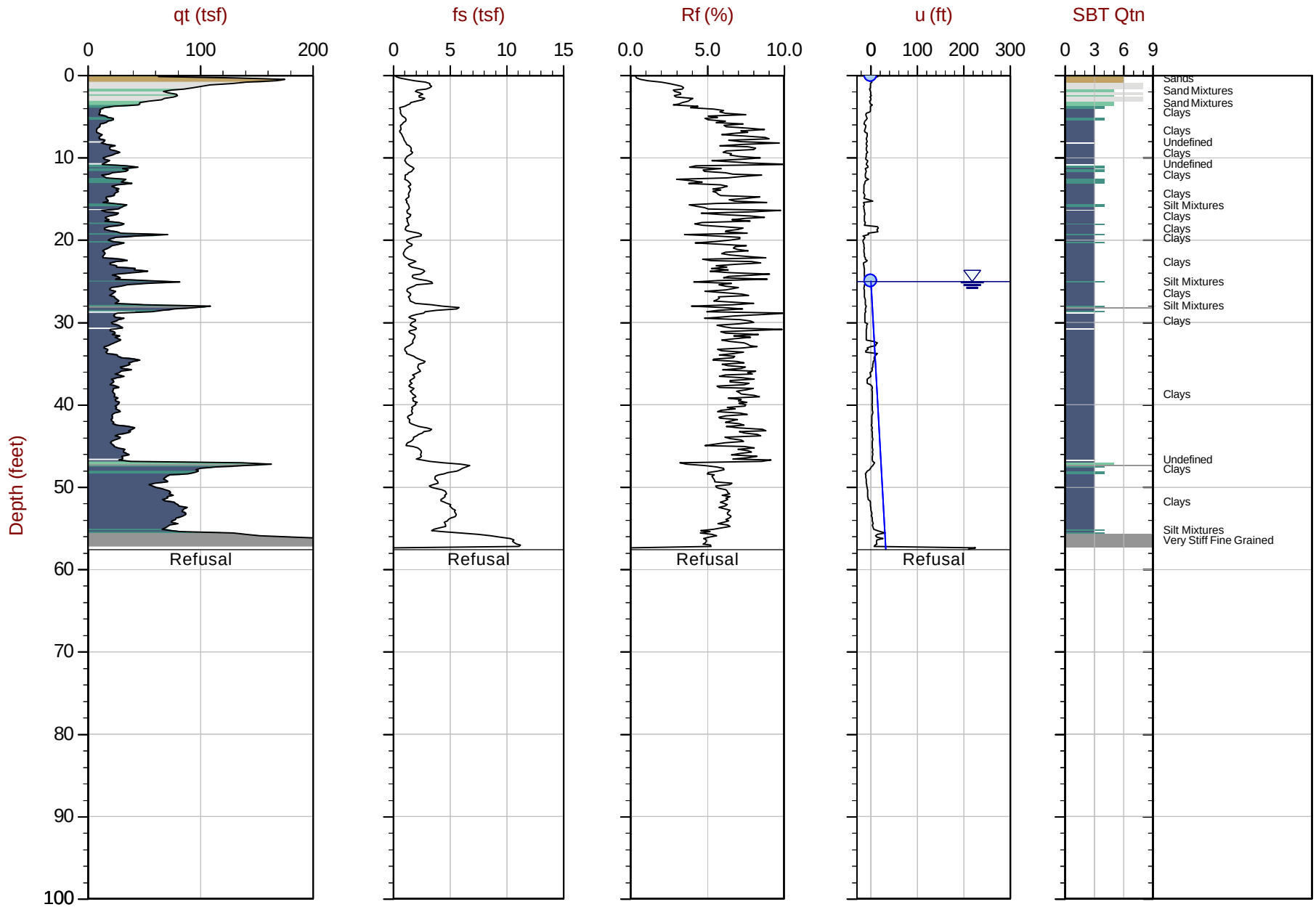
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 09:41
Site: DTE Monroe Power Plant

Sounding: CPT20-102
Cone: 513:T1500F15U500



Max Depth: 17.550 m / 57.58 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP102.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141297ft E: 13391656ft
Sheet No: 1 of 1

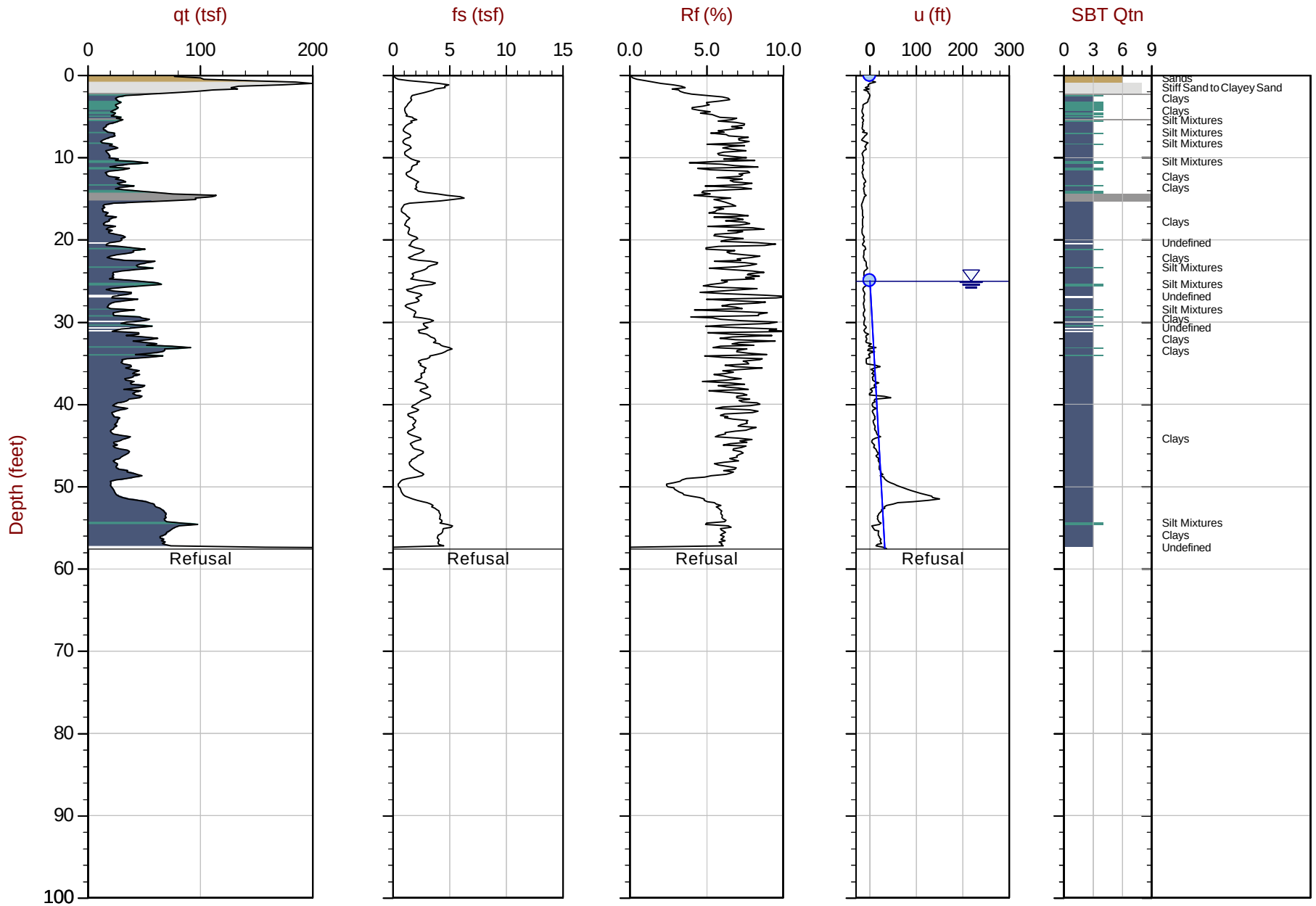
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 10:26
Site: DTE Monroe Power Plant

Sounding: CPT20-104
Cone: 513:T1500F15U500



Max Depth: 17.550 m / 57.58 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP104.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141174ft E: 13391805ft
Sheet No: 1 of 1

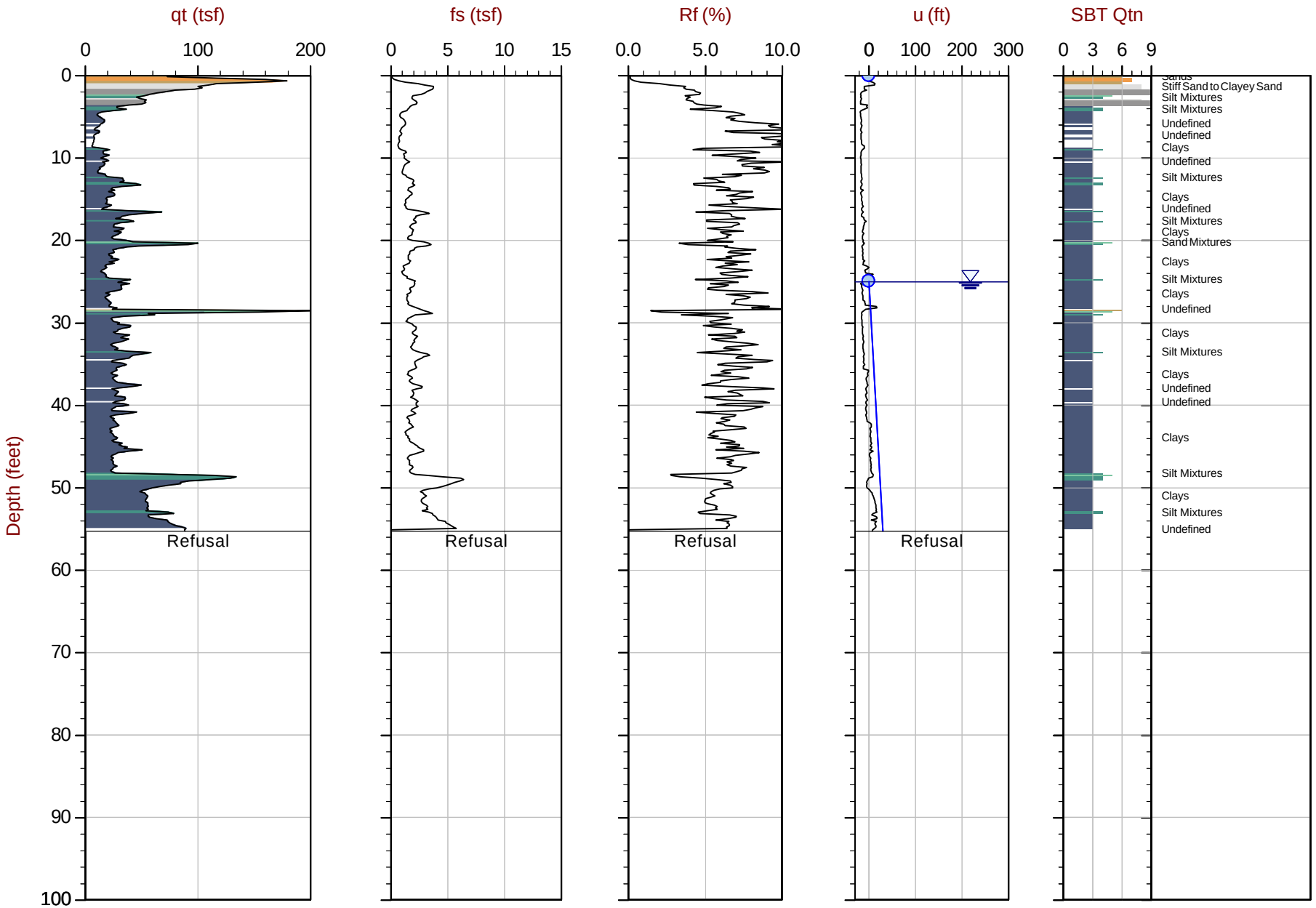
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 11:10
Site: DTE Monroe Power Plant

Sounding: CPT20-106
Cone: 513:T1500F15U500



Max Depth: 16.850 m / 55.28 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP106.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140981ft E: 13391734ft
Sheet No: 1 of 1

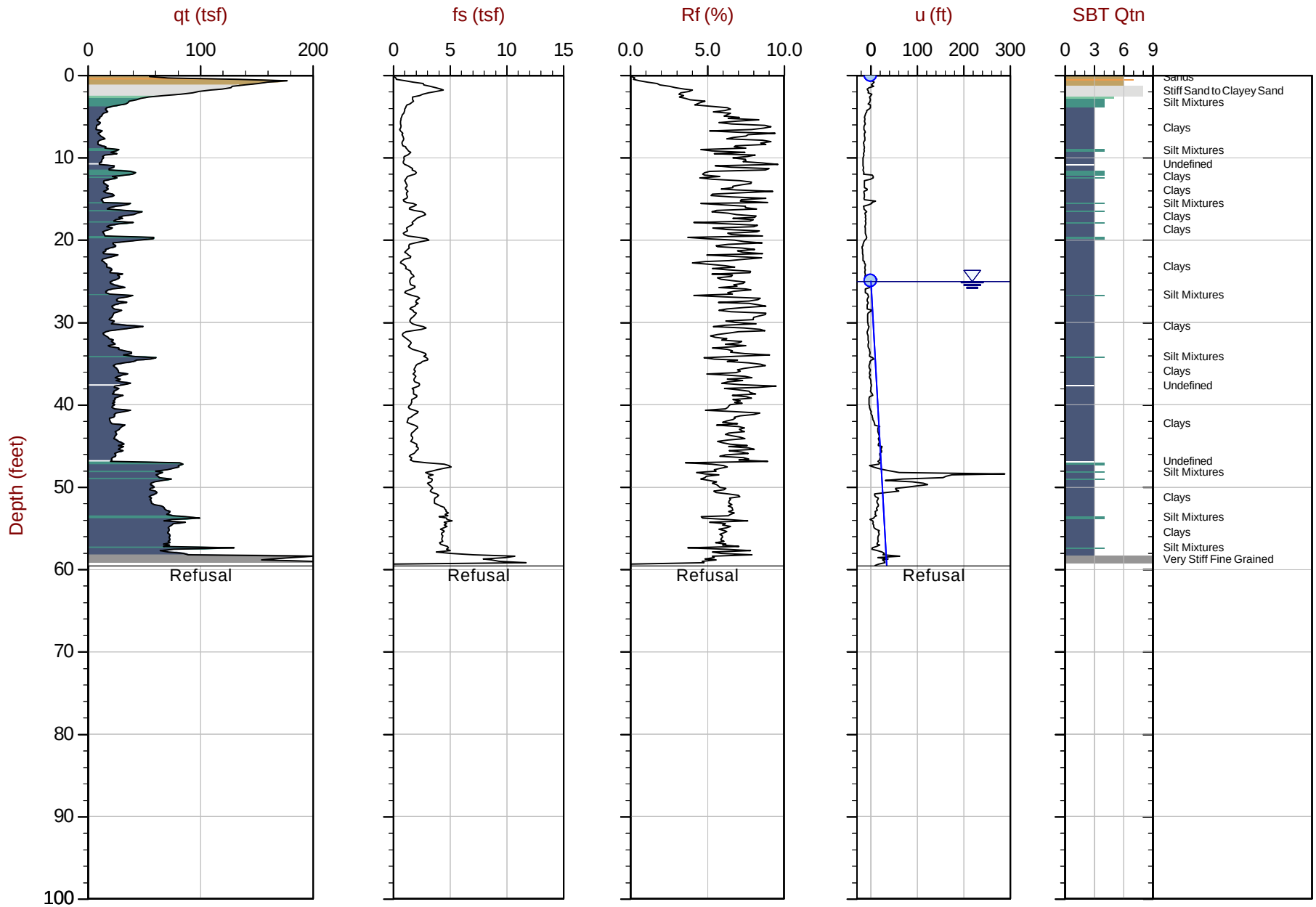
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 11:58
Site: DTE Monroe Power Plant

Sounding: CPT20-108
Cone: 513:T1500F15U500



Max Depth: 18.150 m / 59.55 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP108.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140801ft E: 13391655ft
Sheet No: 1 of 1

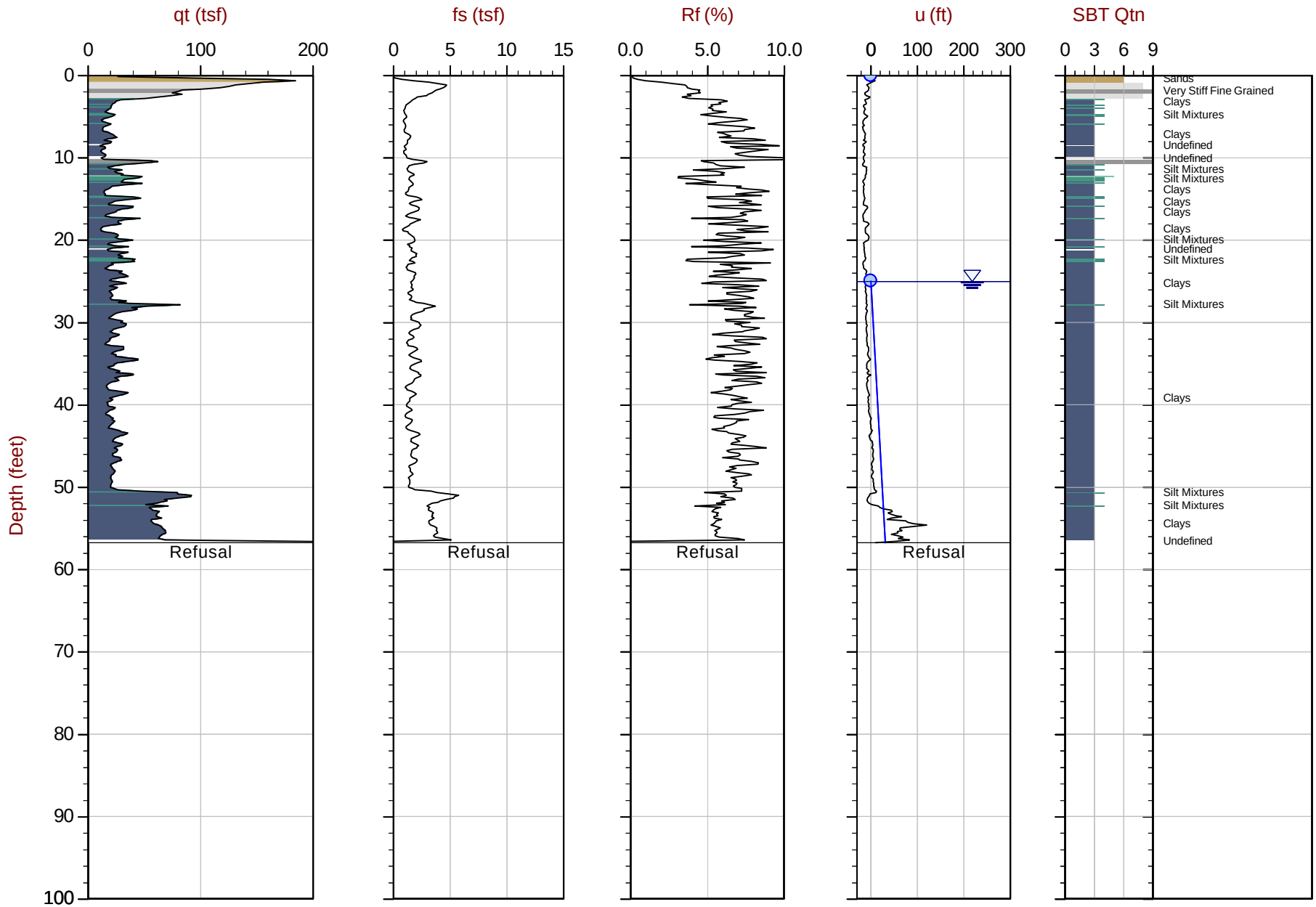
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 12:45
Site: DTE Monroe Power Plant

Sounding: CPT20-110
Cone: 513:T1500F15U500



Max Depth: 17.300 m / 56.76 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP110.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140617ft E: 13391584ft
Sheet No: 1 of 1

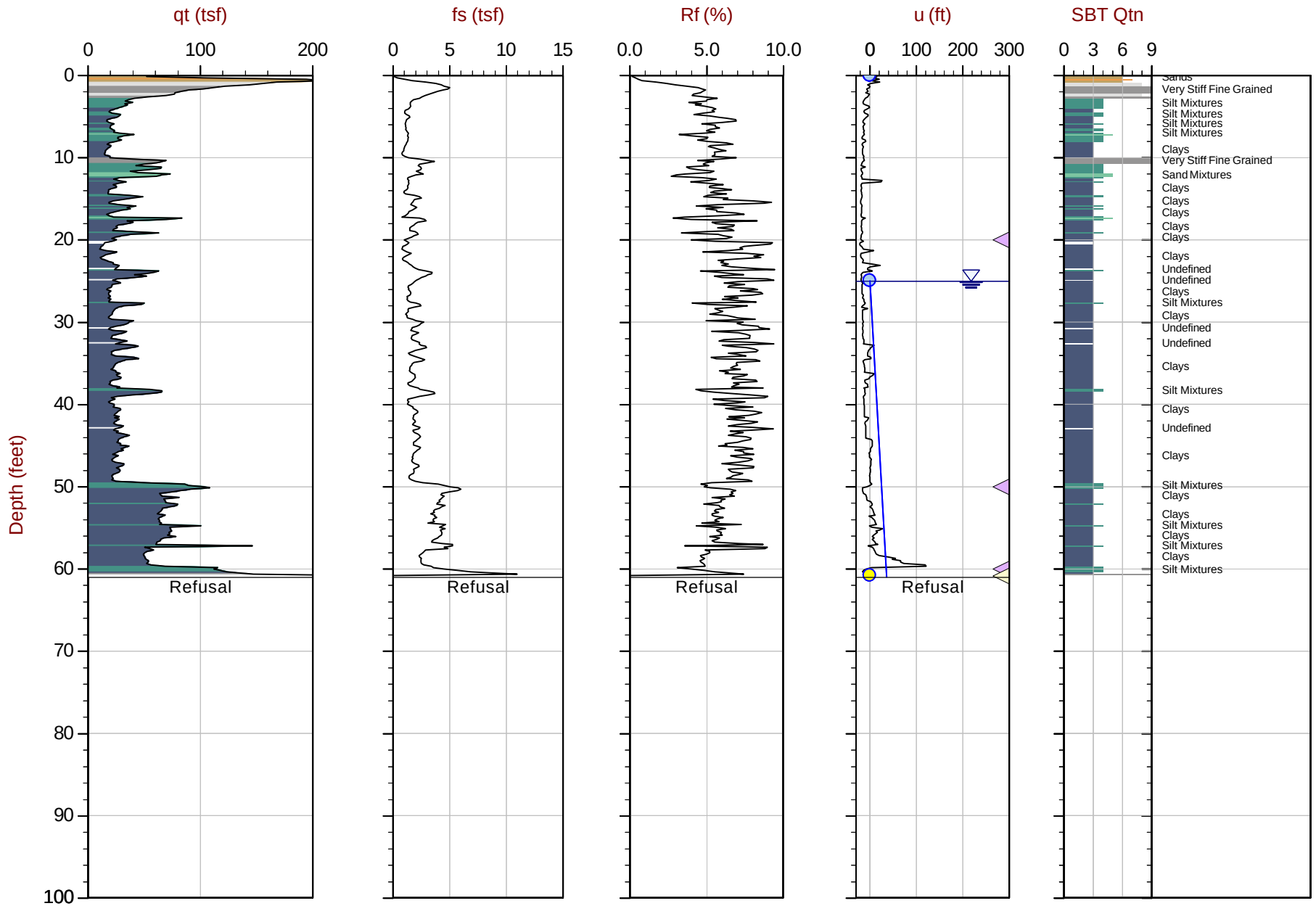
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-07 08:49
Site: DTE Monroe Power Plant

Sounding: CPT20-110B
Cone: 513:T1500F15U500



Max Depth: 18.600 m / 61.02 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP110B.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140610ft E: 13391577ft
Sheet No: 1 of 1

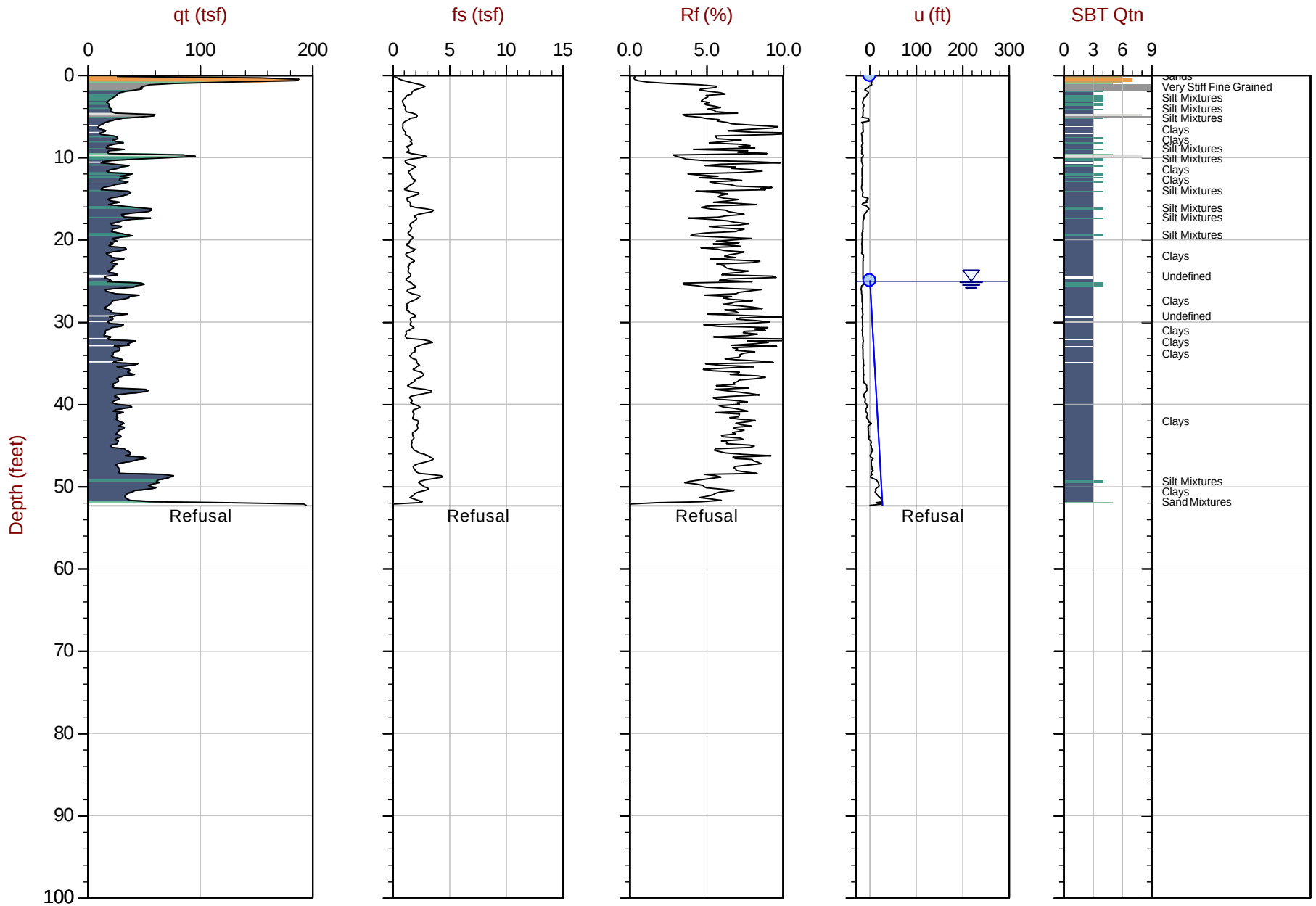
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 13:34
Site: DTE Monroe Power Plant

Sounding: CPT20-112
Cone: 513:T1500F15U500



Max Depth: 15.950 m / 52.33 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP112.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140443ft E: 13391653ft
Sheet No: 1 of 1

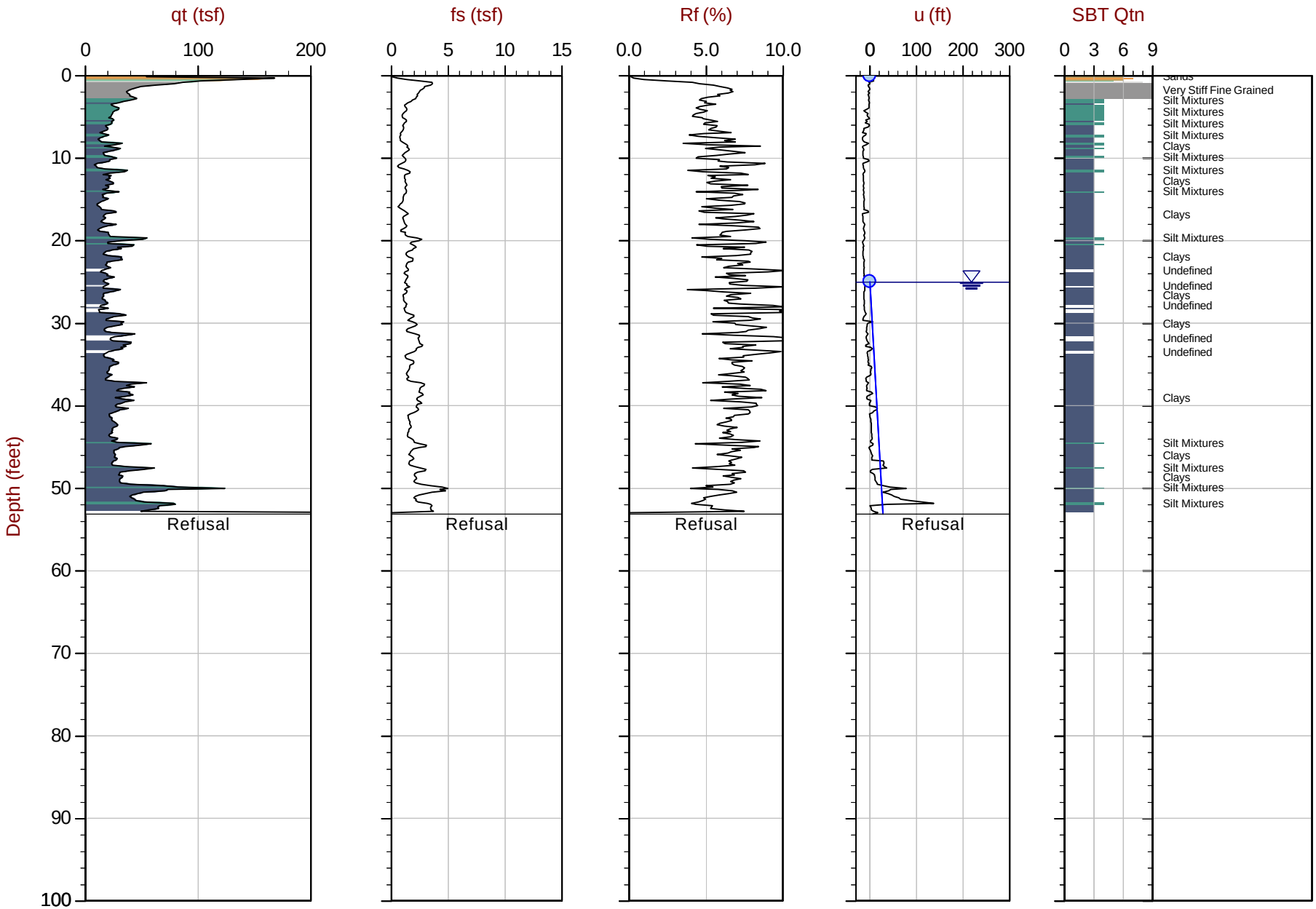
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 14:25
Site: DTE Monroe Power Plant

Sounding: SCPT20-114
Cone: 513:T1500F15U500



Max Depth: 16.200 m / 53.15 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_SP114.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140335ft E: 13391822ft
Sheet No: 1 of 1

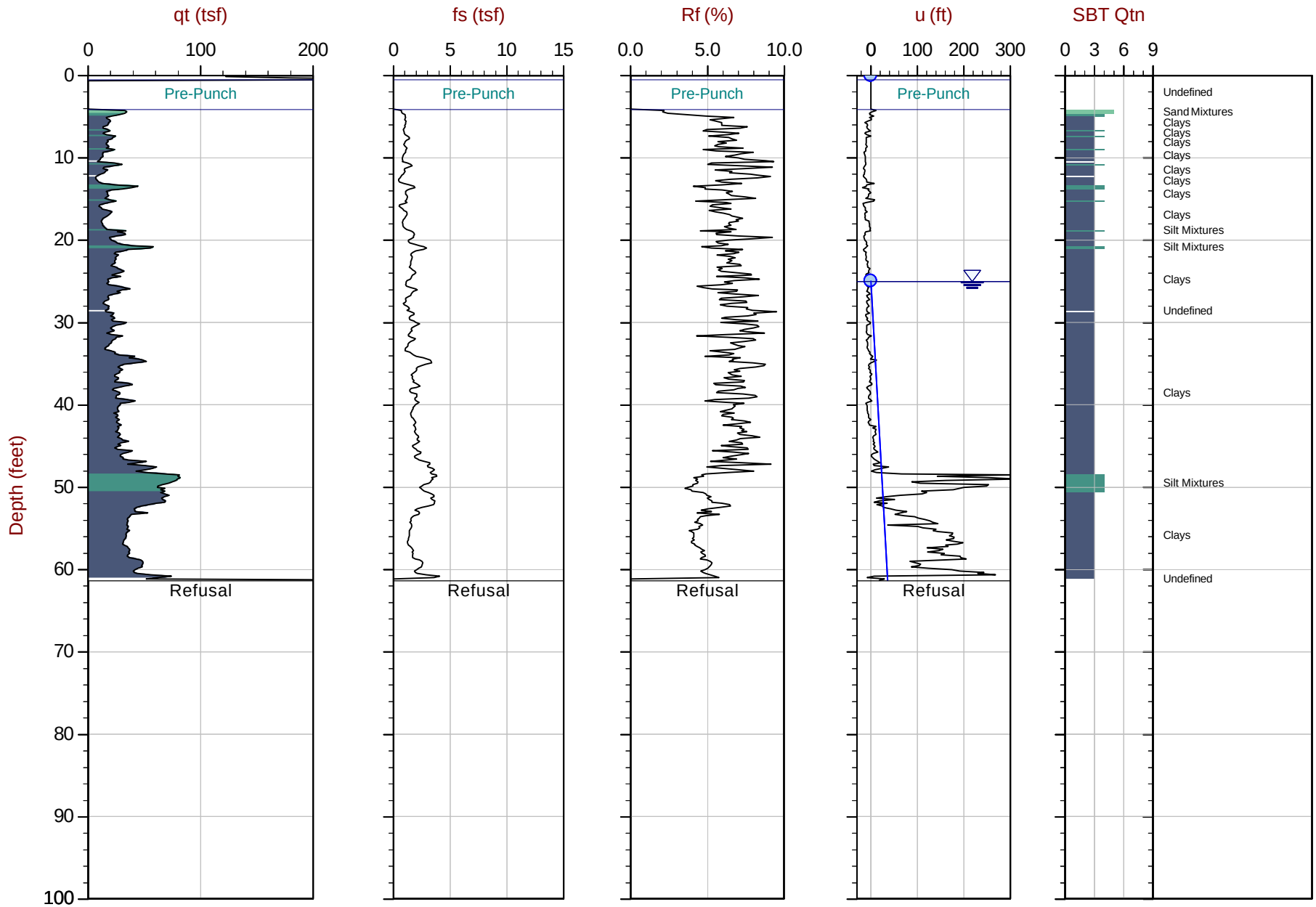
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-06 15:13
Site: DTE Monroe Power Plant

Sounding: CPT20-116
Cone: 513:T1500F15U500



Max Depth: 18.700 m / 61.35 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP116.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140233ft E: 13391996ft
Sheet No: 1 of 1

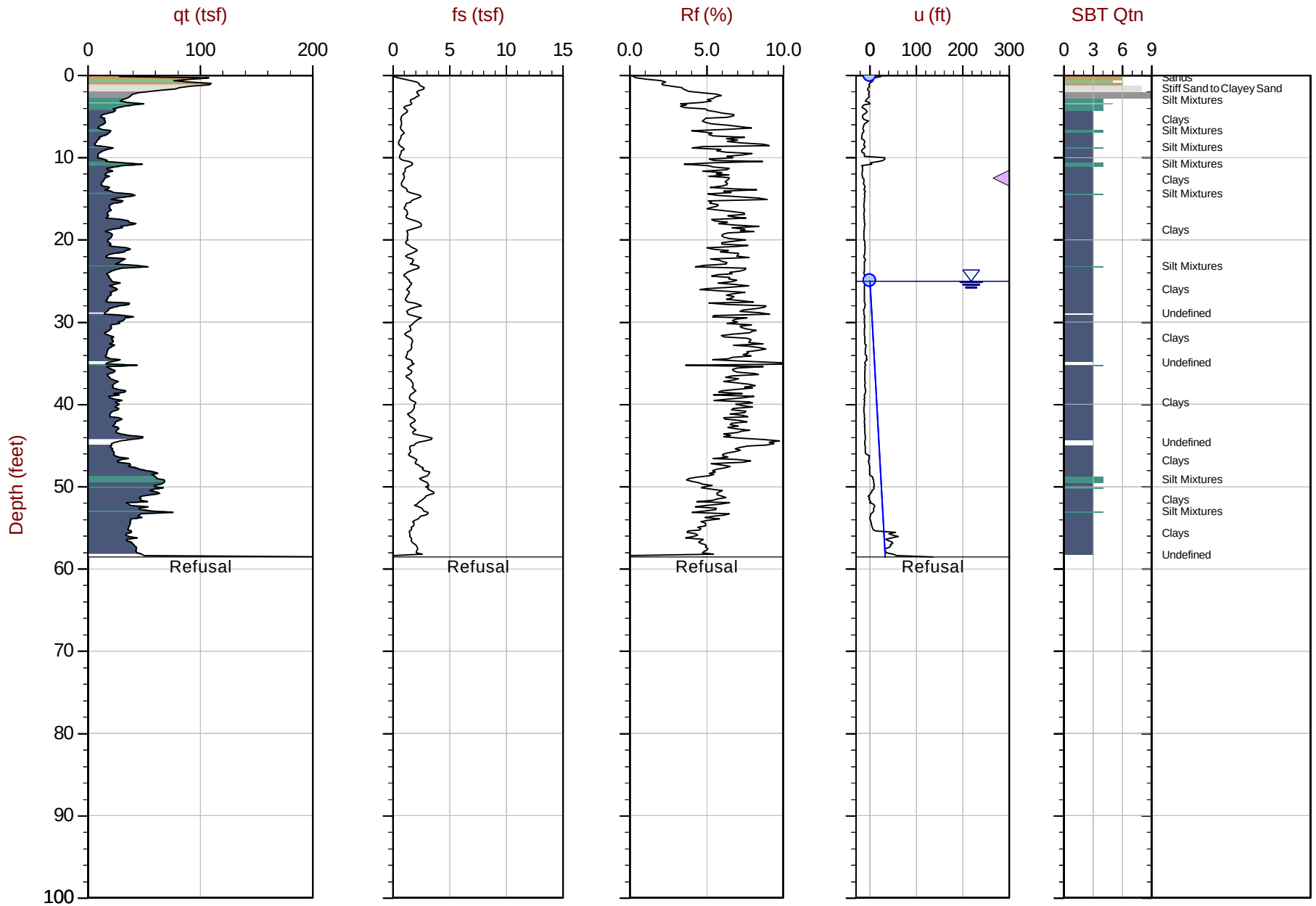
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-07 12:57
Site: DTE Monroe Power Plant

Sounding: CPT20-118
Cone: 513:T1500F15U500



Max Depth: 17.850 m / 58.56 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP118.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140123ft E: 13392169ft
Sheet No: 1 of 1

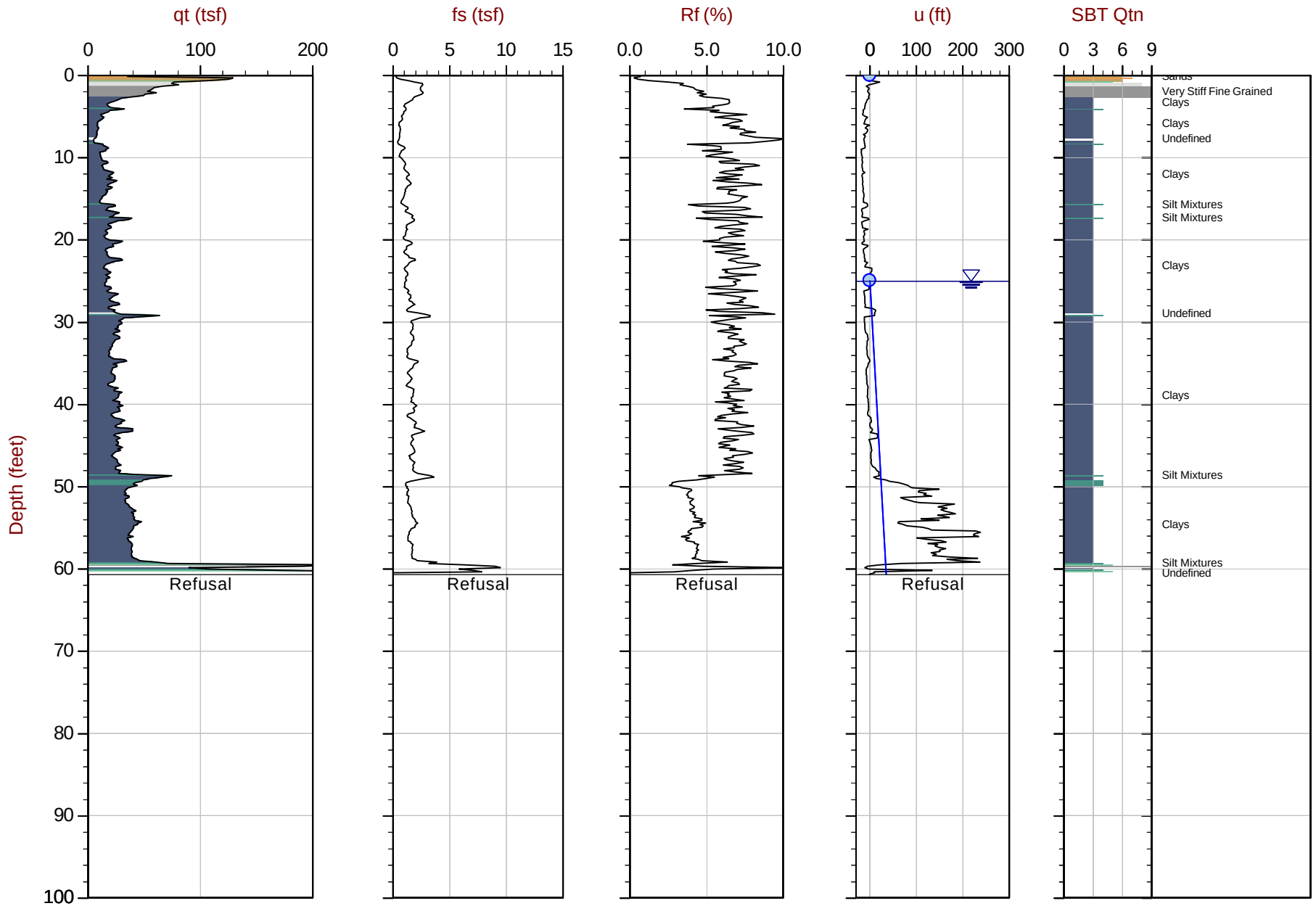
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-07 14:17
Site: DTE Monroe Power Plant

Sounding: CPT20-120
Cone: 513:T1500F15U500



Max Depth: 18.500 m / 60.69 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP120.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140017ft E: 13392339ft
Sheet No: 1 of 1

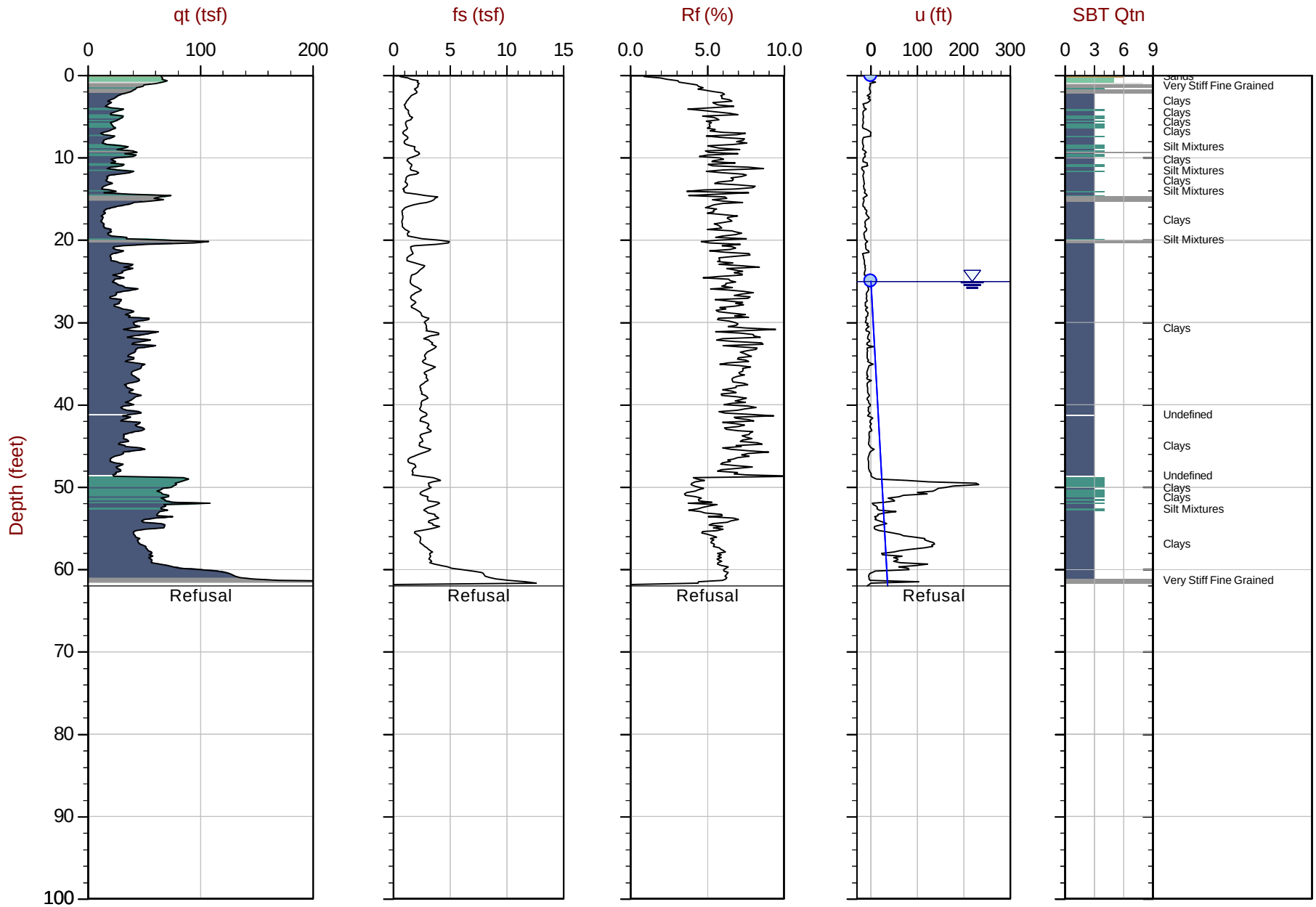
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-07 15:10
Site: DTE Monroe Power Plant

Sounding: CPT20-122
Cone: 513:T1500F15U500



Max Depth: 18.900 m / 62.01 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP122.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139912ft E: 13392507ft
Sheet No: 1 of 1

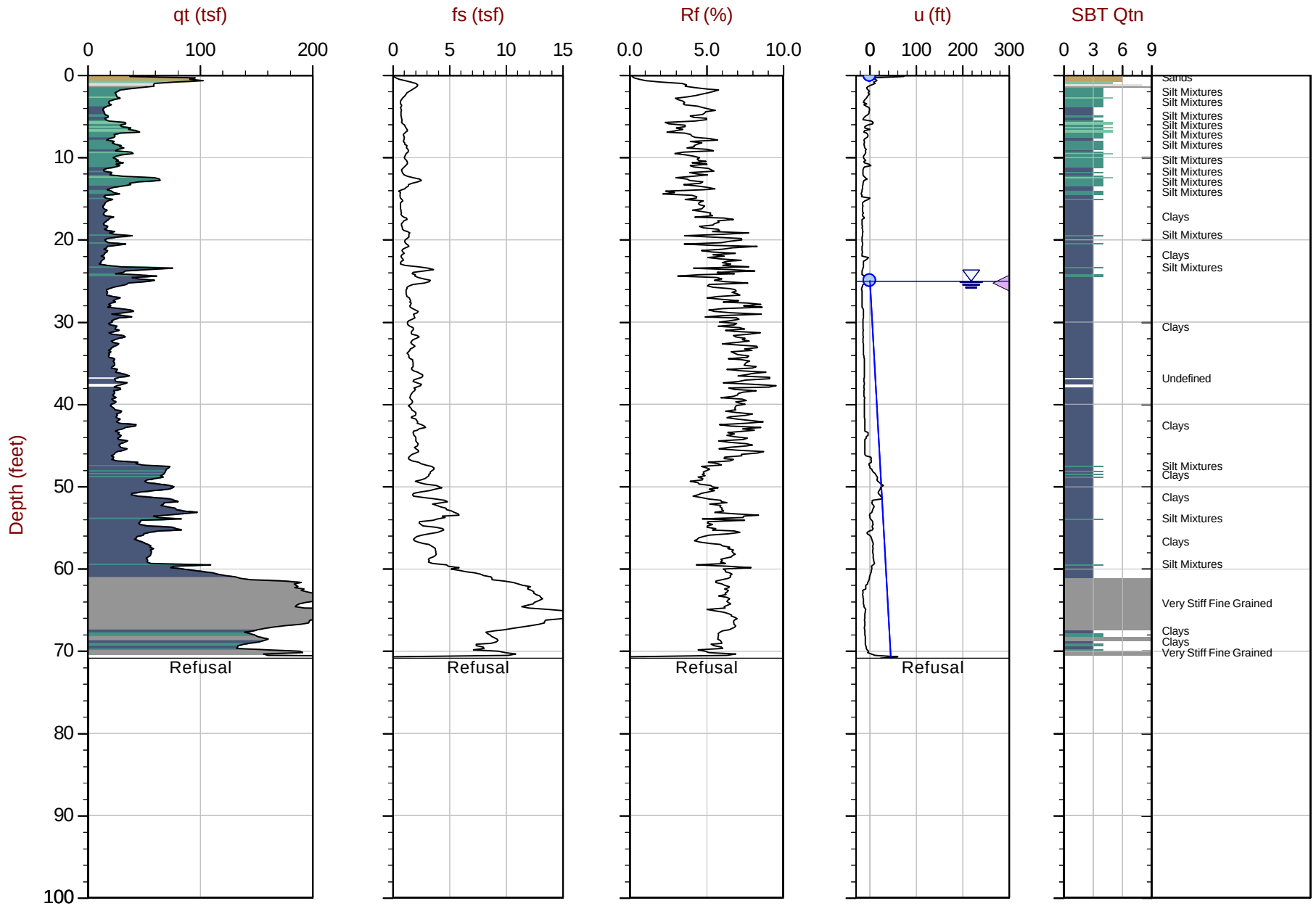
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-08 08:58
Site: DTE Monroe Power Plant

Sounding: CPT20-124
Cone: 513:T1500F15U500



Max Depth: 21.600 m / 70.87 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP124.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139802ft E: 13392678ft
Sheet No: 1 of 1

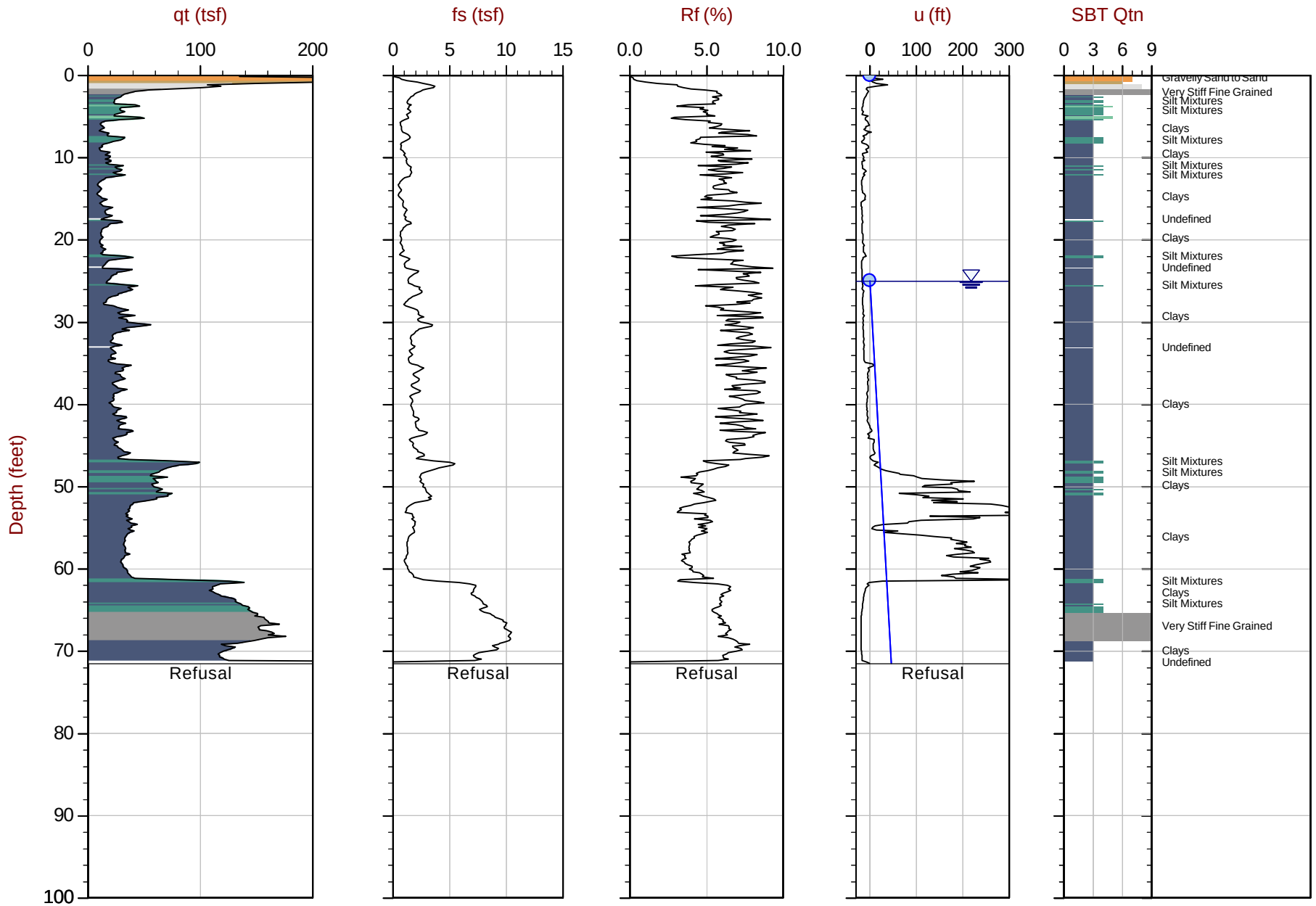
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-08 10:02
Site: DTE Monroe Power Plant

Sounding: CPT20-126
Cone: 513:T1500F15U500



Max Depth: 21.800 m / 71.52 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP126.COR
Unit Wt: SBTQtn (PKR2009)

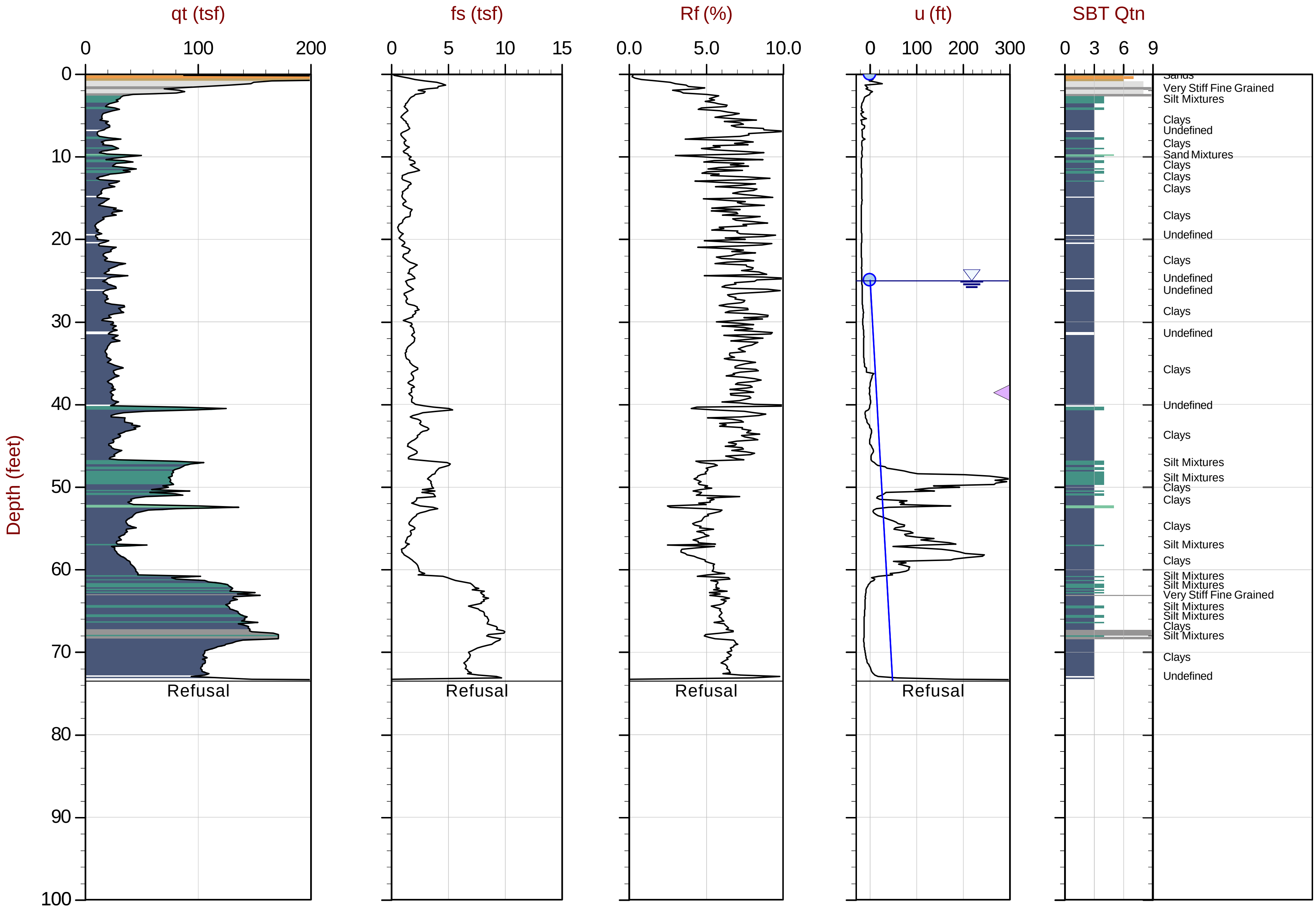
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139694ft E: 13392854ft
Sheet No: 1 of 1

Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

ConeTec

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-08 11:17
Site: DTE Monroe Power Plant
Sounding: CPT20-128
Cone: 513:T1500F15U500



Max Depth: 22.400 m / 73.49 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP128.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139593ft E: 13393024ft
Sheet No: 1 of 1

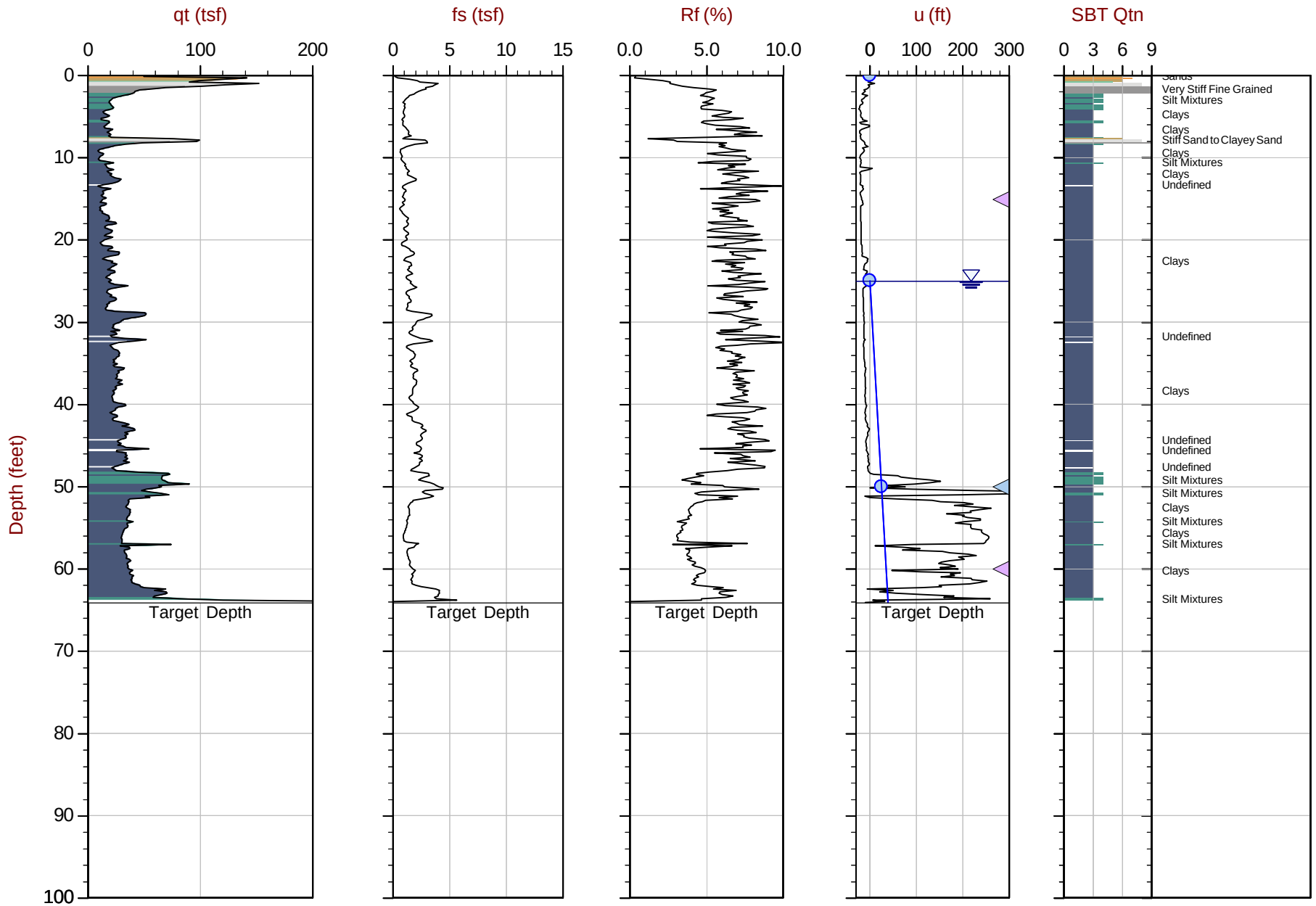
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-08 12:06
Site: DTE Monroe Power Plant

Sounding: CPT20-130
Cone: 513:T1500F15U500



Max Depth: 19.550 m / 64.14 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP130.COR
Unit Wt: SBTQtn (PKR2009)

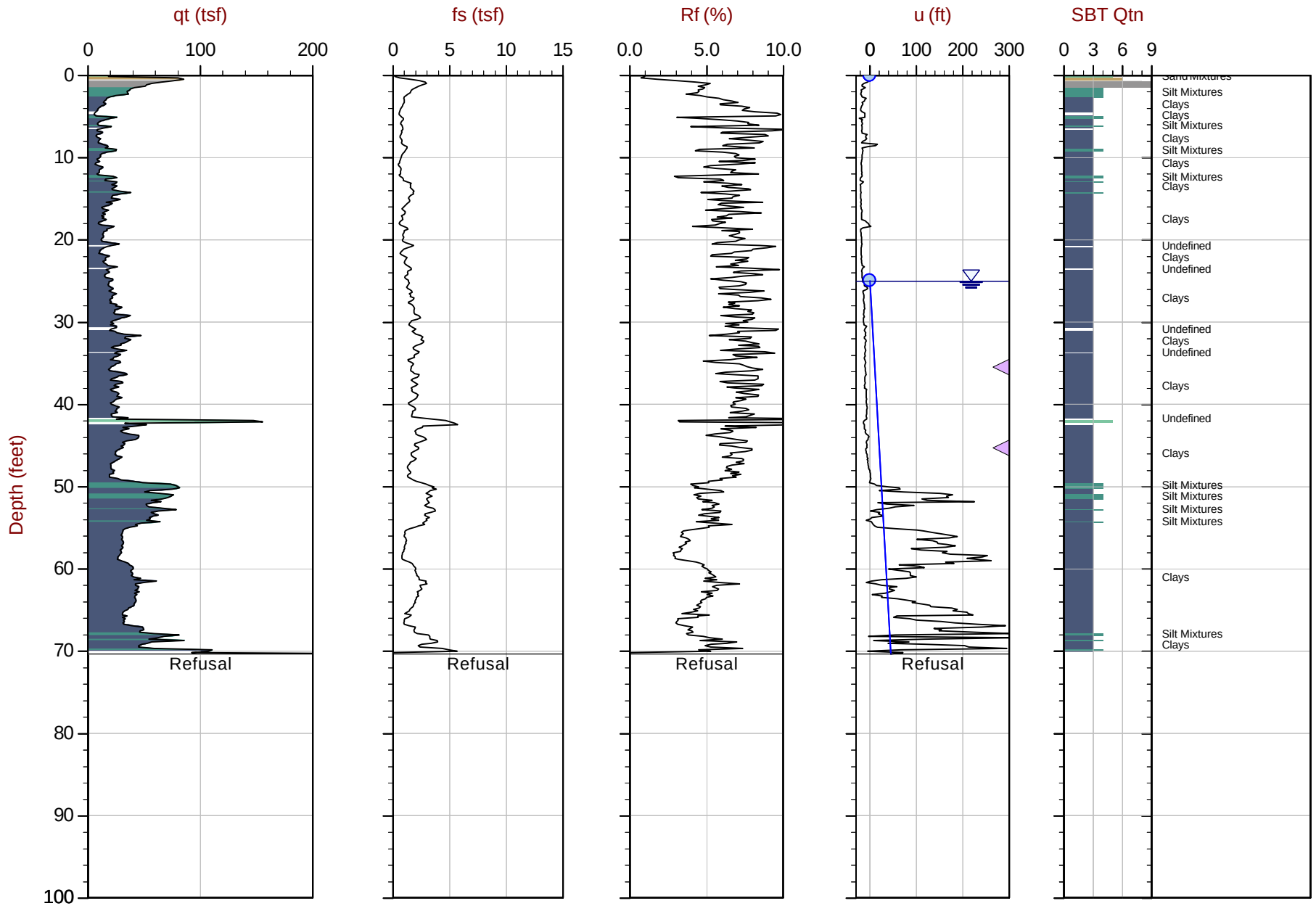
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139484ft E: 13393198ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-08 15:16
Site: DTE Monroe Power Plant

Sounding: CPT20-132
Cone: 513:T1500F15U500



Max Depth: 21.450 m / 70.37 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP132.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139378ft E: 13393362ft
Sheet No: 1 of 1

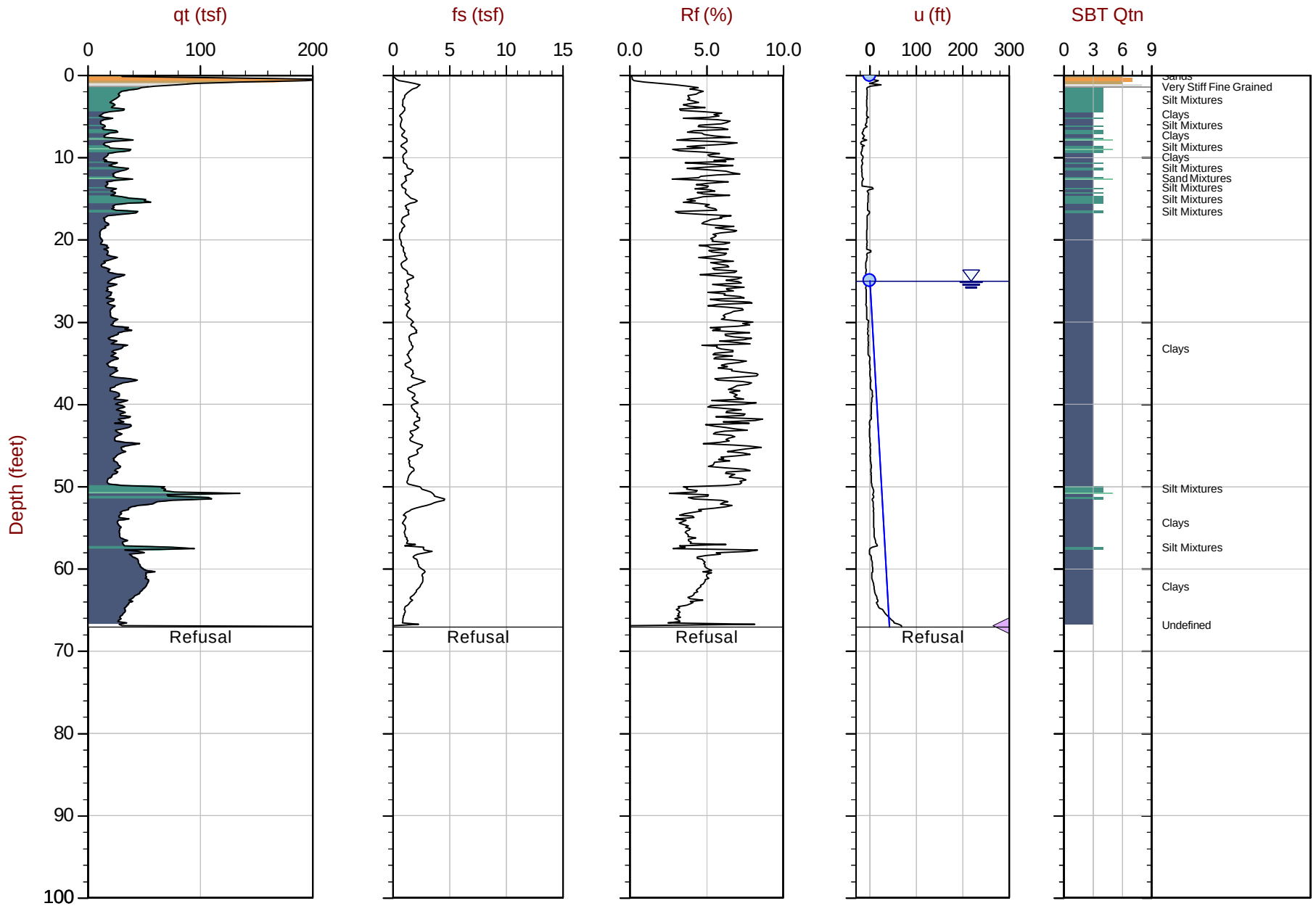
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-14 14:09
Site: DTE Monroe Power Plant

Sounding: CPT20-134
Cone: 568:T1500F15U500



Max Depth: 20.450 m / 67.09 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point

File: 20-61-21655_CP134.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139281ft E: 13393532ft
Sheet No: 1 of 1

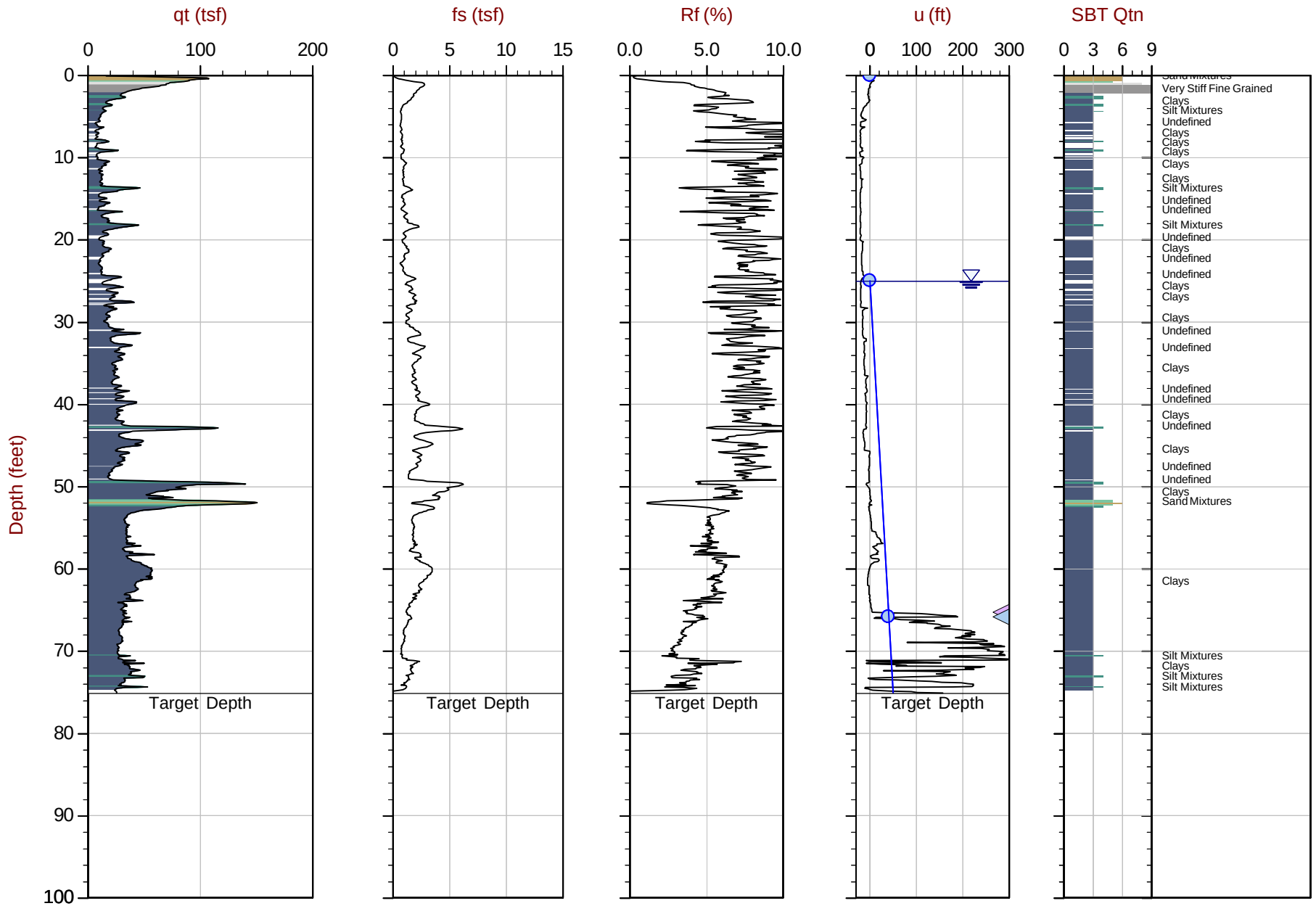
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-14 13:01
Site: DTE Monroe Power Plant

Sounding: CPT20-136
Cone: 551:T1500F15U500



Max Depth: 22.900 m / 75.13 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP136.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139166ft E: 13393704ft
Sheet No: 1 of 1

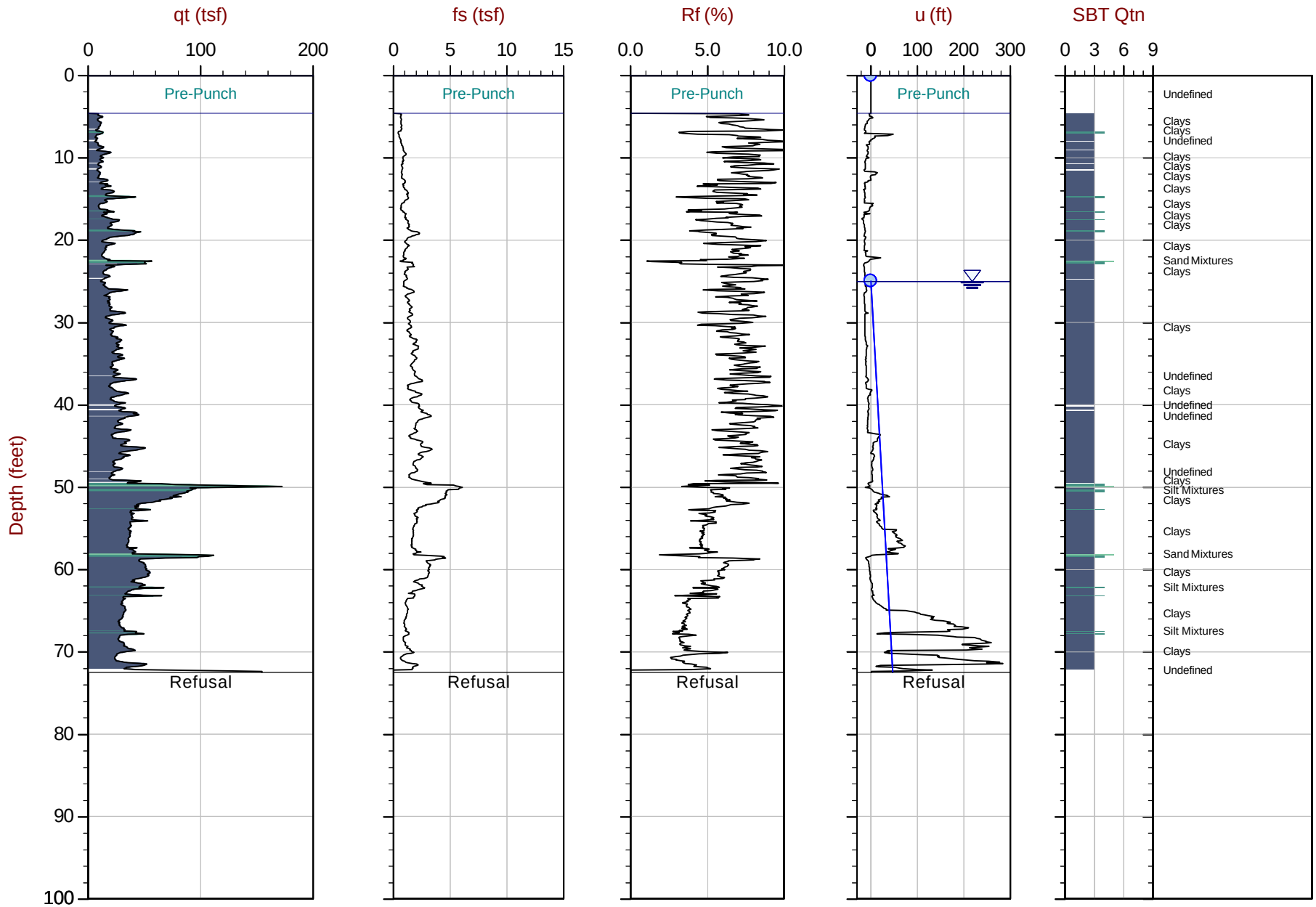
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-14 12:17
Site: DTE Monroe Power Plant

Sounding: CPT20-138
Cone: 551:T1500F15U500



Max Depth: 22.100 m / 72.51 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP138.COR
Unit Wt: SBTQtn (PKR2009)

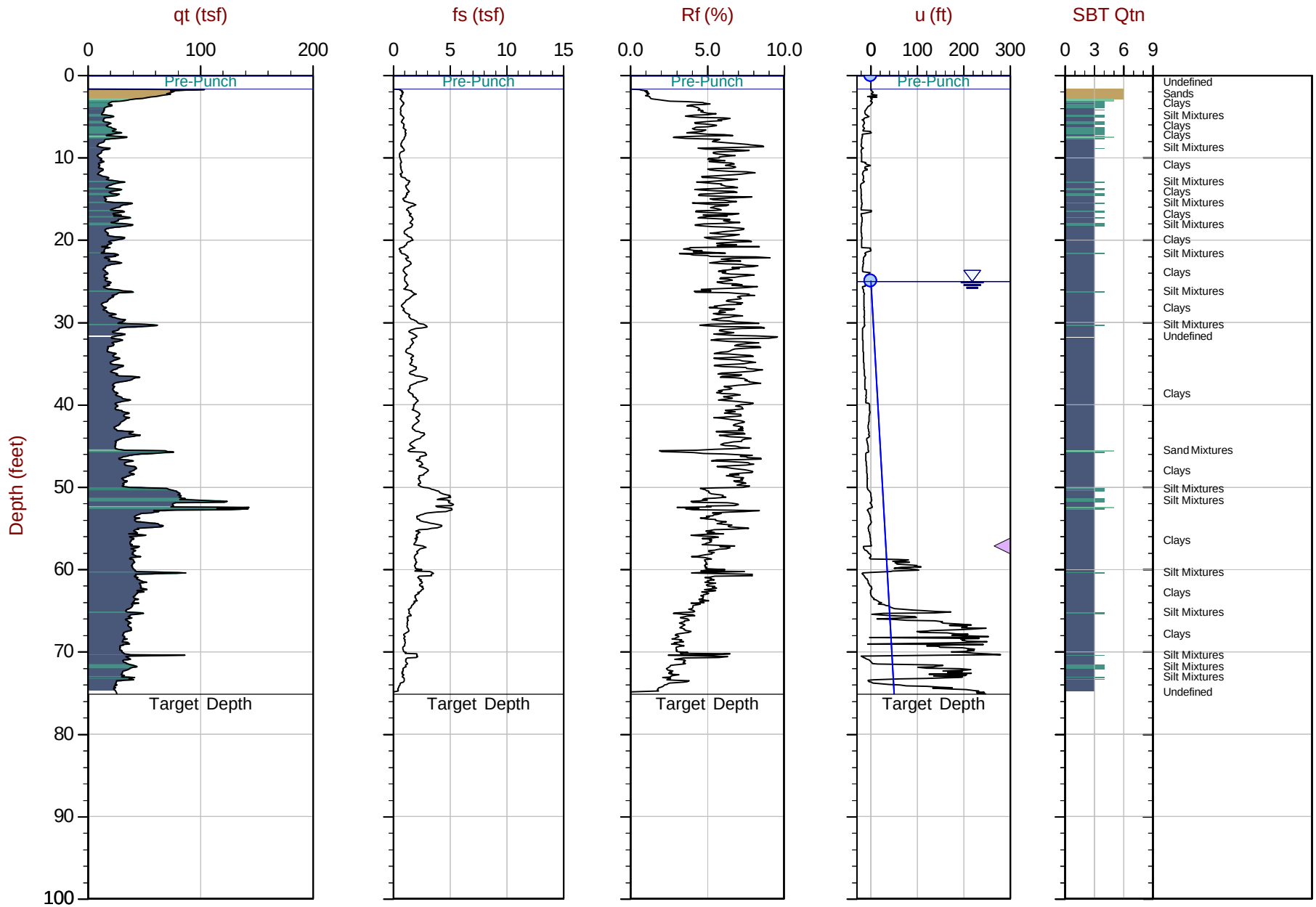
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139110ft E: 13393797ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-13 14:56
Site: DTE Monroe Power Plant

Sounding: CPT20-140
Cone: 551:T1500F15U500



Max Depth: 22.900 m / 75.13 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP140.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139141ft E: 13393971ft
Sheet No: 1 of 1

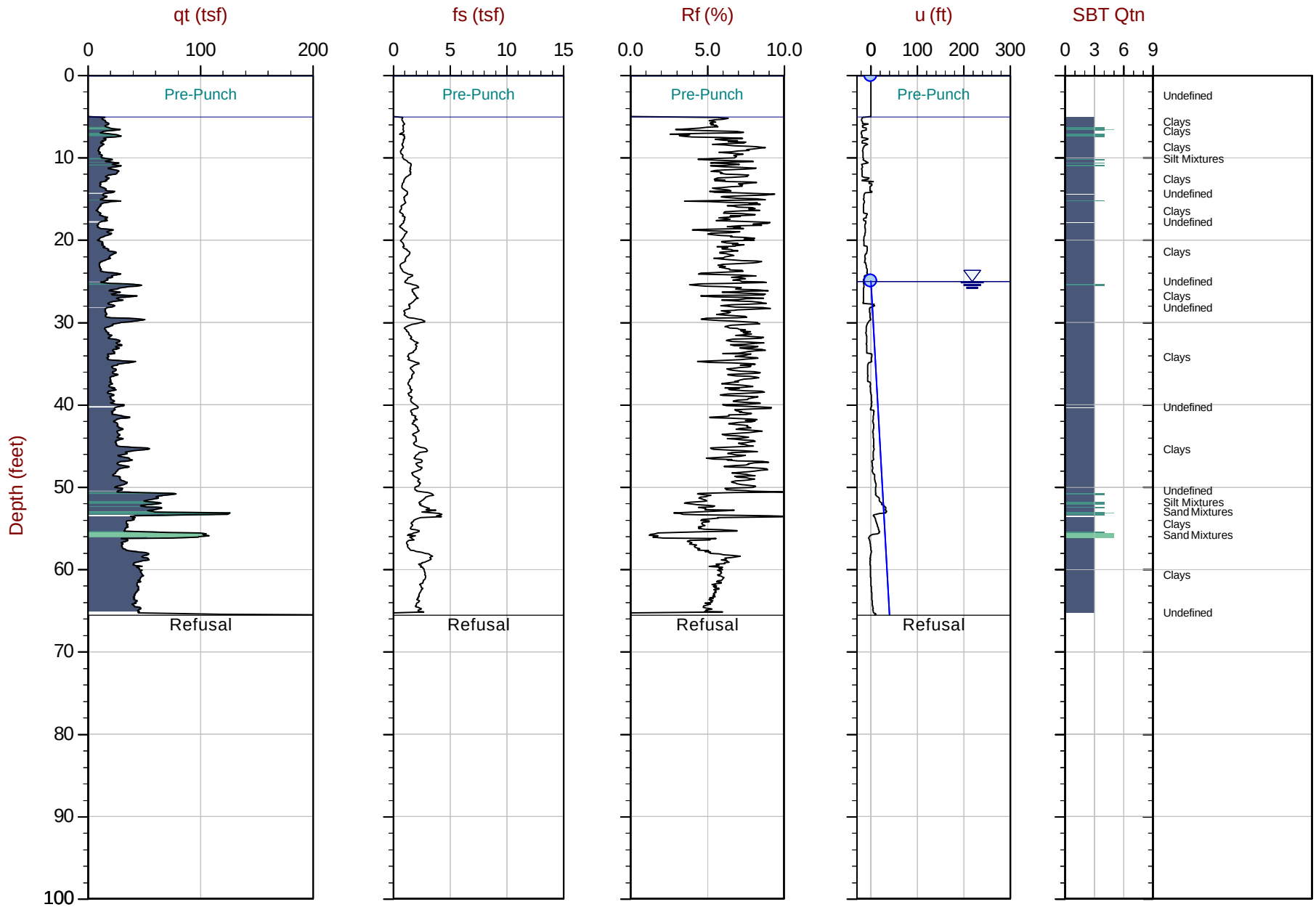
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-14 11:26
Site: DTE Monroe Power Plant

Sounding: CPT20-142
Cone: 551:T1500F15U500



Max Depth: 19.975 m / 65.53 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP142.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139293ft E: 13394120ft
Sheet No: 1 of 1

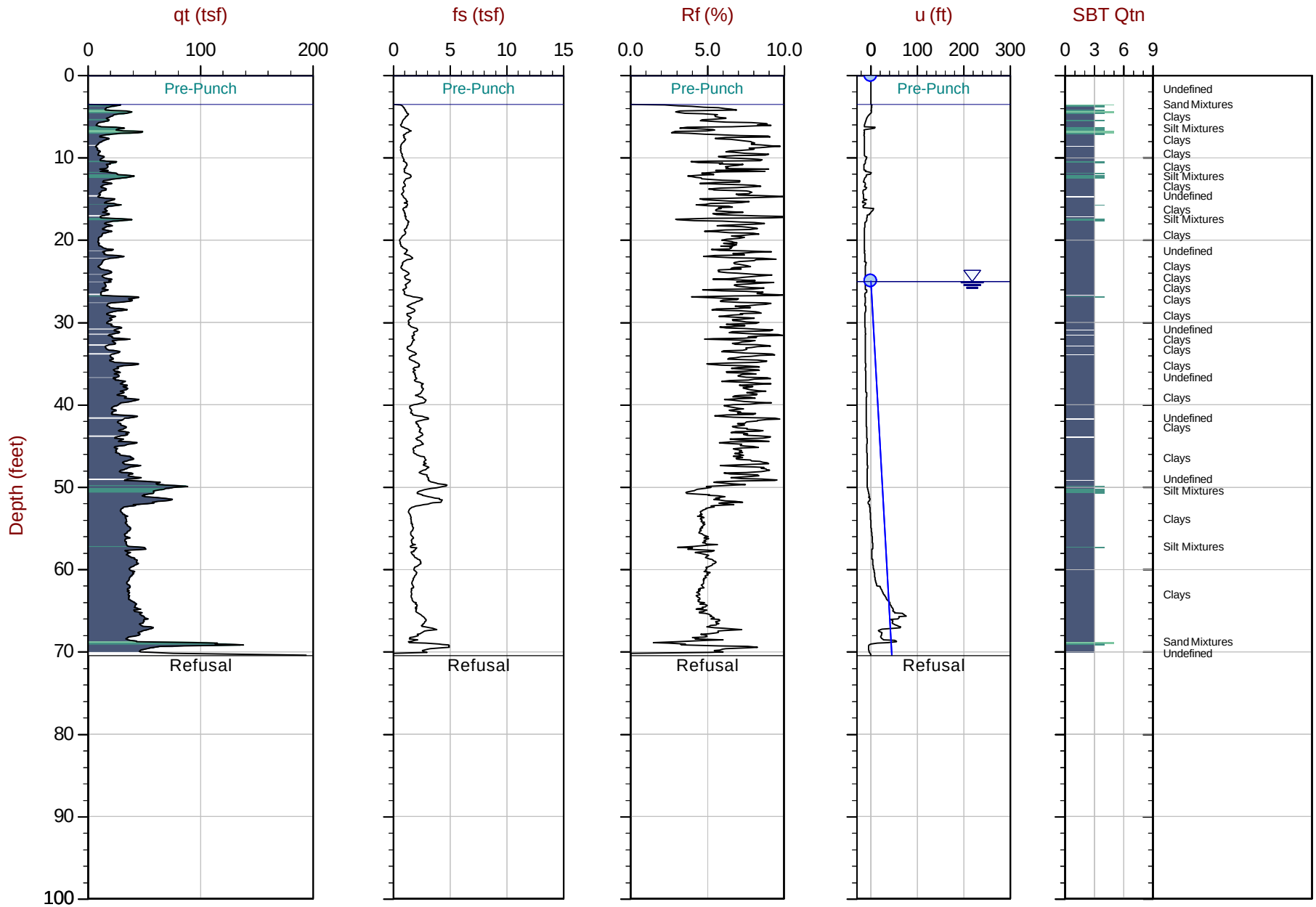
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-14 10:25
Site: DTE Monroe Power Plant

Sounding: CPT20-144
Cone: 551:T1500F15U500



Max Depth: 21.475 m / 70.46 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP144.COR
Unit Wt: SBTQtn (PKR2009)

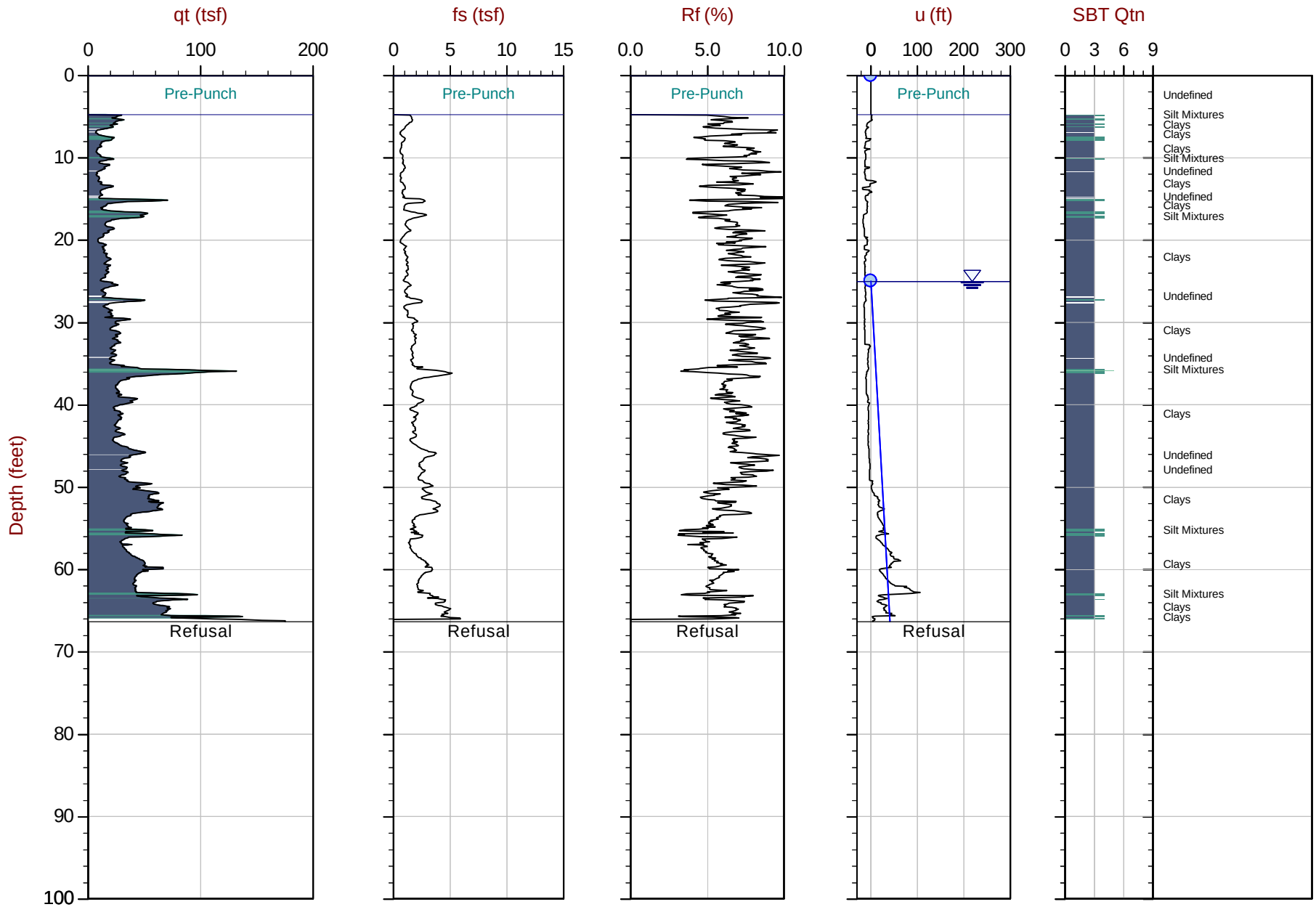
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139326ft E: 13394303ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-14 09:43
Site: DTE Monroe Power Plant

Sounding: CPT20-146
Cone: 551:T1500F15U500



Max Depth: 20.225 m / 66.35 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP146.COR
Unit Wt: SBTQtn (PKR2009)

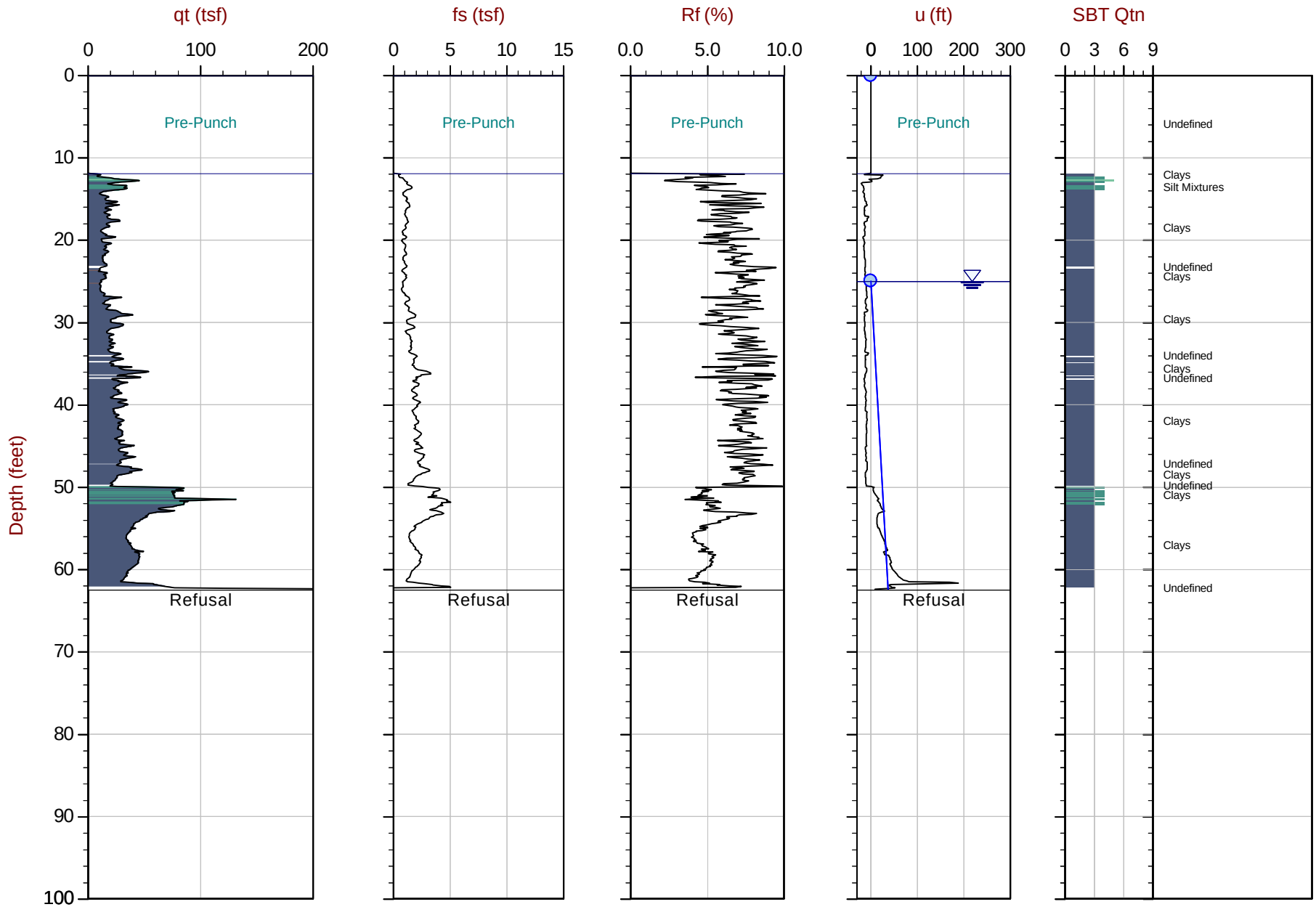
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139290ft E: 13394504ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-14 09:01
Site: DTE Monroe Power Plant

Sounding: CPT20-148
Cone: 551:T1500F15U500



Max Depth: 19.050 m / 62.50 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP148.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139269ft E: 13394705ft
Sheet No: 1 of 1

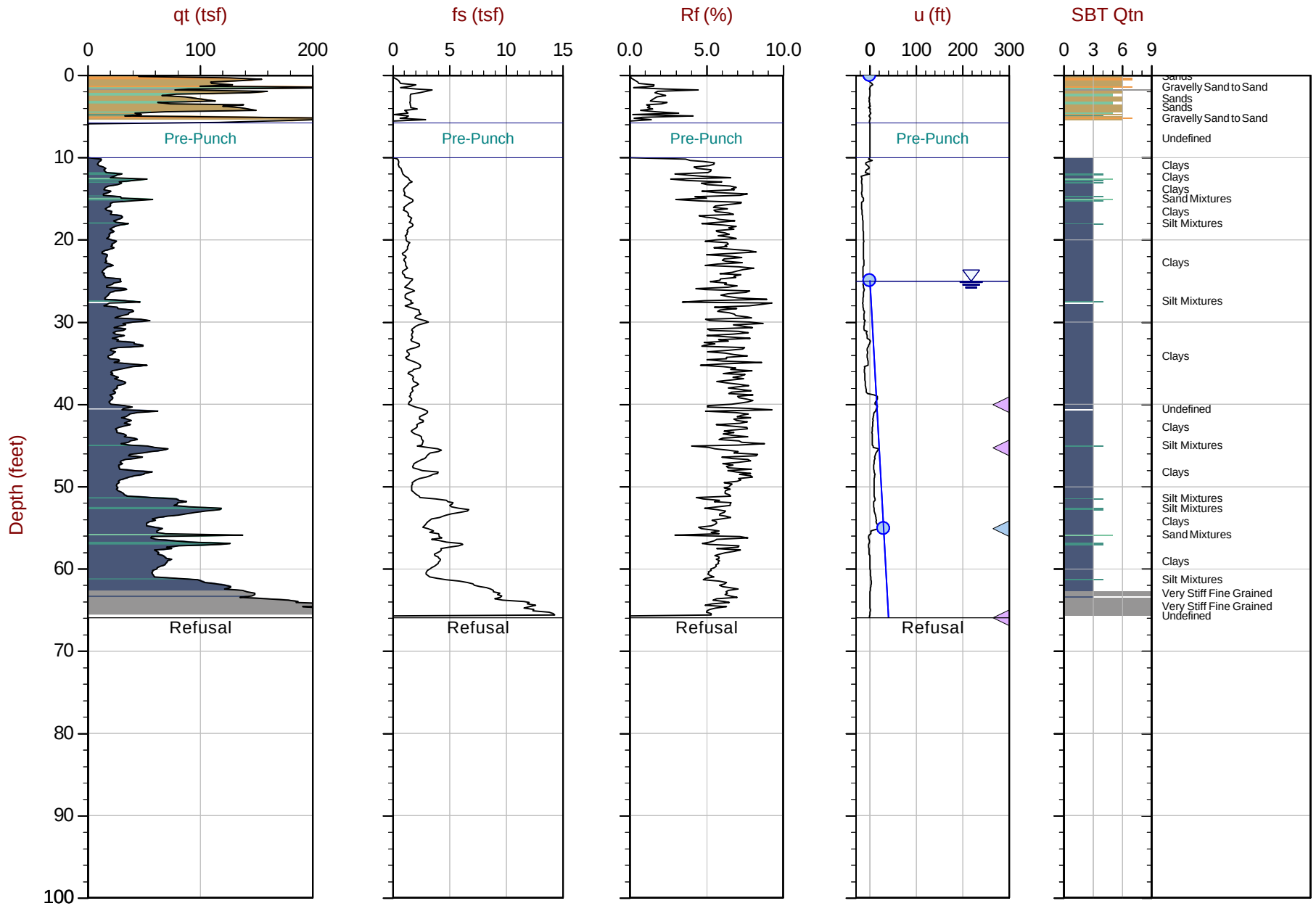
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21655
Date: 2020-12-14 08:55
Site: DTE Monroe Power Plant

Sounding: CPT20-150
Cone: 568:T1500F15U500



Max Depth: 20.100 m / 65.94 ft
Depth Inc: 0.050 m / 0.164 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP150.COR
Unit Wt: SBTQtn (PKR2009)

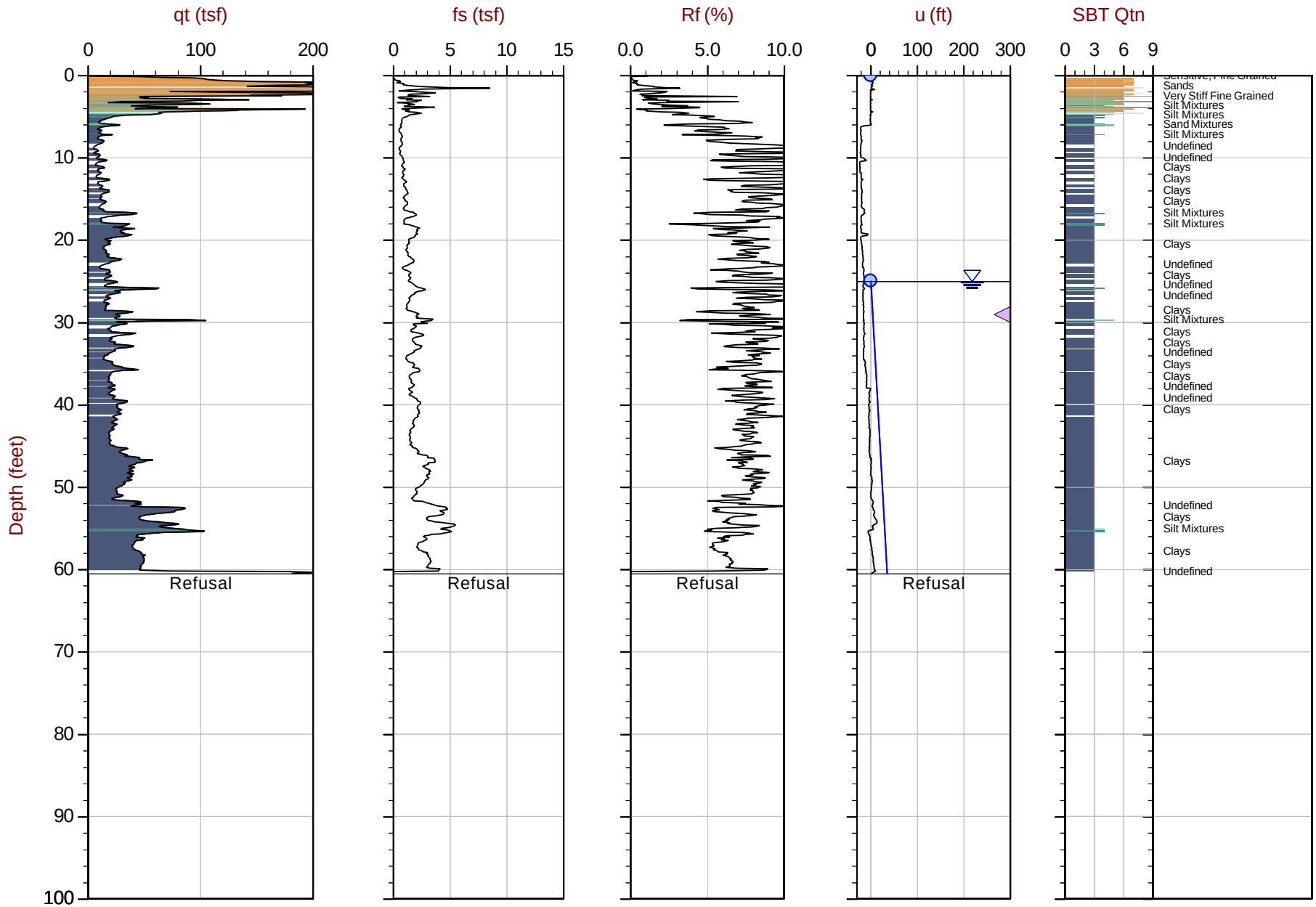
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139340ft E: 13394900ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 14:54
Site: DTE Monroe Power Plant

Sounding: CPT20-152
Cone: 551:T1500F15U500



Max Depth: 18.450 m / 60.53 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP152.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139451ft E: 13395043ft
Sheet No: 1 of 1

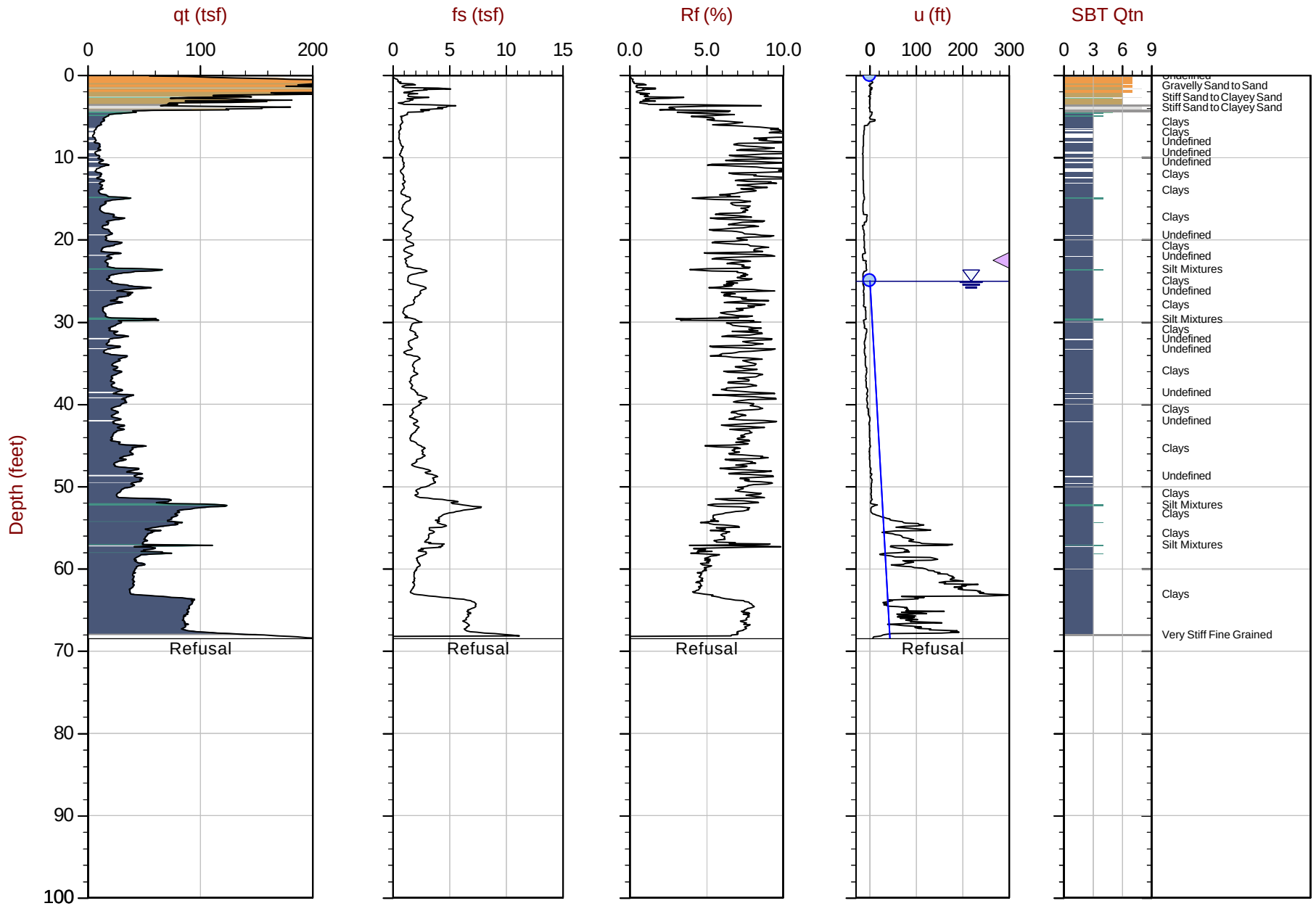
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 14:08
Site: DTE Monroe Power Plant

Sounding: CPT20-154
Cone: 551:T1500F15U500



Max Depth: 20.875 m / 68.49 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP154.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139579ft E: 13395198ft
Sheet No: 1 of 1

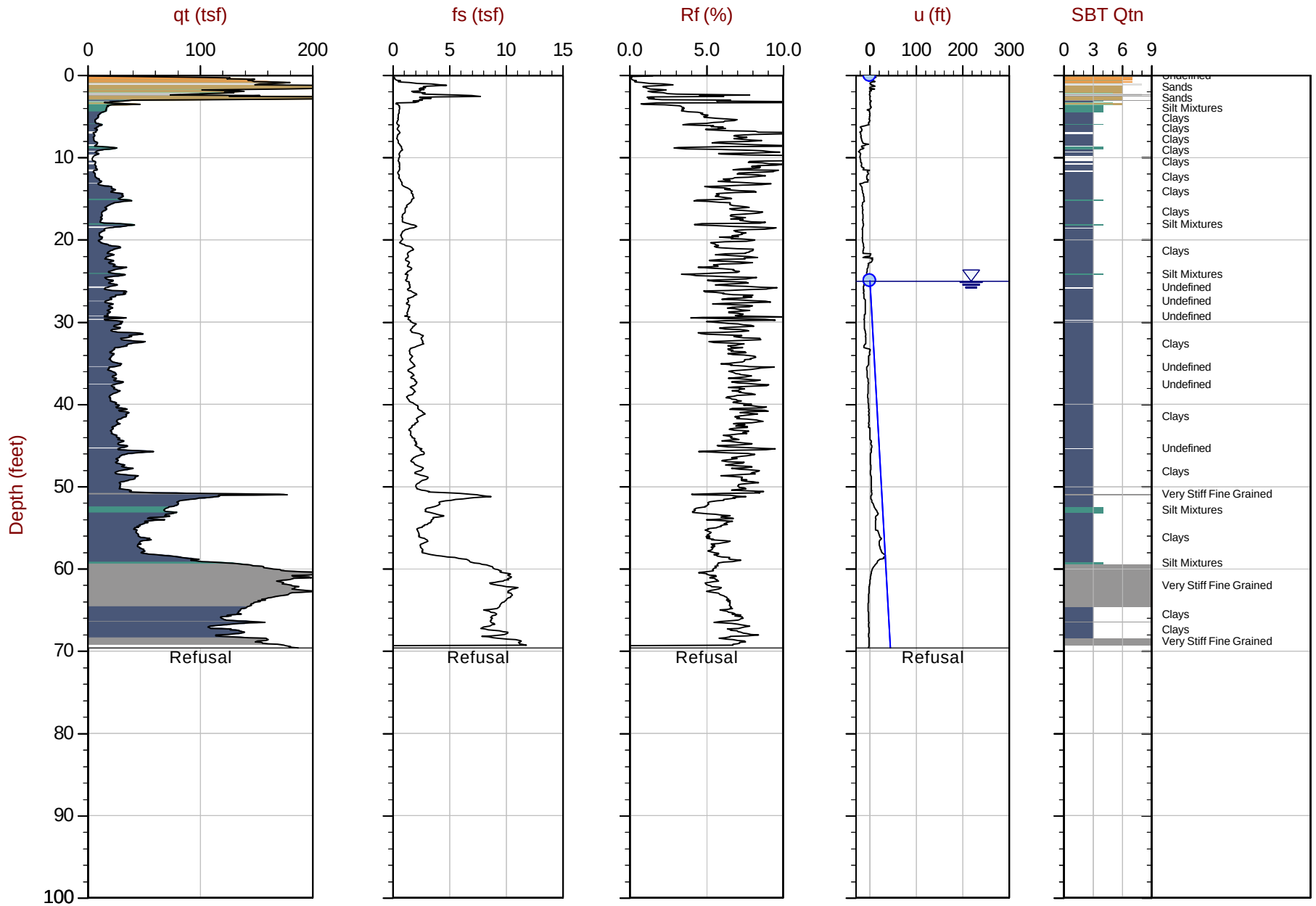
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 13:22
Site: DTE Monroe Power Plant

Sounding: CPT20-156
Cone: 551:T1500F15U500



Max Depth: 21.225 m / 69.63 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP156.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139707ft E: 13395357ft
Sheet No: 1 of 1

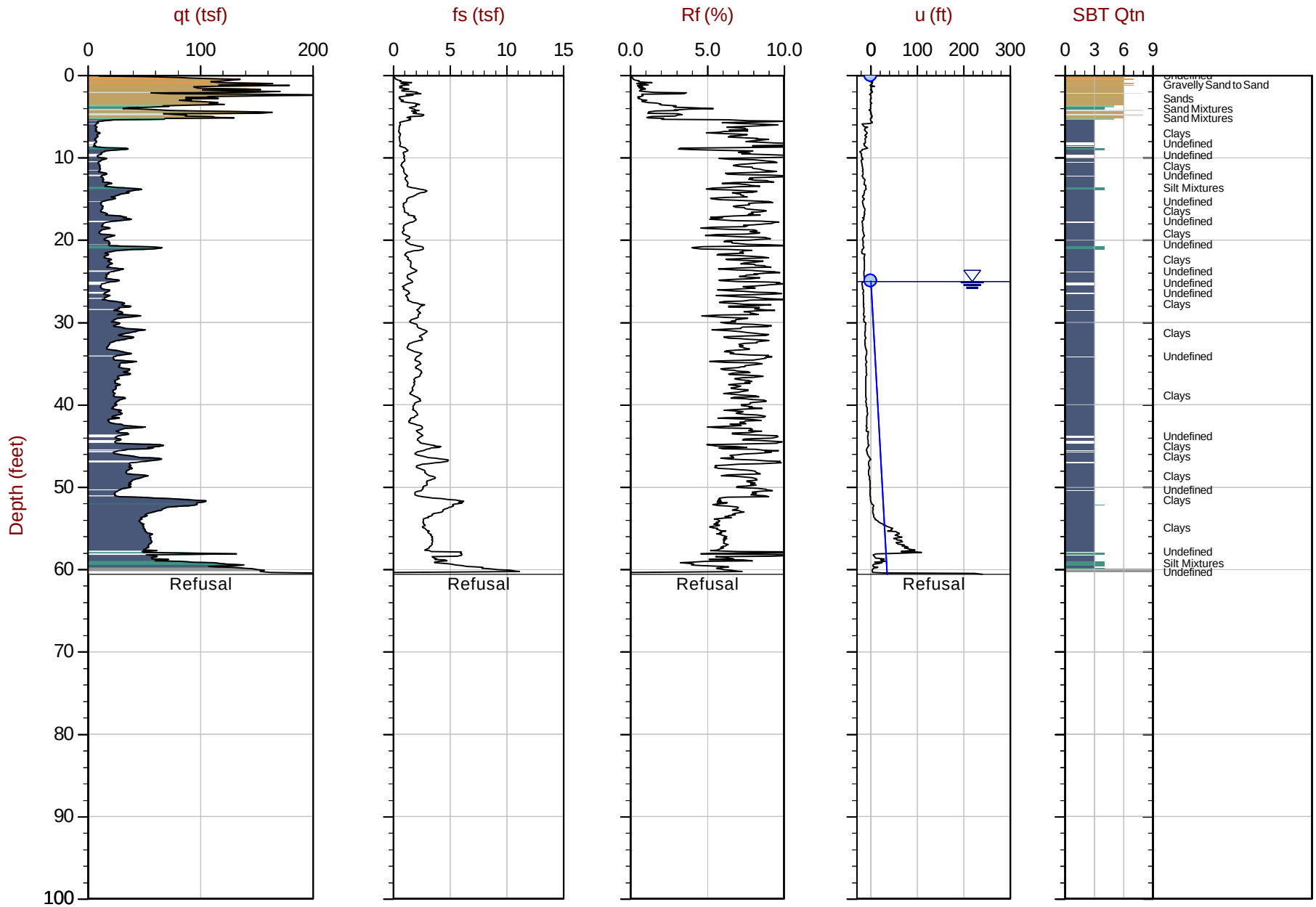
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 12:47
Site: DTE Monroe Power Plant

Sounding: CPT20-158
Cone: 551:T1500F15U500



Max Depth: 18.475 m / 60.61 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP158.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139832ft E: 13395506ft
Sheet No: 1 of 1

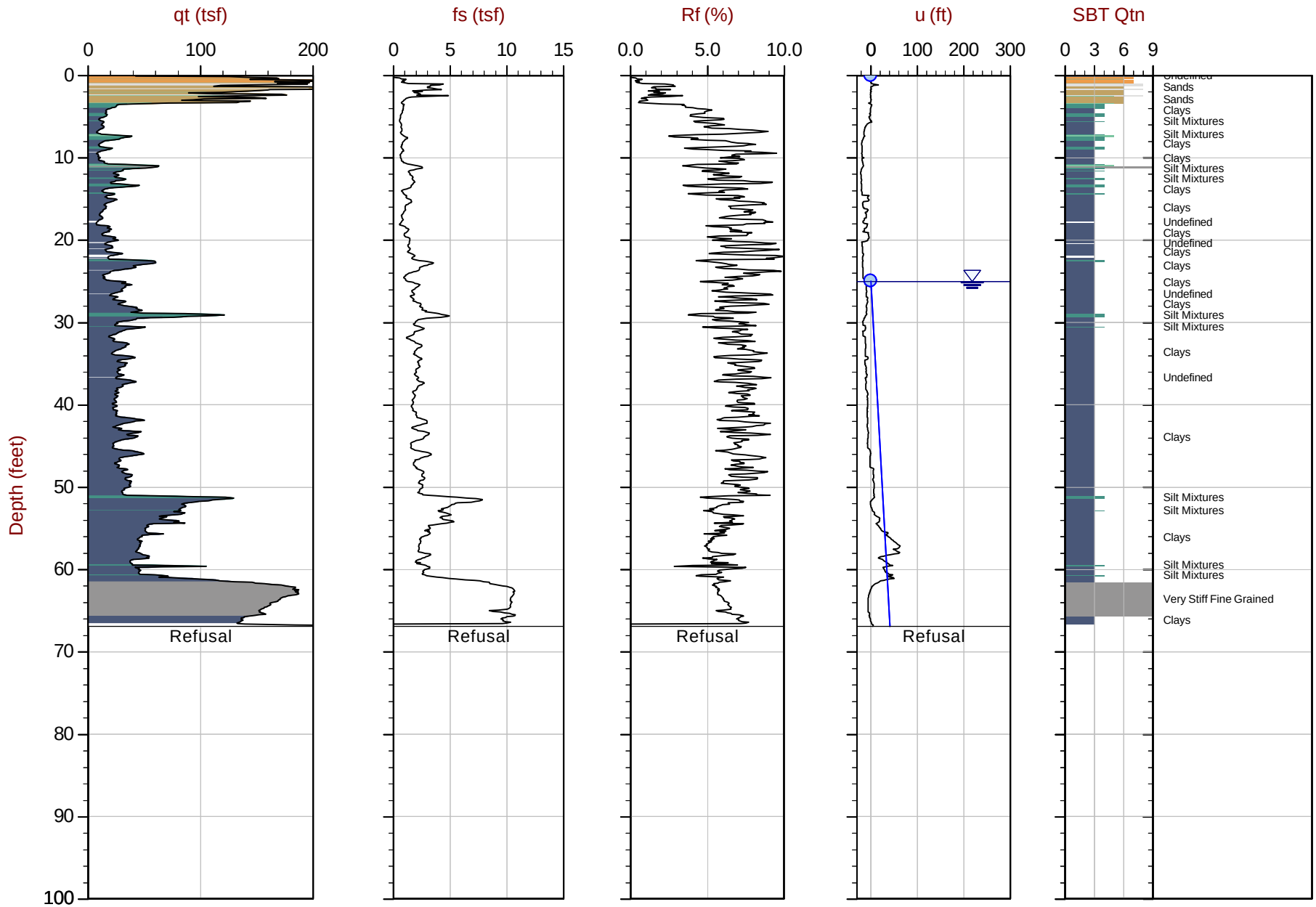
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 12:06
Site: DTE Monroe Power Plant

Sounding: CPT20-160
Cone: 551:T1500F15U500



Max Depth: 20.400 m / 66.93 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP160.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 139960ft E: 13395666ft
Sheet No: 1 of 1

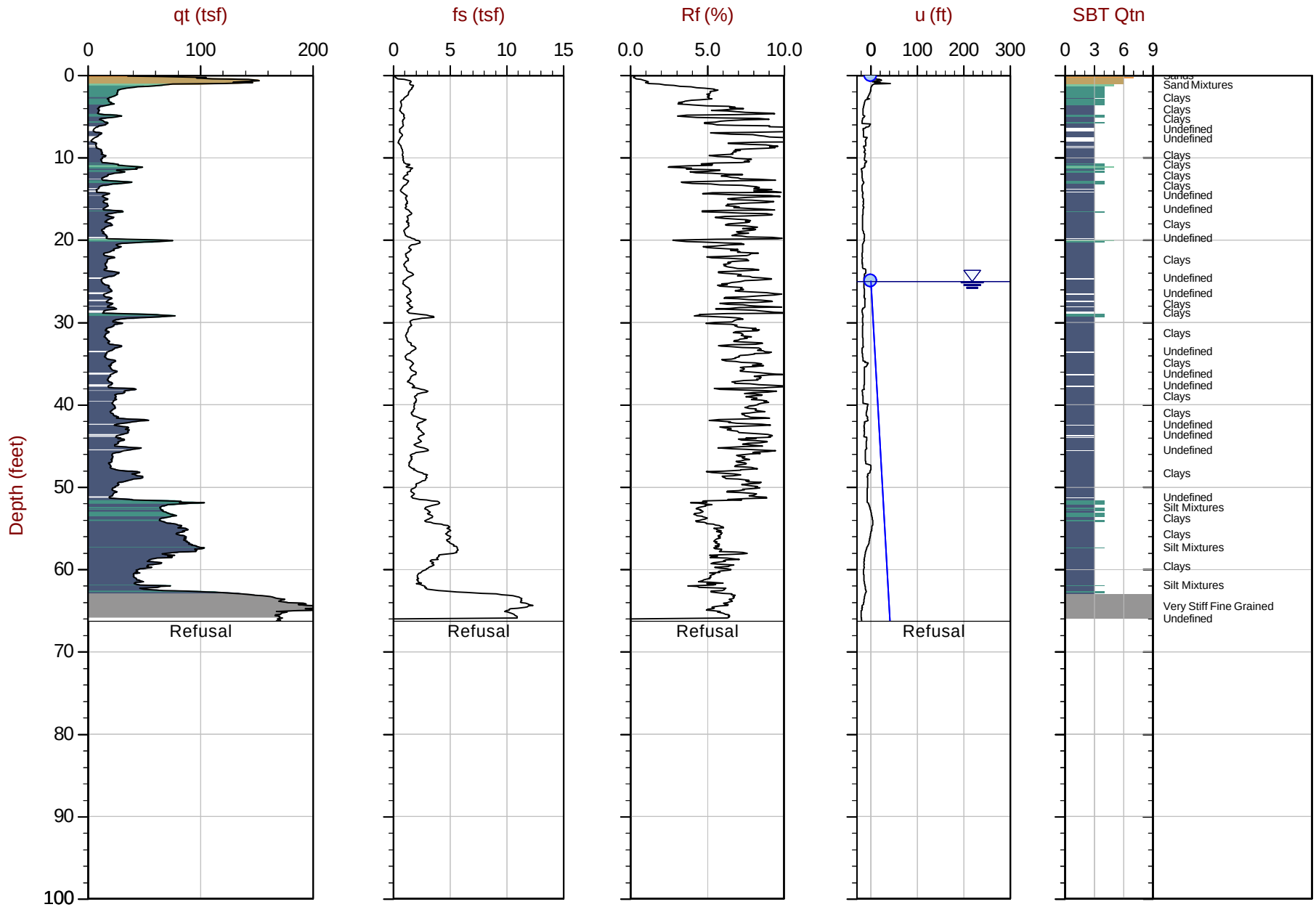
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 11:22
Site: DTE Monroe Power Plant

Sounding: CPT20-162
Cone: 551:T1500F15U500



Max Depth: 20.200 m / 66.27 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP162.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140089ft E: 13395835ft
Sheet No: 1 of 1

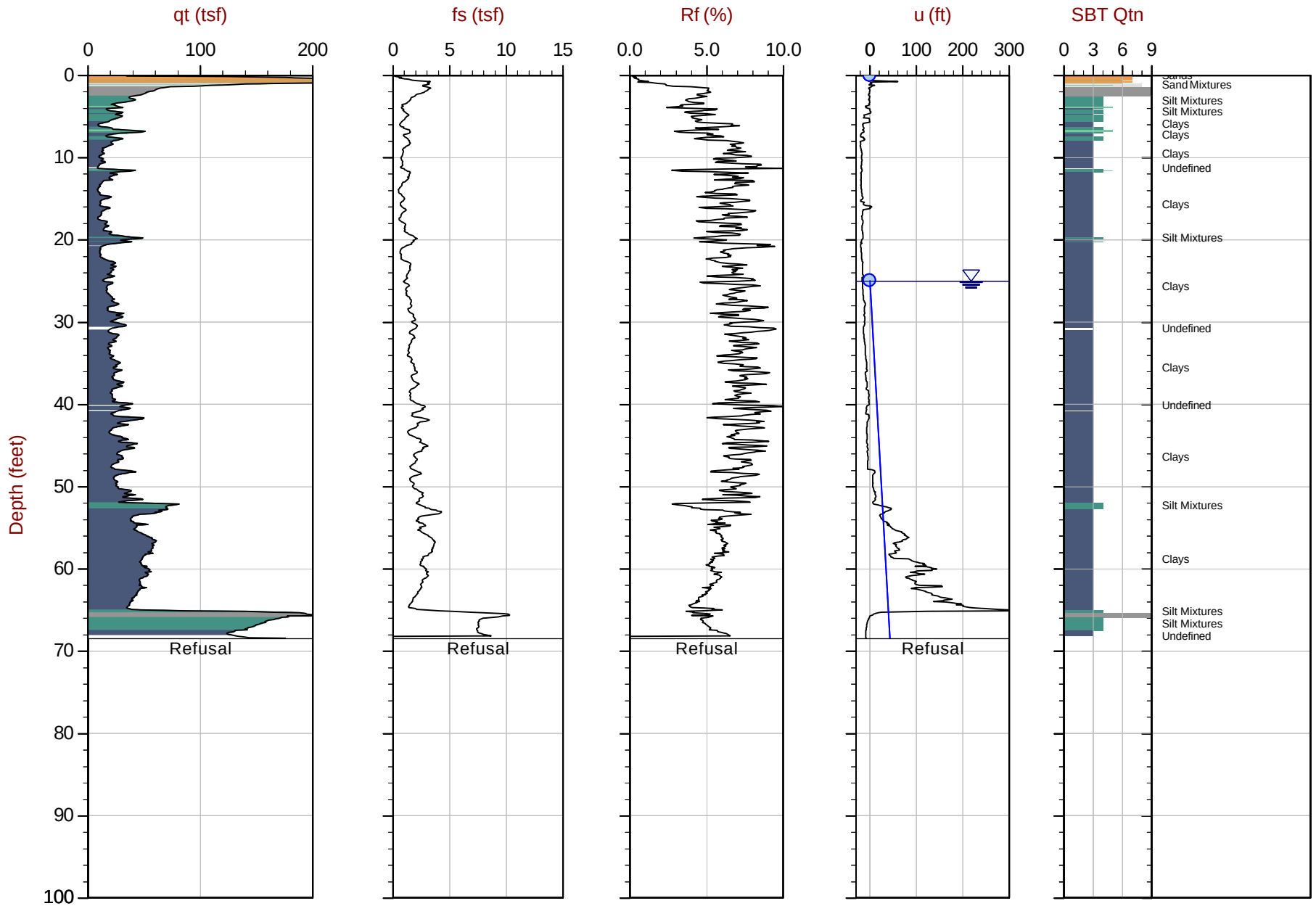
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 10:32
Site: DTE Monroe Power Plant

Sounding: CPT20-164
Cone: 551:T1500F15U500



Max Depth: 20.875 m / 68.49 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP164.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140210ft E: 13395988ft
Sheet No: 1 of 1

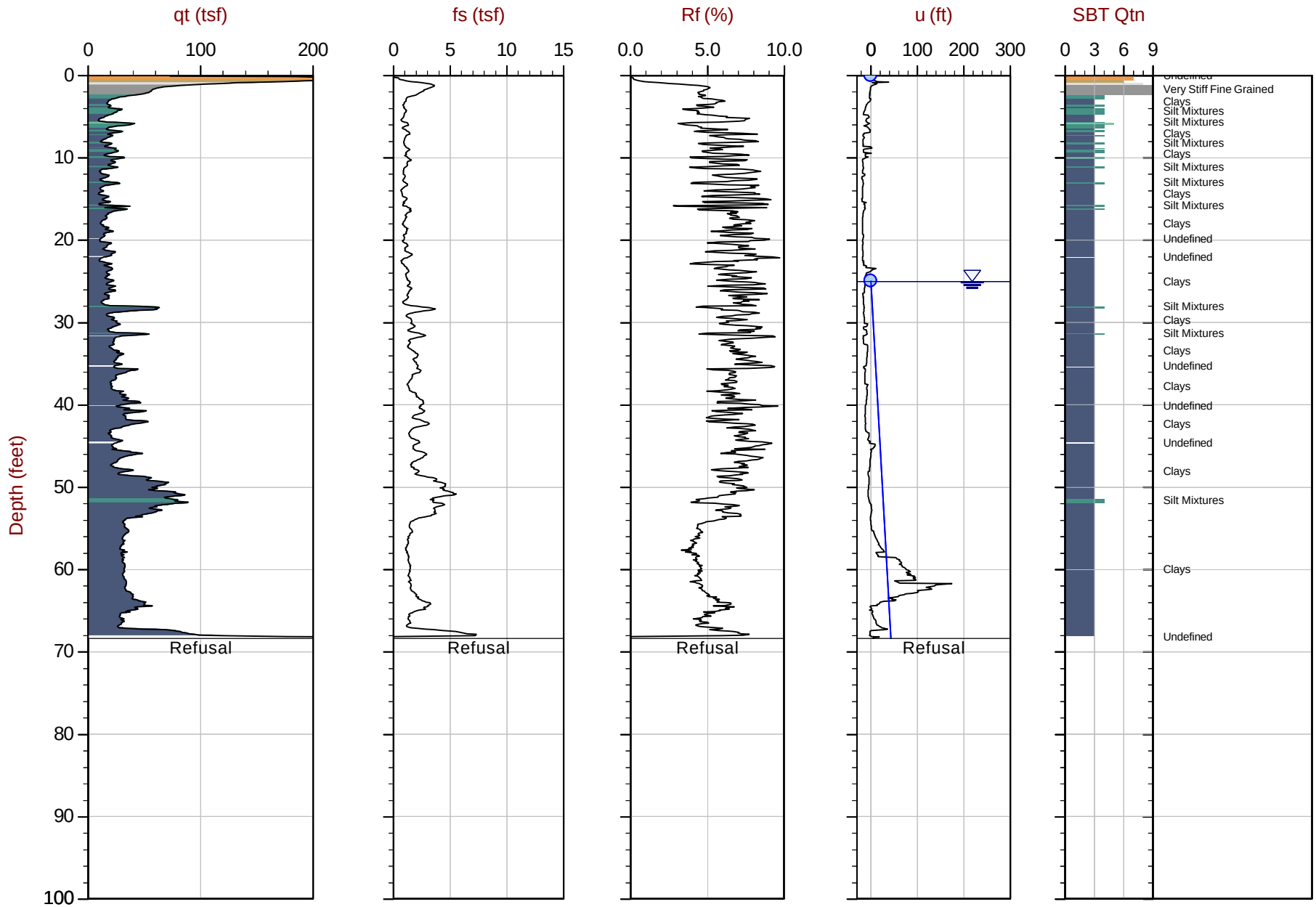
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 09:42
Site: DTE Monroe Power Plant

Sounding: CPT20-166
Cone: 551:T1500F15U500



Max Depth: 20.850 m / 68.40 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP166.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140336ft E: 13396145ft
Sheet No: 1 of 1

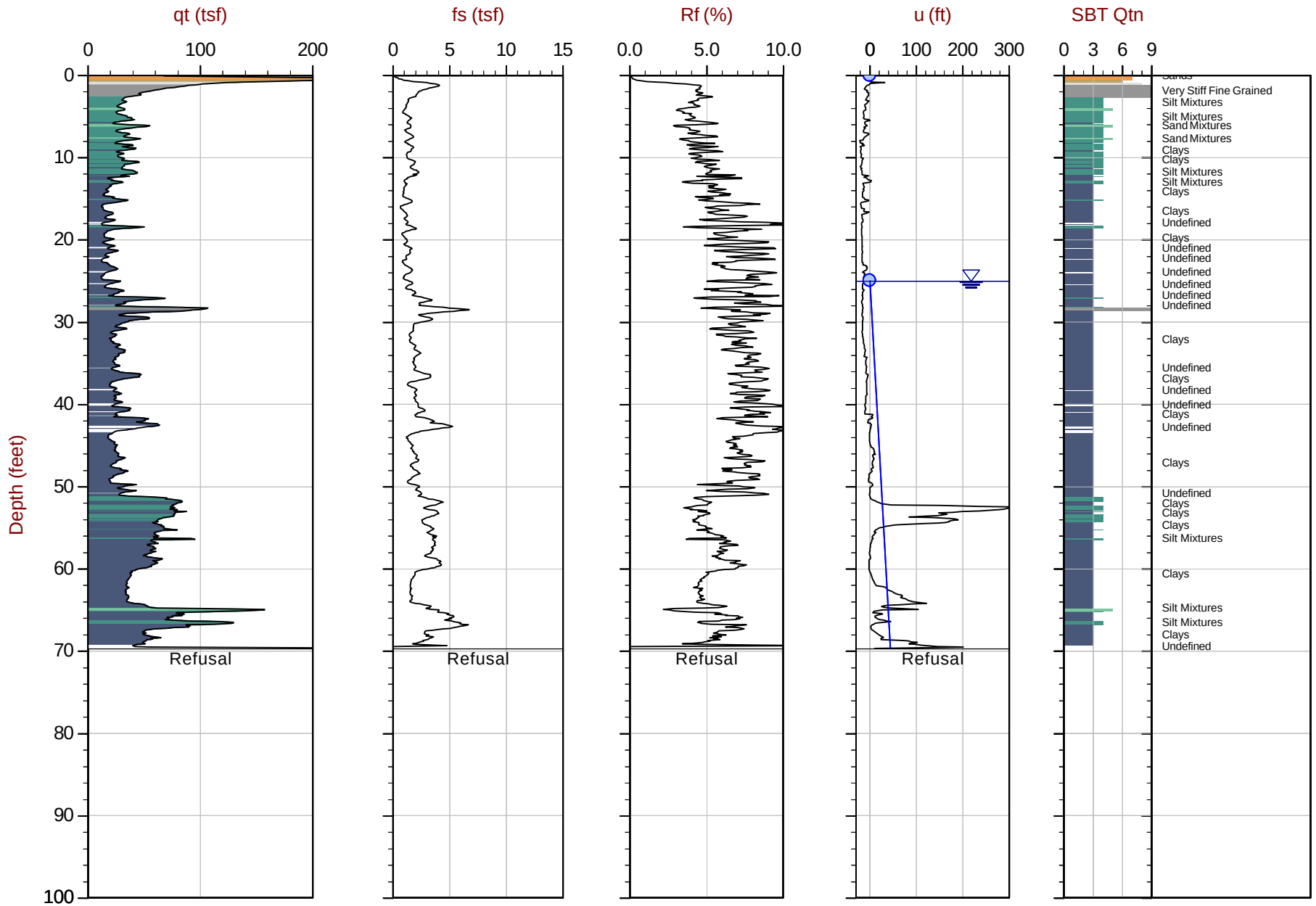
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-08 08:50
Site: DTE Monroe Power Plant

Sounding: CPT20-168
Cone: 551:T1500F15U500



Max Depth: 21.250 m / 69.72 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP168.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140461ft E: 13396297ft
Sheet No: 1 of 1

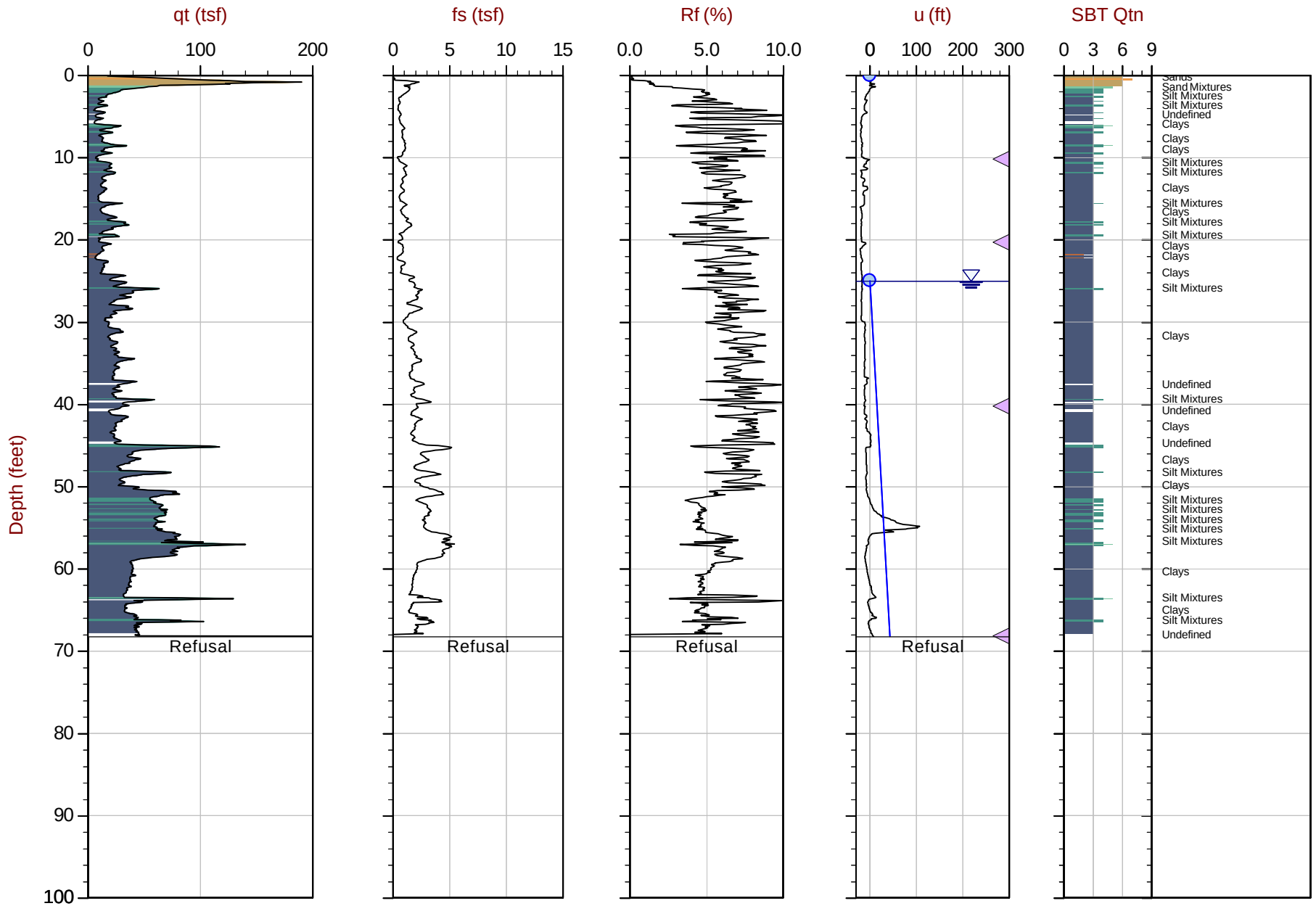
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-07 13:59
Site: DTE Monroe Power Plant

Sounding: CPT20-170
Cone: 551:T1500F15U500



Max Depth: 20.800 m / 68.24 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP170.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140603ft E: 13396441ft
Sheet No: 1 of 1

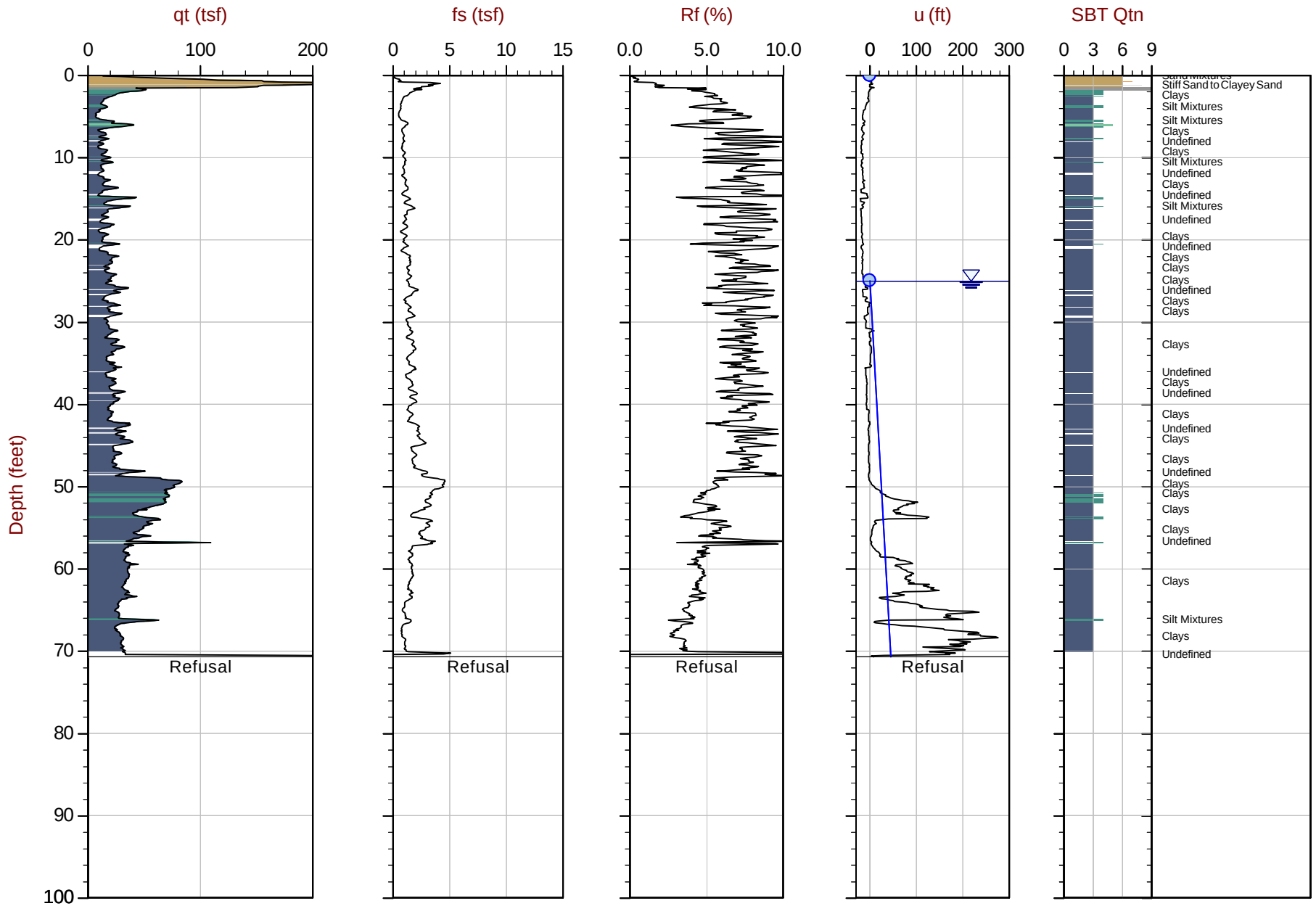
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-07 13:14
Site: DTE Monroe Power Plant

Sounding: CPT20-172
Cone: 551:T1500F15U500



Max Depth: 21.550 m / 70.70 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point
Overplot Item: Ueq, Assumed Ueq, Dissipation, Ueq achieved, Dissipation, Ueq not achieved, Dissipation, Ueq assumed, Hydrostatic Line

File: 20-61-21655_CP172.COR
Unit Wt: SBTQtn (PKR2009)

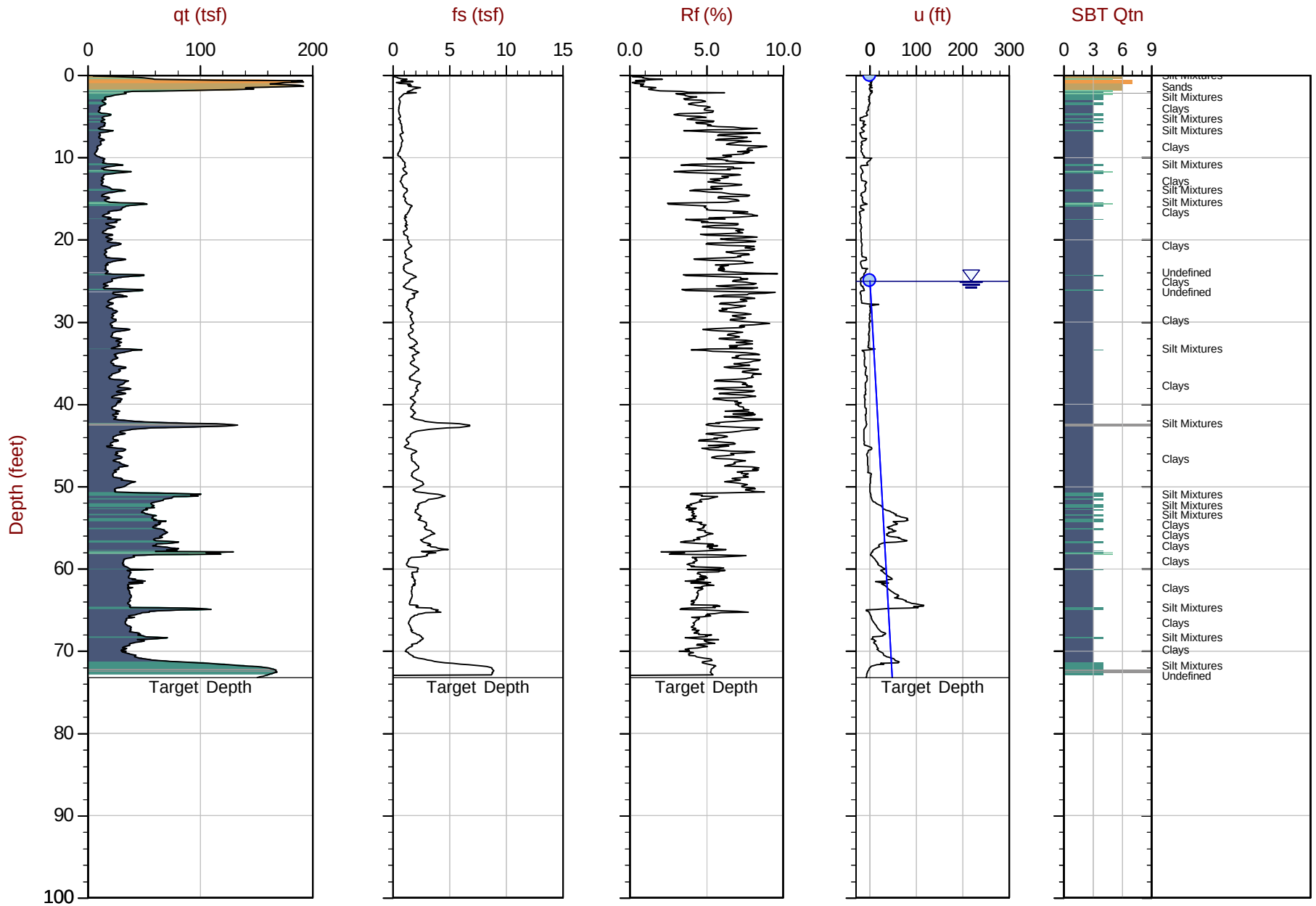
SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140759ft E: 13396566ft
Sheet No: 1 of 1

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-07 12:22
Site: DTE Monroe Power Plant

Sounding: CPT20-174
Cone: 551:T1500F15U500



Max Depth: 22.325 m / 73.24 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP174.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 140916ft E: 13396693ft
Sheet No: 1 of 1

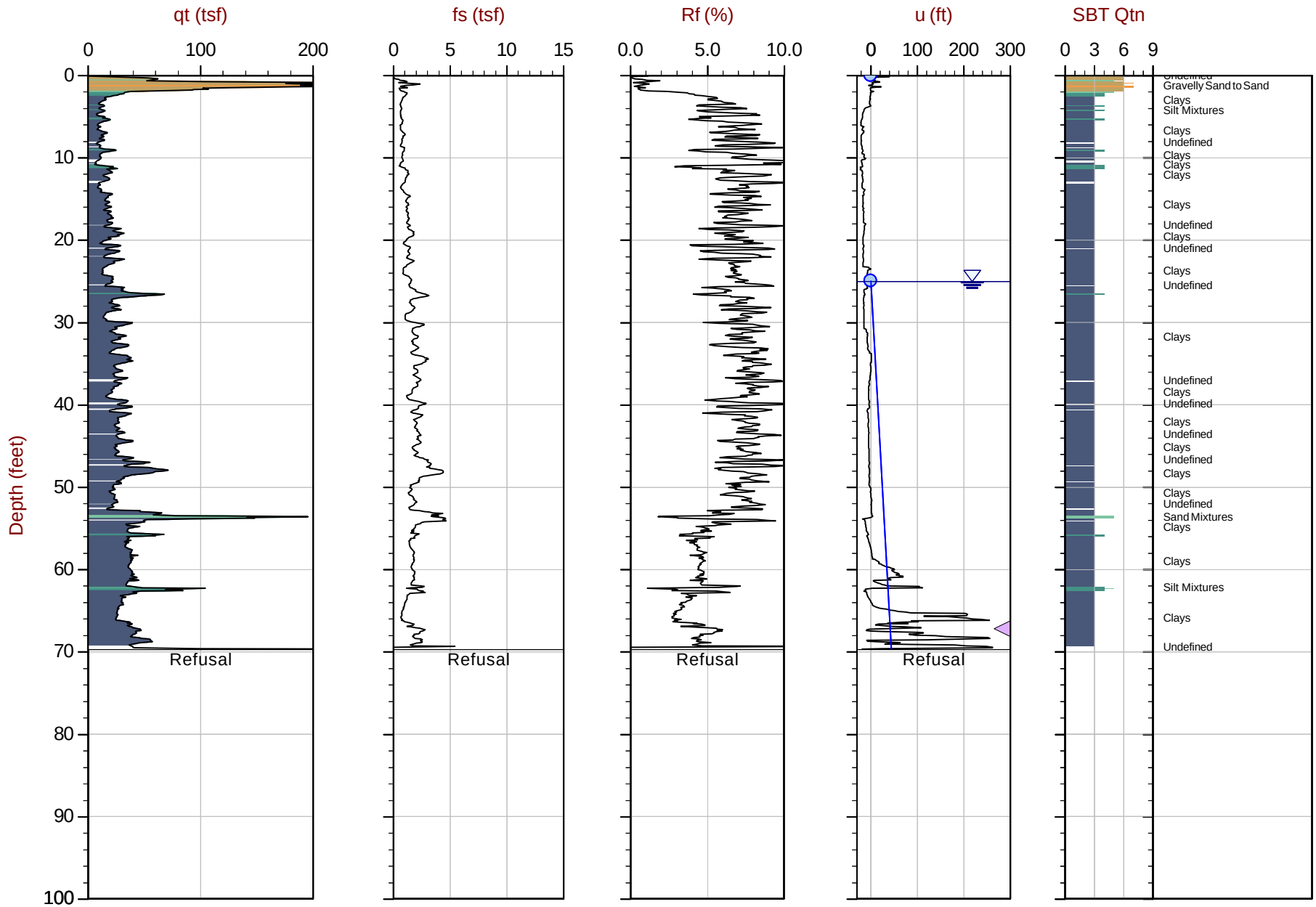
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-07 10:33
Site: DTE Monroe Power Plant

Sounding: CPT20-176
Cone: 551:T1500F15U500



Max Depth: 21.250 m / 69.72 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP176.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141071ft E: 13396820ft
Sheet No: 1 of 1

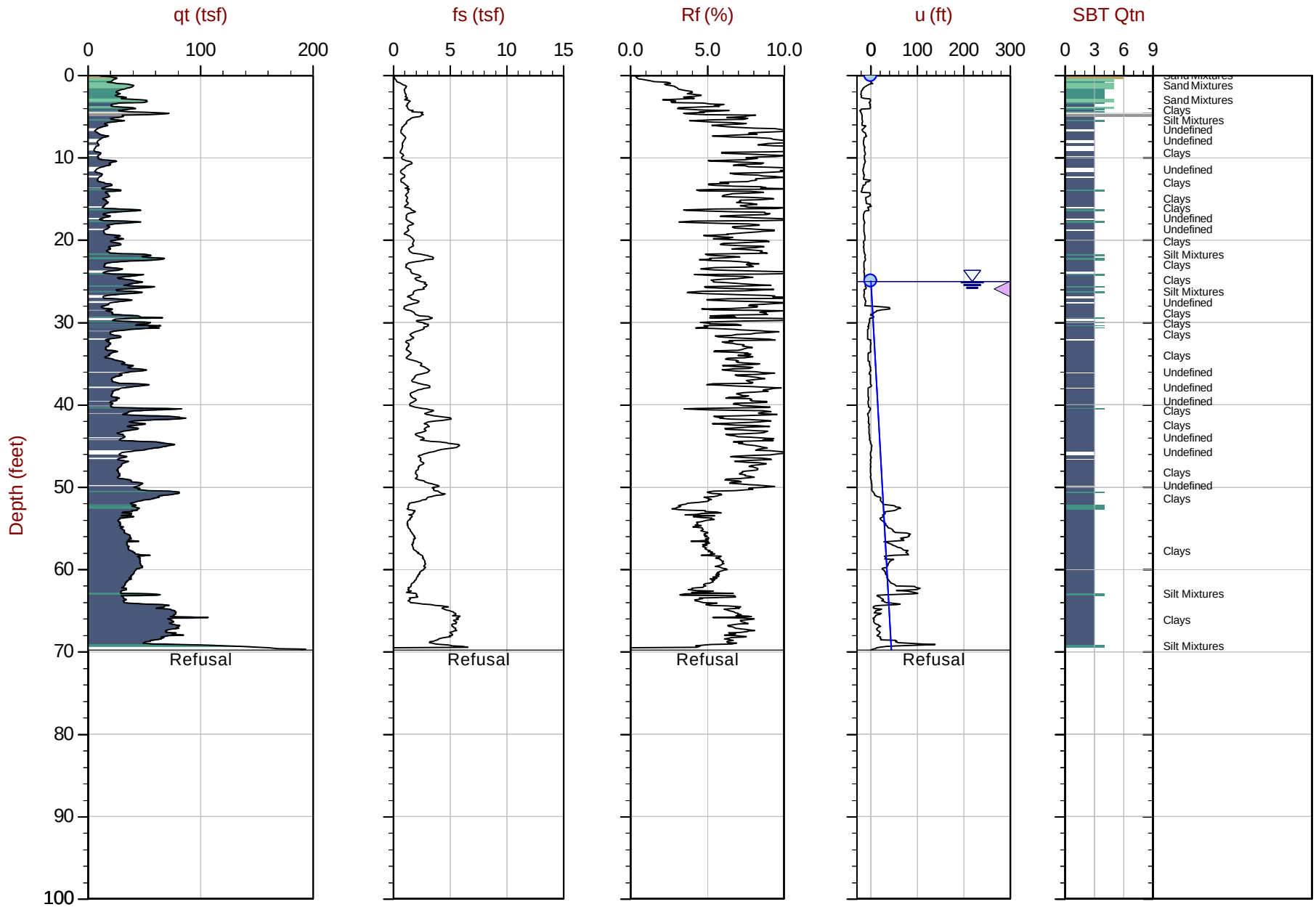
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-07 09:43
Site: DTE Monroe Power Plant

Sounding: CPT20-178
Cone: 551:T1500F15U500



Max Depth: 21.275 m / 69.80 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_CP178.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141268ft E: 13396939ft
Sheet No: 1 of 1

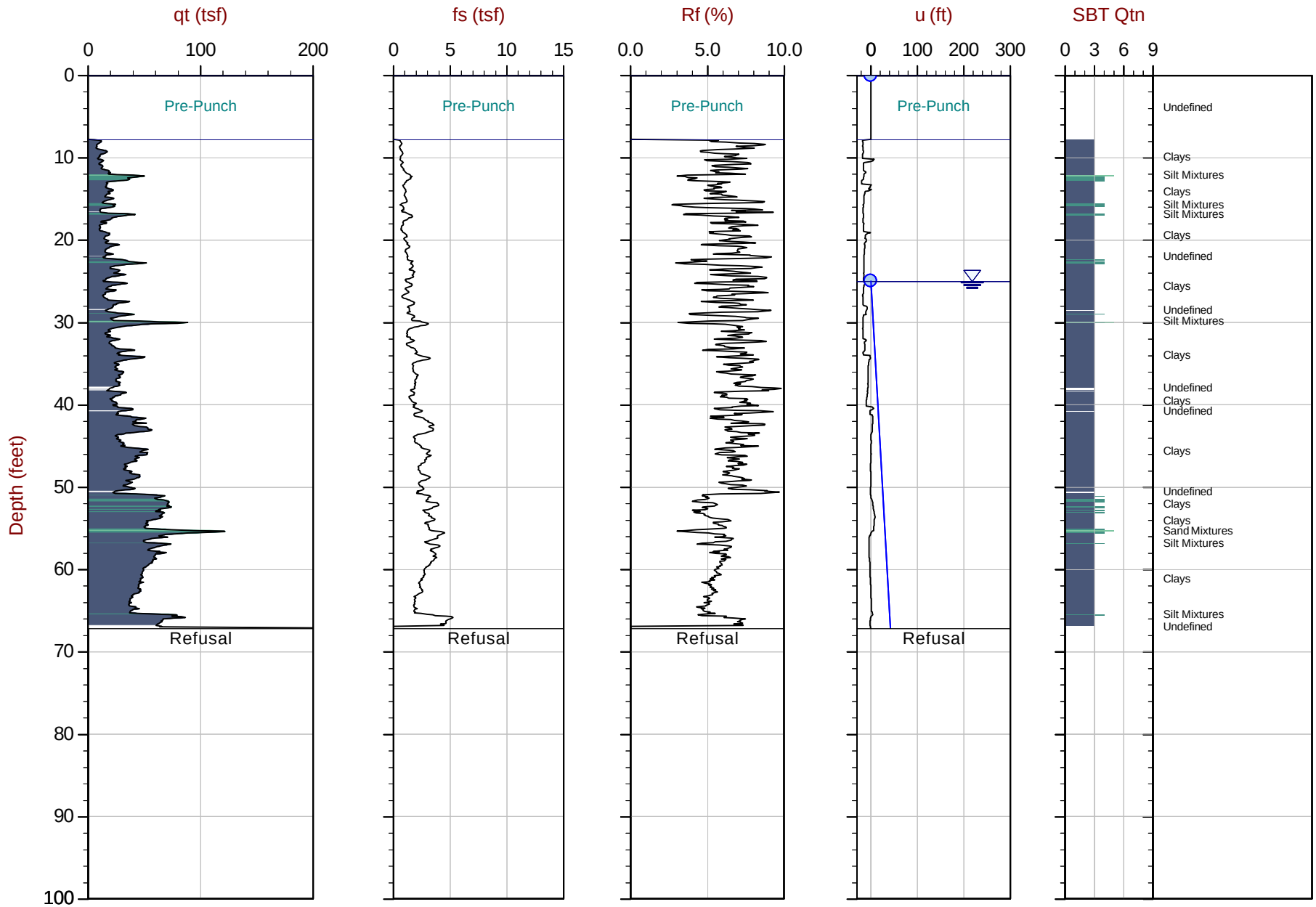
Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

CONETEC

GeoSyntec

Job No: 20-61-21665
Date: 2020-12-07 08:53
Site: DTE Monroe Power Plant

Sounding: SCPT20-180
Cone: 551:T1500F15U500



Max Depth: 20.475 m / 67.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: Every Point

File: 20-61-21655_SP180.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: Michigan State Plane South N: 141428ft E: 13397002ft
Sheet No: 1 of 1

Overplot Item: Ueq | Assumed Ueq | Dissipation, Ueq achieved | Dissipation, Ueq not achieved | Dissipation, Ueq assumed | Hydrostatic Line

APPENDIX K2 – PPD TEST RESULTS

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (m)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50} [a] (s)	Assumed Rigidity Index (I_r)	c_h [b] (cm^2/min)	Overnight Pore Pressure Reading[1] (ft)
CPT20-000	20-61-21655_CP000	15	105	48.720	Not Achieved						
CPT20-004	20-61-21655_CP004	15	300	45.111	Not Achieved						
CPT20-004	20-61-21655_CP004	15	3600	55.117	Not Achieved		25.0	3531	3361	0.2	
CPT20-004	20-61-21655_CP004	15	195	66.928	Not Achieved						
CPT20-006	20-61-21655_CP006	15	300	50.442	Not Achieved						
CPT20-008	20-61-21655_CP008	15	100	50.114	Not Achieved						
CPT20-008	20-61-21655_CP008	15	5190	55.117	Not Achieved						
CPT20-008	20-61-21655_CP008	15	5270	60.121	Not Achieved						
CPT20-008	20-61-21655_CP008	15	400	63.812	Not Achieved						
CPT20-010	20-61-21655_CP010	15	105	21.899	Not Achieved						
CPT20-022	20-61-21655_CP022	15	75	72.014	Not Achieved						
CPT20-028	20-61-21655_CP028	15	250	47.490	Not Achieved						
CPT20-028	20-61-21655_CP028	15	835	50.114	Not Achieved		25.0	375	325	2.2	
CPT20-028	20-61-21655_CP028	15	5225	55.117	Not Achieved		25.0	4158	3978	0.2	
CPT20-028	20-61-21655_CP028	15	580	59.547	Not Achieved						
CPT20-030	20-61-21655_CP030	15	65	59.875	Not Achieved						
CPT20-032	20-61-21655_CP032	15	150	23.950	Not Achieved						
CPT20-034	20-61-21655_CP034	15	80	9.514	Not Achieved						
CPT20-034	20-61-21655_CP034	15	235	45.931	Not Achieved						
CPT20-036	20-61-21655_CP036	15	3570	21.161	Not Achieved						

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (m)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50} [a] (s)	Assumed Rigidity Index (I_r)	c_h [b] (cm^2/min)	Overnight Pore Pressure Reading[1] (ft)
CPT20-038	20-61-21655_CP038	15	3530	57.004	Not Achieved						
CPT20-048	20-61-21655_CP048	15	1200	50.032	Not Achieved		25.0	1023	943	0.7	
CPT20-048	20-61-21655_CP048	15	5400	55.117	Not Achieved		25.0	5189	4739	0.2	
CPT20-048	20-61-21655_CP048	15	4985	60.039	Not Achieved						75.2
CPT20-054	20-61-21655_CP054	15	70	60.859	Not Achieved						
CPT20-058	20-61-21655_CP058	15	3125	42.158	Not Achieved						
CPT20-060	20-61-21655_CP060	15	65	59.875	Not Achieved						
CPT20-068	20-61-21655_CP068	15	2700	40.026	Not Achieved						
CPT20-068	20-61-21655_CP068	15	3600	43.143	Not Achieved						
CPT20-068	20-61-21655_CP068	15	570	55.117	Not Achieved						
CPT20-068	20-61-21655_CP068	15	1800	59.054	6.4	52.6					
CPT20-074	20-61-21655_CP074	15	110	38.713	6.6	32.1					
CPT20-078B	20-61-21655_CP078B	15	100	38.713	4.4	34.3					
CPT20-078B	20-61-21655_CP078B	15	270	48.556	Not Achieved						
CPT20-086	20-61-21655_CP086	15	230	48.720	Not Achieved						
CPT20-090	20-61-21655_CP090	15	3600	20.013	Not Achieved						
CPT20-090	20-61-21655_CP090	15	7200	40.026	Not Achieved						
CPT20-090	20-61-21655_CP090	15	5365	60.039	Not Achieved						87.0
CPT20-092	20-61-21655_CP092	15	100	5.741	0.0						
CPT20-092	20-61-21655_CP092	15	210	58.398	Not Achieved						

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (m)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50} [a] (s)	Assumed Rigidity Index (I_r)	c_h [b] (cm^2/min)	Overnight Pore Pressure Reading[1] (ft)
SCPT20-096	20-61-21655_SP096	15	85	1.148	0.0						
SCPT20-096	20-61-21655_SP096	15	405	35.433	Not Achieved						
CPT20-110B	20-61-21655_CP110B	15	3600	20.013	Not Achieved						
CPT20-110B	20-61-21655_CP110B	15	3600	50.032	Not Achieved						
CPT20-110B	20-61-21655_CP110B	15	3605	60.039	Not Achieved						
CPT20-110B	20-61-21655_CP110B	15	485	60.859	0.0						
CPT20-118	20-61-21655_CP118	15	95	12.467	Not Achieved						
CPT20-124	20-61-21655_CP124	15	120	25.262	Not Achieved						
CPT20-128	20-61-21655_CP128	15	145	38.549	Not Achieved						
CPT20-130	20-61-21655_CP130	15	610	15.092	Not Achieved						
CPT20-130	20-61-21655_CP130	15	3600	50.032	Not Achieved		25.0	1192	1077	0.7	
CPT20-130	20-61-21655_CP130	15	3580	60.039	Not Achieved						
CPT20-132	20-61-21655_CP132	15	250	35.433	Not Achieved						
CPT20-132	20-61-21655_CP132	15	410	45.275	Not Achieved						
CPT20-134	20-61-21655_CP134	15	3600	66.928	Not Achieved						
CPT20-136	20-61-21655_CP136	15	670	65.288	Not Achieved						
CPT20-136	20-61-21655_CP136	15	6300	65.862	Not Achieved		25.0	4148	4048	0.2	
CPT20-140	20-61-21655_CP140	15	3110	57.168	Not Achieved						52.3
CPT20-150	20-61-21655_CP150	15	600	40.026	Not Achieved						
CPT20-150	20-61-21655_CP150	15	3600	45.275	Not Achieved						

Job No:	20-61-21655
Client:	Geosyntec Consultants
Project:	DTE Monroe Power Plant
Start Date:	01-Dec-2020
End Date:	14-Dec-2020

CPTu PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm^2)	Duration (s)	Test Depth (m)	Estimated Equilibrium Pore Pressure U_{eq} (ft)	Calculated Phreatic Surface (ft)	Estimated Phreatic Surface (ft)	t_{50} [a] (s)	Assumed Rigidity Index (I_r)	c_h [b] (cm^2/min)	Overnight Pore Pressure Reading[1] (ft)
CPT20-150	20-61-21655_CP150	15	7500	55.117	Not Achieved		25.0	6030	4530	0.2	
CPT20-150	20-61-21655_CP150	15	345	65.944	Not Achieved						
CPT20-152	20-61-21655_CP152	15	70	29.035	Not Achieved						
CPT20-154	20-61-21655_CP154	15	125	22.473	Not Achieved						
CPT20-170	20-61-21655_CP170	15	300	10.170	Not Achieved						
CPT20-170	20-61-21655_CP170	15	300	20.259	Not Achieved						
CPT20-170	20-61-21655_CP170	15	300	40.190	Not Achieved						
CPT20-170	20-61-21655_CP170	15	3600	68.159	Not Achieved						
CPT20-176	20-61-21655_CP176	15	3600	67.174	Not Achieved						
CPT20-178	20-61-21655_CP178	15	145	25.918	Not Achieved						
Totals	70 dissipations		2093.6 min								

a. Time is relative to where umax occurred.

b. Houlsby and Teh, 1991.

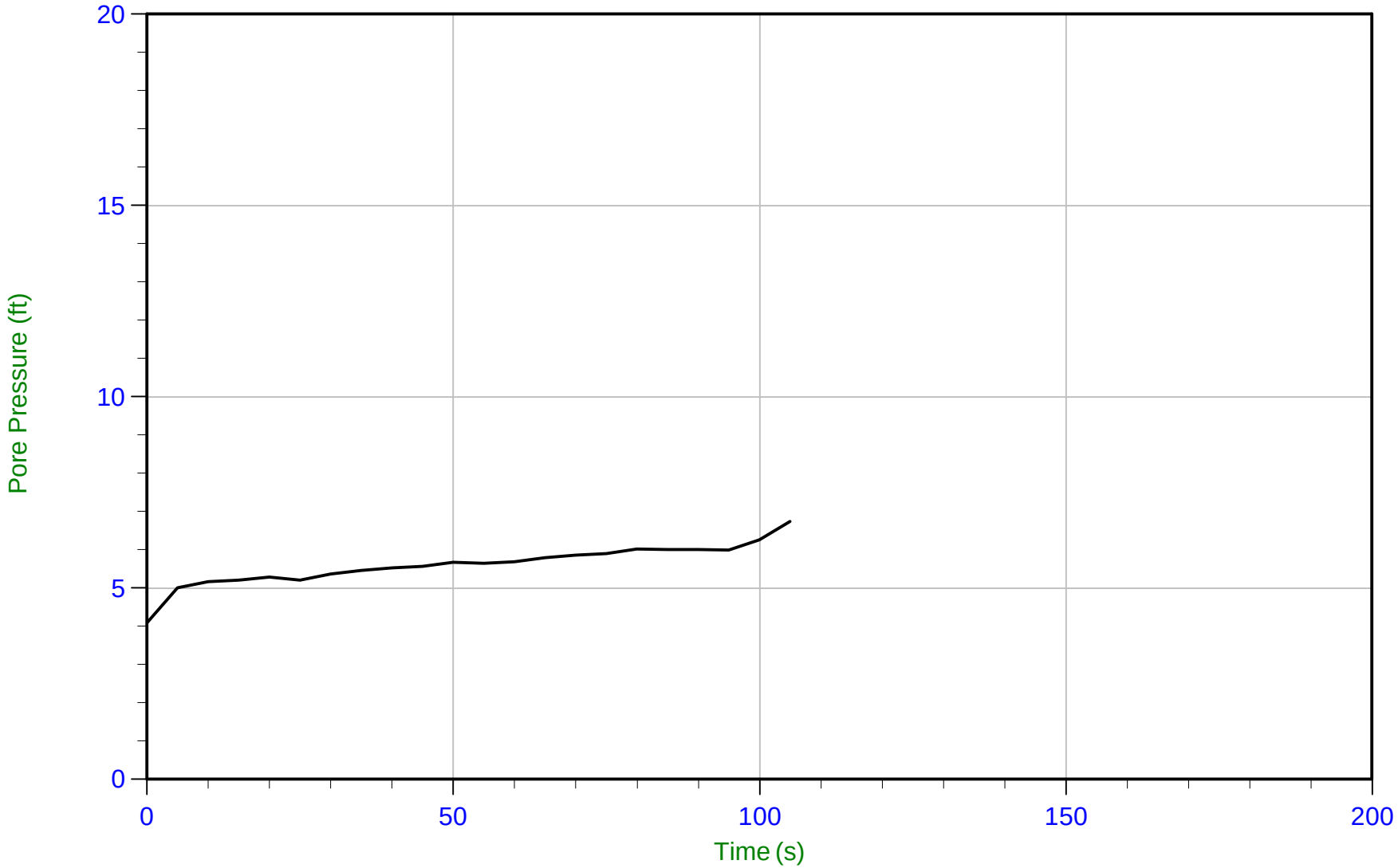
1. The cone was left in the ground overnight and final final pore pressure readings was taken the next morning.

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/02/2020 10:20
Site: DTE Monroe Power Plant

Sounding: CPT20-000
Cone: 567:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP000.PPF
Depth: 14.850 m / 48.720 ft
Duration: 105.0 s

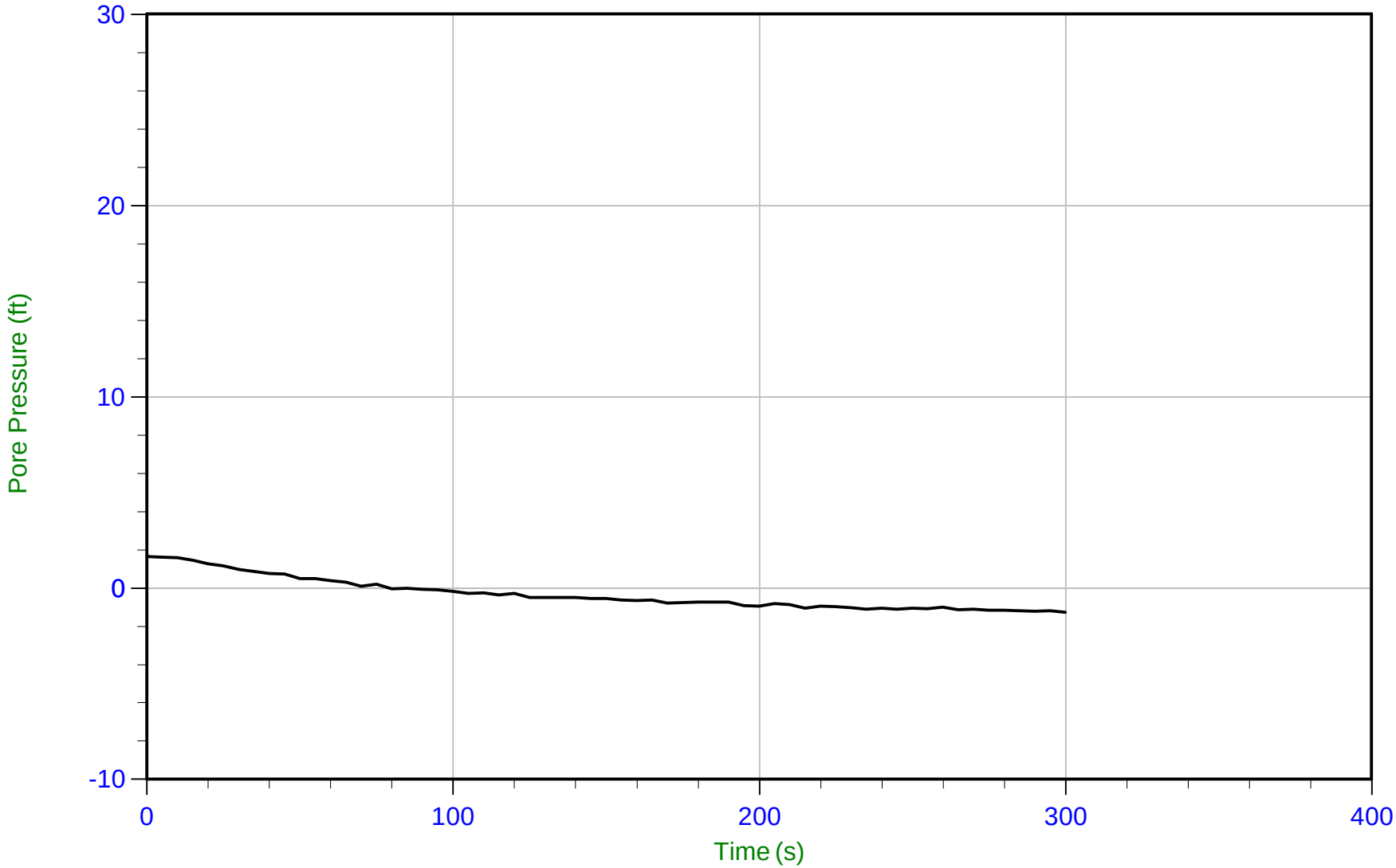
u Min: 4.1 ft
u Max: 6.7 ft
u Final: 6.7 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/01/2020 13:06
Site: DTE Monroe Power Plant

Sounding: CPT20-004
Cone: 567:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP004.PPF
Depth: 13.750 m / 45.111 ft
Duration: 300.0 s

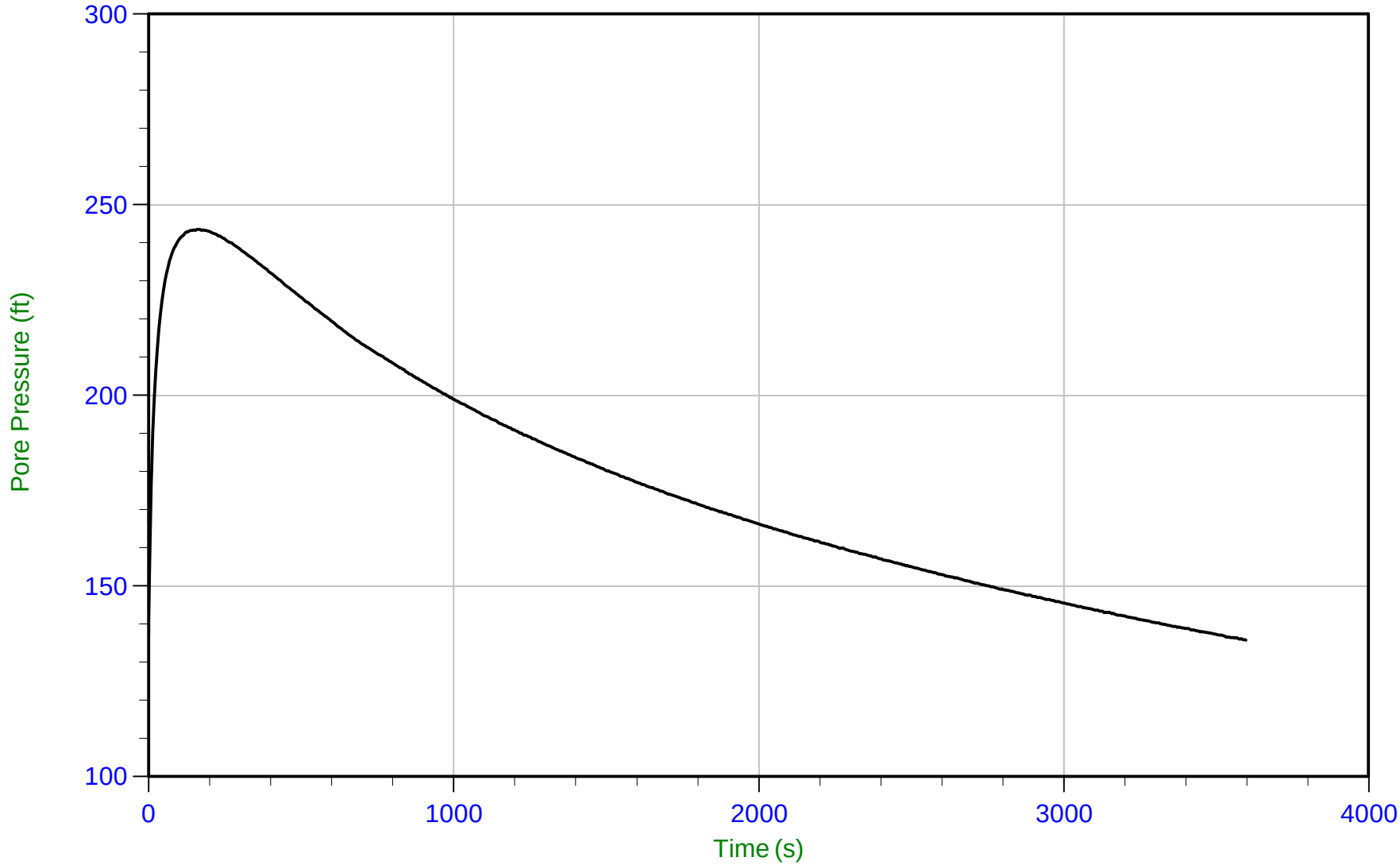
u Min: -1.3 ft
u Max: 1.7 ft
u Final: -1.3 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/01/2020 13:06
Site: DTE Monroe Power Plant

Sounding: CPT20-004
Cone: 567:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP004.PPF
Depth: 16.800 m / 55.117 ft
Duration: 3600.0 s

u Min: 135.7 ft
u Max: 243.5 ft
u Final: 135.7 ft

WT: 7.620 m / 25.000 ft
Ueq: 30.1 ft
U(50): 136.83 ft

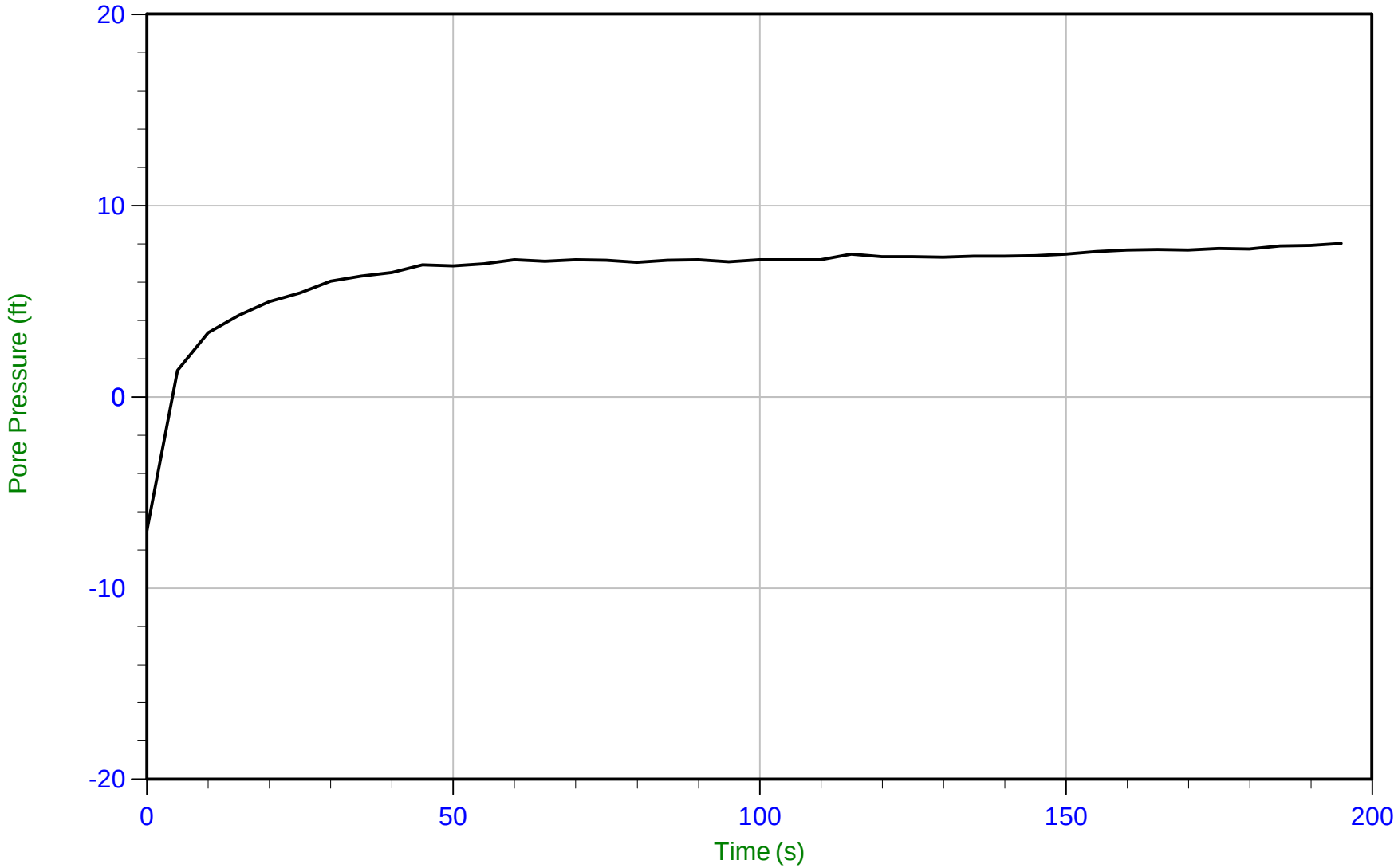
T(50): 3361.4 s
Ir: 100
Ch: 0.2 cm²/min

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/01/2020 13:06
Site: DTE Monroe Power Plant

Sounding: CPT20-004
Cone: 567:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP004.PPF
Depth: 20.400 m / 66.928 ft
Duration: 195.0 s

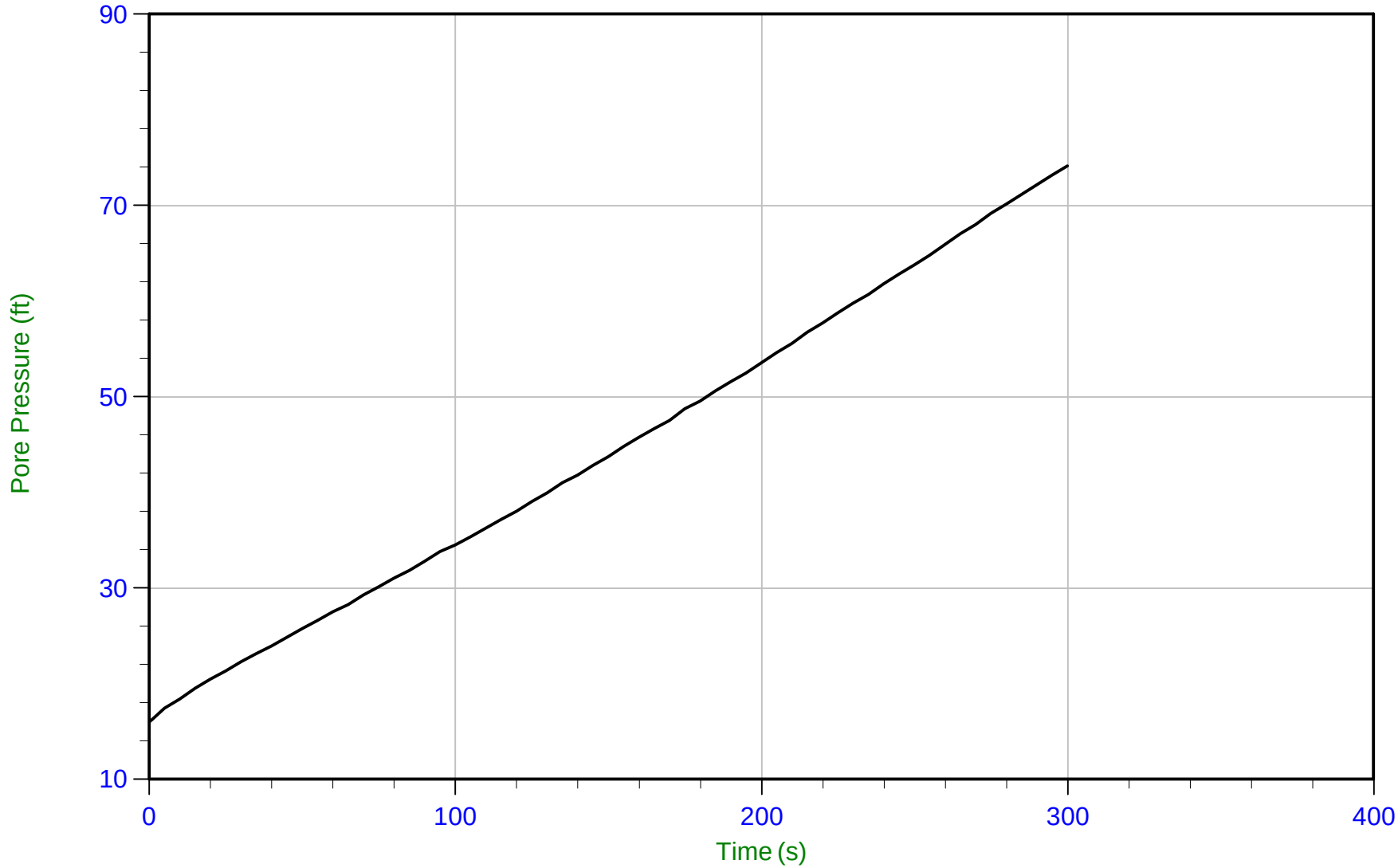
u Min: -7.0 ft
u Max: 8.0 ft
u Final: 8.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/01/2020 13:15
Site: DTE Monroe Power Plant

Sounding: CPT20-006
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP006.PPF
Depth: 15.375 m / 50.442 ft
Duration: 300.0 s

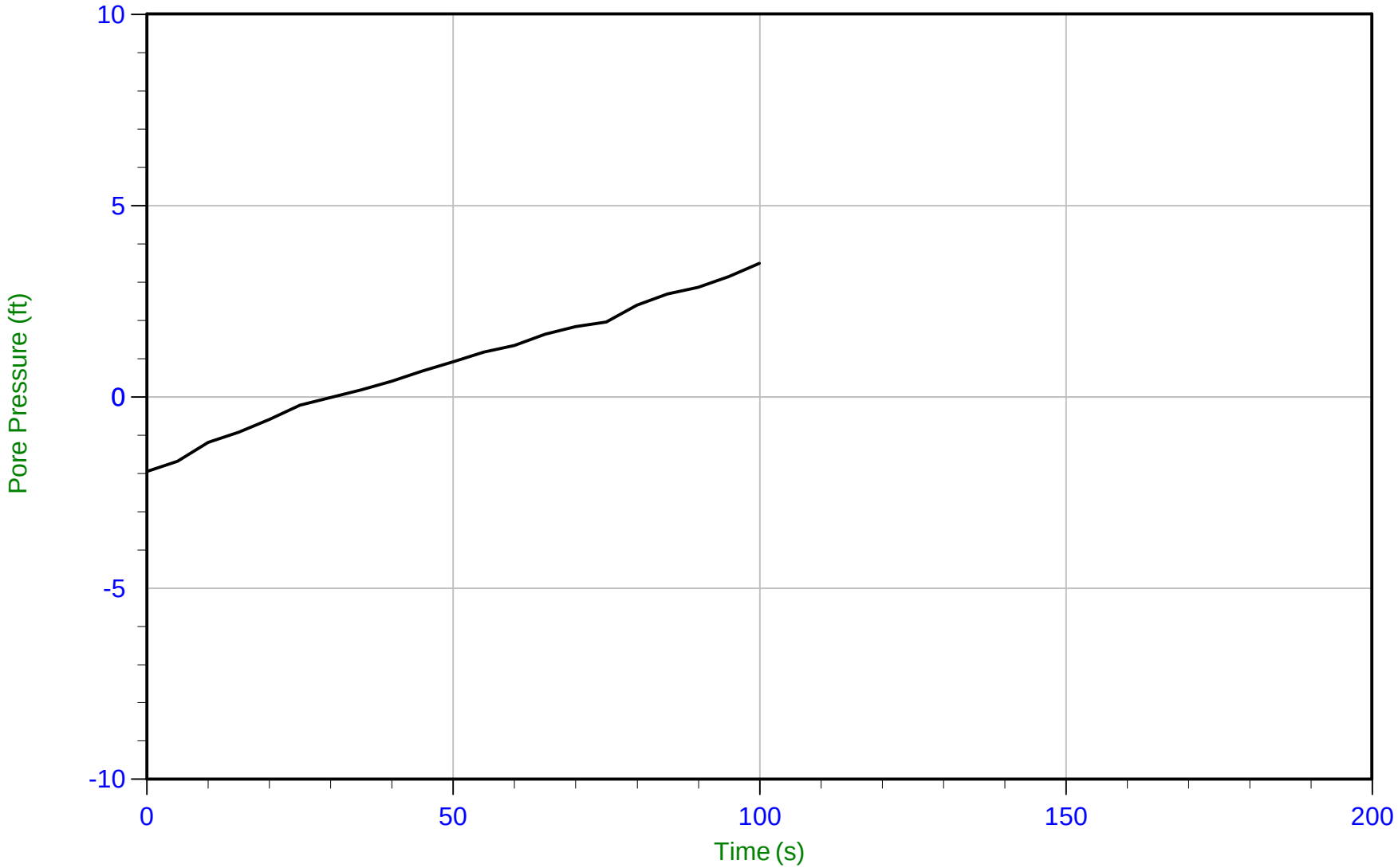
u Min: 16.0 ft
u Max: 74.2 ft
u Final: 74.2 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:23
Site: DTE Monroe Power Plant

Sounding: CPT20-008
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP008.PPF
Depth: 15.275 m / 50.114 ft
Duration: 100.0 s

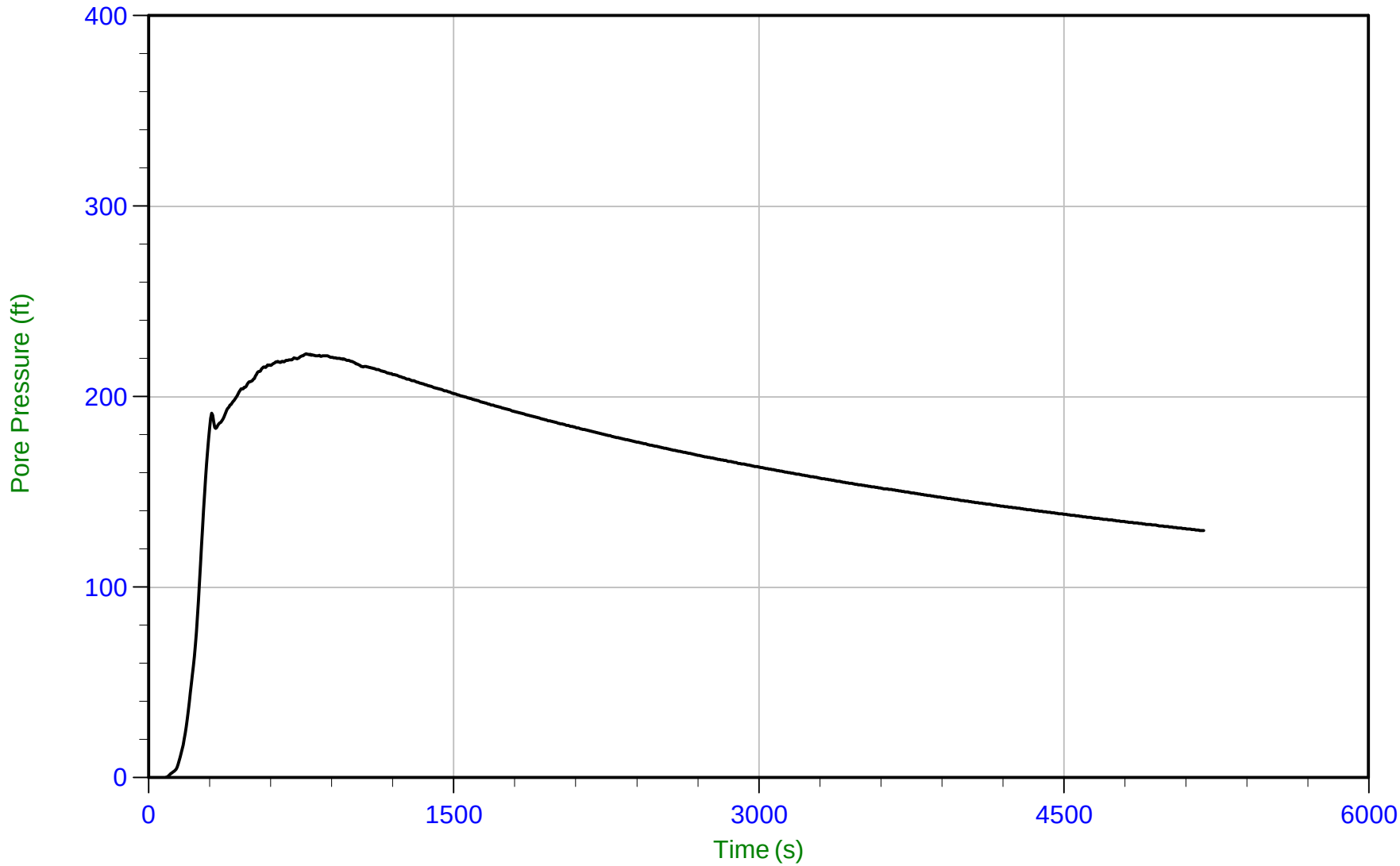
u Min: -1.9 ft
u Max: 3.5 ft
u Final: 3.5 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:23
Site: DTE Monroe Power Plant

Sounding: CPT20-008
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP008.PPF
Depth: 16.800 m / 55.117 ft
Duration: 5190.0 s

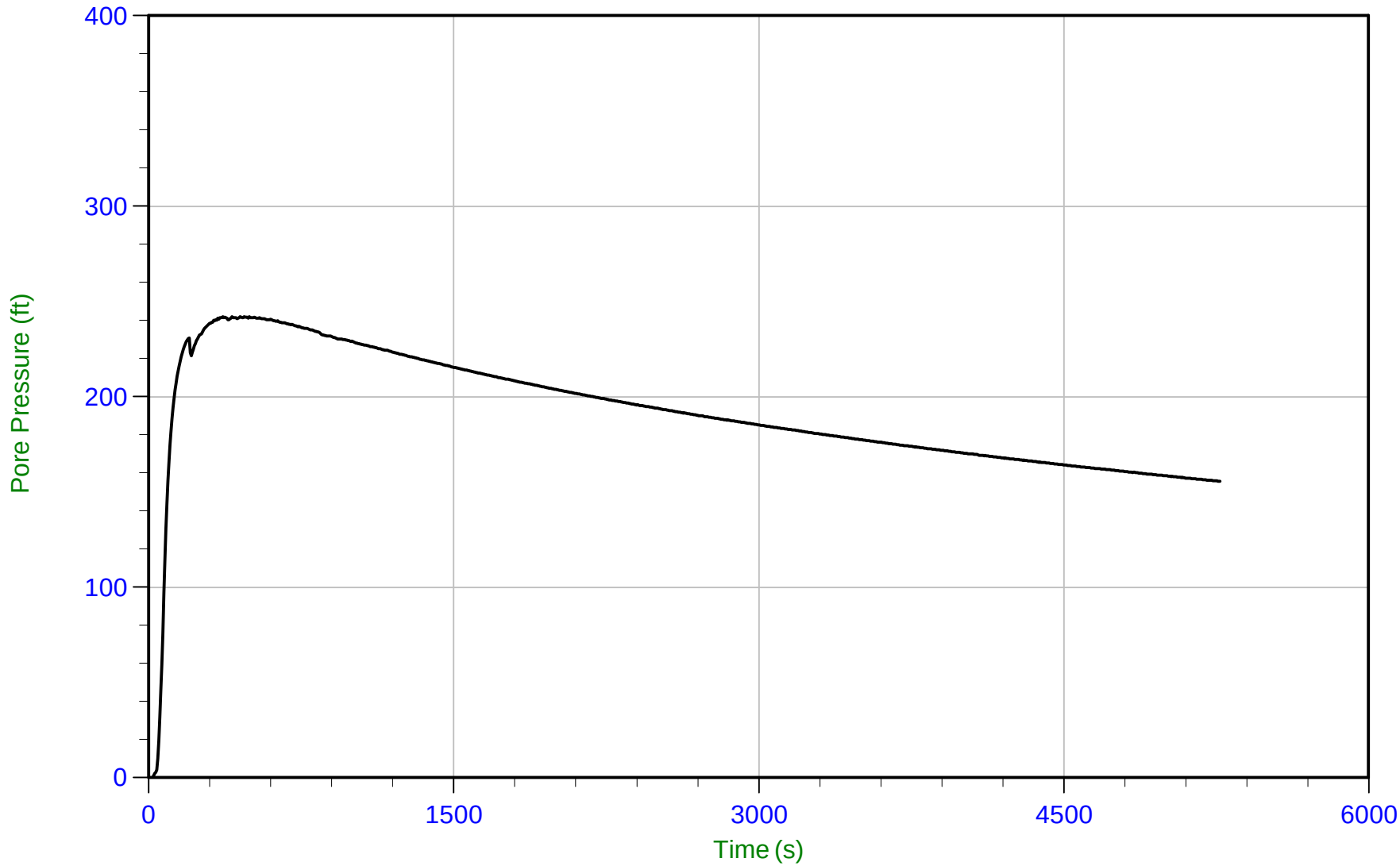
u Min: -7.1 ft
u Max: 222.5 ft
u Final: 129.7 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:23
Site: DTE Monroe Power Plant

Sounding: CPT20-008
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP008.PPF
Depth: 18.325 m / 60.121 ft
Duration: 5270.0 s

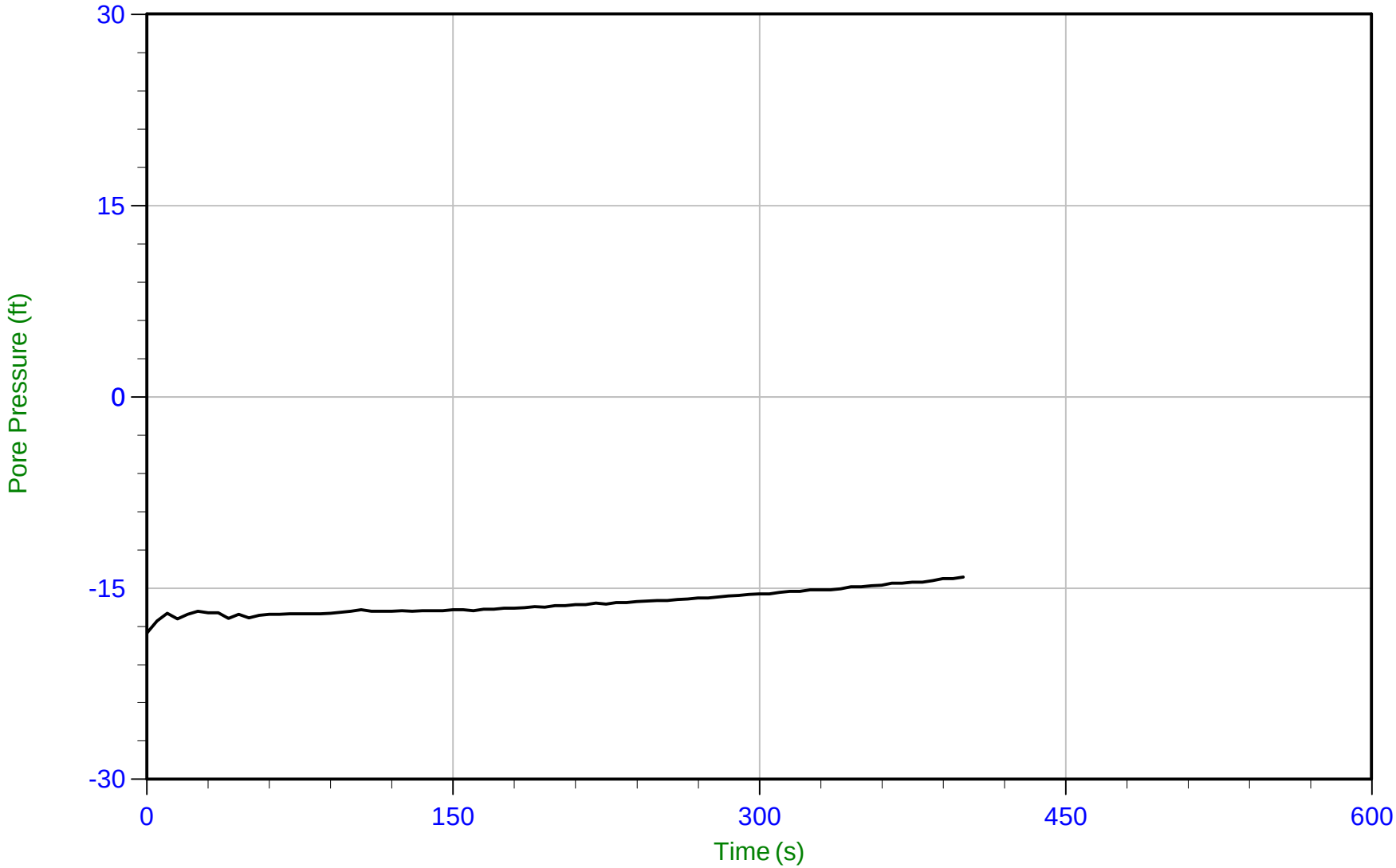
u Min: -9.1 ft
u Max: 242.1 ft
u Final: 155.6 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:23
Site: DTE Monroe Power Plant

Sounding: CPT20-008
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

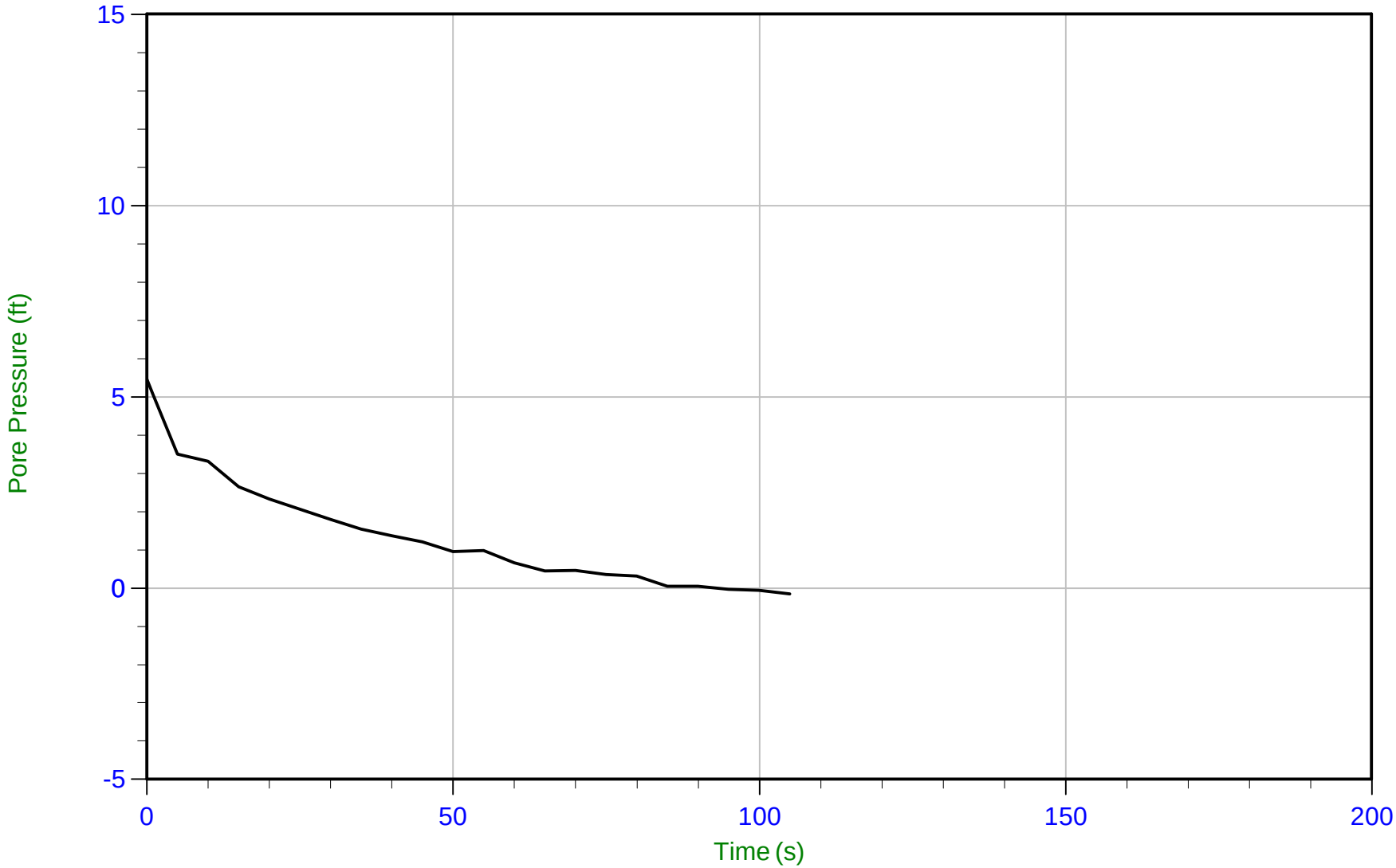
Filename: 20-61-21655_CP008.PPF
Depth: 19.450 m / 63.812 ft
Duration: 400.0 s

u Min: -18.5 ft
u Max: -14.1 ft
u Final: -14.1 ft

Geosyntec

Job No: 20-61-21655
Date: 12/02/2020 10:04
Site: DTE Monroe Power Plant

Sounding: CPT20-010
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP010.PPF
Depth: 6.675 m / 21.899 ft
Duration: 105.0 s

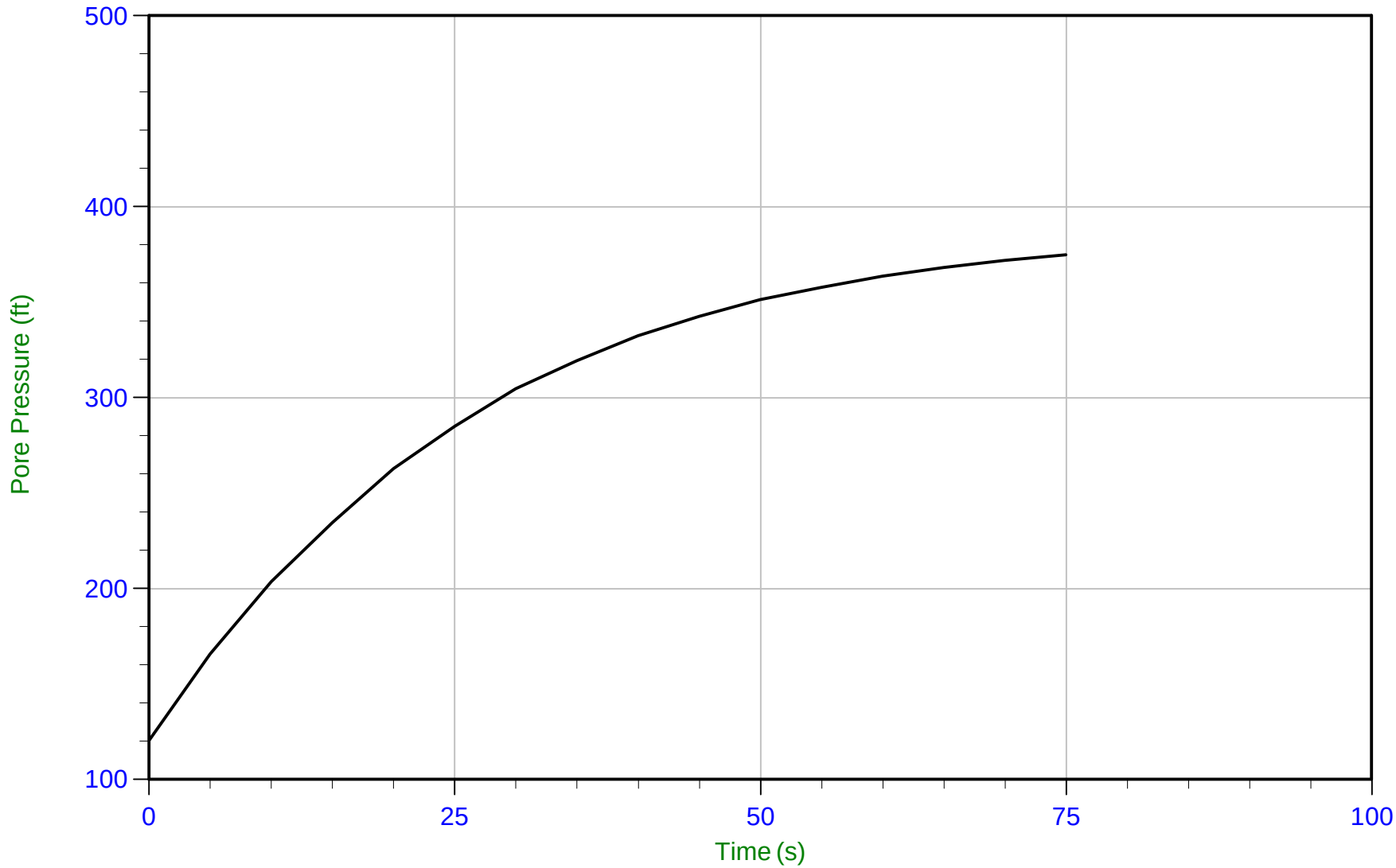
u Min: -0.1 ft
u Max: 5.5 ft
u Final: -0.1 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/03/2020 08:59
Site: DTE Monroe Power Plant

Sounding: CPT20-022
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

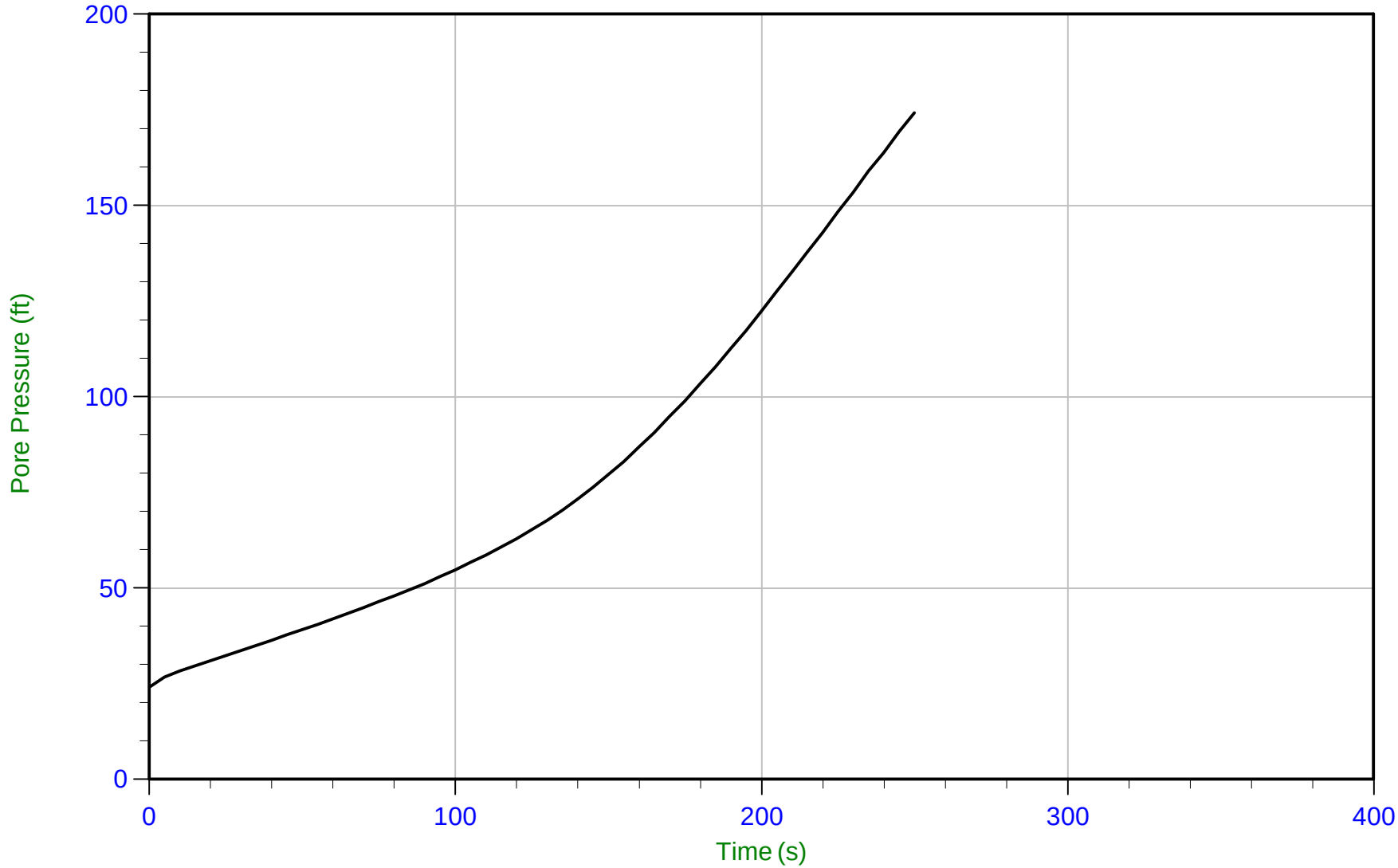
Filename: 20-61-21655_CP022.PPF
Depth: 21.950 m / 72.014 ft
Duration: 75.0 s

u Min: 120.3 ft
u Max: 374.8 ft
u Final: 374.8 ft

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 12:08
Site: DTE Monroe Power Plant

Sounding: CPT20-028
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP028.PPF
Depth: 14.475 m / 47.490 ft
Duration: 250.0 s

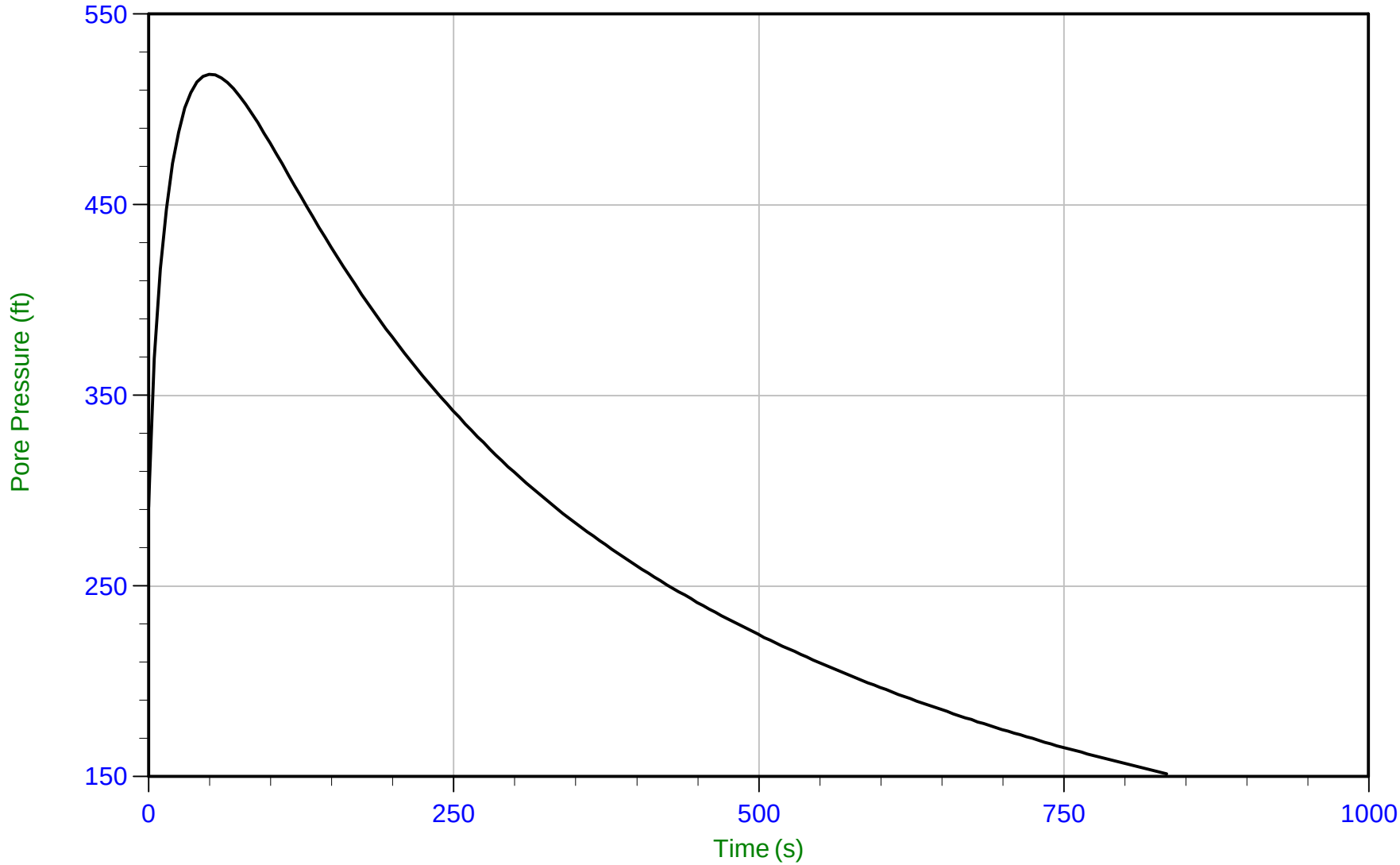
u Min: 24.1 ft
u Max: 174.2 ft
u Final: 174.2 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 12:08
Site: DTE Monroe Power Plant

Sounding: CPT20-028
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP028.PPF
Depth: 15.275 m / 50.114 ft
Duration: 835.0 s

u Min: 151.5 ft
u Max: 518.4 ft
u Final: 151.5 ft

WT: 7.620 m / 25.000 ft
Ueq: 25.1 ft
U(50): 271.75 ft

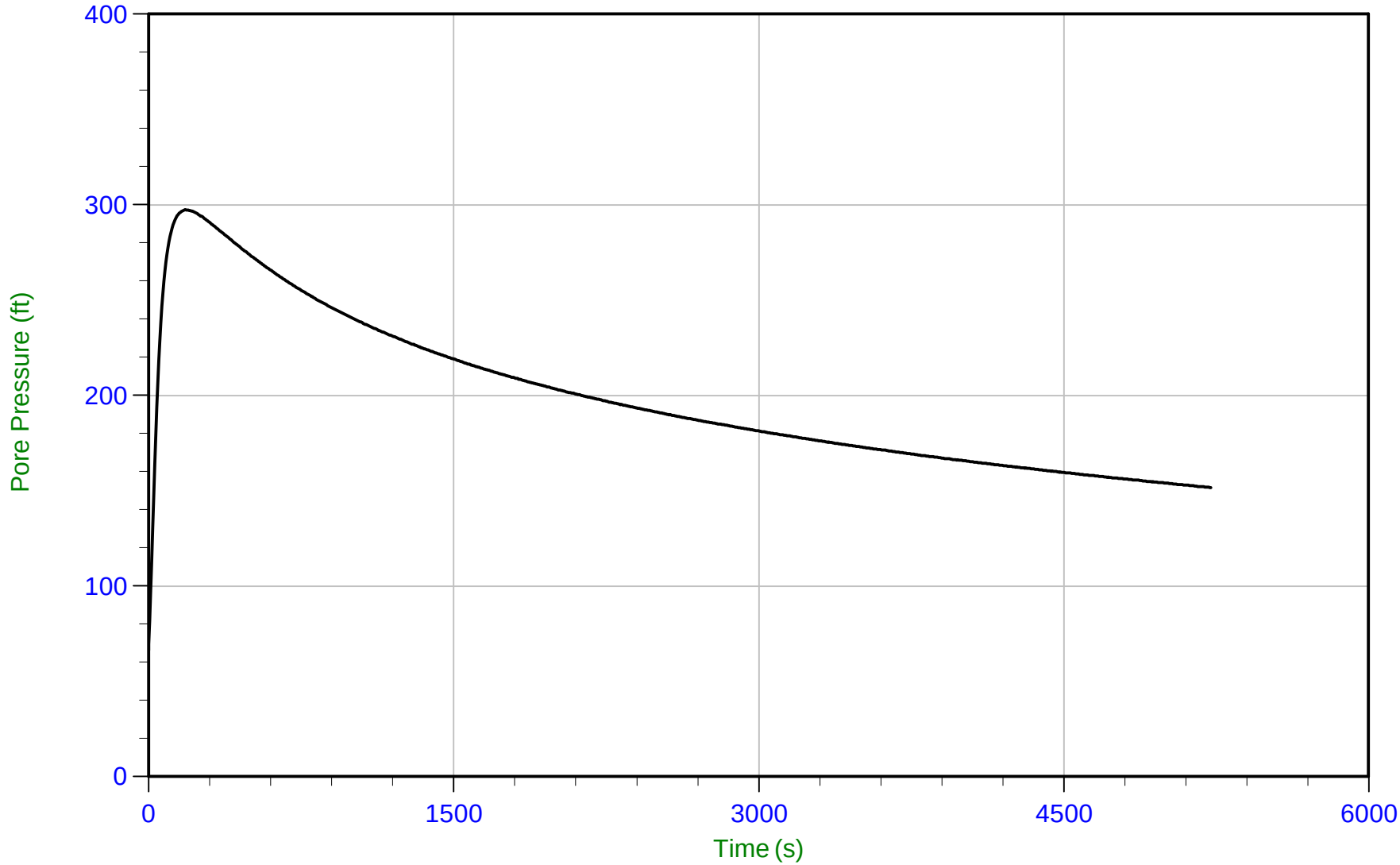
T(50): 325.0 s
Ir: 100
Ch: 2.2 cm²/min

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 12:08
Site: DTE Monroe Power Plant

Sounding: CPT20-028
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP028.PPF
Depth: 16.800 m / 55.117 ft
Duration: 5225.0 s

u Min: 66.4 ft
u Max: 297.4 ft
u Final: 151.7 ft

WT: 7.620 m / 25.000 ft
Ueq: 30.1 ft
U(50): 163.75 ft

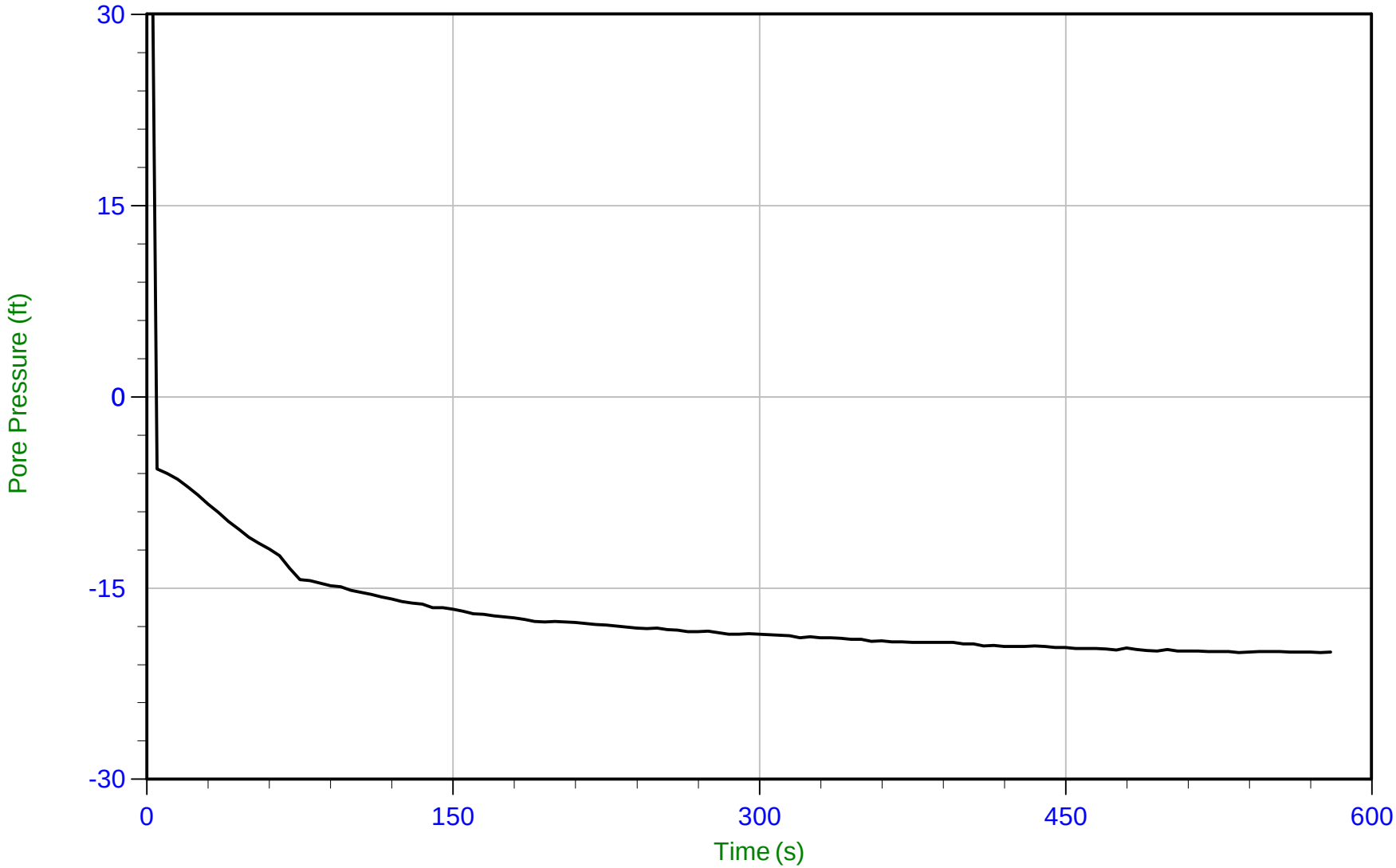
T(50): 3978.2 s
Ir: 100
Ch: 0.2 cm²/min

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 12:08
Site: DTE Monroe Power Plant

Sounding: CPT20-028
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP028.PPF
Depth: 18.150 m / 59.547 ft
Duration: 580.0 s

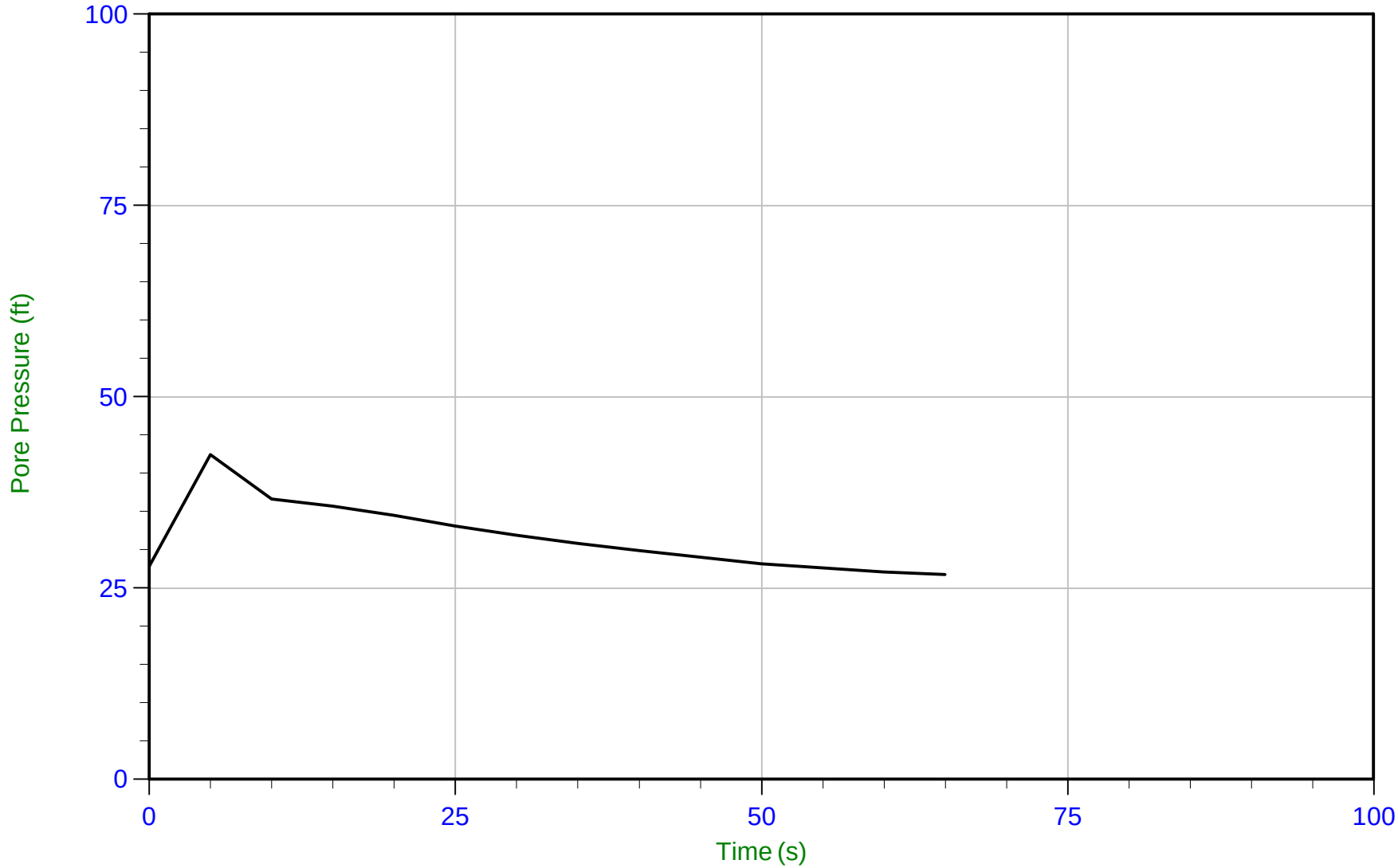
u Min: -20.1 ft
u Max: 82.2 ft
u Final: -20.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/03/2020 12:31
Site: DTE Monroe Power Plant

Sounding: CPT20-030
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP030.PPF
Depth: 18.250 m / 59.875 ft
Duration: 65.0 s

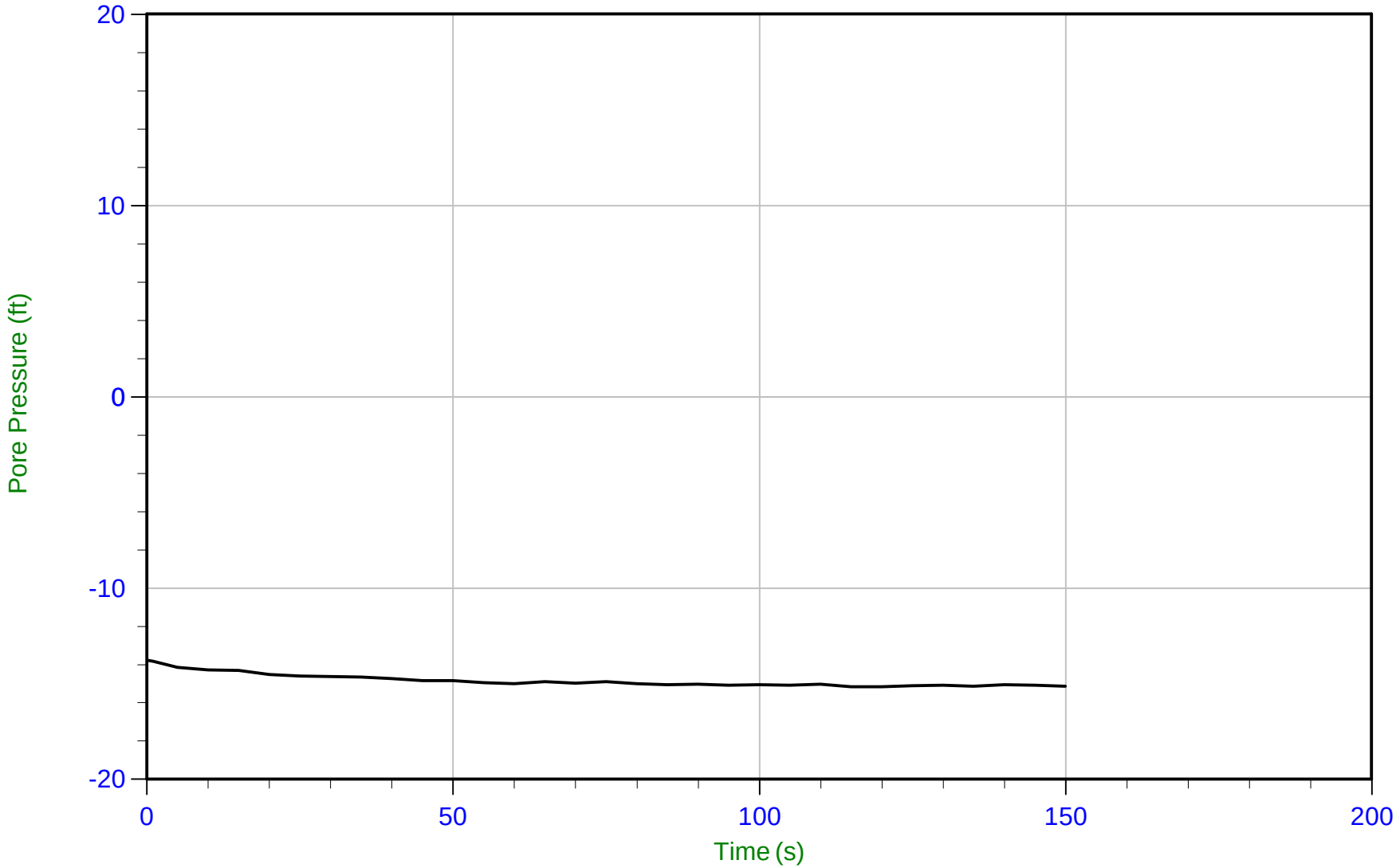
u Min: 26.8 ft
u Max: 42.5 ft
u Final: 26.8 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/03/2020 13:26
Site: DTE Monroe Power Plant

Sounding: CPT20-032
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP032.PPF
Depth: 7.300 m / 23.950 ft
Duration: 150.0 s

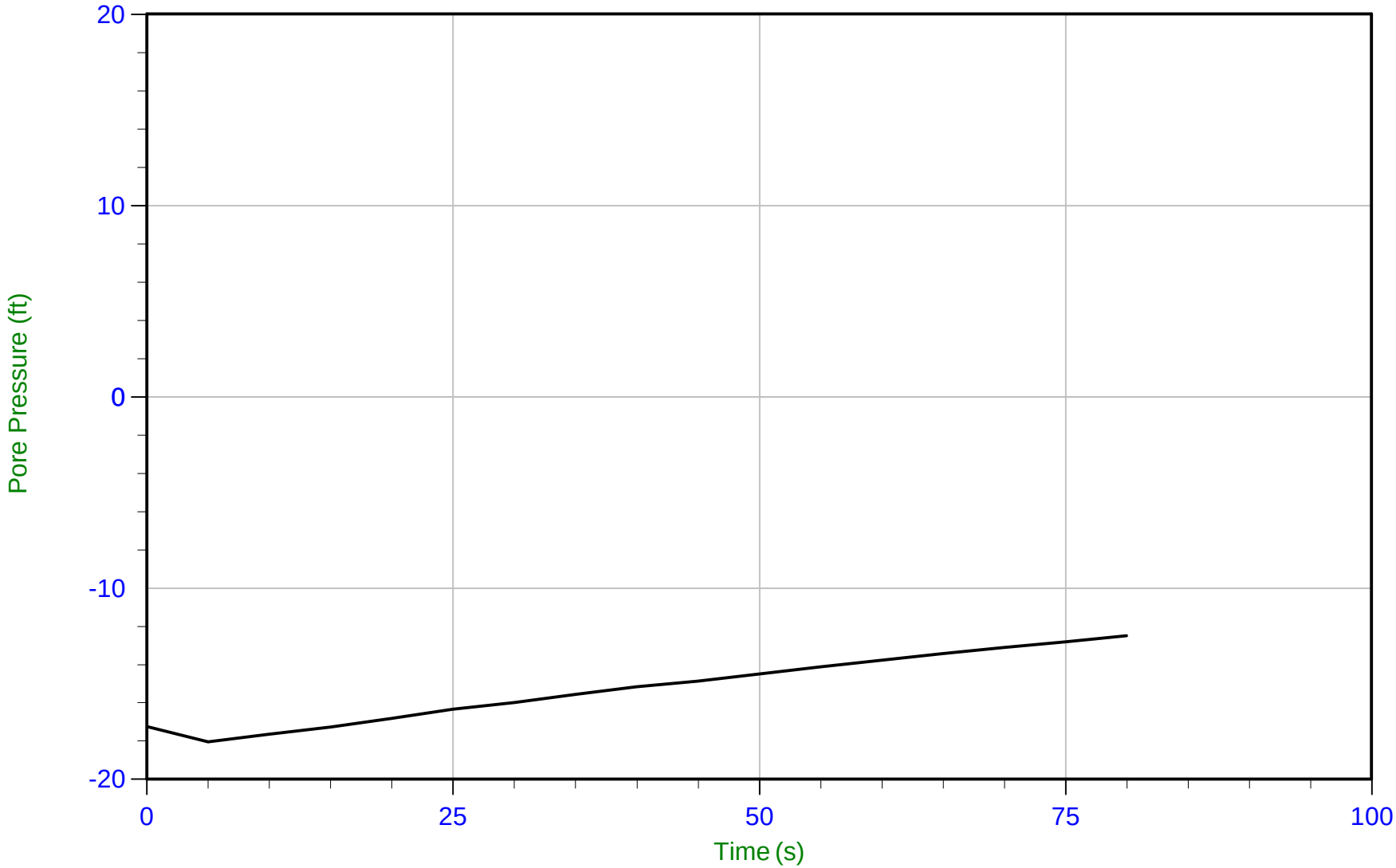
u Min: -15.2 ft
u Max: -13.8 ft
u Final: -15.1 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/03/2020 14:24
Site: DTE Monroe Power Plant

Sounding: CPT20-034
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP034.PPF
Depth: 2.900 m / 9.514 ft
Duration: 80.0 s

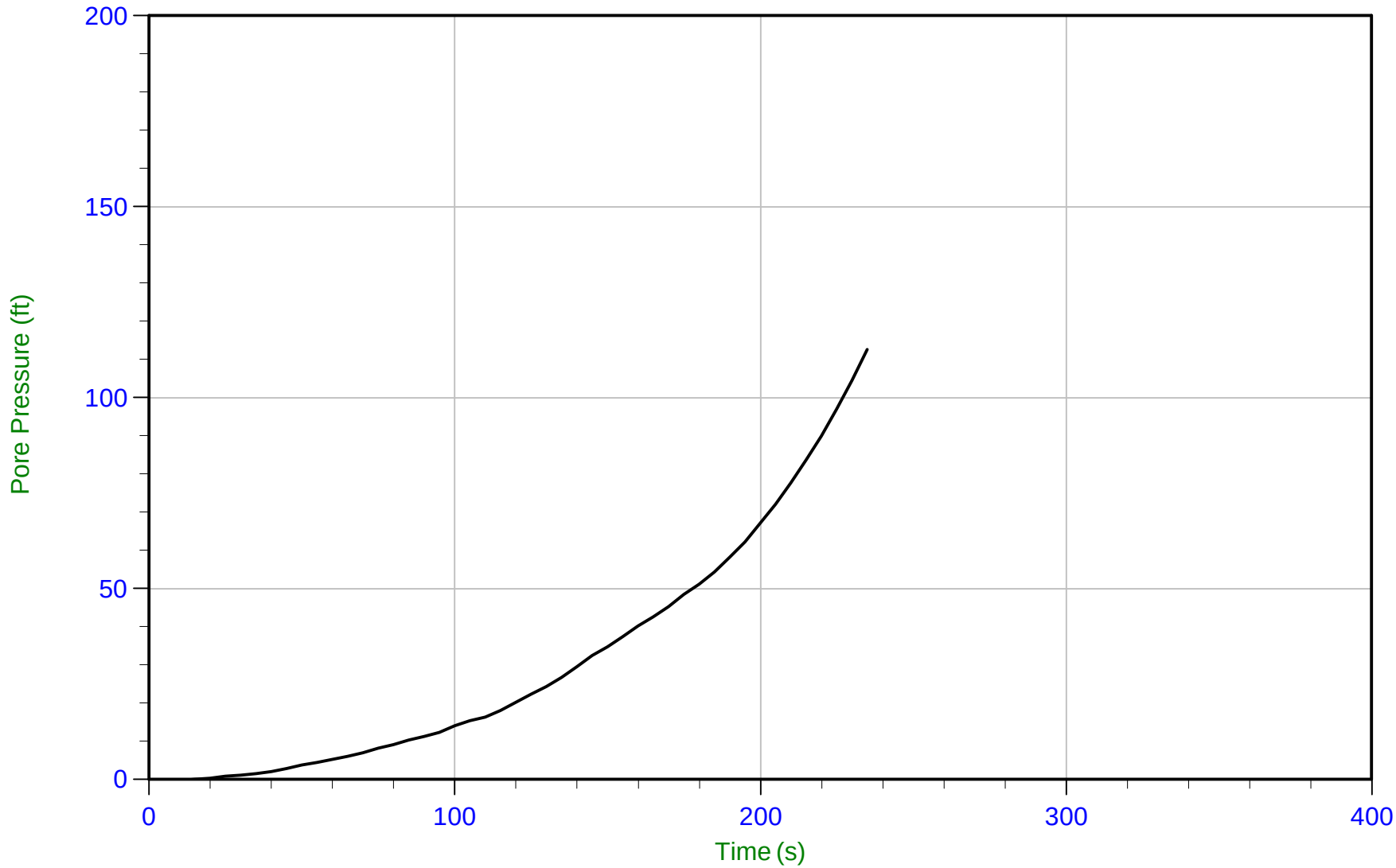
u Min: -18.0 ft
u Max: -12.5 ft
u Final: -12.5 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/03/2020 14:24
Site: DTE Monroe Power Plant

Sounding: CPT20-034
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP034.PPF
Depth: 14.000 m / 45.931 ft
Duration: 235.0 s

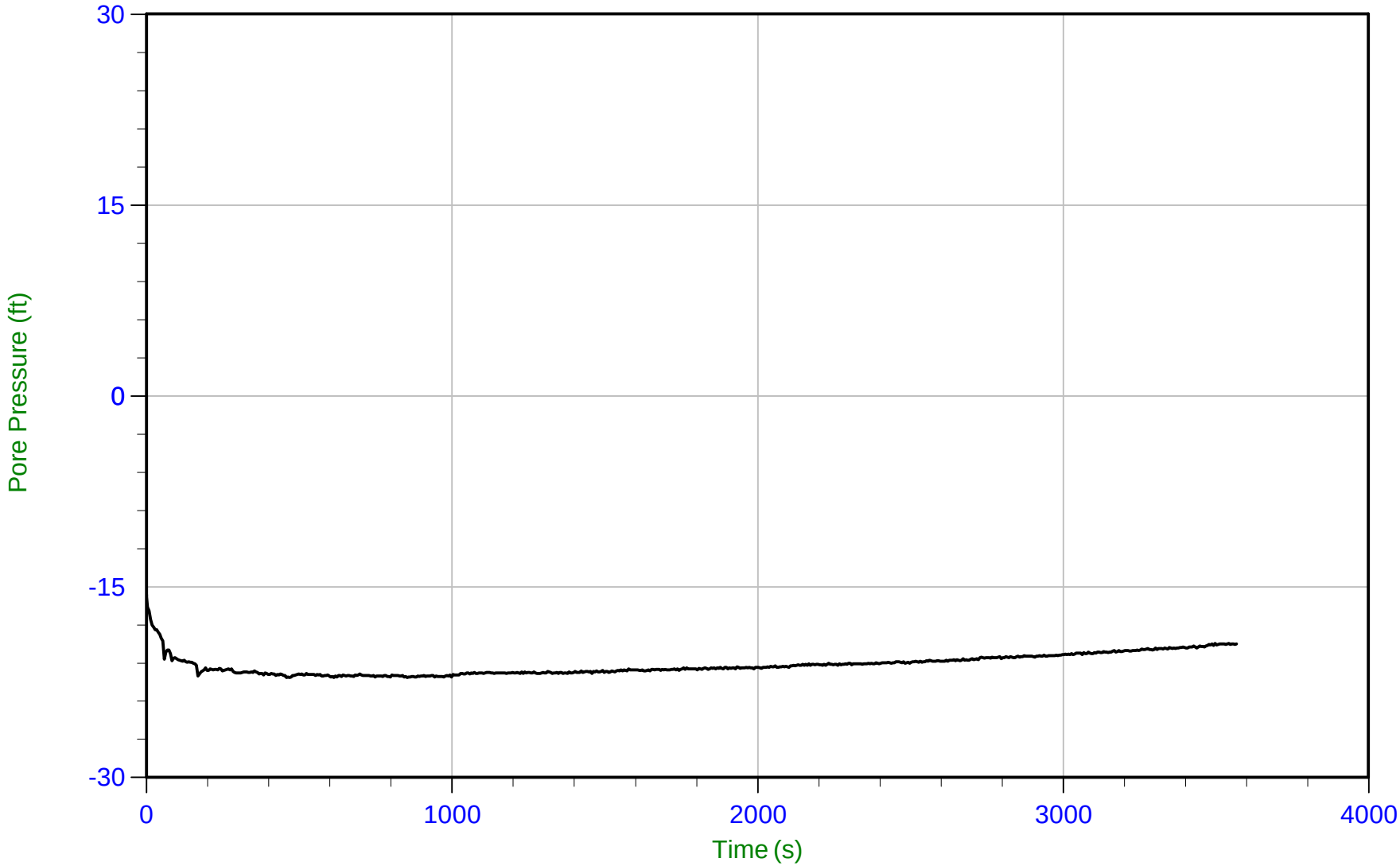
u Min: -1.1 ft
u Max: 112.6 ft
u Final: 112.6 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/04/2020 09:07
Site: DTE Monroe Power Plant

Sounding: CPT20-036
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP036.PPF
Depth: 6.450 m / 21.161 ft
Duration: 3570.0 s

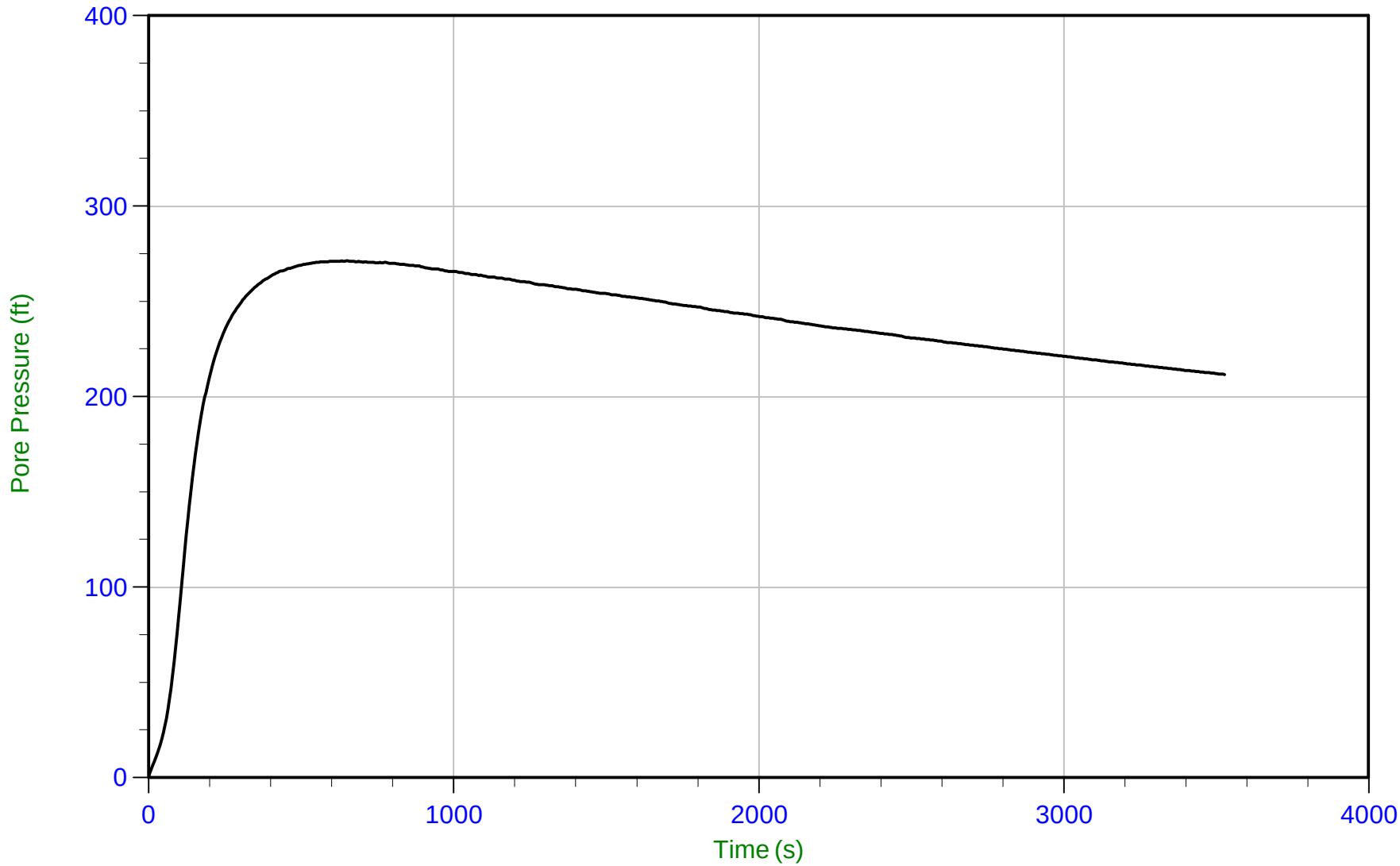
u Min: -22.2 ft
u Max: -15.6 ft
u Final: -19.5 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/04/2020 10:59
Site: DTE Monroe Power Plant

Sounding: CPT20-038
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP038.PPF
Depth: 17.375 m / 57.004 ft
Duration: 3530.0 s

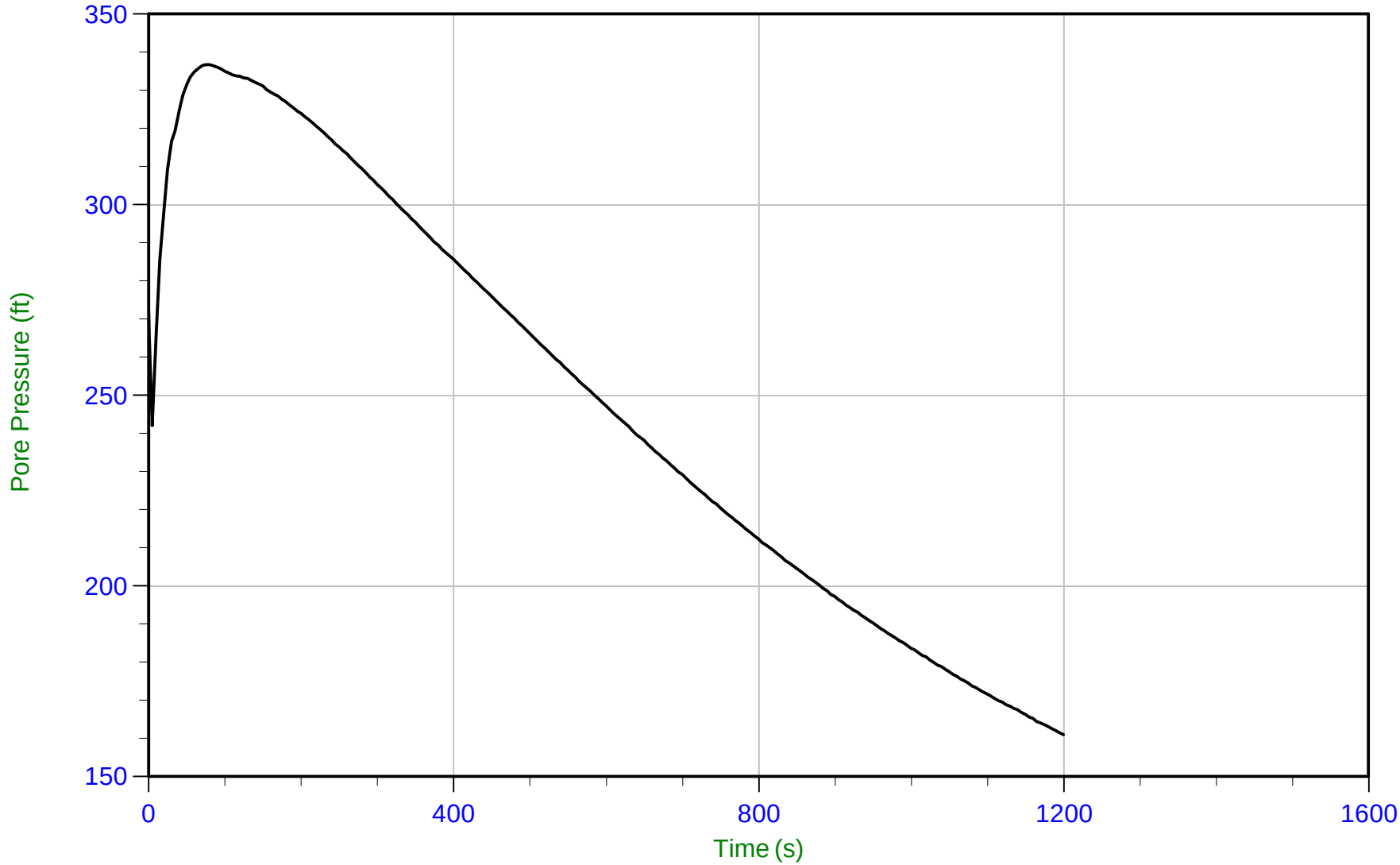
u Min: -0.1 ft
u Max: 271.3 ft
u Final: 211.6 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 12:22
Site: DTE Monroe Power Plant

Sounding: CPT20-048
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP048.PPF
Depth: 15.250 m / 50.032 ft
Duration: 1200.0 s

u Min: 161.0 ft
u Max: 336.7 ft
u Final: 161.0 ft

WT: 7.620 m / 25.000 ft
Ueq: 25.0 ft
U(50): 180.88 ft

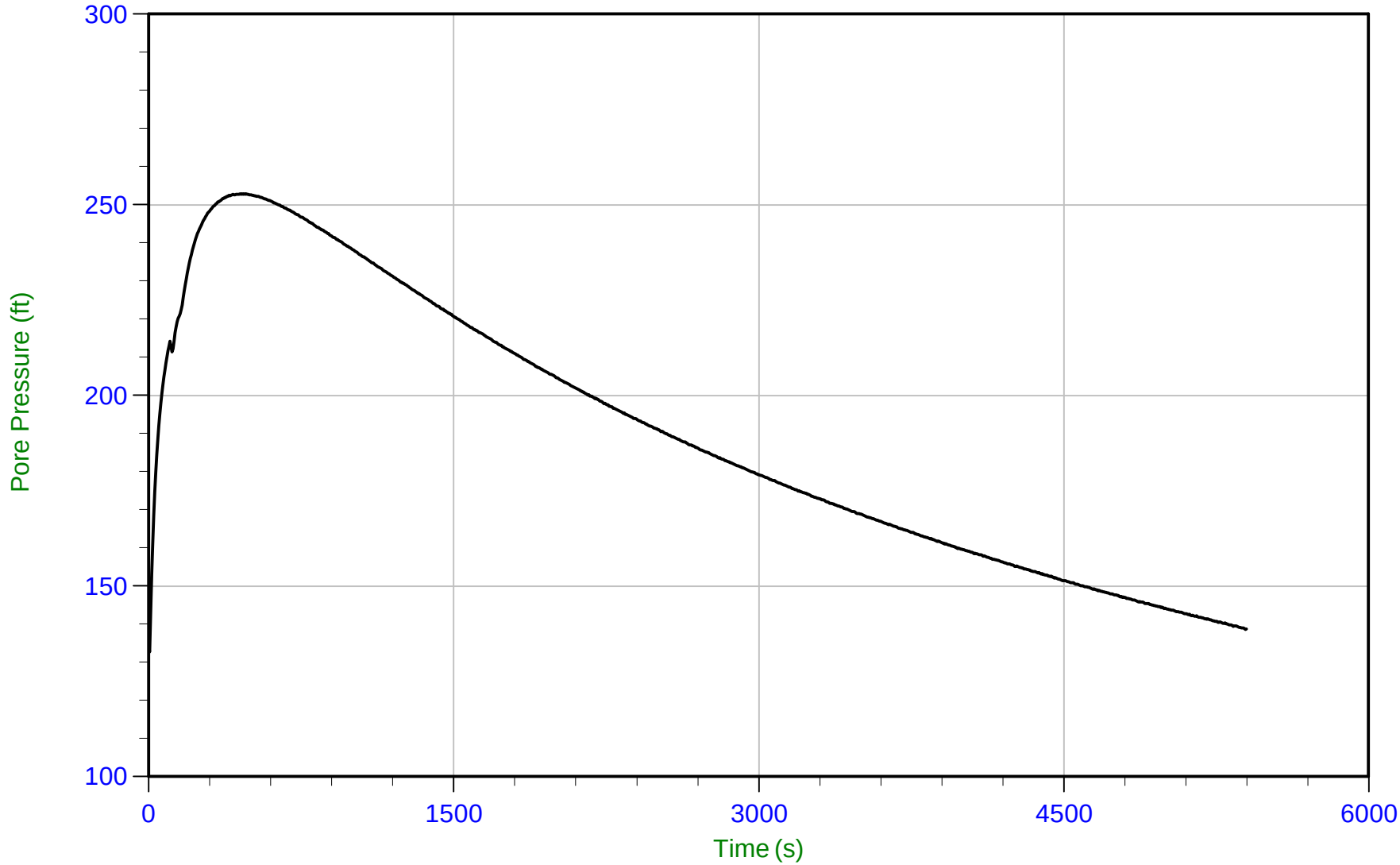
T(50): 943.4 s
Ir: 100
Ch: 0.7 cm²/min

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 12:22
Site: DTE Monroe Power Plant

Sounding: CPT20-048
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP048.PPF
Depth: 16.800 m / 55.117 ft
Duration: 5400.0 s

u Min: 132.7 ft
u Max: 252.9 ft
u Final: 138.7 ft

WT: 7.620 m / 25.000 ft
Ueq: 30.1 ft
U(50): 141.53 ft

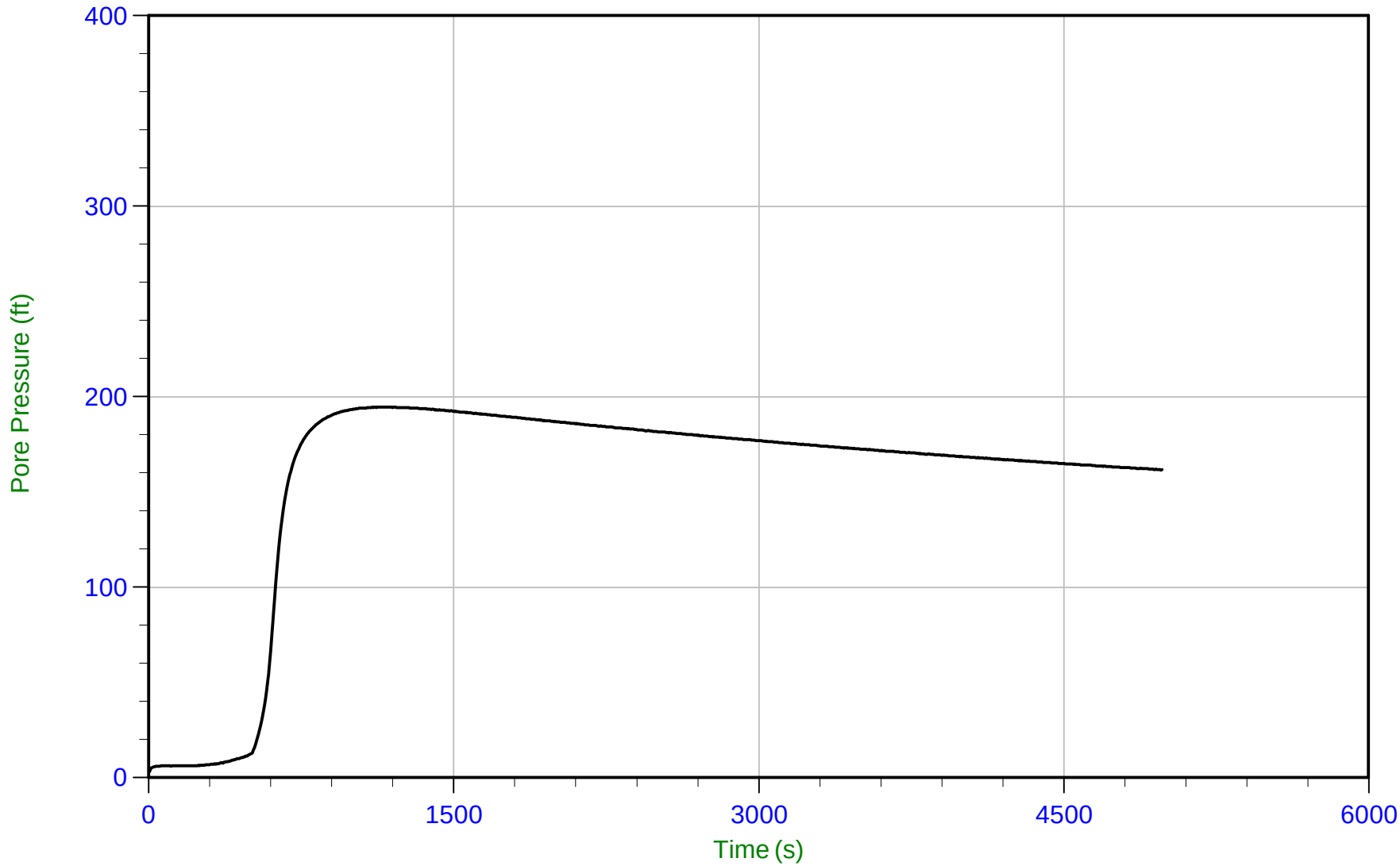
T(50): 4738.7 s
Ir: 100
Ch: 0.1 cm²/min

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 12:22
Site: DTE Monroe Power Plant

Sounding: CPT20-048
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP048.PPF
Depth: 18.300 m / 60.039 ft
Duration: 4985.0 s

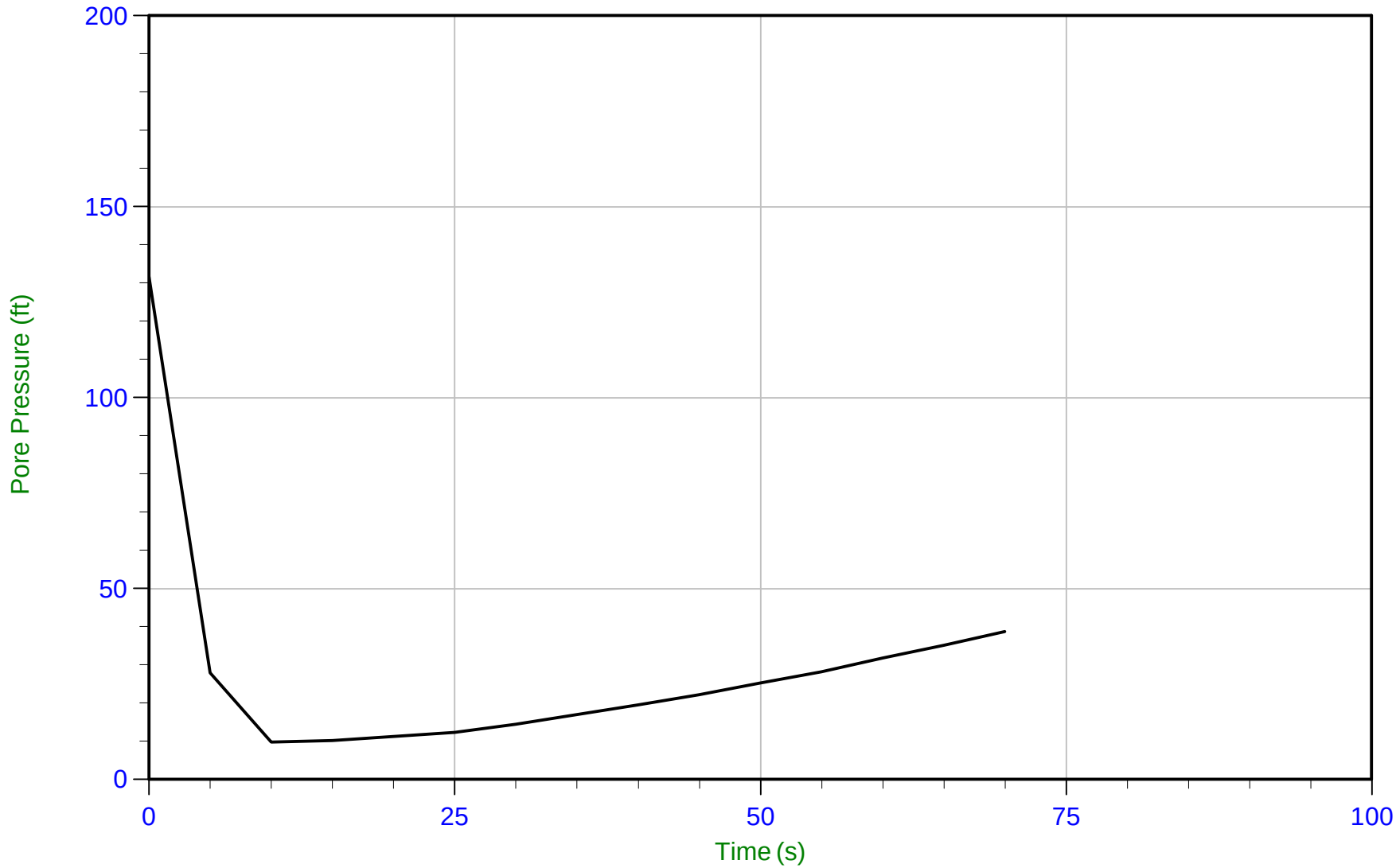
u Min: 2.6 ft
u Max: 194.6 ft
u Final: 161.7 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/05/2020 12:28
Site: DTE Monroe Power Plant

Sounding: CPT20-054
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP054.PPF
Depth: 18.550 m / 60.859 ft
Duration: 70.0 s

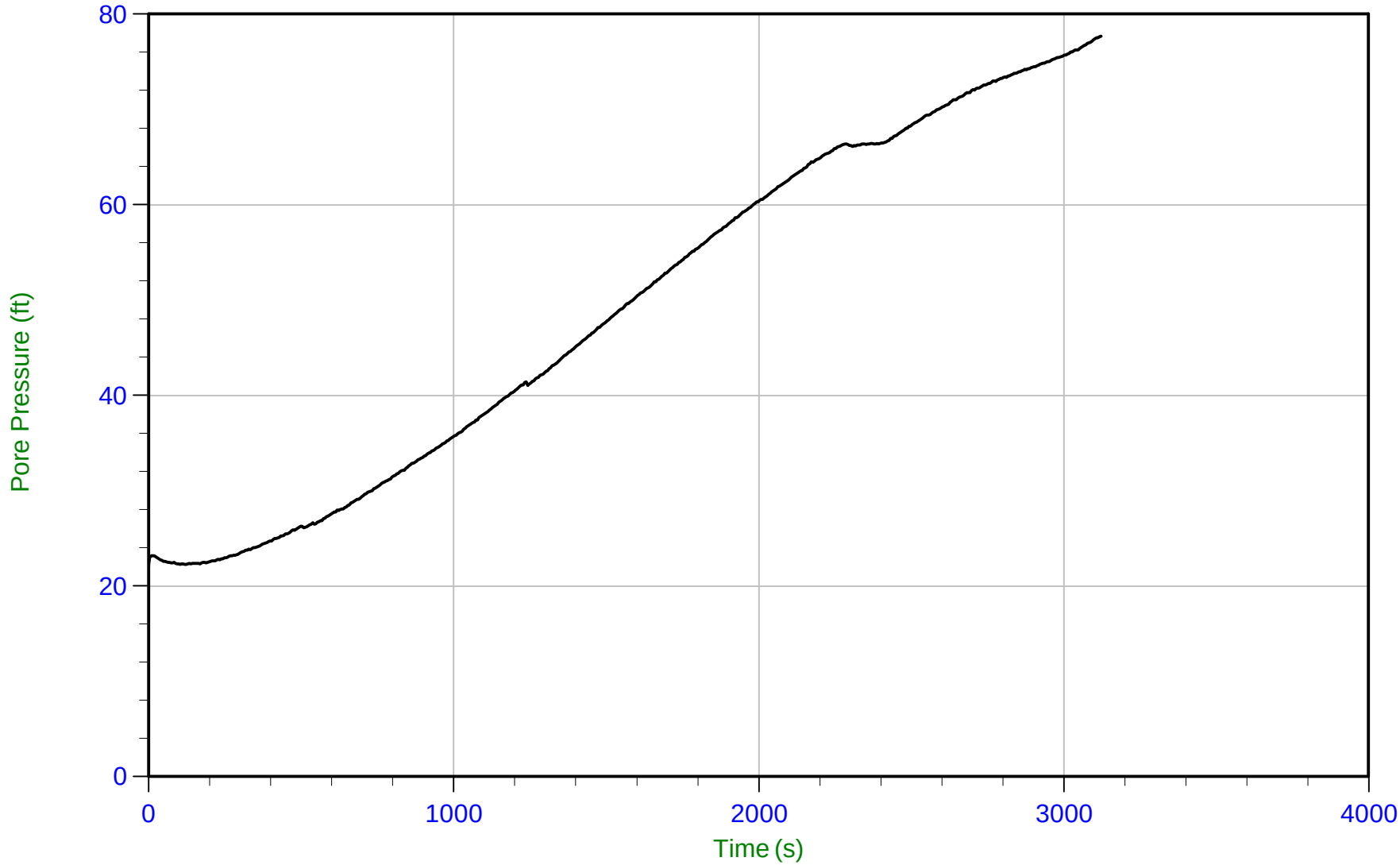
u Min: 9.8 ft
u Max: 131.6 ft
u Final: 38.7 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/06/2020 13:22
Site: DTE Monroe Power Plant

Sounding: CPT20-058
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP058.PPF
Depth: 12.850 m / 42.158 ft
Duration: 3125.0 s

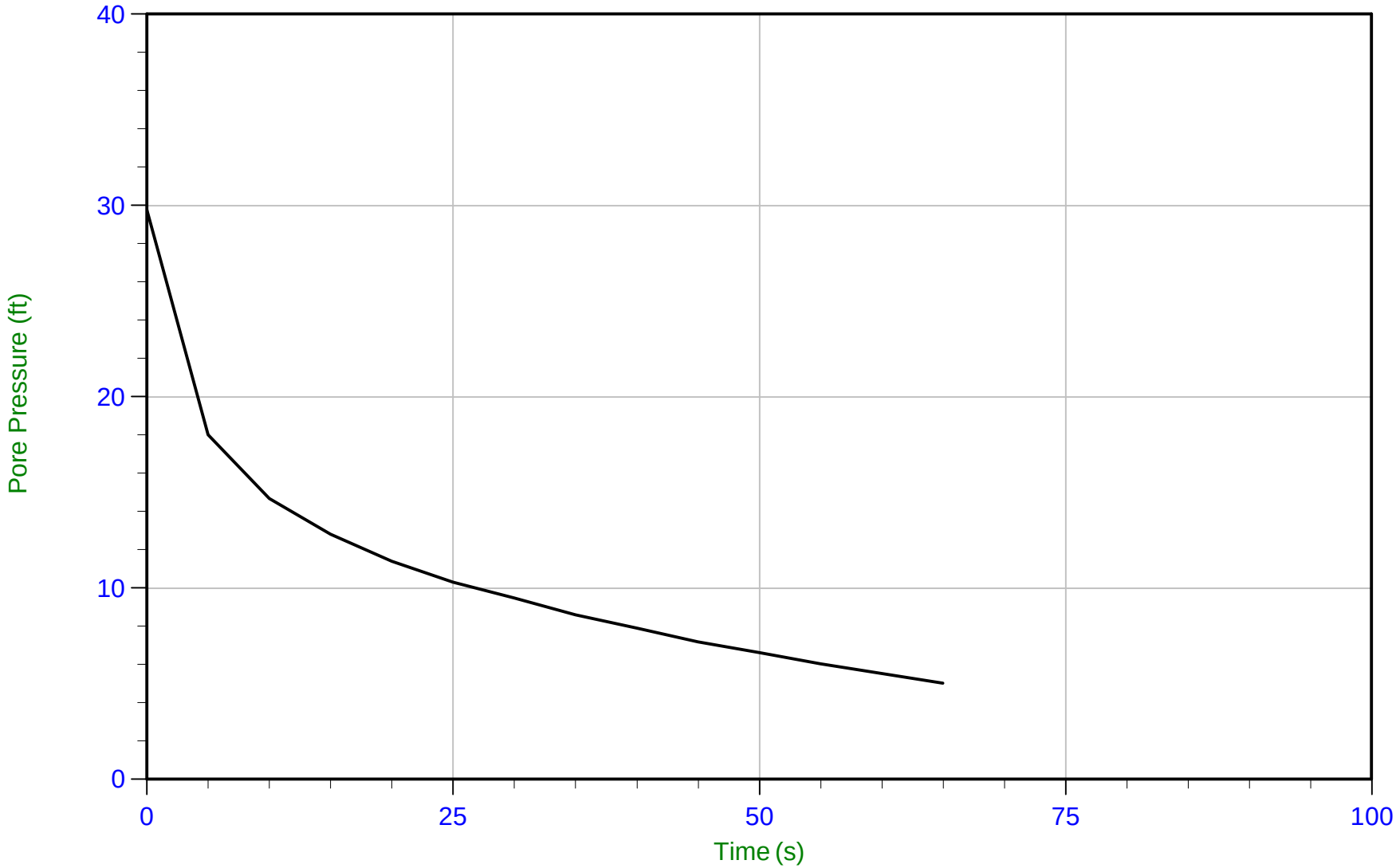
u Min: 22.1 ft
u Max: 77.7 ft
u Final: 77.7 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/06/2020 12:21
Site: DTE Monroe Power Plant

Sounding: CPT20-060
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP060.PPF
Depth: 18.250 m / 59.875 ft
Duration: 65.0 s

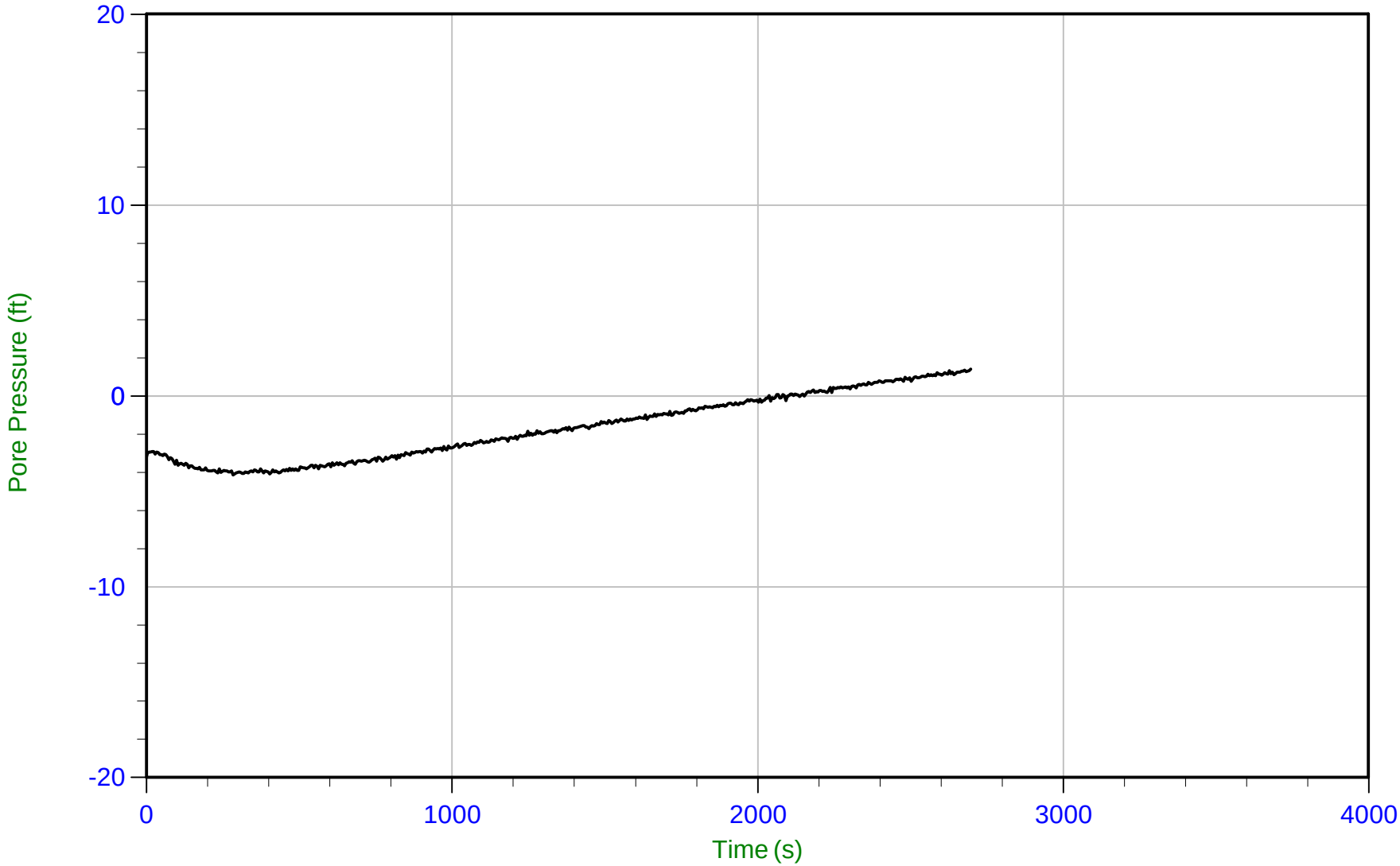
u Min: 5.0 ft
u Max: 29.8 ft
u Final: 5.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:36
Site: DTE Monroe Power Plant

Sounding: CPT20-068
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

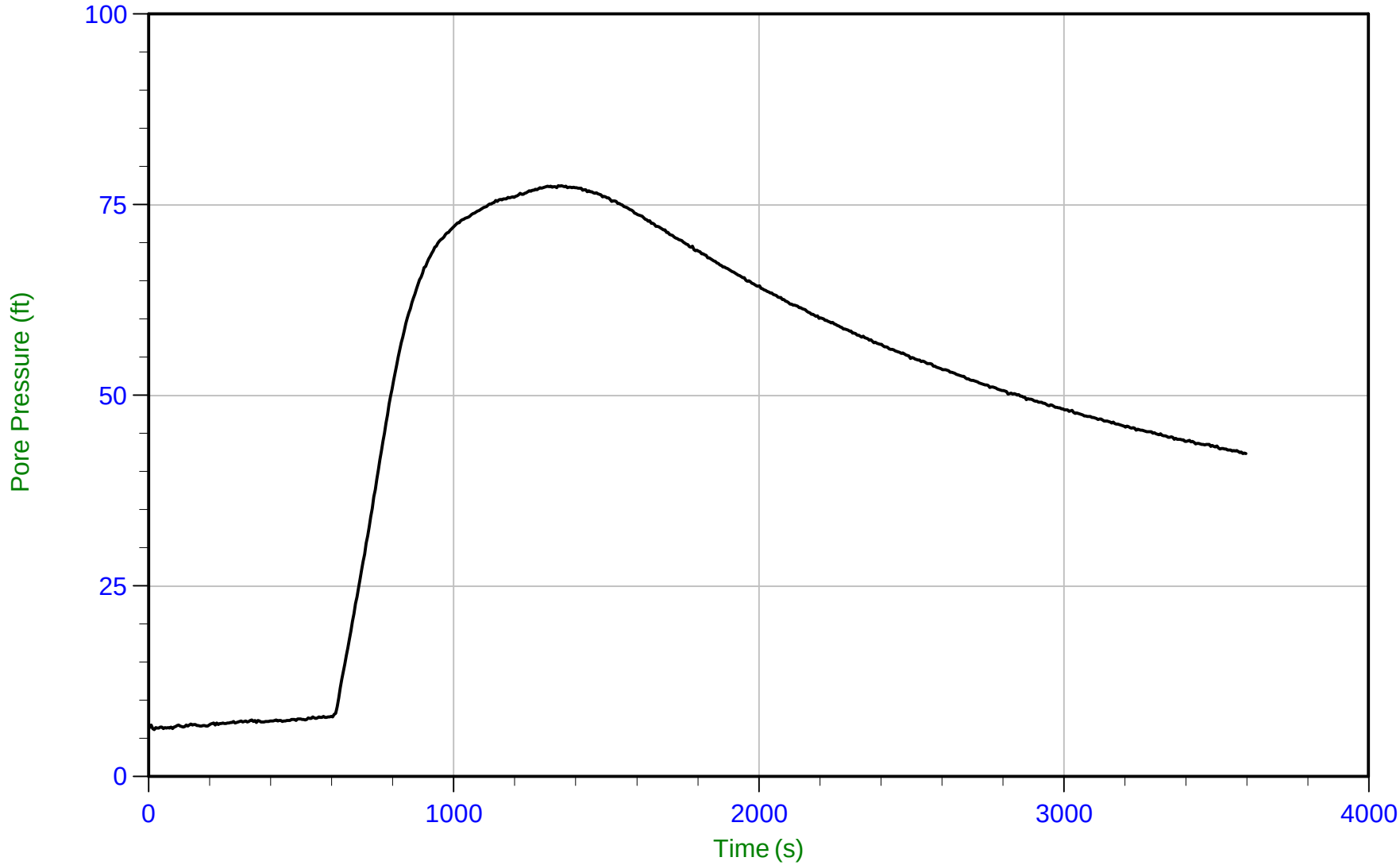
Filename: 20-61-21655_CP068.PPF
Depth: 12.200 m / 40.026 ft
Duration: 2700.0 s

u Min: -4.1 ft
u Max: 1.4 ft
u Final: 1.4 ft

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:36
Site: DTE Monroe Power Plant

Sounding: CPT20-068
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP068.PPF
Depth: 13.150 m / 43.143 ft
Duration: 3600.0 s

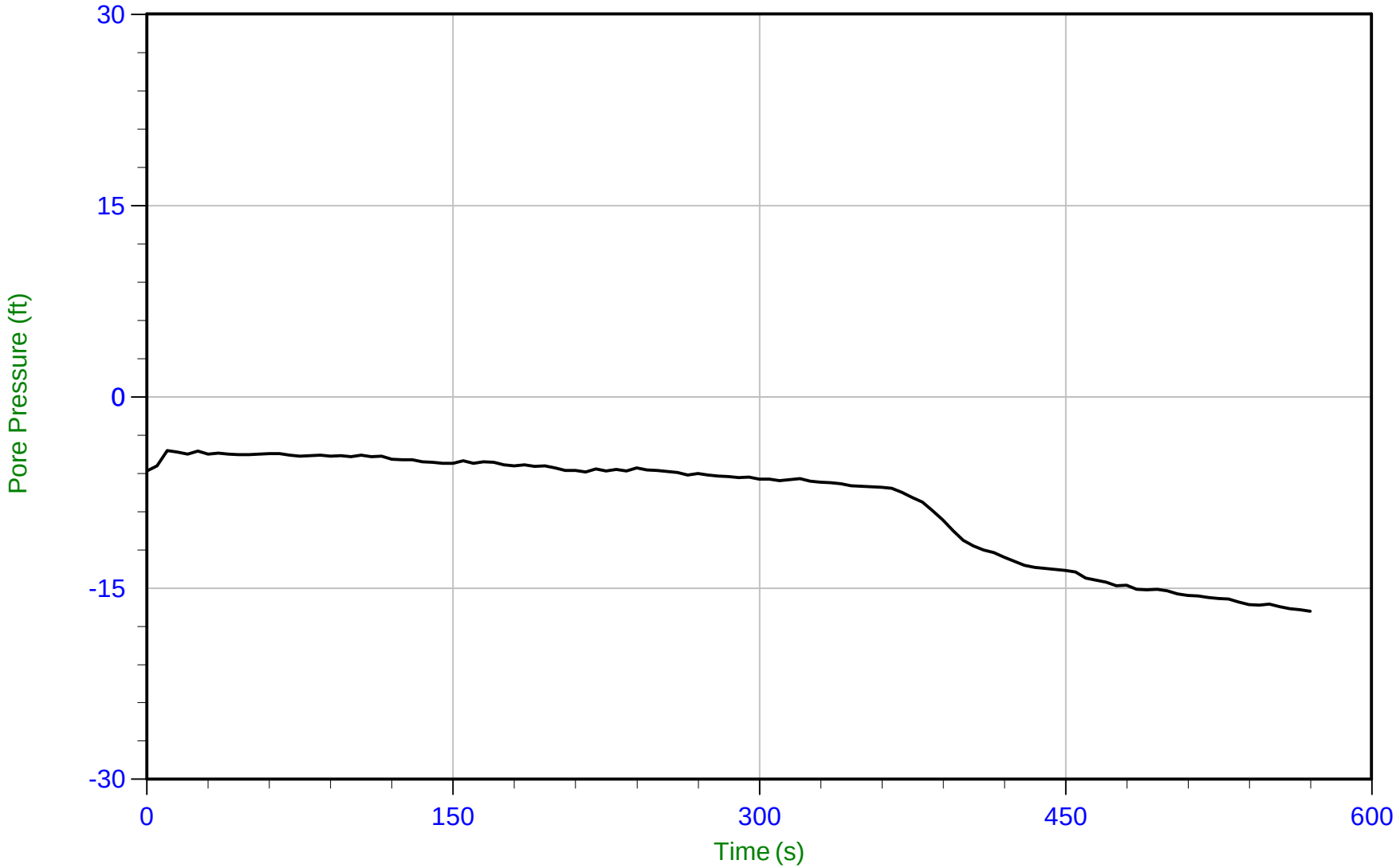
u Min: 6.2 ft
u Max: 77.5 ft
u Final: 42.4 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:36
Site: DTE Monroe Power Plant

Sounding: CPT20-068
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP068.PPF
Depth: 16.800 m / 55.117 ft
Duration: 570.0 s

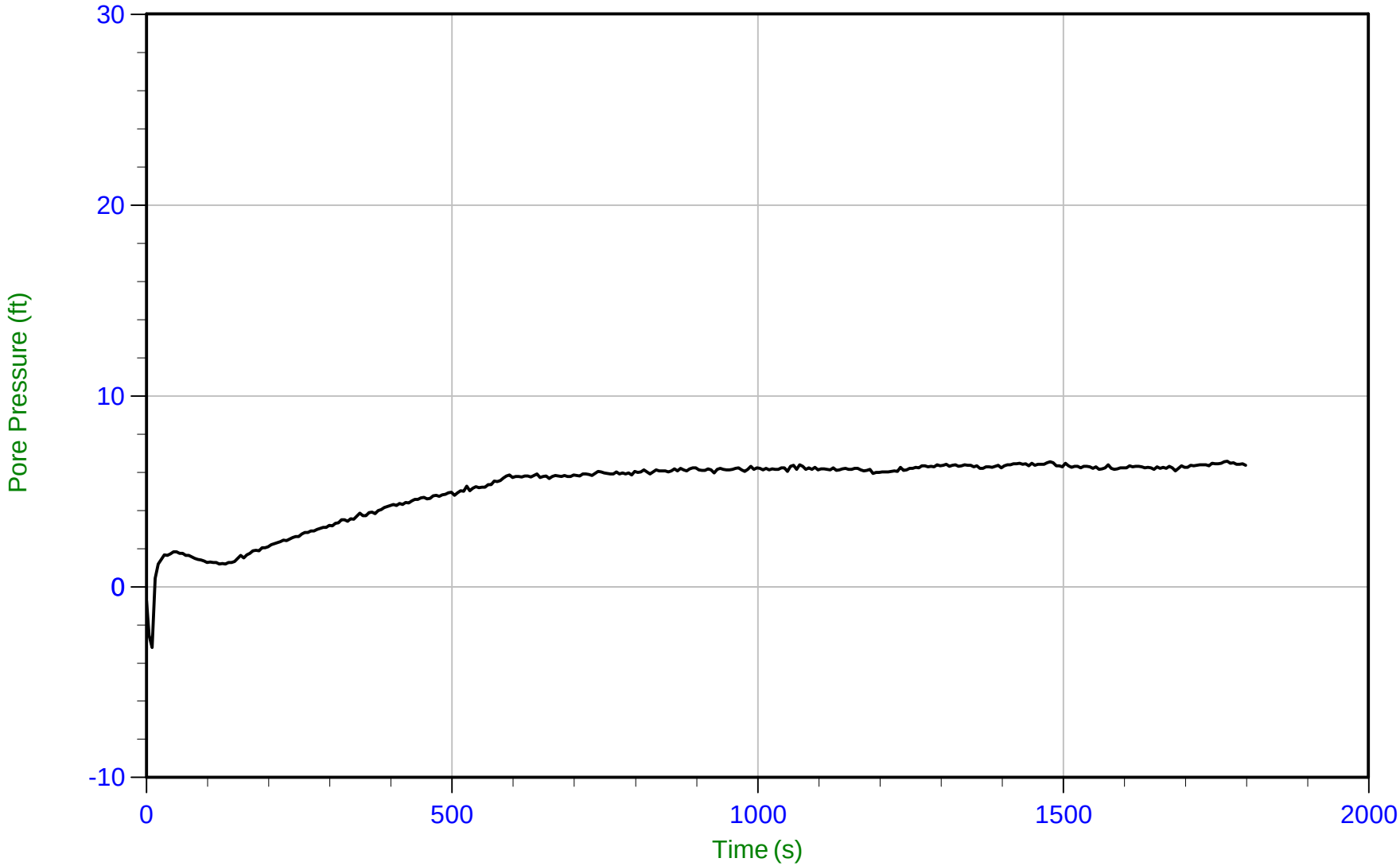
u Min: -16.8 ft
u Max: -4.2 ft
u Final: -16.8 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 08:36
Site: DTE Monroe Power Plant

Sounding: CPT20-068
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP068.PPF
Depth: 18.000 m / 59.054 ft
Duration: 1800.0 s

u Min: -3.2 ft
u Max: 6.6 ft
u Final: 6.4 ft

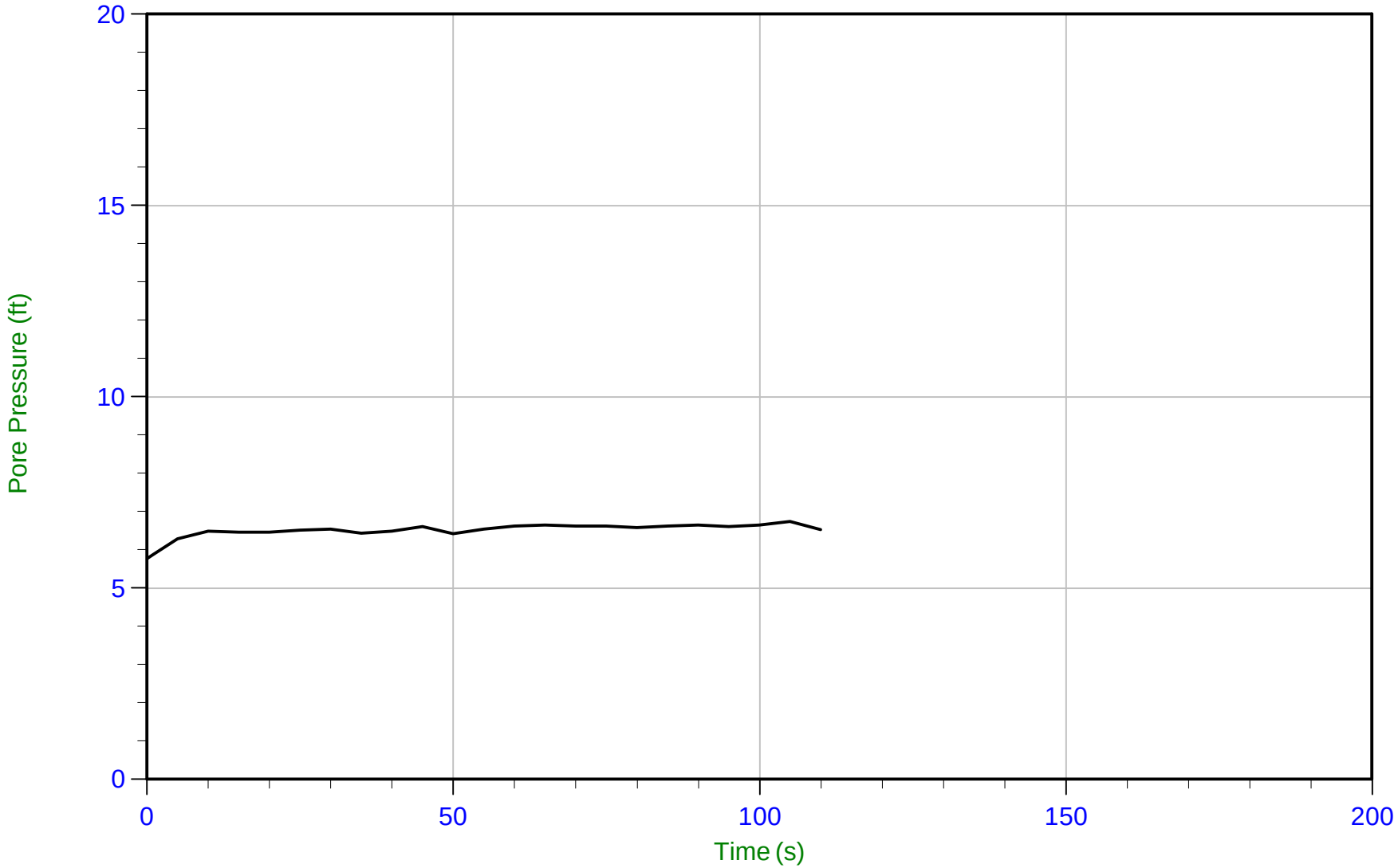
WT: 16.043 m / 52.634 ft
Ueq: 6.4 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/02/2020 14:17
Site: DTE Monroe Power Plant

Sounding: CPT20-074
Cone: 567:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP074.PPF
Depth: 11.800 m / 38.713 ft
Duration: 110.0 s

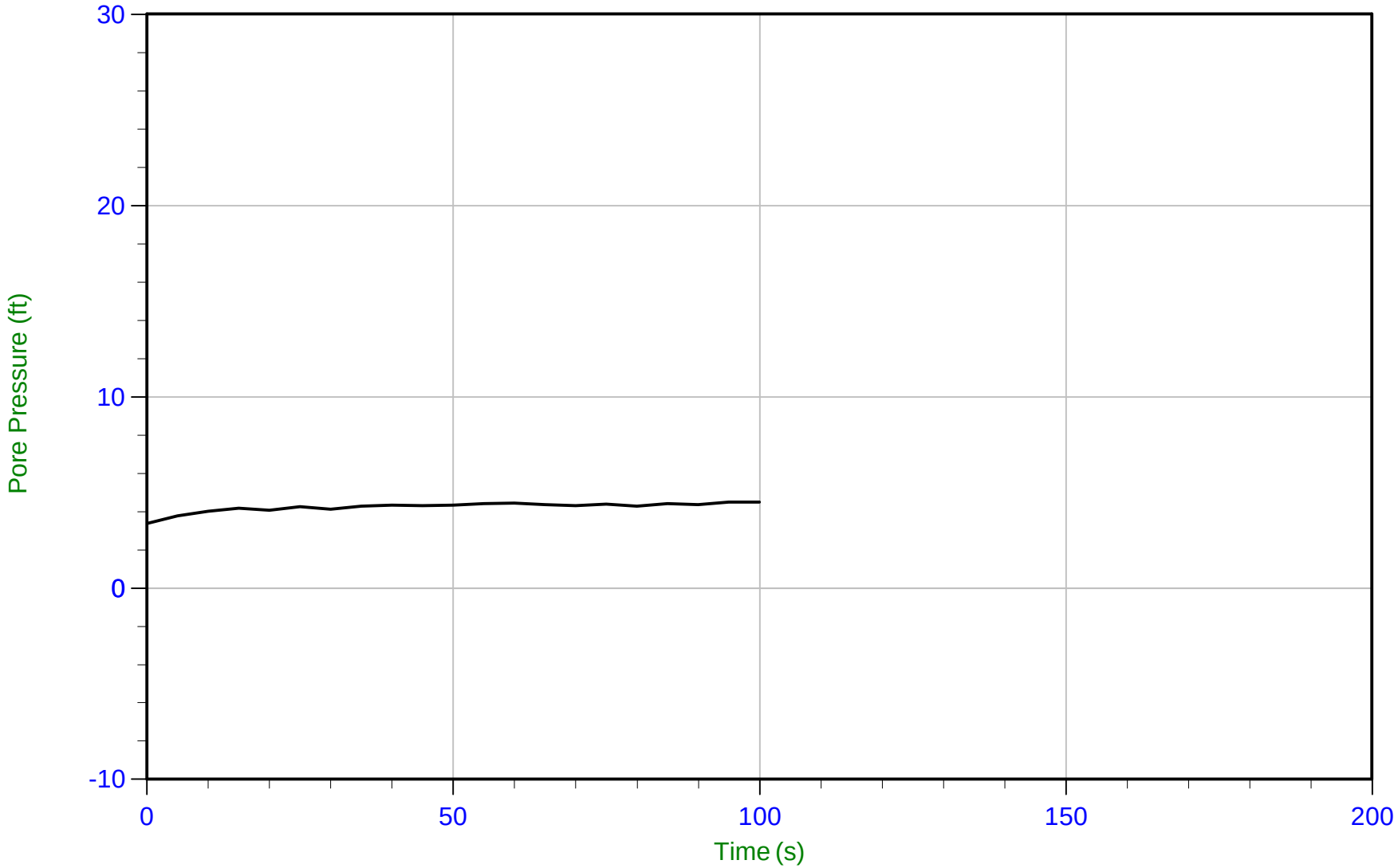
u Min: 5.8 ft
u Max: 6.7 ft
u Final: 6.5 ft

WT: 9.794 m / 32.132 ft
Ueq: 6.6 ft

Geosyntec

Job No: 20-61-21655
Date: 12/03/2020 10:17
Site: DTE Monroe Power Plant

Sounding: CPT20-078B
Cone: 567:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP078B.PPF
Depth: 11.800 m / 38.713 ft
Duration: 100.0 s

u Min: 3.4 ft
u Max: 4.5 ft
u Final: 4.5 ft

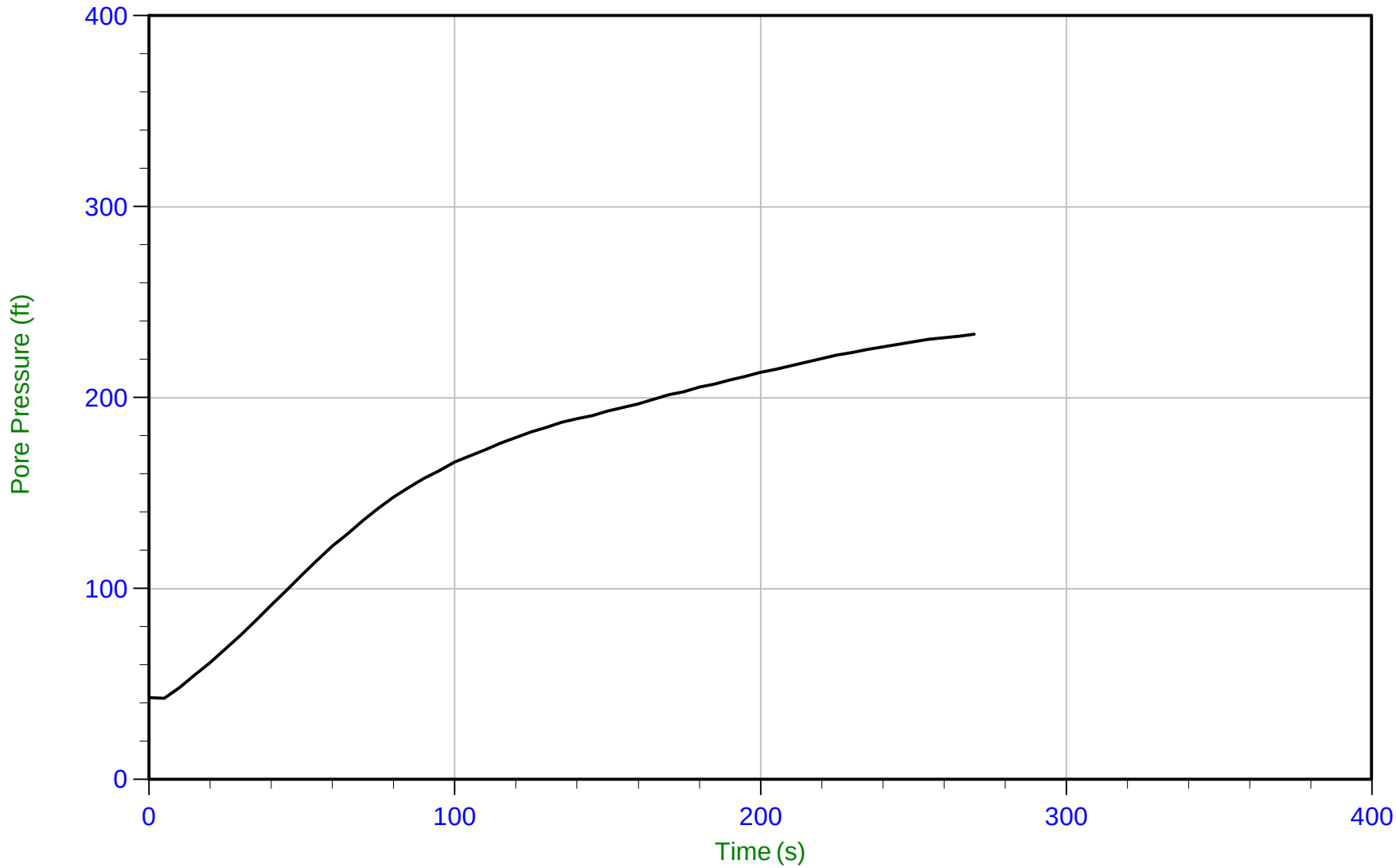
WT: 10.447 m / 34.275 ft
Ueq: 4.4 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/03/2020 10:17
Site: DTE Monroe Power Plant

Sounding: CPT20-078B
Cone: 567:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP078B.PPF
Depth: 14.800 m / 48.556 ft
Duration: 270.0 s

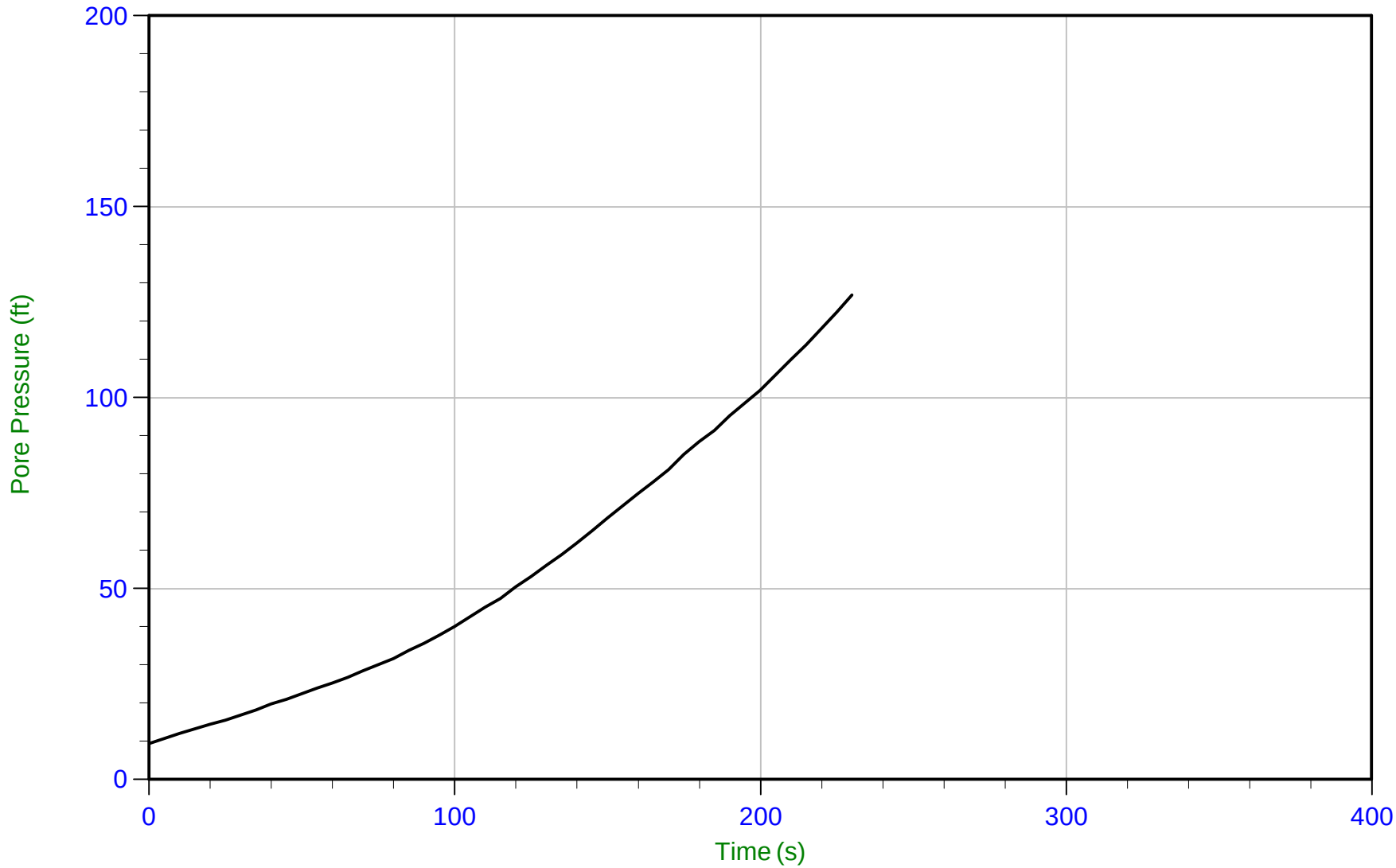
u Min: 42.6 ft
u Max: 233.2 ft
u Final: 233.2 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/04/2020 08:46
Site: DTE Monroe Power Plant

Sounding: CPT20-086
Cone: 675:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP086.PPF
Depth: 14.850 m / 48.720 ft
Duration: 230.0 s

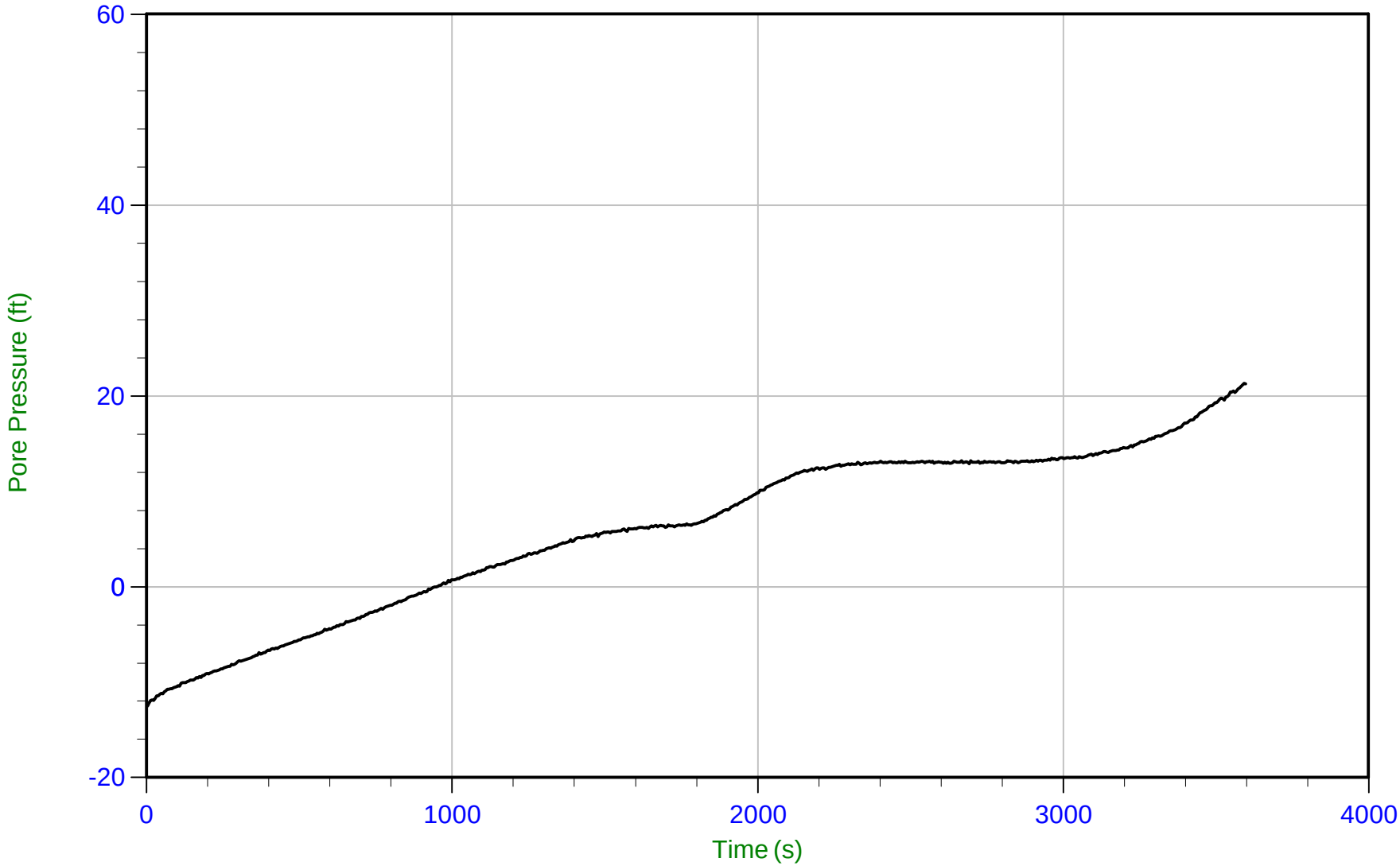
u Min: 9.3 ft
u Max: 126.9 ft
u Final: 126.9 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/04/2020 11:17
Site: DTE Monroe Power Plant

Sounding: CPT20-090
Cone: 675:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP090.PPF
Depth: 6.100 m / 20.013 ft
Duration: 3600.0 s

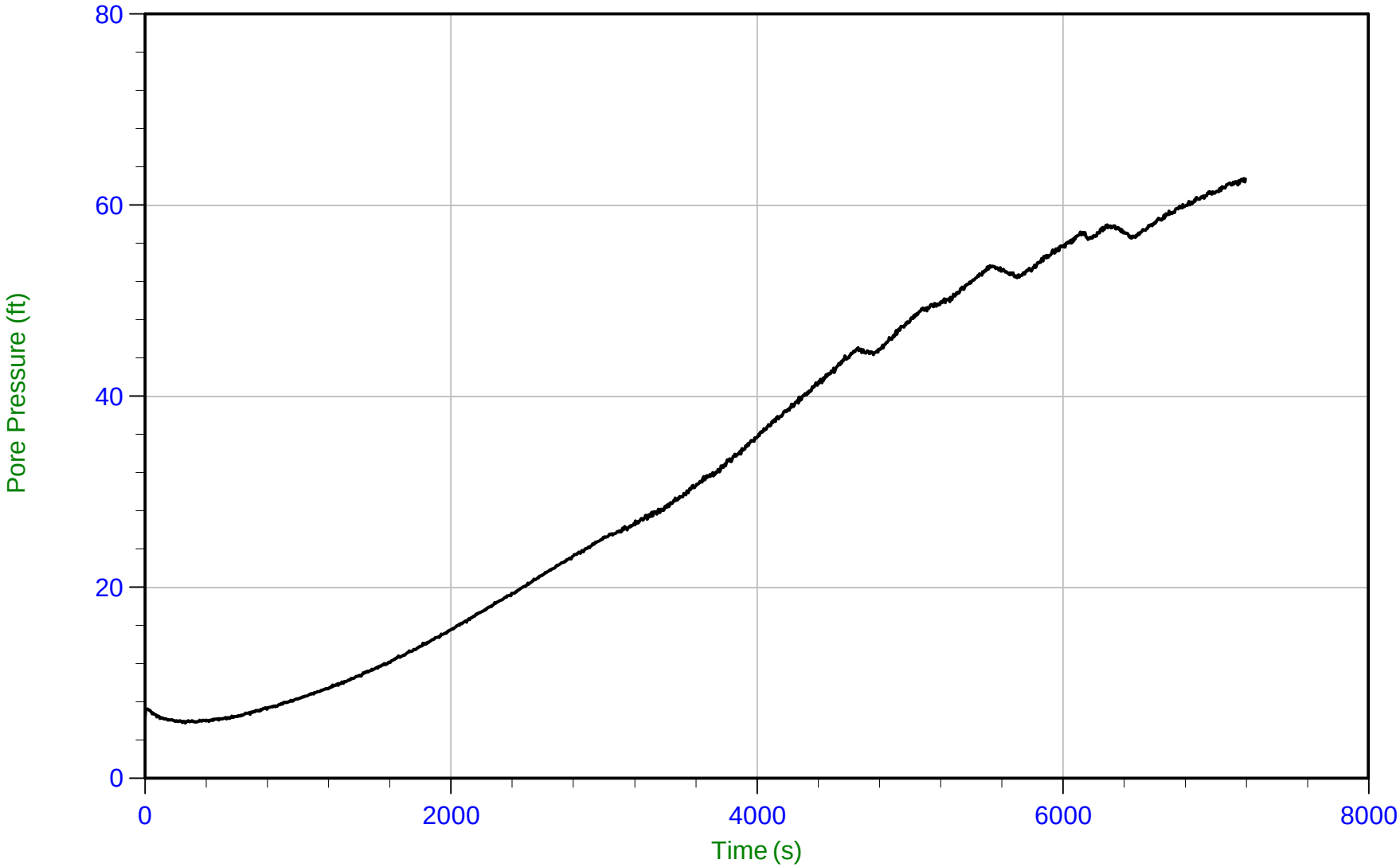
u Min: -12.5 ft
u Max: 21.3 ft
u Final: 21.3 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/04/2020 11:17
Site: DTE Monroe Power Plant

Sounding: CPT20-090
Cone: 675:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP090.PPF
Depth: 12.200 m / 40.026 ft
Duration: 7200.0 s

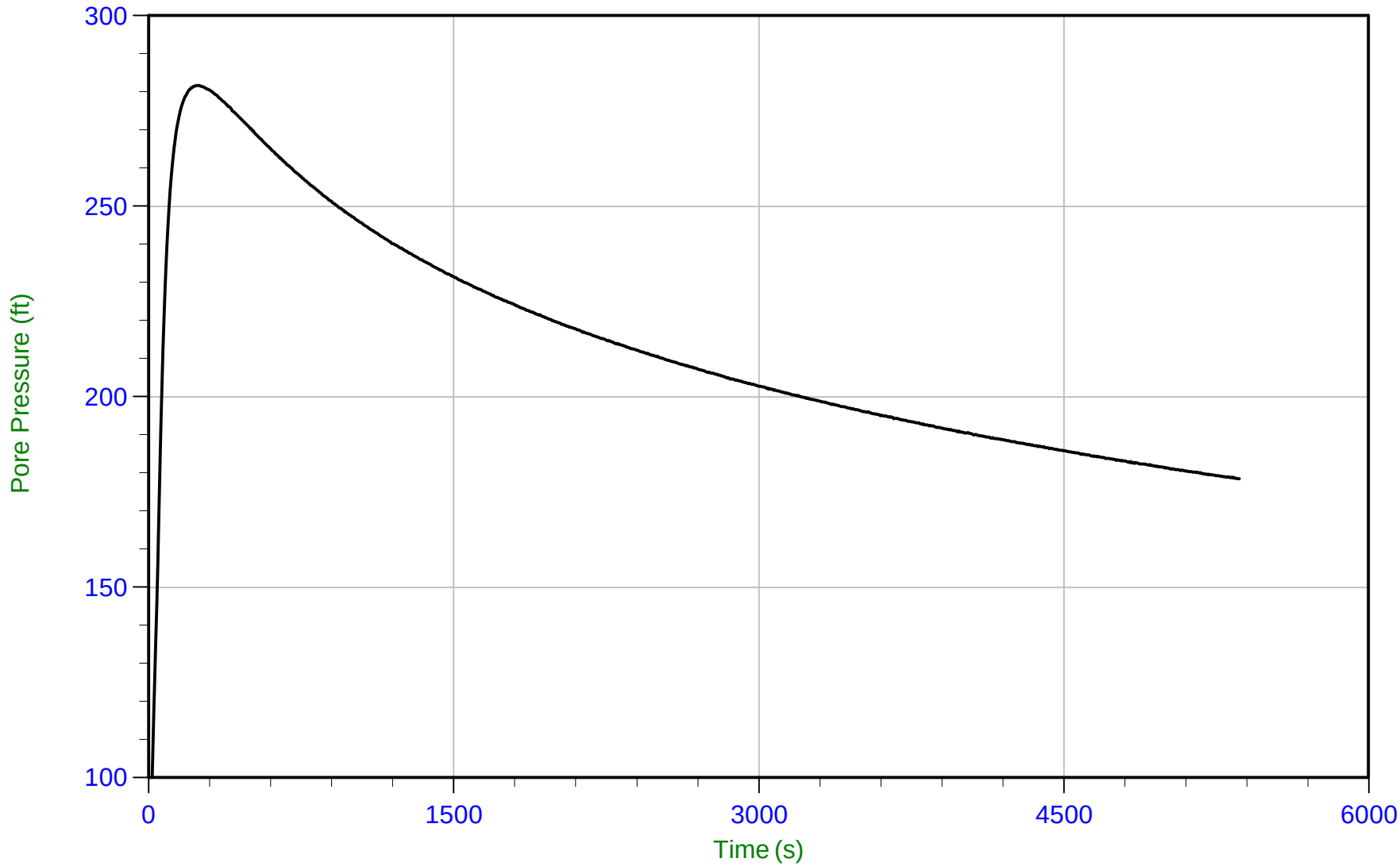
u Min: 5.8 ft
u Max: 62.8 ft
u Final: 62.8 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/04/2020 11:17
Site: DTE Monroe Power Plant

Sounding: CPT20-090
Cone: 675:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP090.PPF
Depth: 18.300 m / 60.039 ft
Duration: 5365.0 s

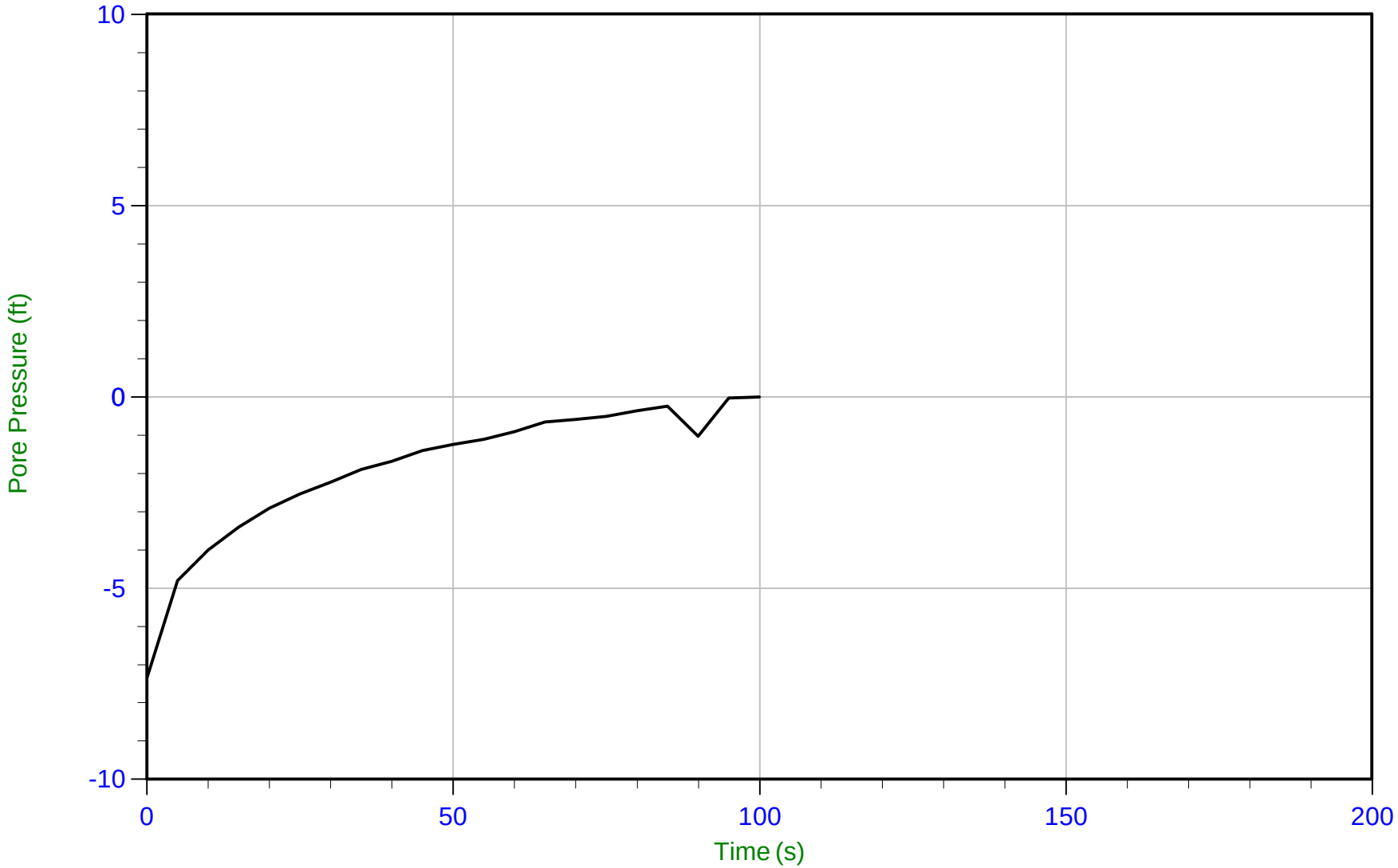
u Min: 70.0 ft
u Max: 281.7 ft
u Final: 178.5 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/05/2020 09:32
Site: DTE Monroe Power Plant

Sounding: CPT20-092
Cone: 675:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP092.PPF
Depth: 1.750 m / 5.741 ft
Duration: 100.0 s

u Min: -7.4 ft
u Max: -0.0 ft
u Final: -0.0 ft

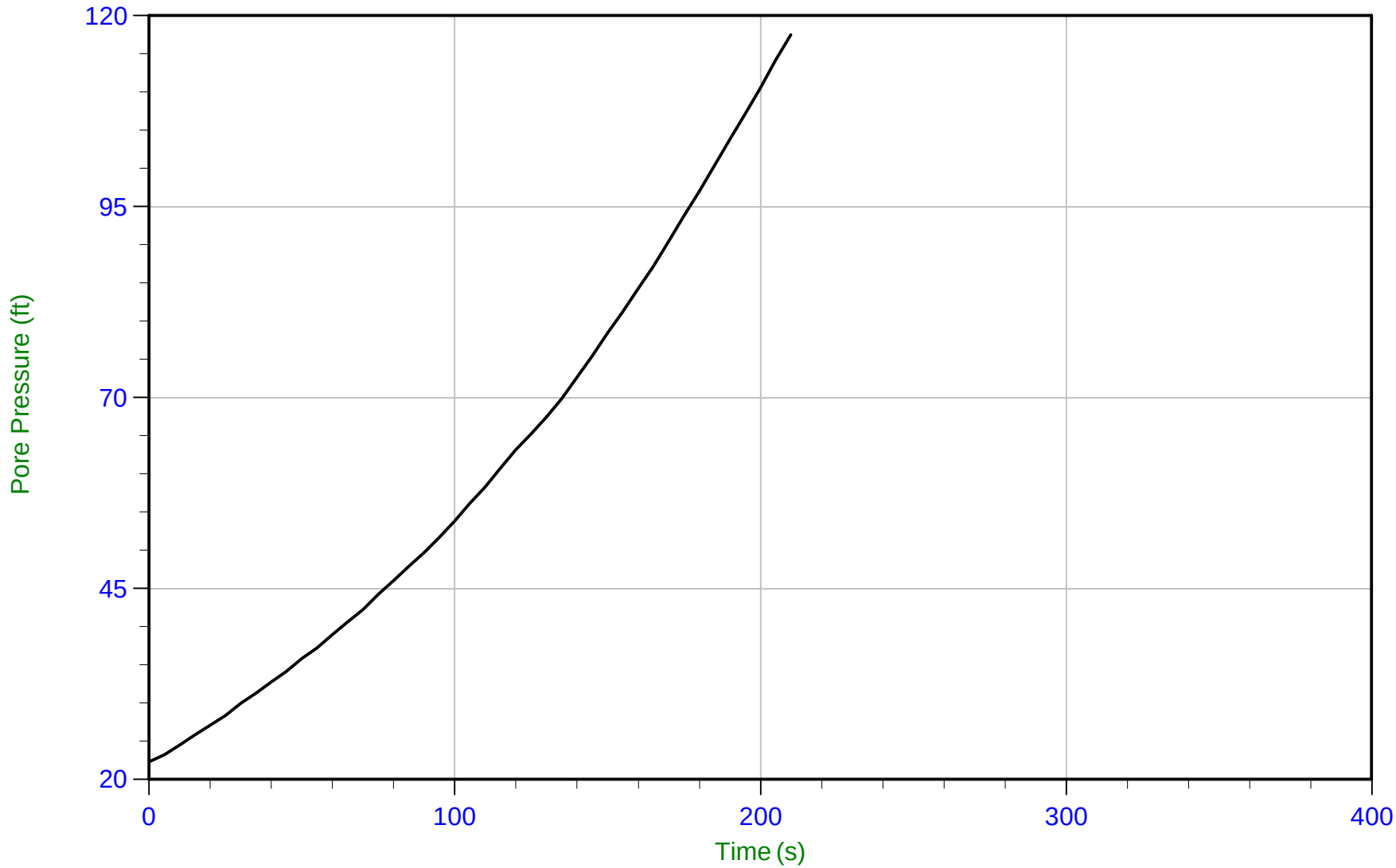
WT: 1.750 m / 5.741 ft
Ueq: 0.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/05/2020 09:32
Site: DTE Monroe Power Plant

Sounding: CPT20-092
Cone: 675:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP092.PPF
Depth: 17.800 m / 58.398 ft
Duration: 210.0 s

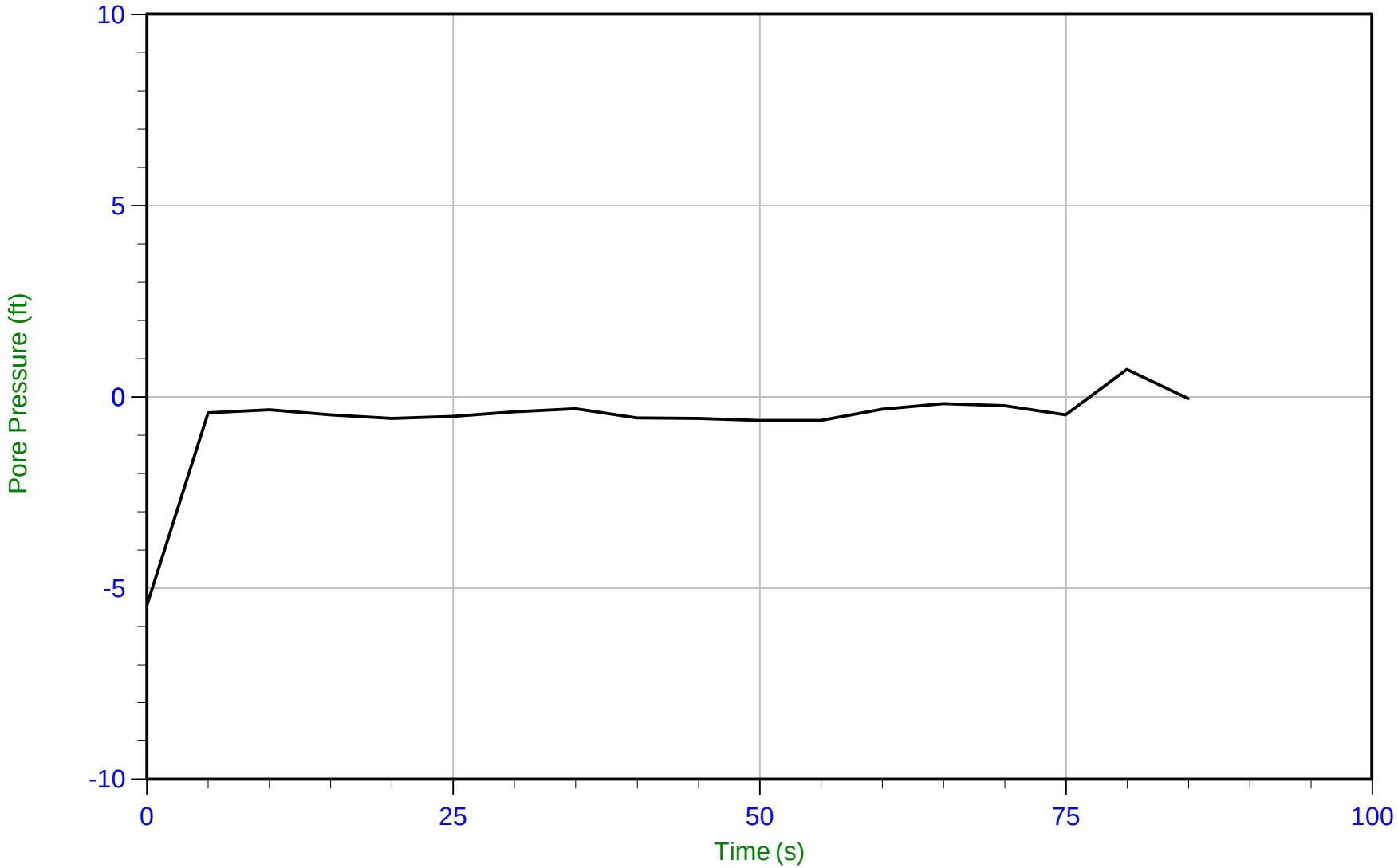
u Min: 22.3 ft
u Max: 117.5 ft
u Final: 117.5 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/05/2020 11:51
Site: DTE Monroe Power Plant

Sounding: SCPT20-096
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_SP096.PPF
Depth: 0.350 m / 1.148 ft
Duration: 85.0 s

u Min: -5.4 ft
u Max: 0.7 ft
u Final: -0.0 ft

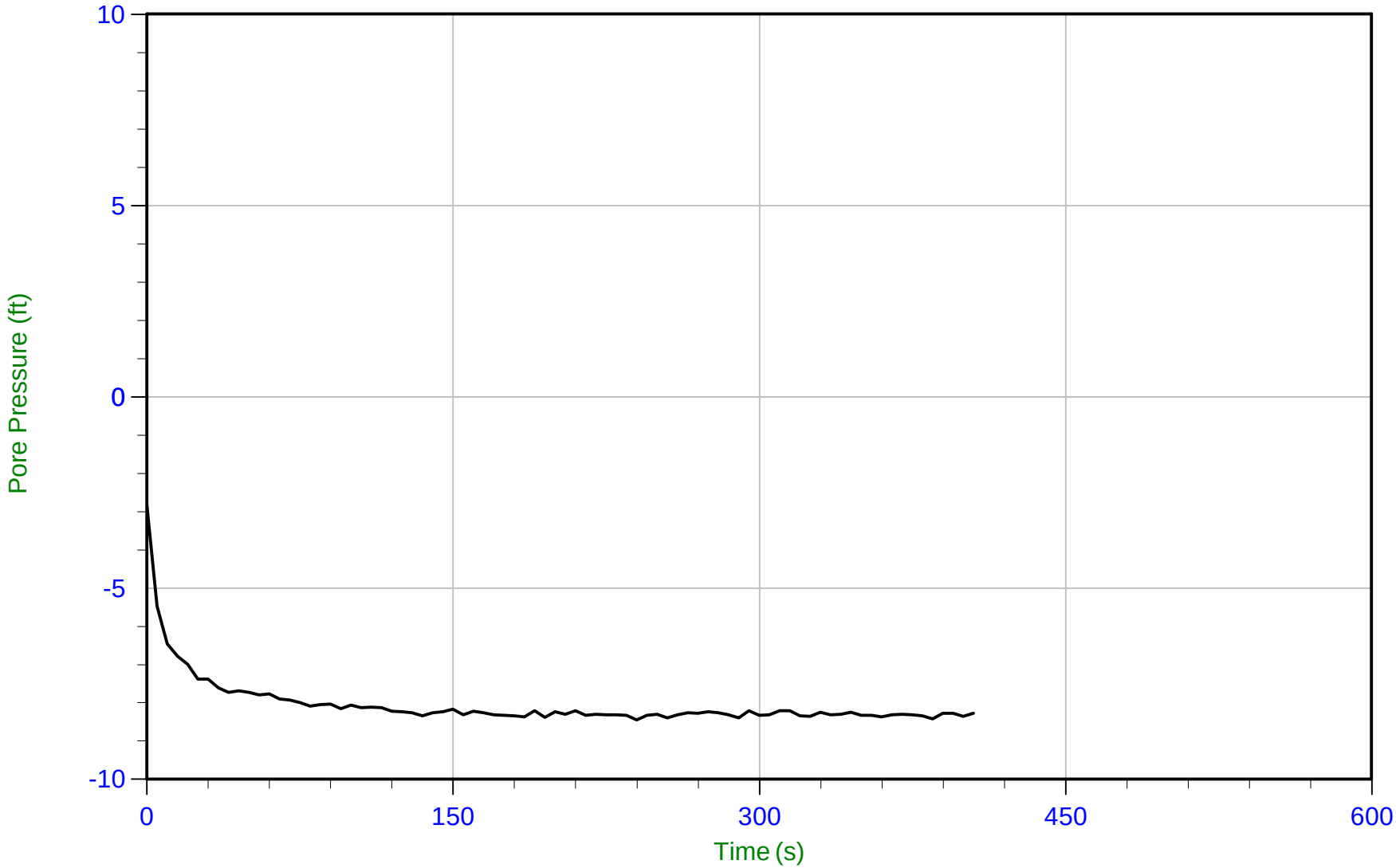
WT: 0.350 m / 1.148 ft
Ueq: 0.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/05/2020 11:51
Site: DTE Monroe Power Plant

Sounding: SCPT20-096
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_SP096.PPF
Depth: 10.800 m / 35.433 ft
Duration: 405.0 s

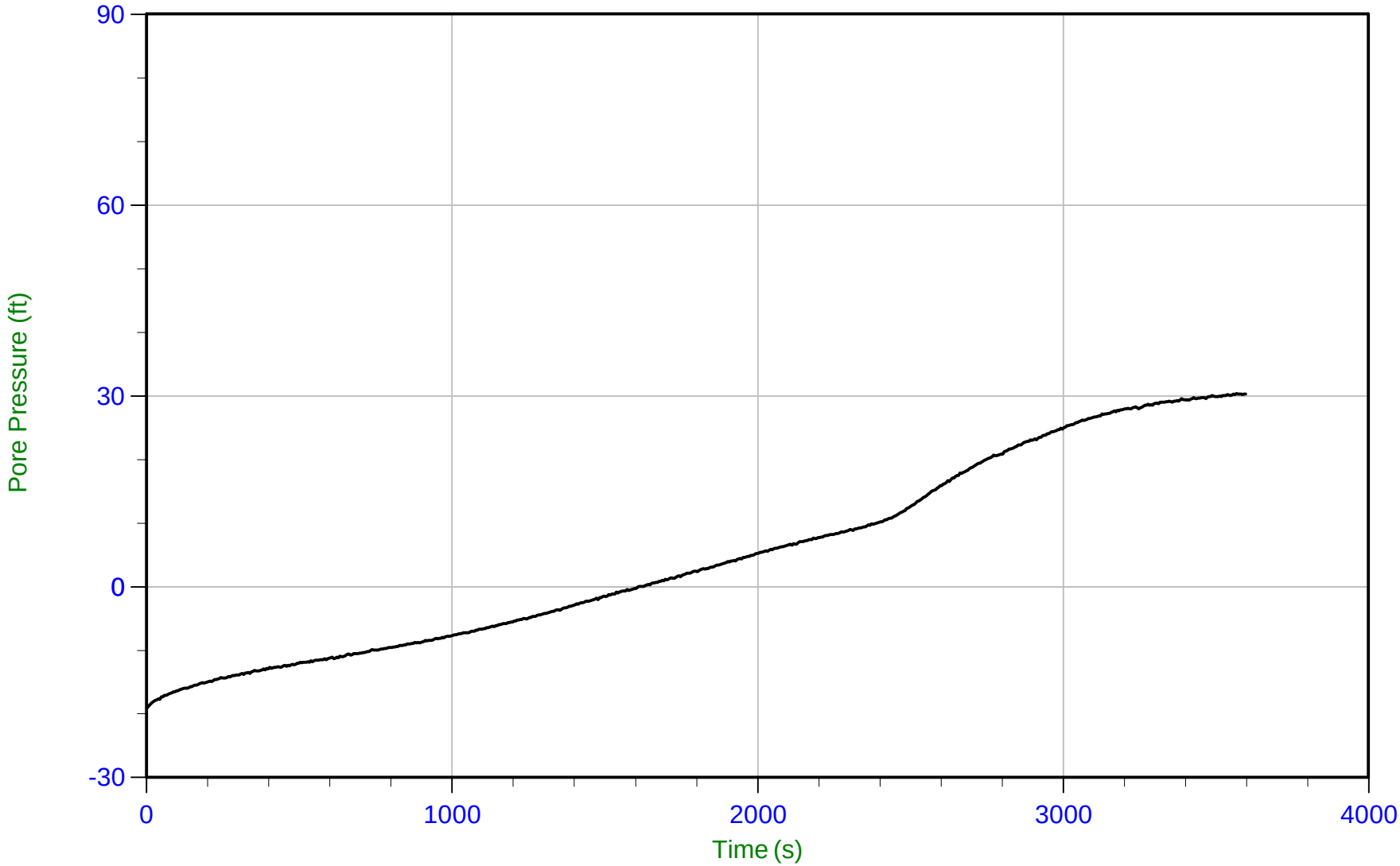
u Min: -8.4 ft
u Max: -2.8 ft
u Final: -8.3 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 08:49
Site: DTE Monroe Power Plant

Sounding: CPT20-110B
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP110B.PPF
Depth: 6.100 m / 20.013 ft
Duration: 3600.0 s

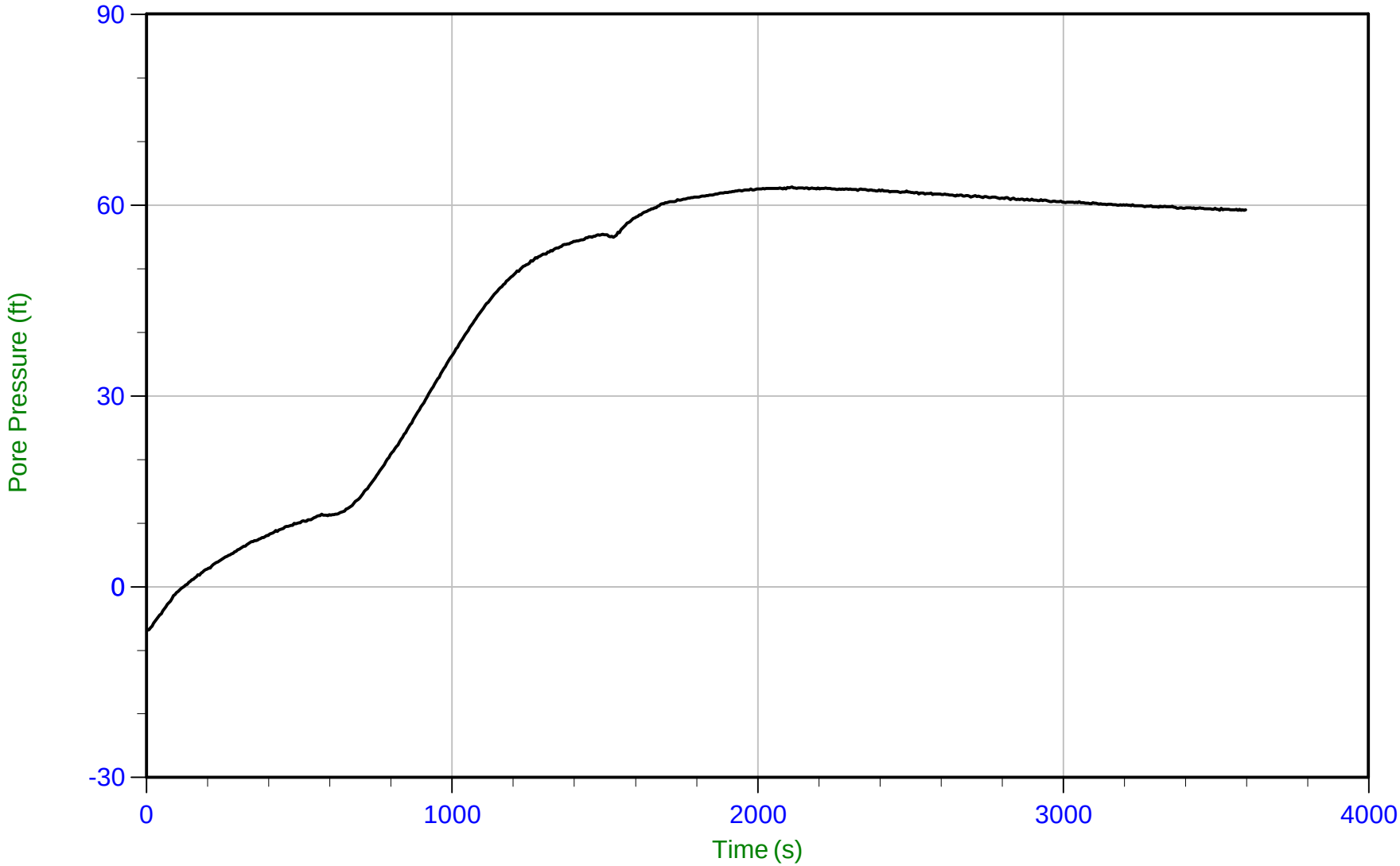
u Min: -19.0 ft
u Max: 30.4 ft
u Final: 30.2 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 08:49
Site: DTE Monroe Power Plant

Sounding: CPT20-110B
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP110B.PPF
Depth: 15.250 m / 50.032 ft
Duration: 3600.0 s

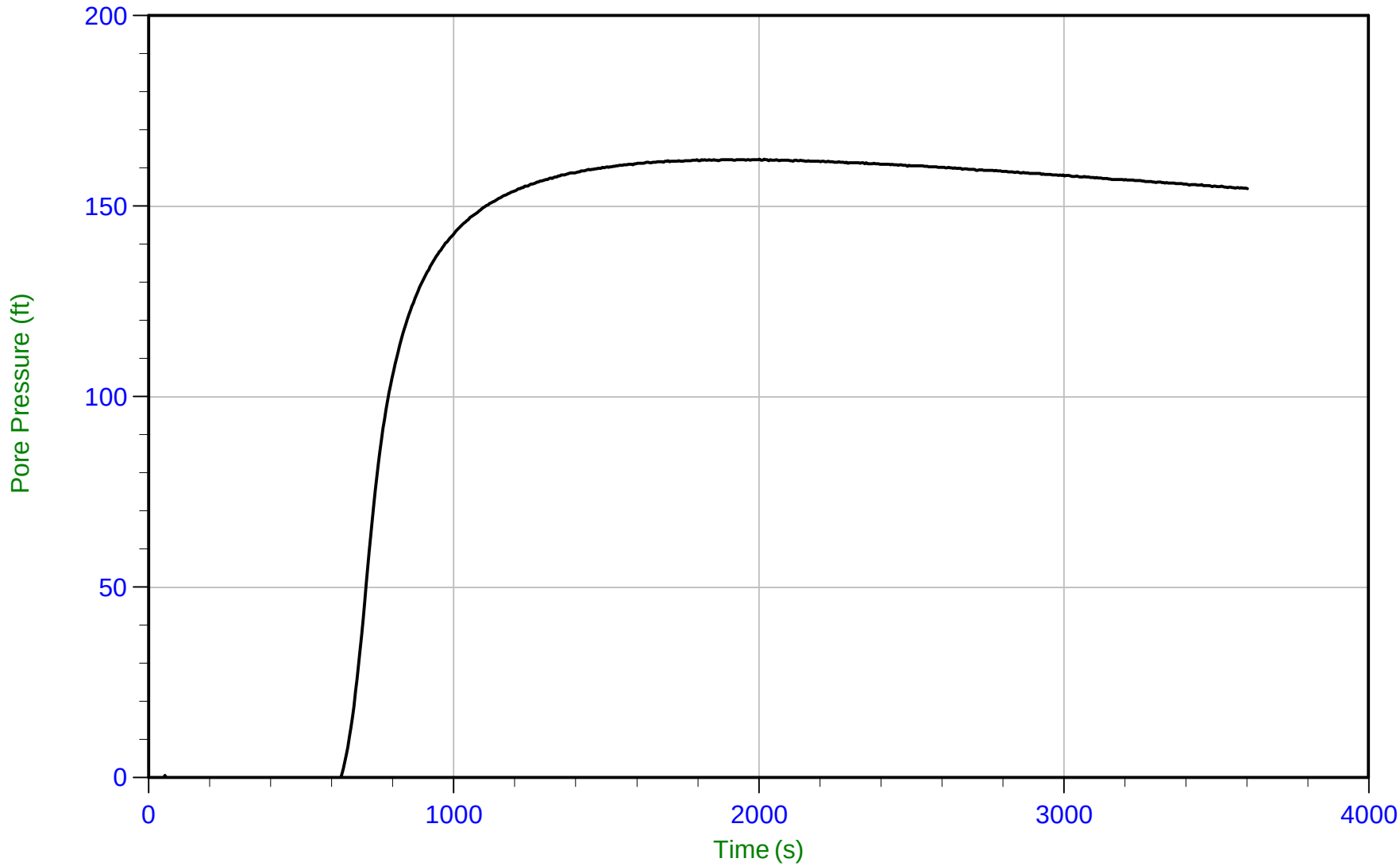
u Min: -6.9 ft
u Max: 62.8 ft
u Final: 59.2 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 08:49
Site: DTE Monroe Power Plant

Sounding: CPT20-110B
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP110B.PPF
Depth: 18.300 m / 60.039 ft
Duration: 3605.0 s

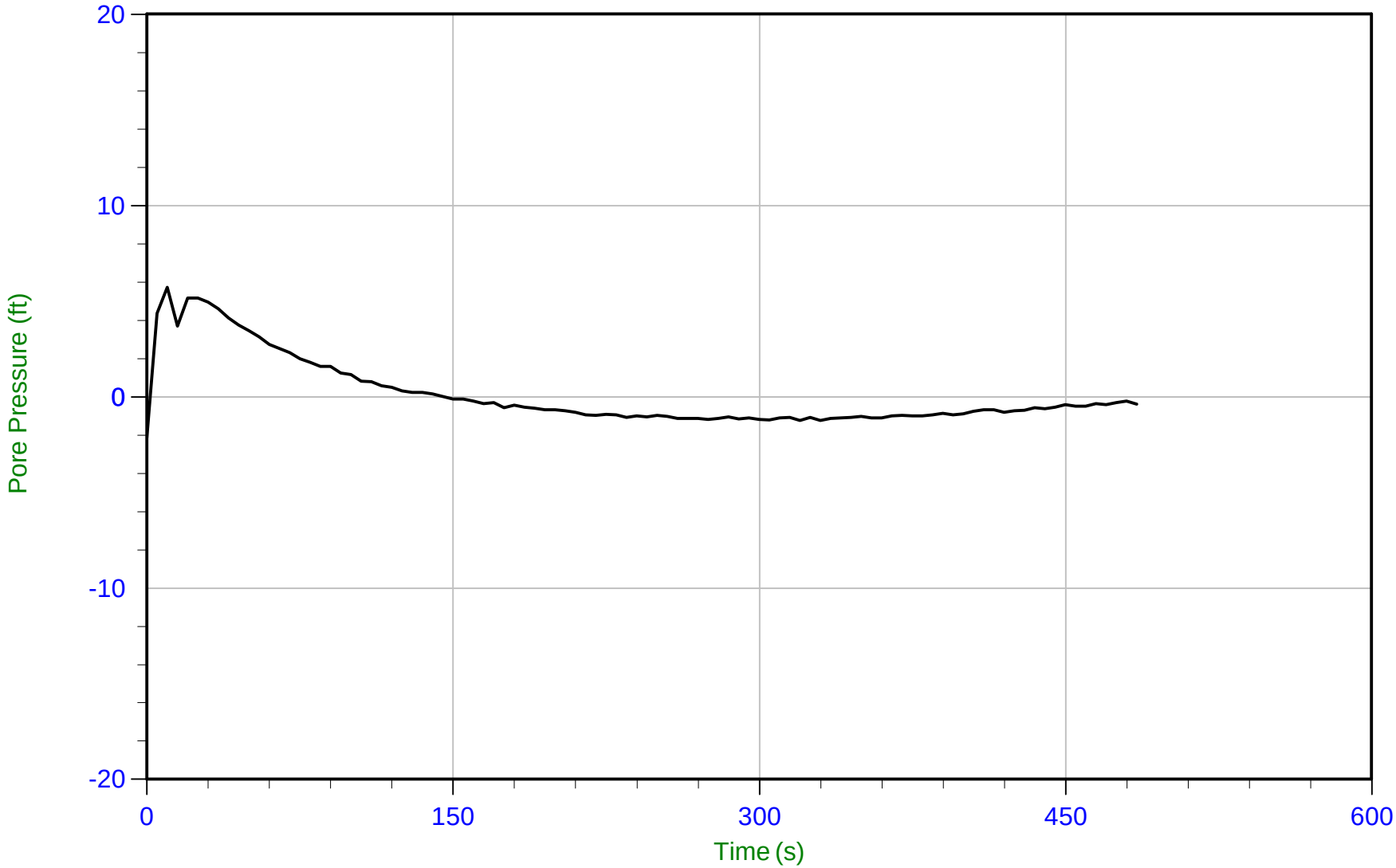
u Min: -10.2 ft
u Max: 162.3 ft
u Final: 154.6 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 08:49
Site: DTE Monroe Power Plant

Sounding: CPT20-110B
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP110B.PPF
Depth: 18.550 m / 60.859 ft
Duration: 485.0 s

u Min: -2.1 ft
u Max: 5.7 ft
u Final: -0.4 ft

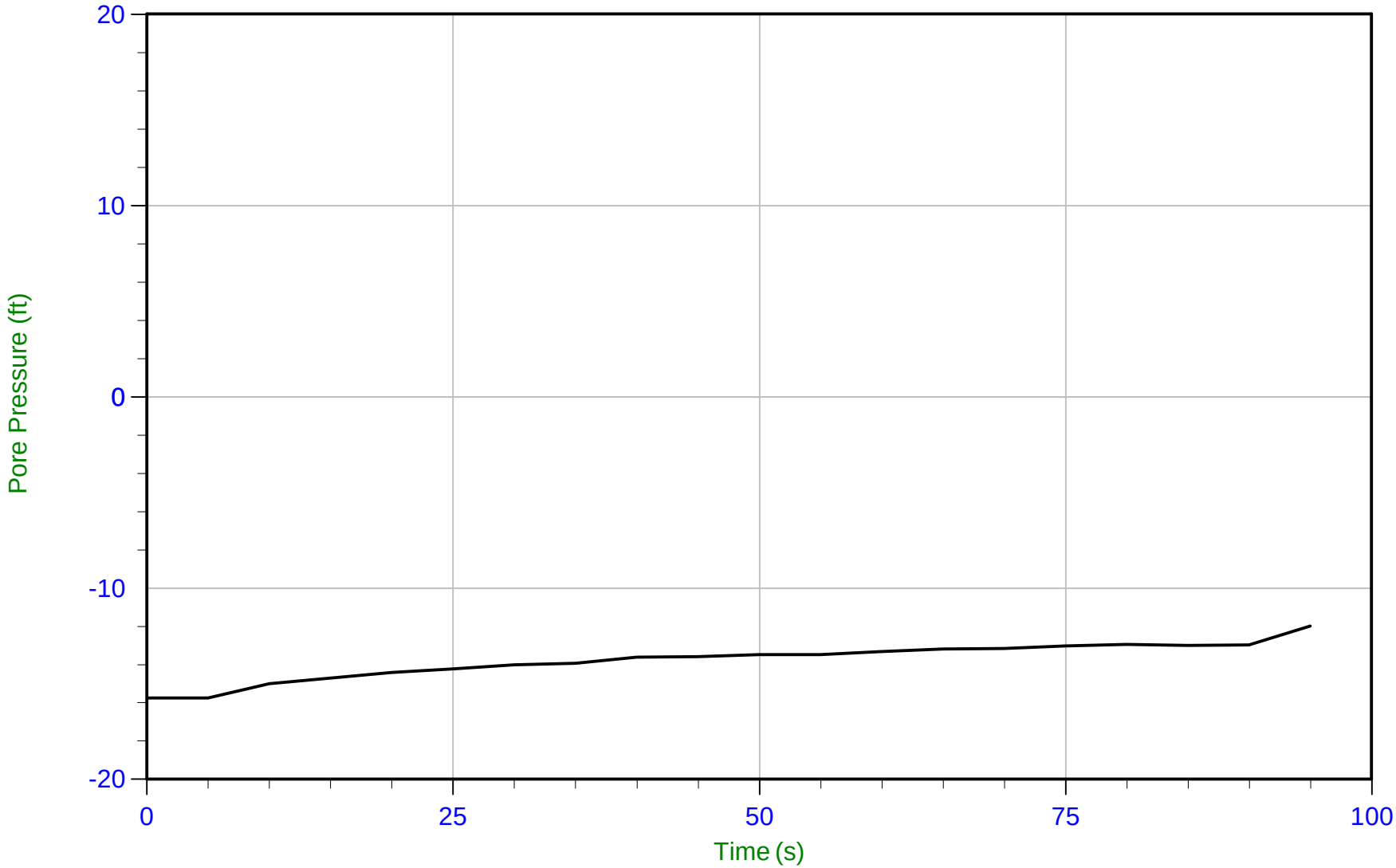
WT: 18.550 m / 60.859 ft
Ueq: 0.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 12:57
Site: DTE Monroe Power Plant

Sounding: CPT20-118
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP118.PPF
Depth: 3.800 m / 12.467 ft
Duration: 95.0 s

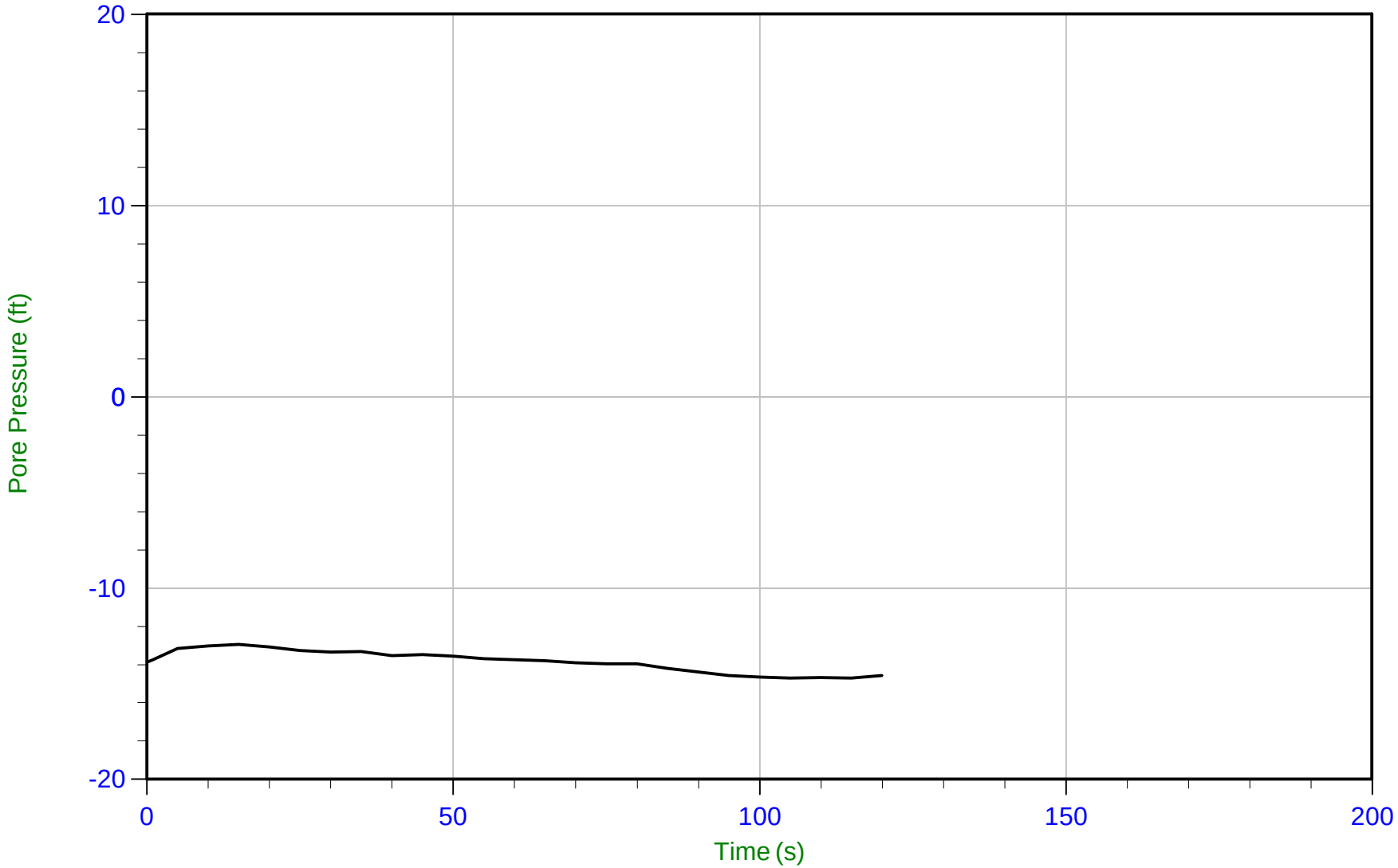
u Min: -15.7 ft
u Max: -12.0 ft
u Final: -12.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 08:58
Site: DTE Monroe Power Plant

Sounding: CPT20-124
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP124.PPF
Depth: 7.700 m / 25.262 ft
Duration: 120.0 s

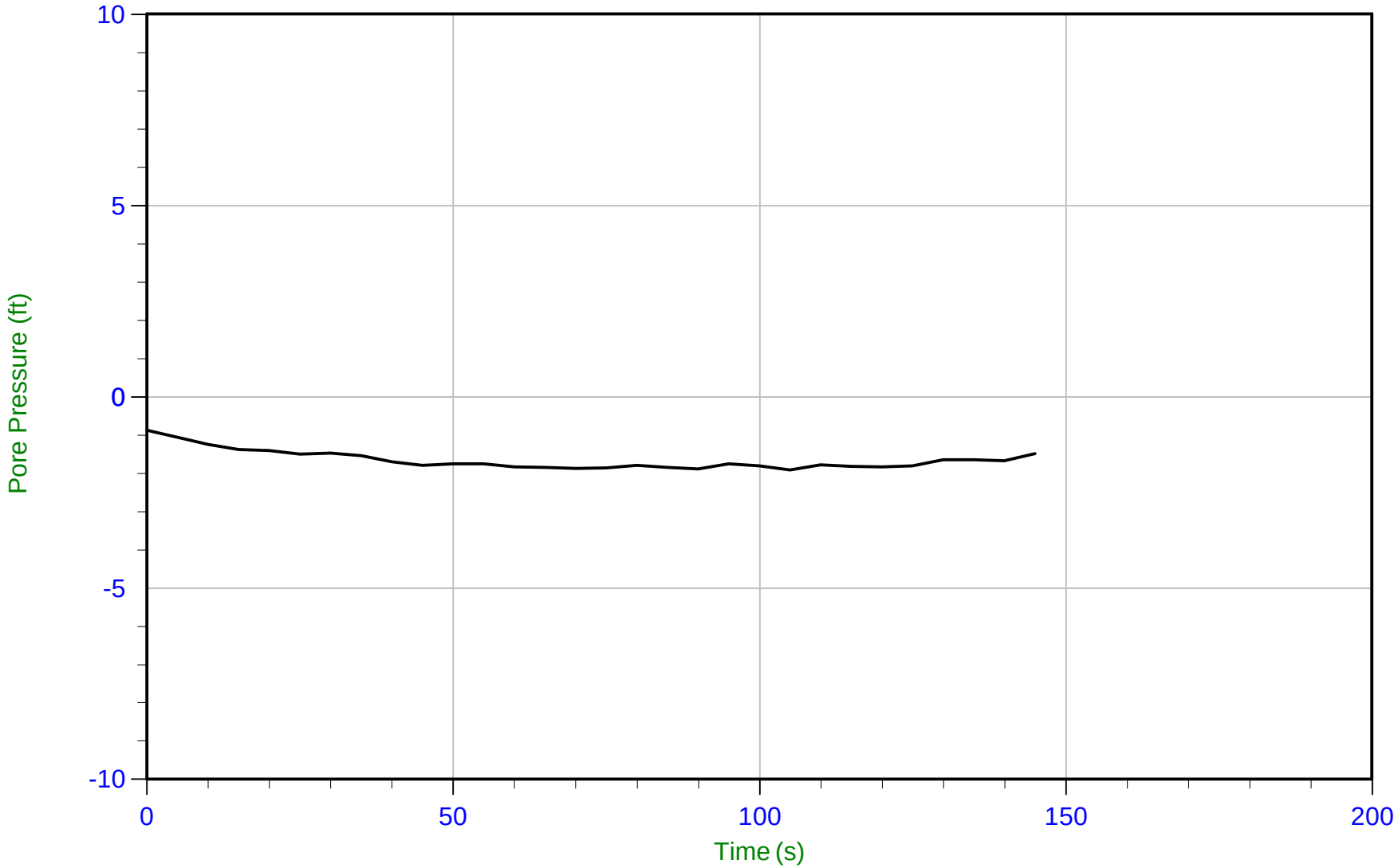
u Min: -14.7 ft
u Max: -13.0 ft
u Final: -14.6 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 11:17
Site: DTE Monroe Power Plant

Sounding: CPT20-128
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP128.PPF
Depth: 11.750 m / 38.549 ft
Duration: 145.0 s

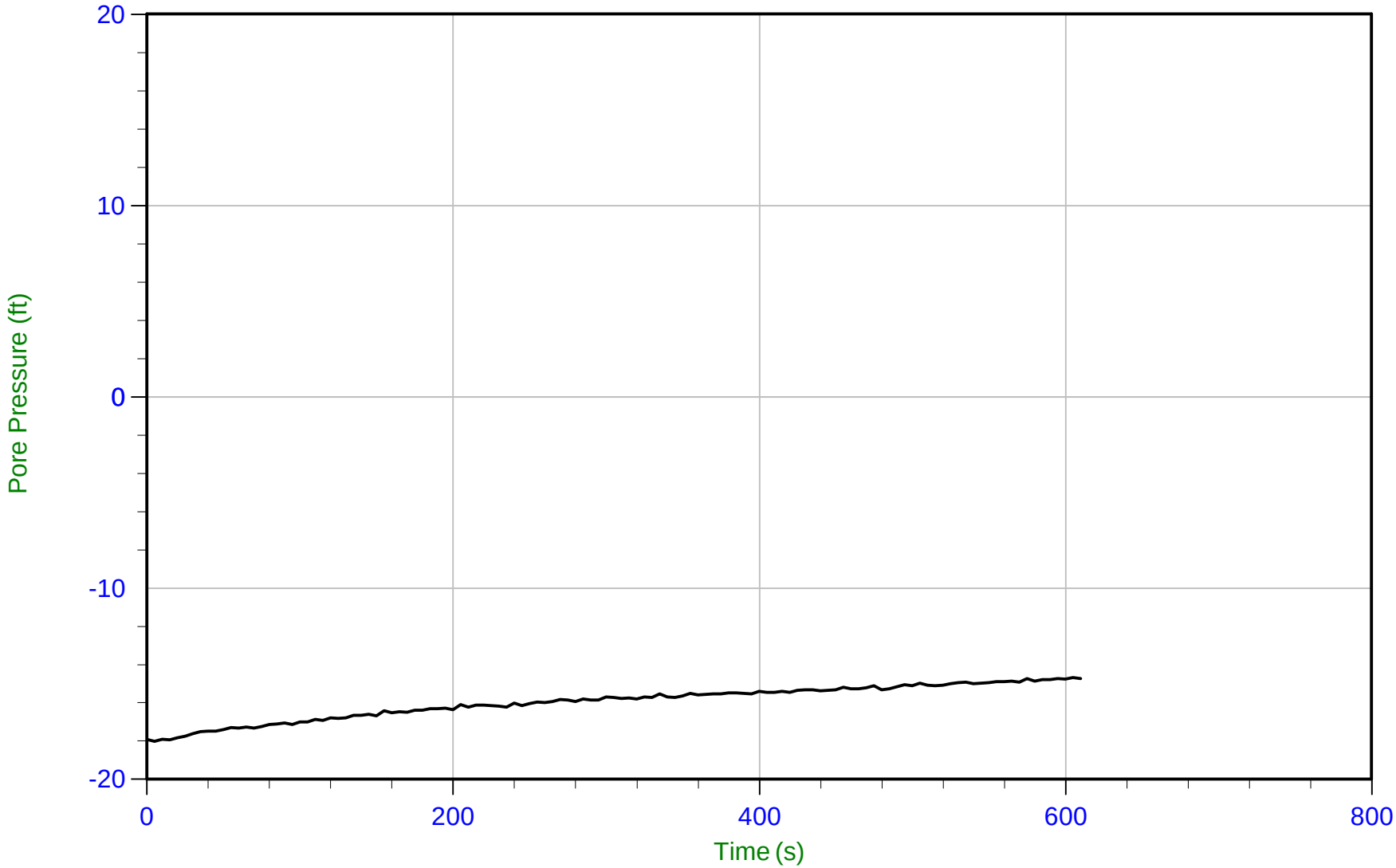
u Min: -1.9 ft
u Max: -0.9 ft
u Final: -1.5 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 12:06
Site: DTE Monroe Power Plant

Sounding: CPT20-130
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP130.PPF
Depth: 4.600 m / 15.092 ft
Duration: 610.0 s

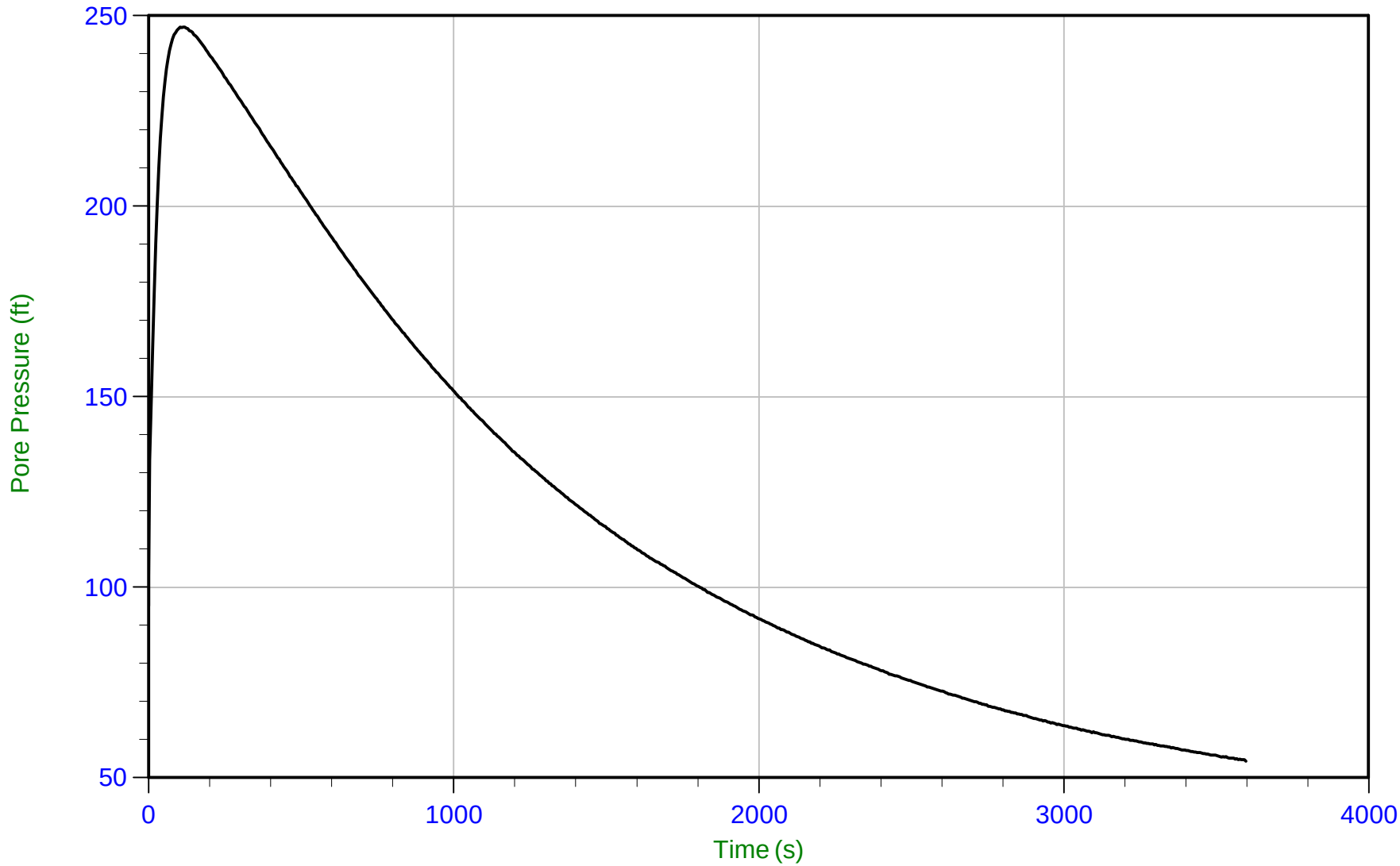
u Min: -18.0 ft
u Max: -14.7 ft
u Final: -14.7 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 12:06
Site: DTE Monroe Power Plant

Sounding: CPT20-130
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP130.PPF
Depth: 15.250 m / 50.032 ft
Duration: 3600.0 s

u Min: 54.4 ft
u Max: 247.0 ft
u Final: 54.4 ft

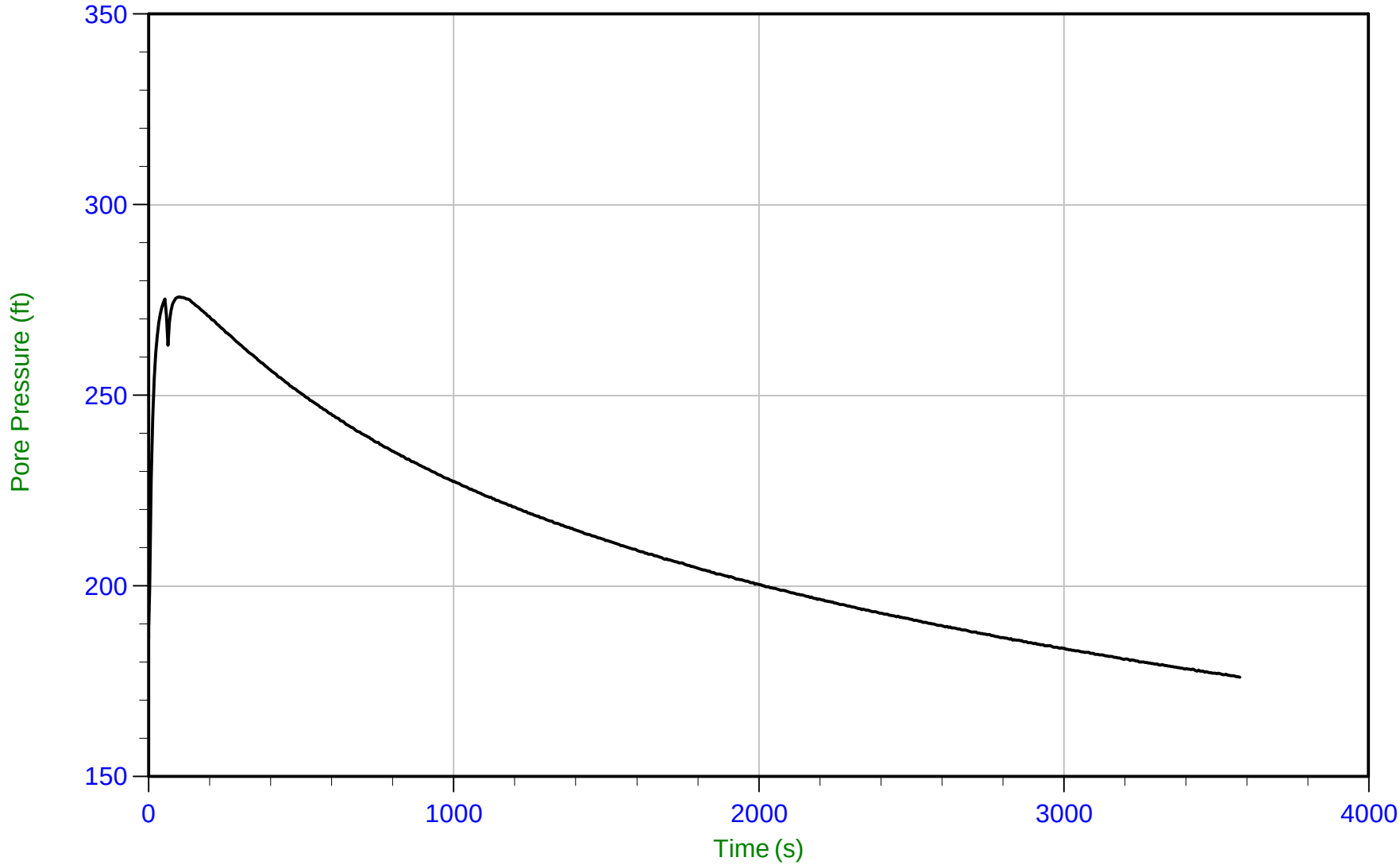
WT: 7.620 m / 25.000 ft
Ueq: 25.0 ft
U(50): 136.01 ft

T(50): 1077.0 s
Ir: 100
Ch: 0.7 cm²/min

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 12:06
Site: DTE Monroe Power Plant

Sounding: CPT20-130
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP130.PPF
Depth: 18.300 m / 60.039 ft
Duration: 3580.0 s

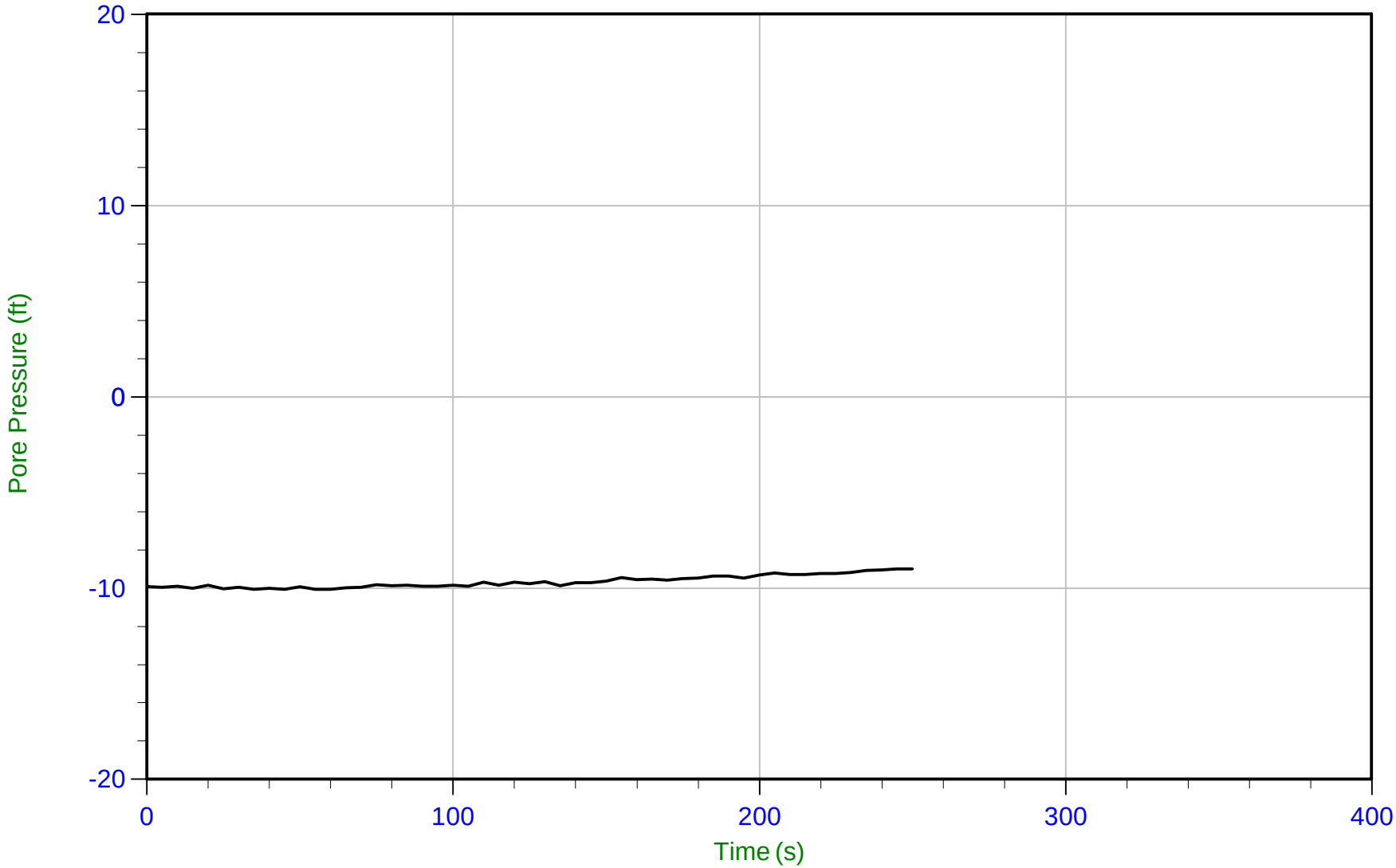
u Min: 176.1 ft
u Max: 275.8 ft
u Final: 176.1 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 15:16
Site: DTE Monroe Power Plant

Sounding: CPT20-132
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP132.PPF
Depth: 10.800 m / 35.433 ft
Duration: 250.0 s

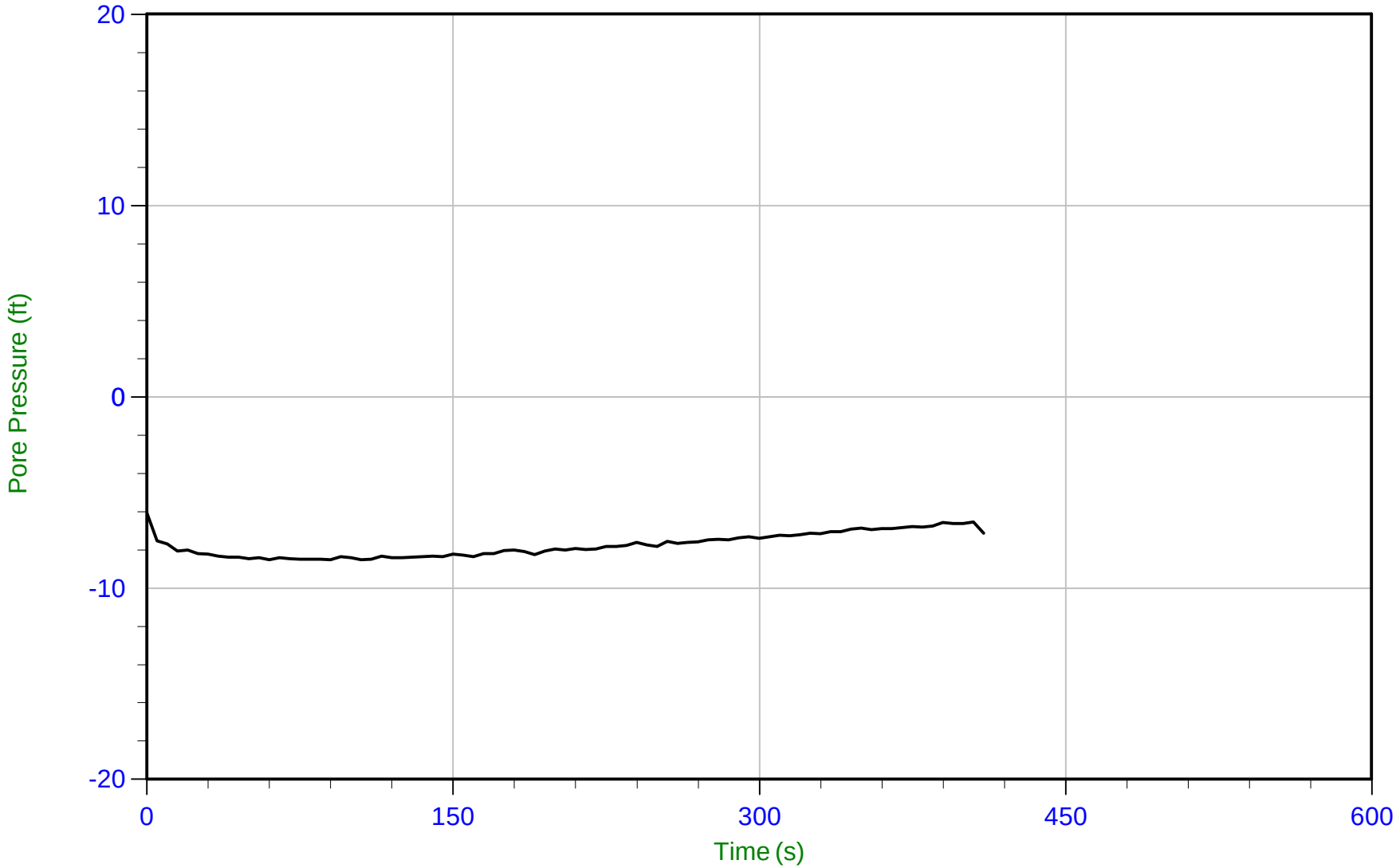
u Min: -10.1 ft
u Max: -9.0 ft
u Final: -9.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 15:16
Site: DTE Monroe Power Plant

Sounding: CPT20-132
Cone: 513:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP132.PPF
Depth: 13.800 m / 45.275 ft
Duration: 410.0 s

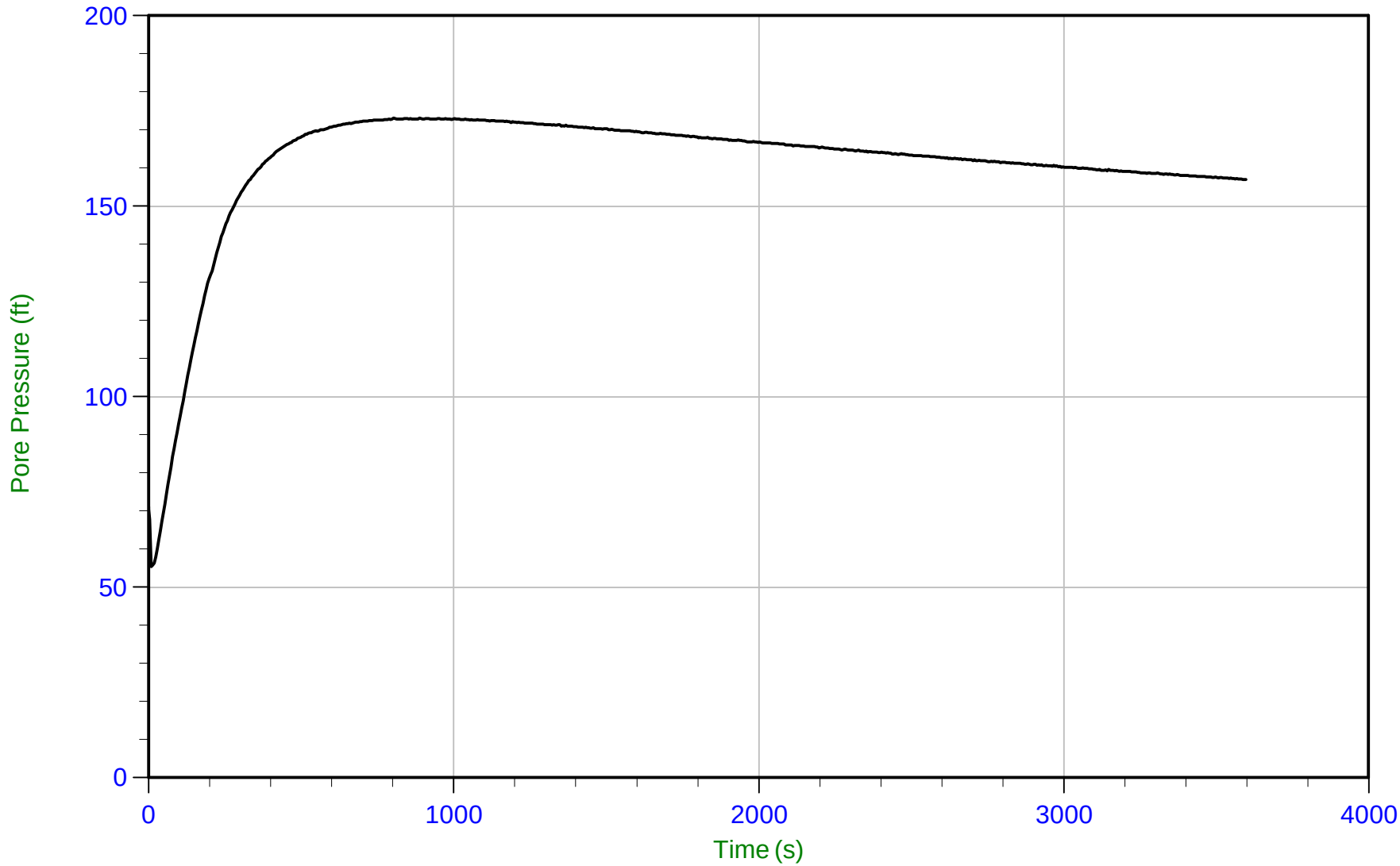
u Min: -8.5 ft
u Max: -6.1 ft
u Final: -7.1 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/14/2020 14:09
Site: DTE Monroe Power Plant

Sounding: CPT20-134
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP134.PPF
Depth: 20.400 m / 66.928 ft
Duration: 3600.0 s

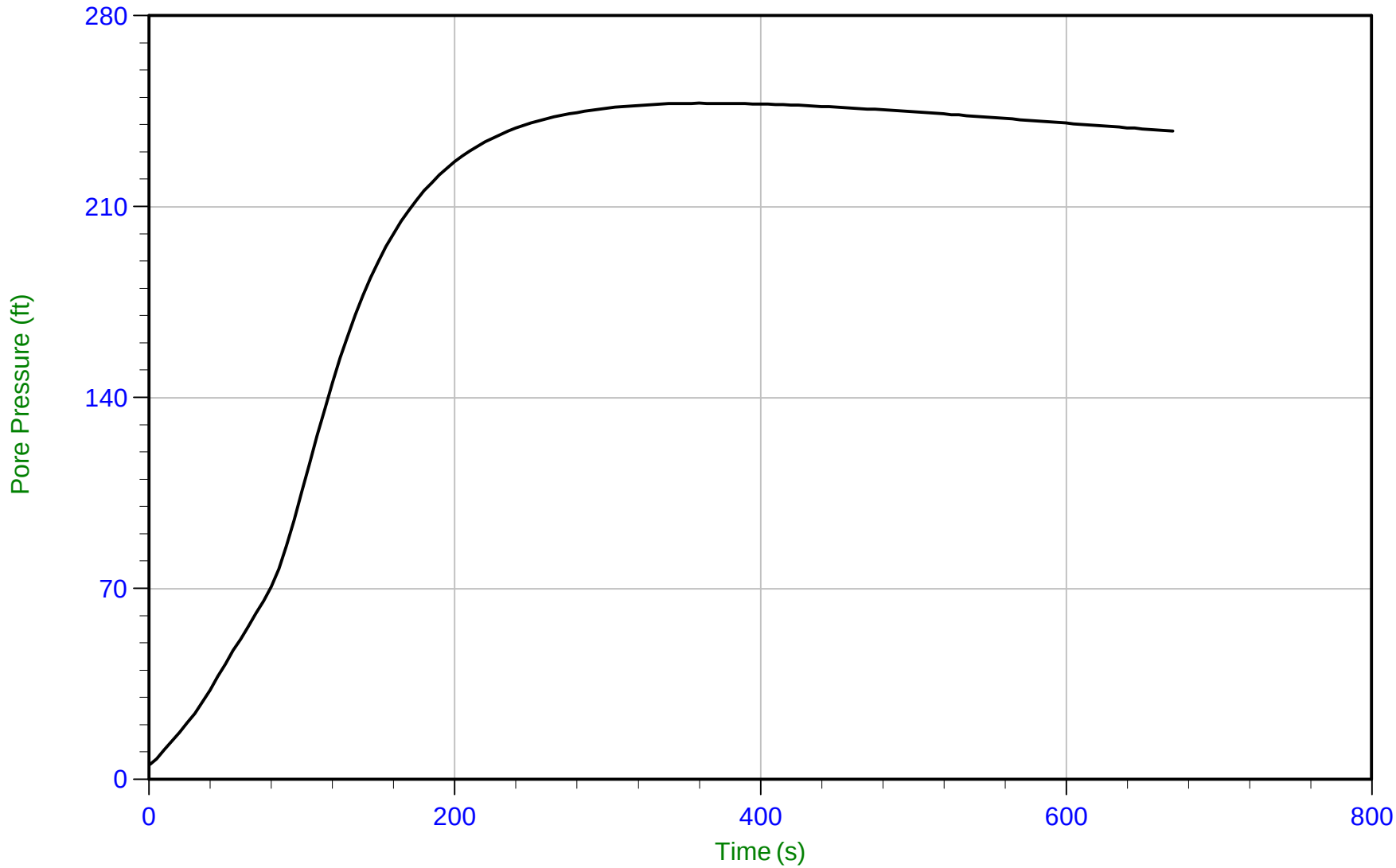
u Min: 55.5 ft
u Max: 173.2 ft
u Final: 157.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/14/2020 13:01
Site: DTE Monroe Power Plant

Sounding: CPT20-136
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP136.PPF
Depth: 19.900 m / 65.288 ft
Duration: 670.0 s

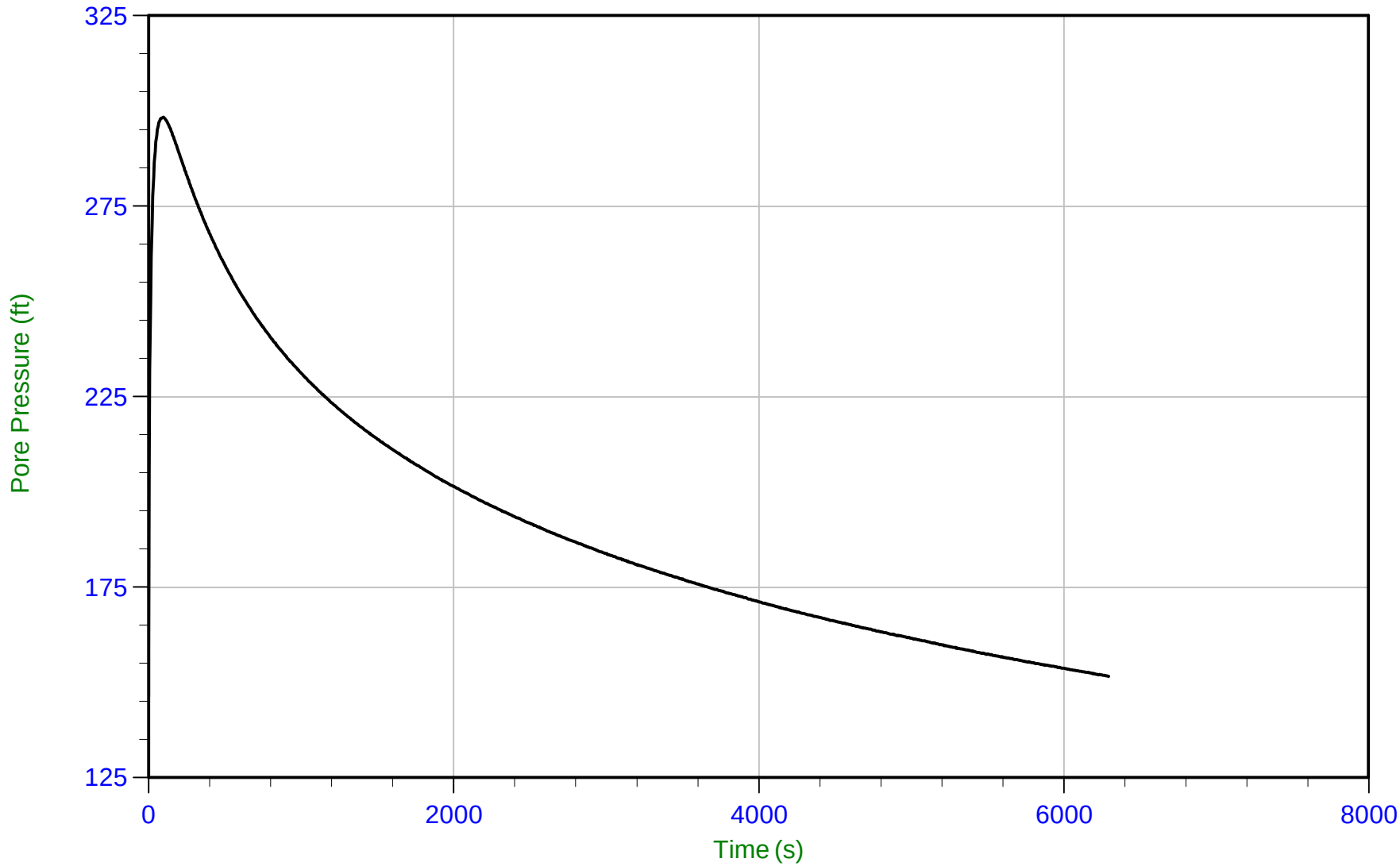
u Min: 5.3 ft
u Max: 247.9 ft
u Final: 237.6 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/14/2020 13:01
Site: DTE Monroe Power Plant

Sounding: CPT20-136
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP136.PPF
Depth: 20.075 m / 65.862 ft
Duration: 6300.0 s

u Min: 146.3 ft
u Max: 298.3 ft
u Final: 151.6 ft

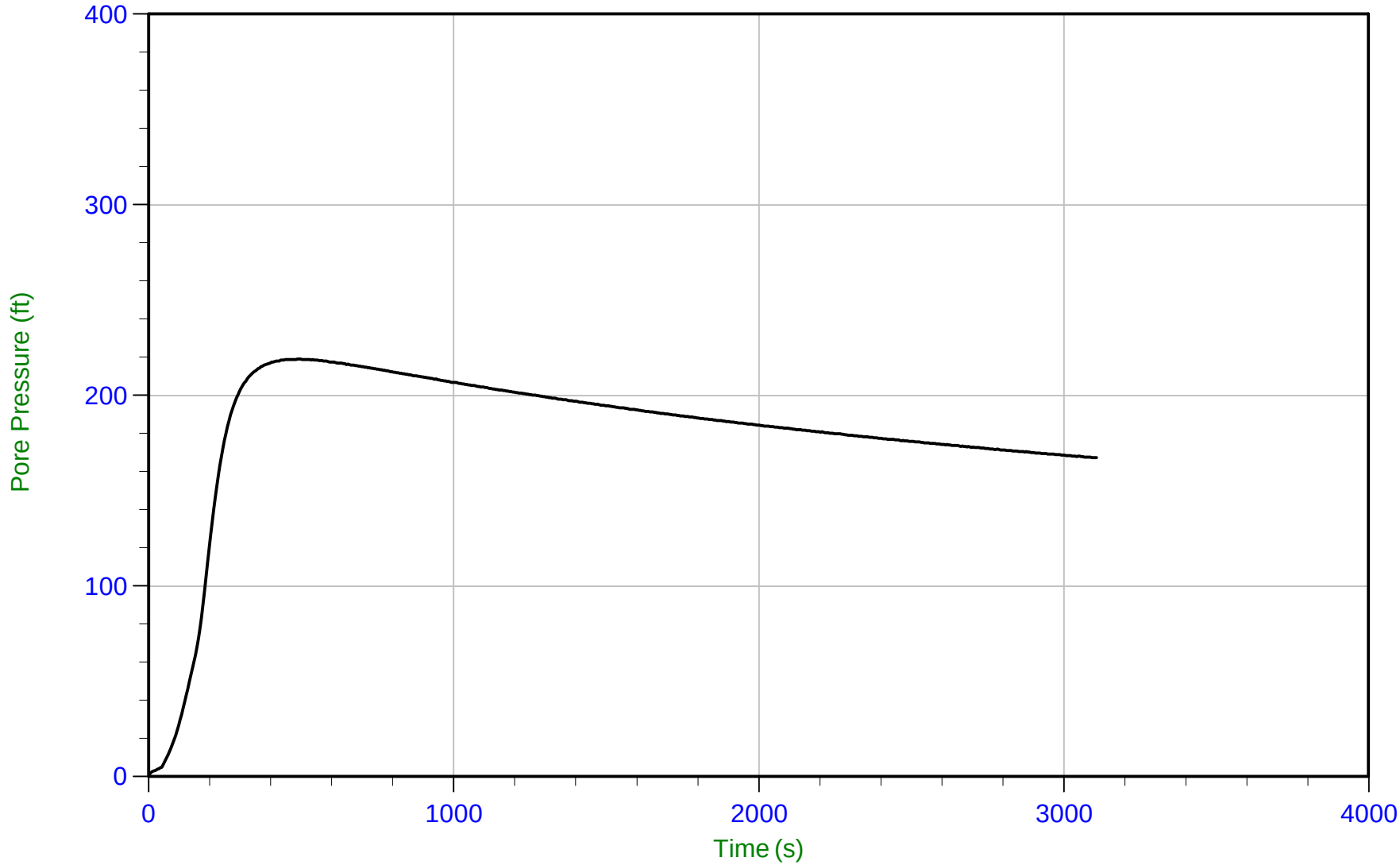
WT: 7.620 m / 25.000 ft
Ueq: 40.9 ft
U(50): 169.60 ft

T(50): 4047.9 s
Ir: 100
Ch: 0.2 cm²/min

Geosyntec

Job No: 20-61-21655
Date: 12/13/2020 14:56
Site: DTE Monroe Power Plant

Sounding: CPT20-140
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP140.PPF
Depth: 17.425 m / 57.168 ft
Duration: 3110.0 s

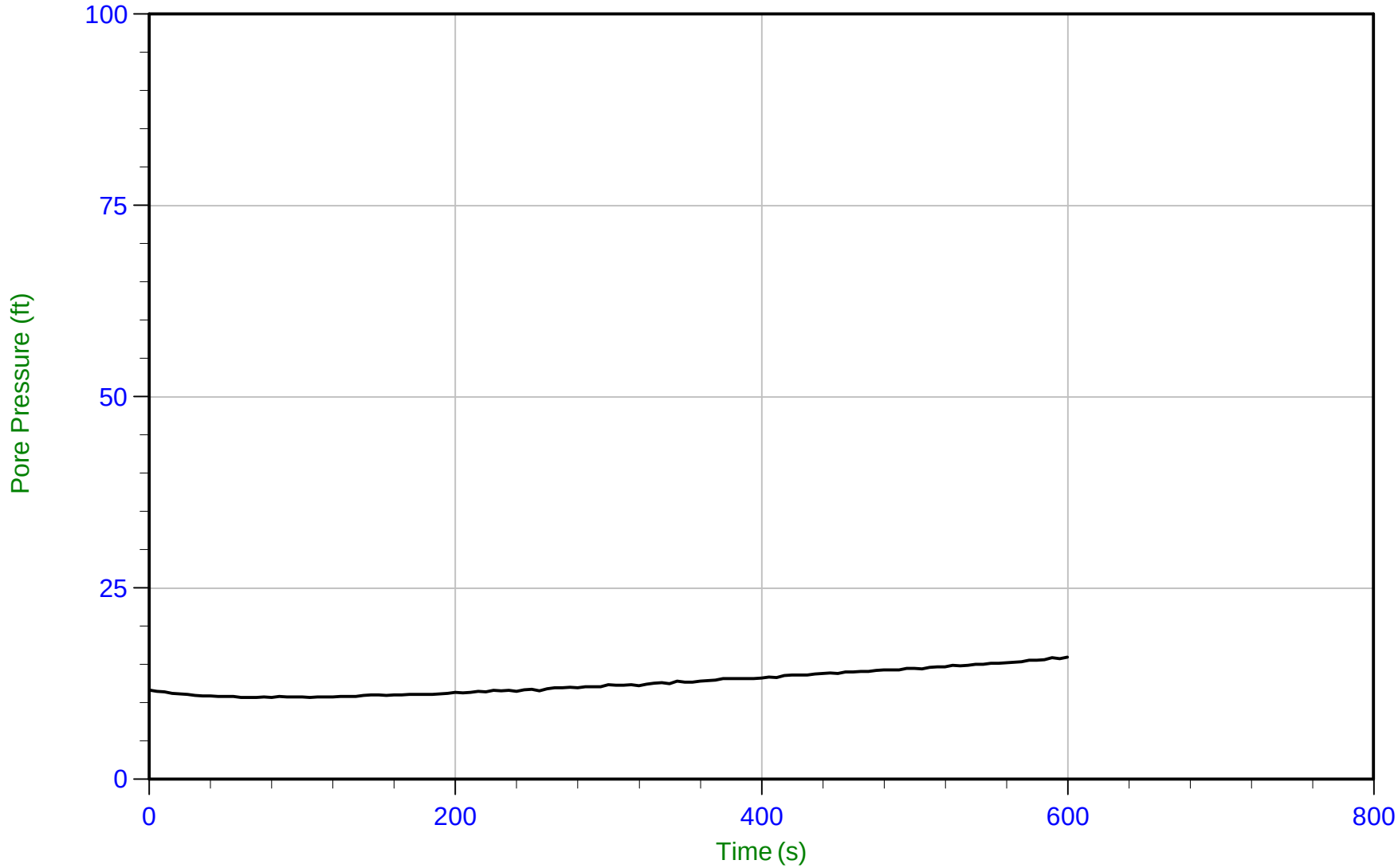
u Min: 1.2 ft
u Max: 219.1 ft
u Final: 167.3 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/14/2020 08:55
Site: DTE Monroe Power Plant

Sounding: CPT20-150
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP150.PPF
Depth: 12.200 m / 40.026 ft
Duration: 600.0 s

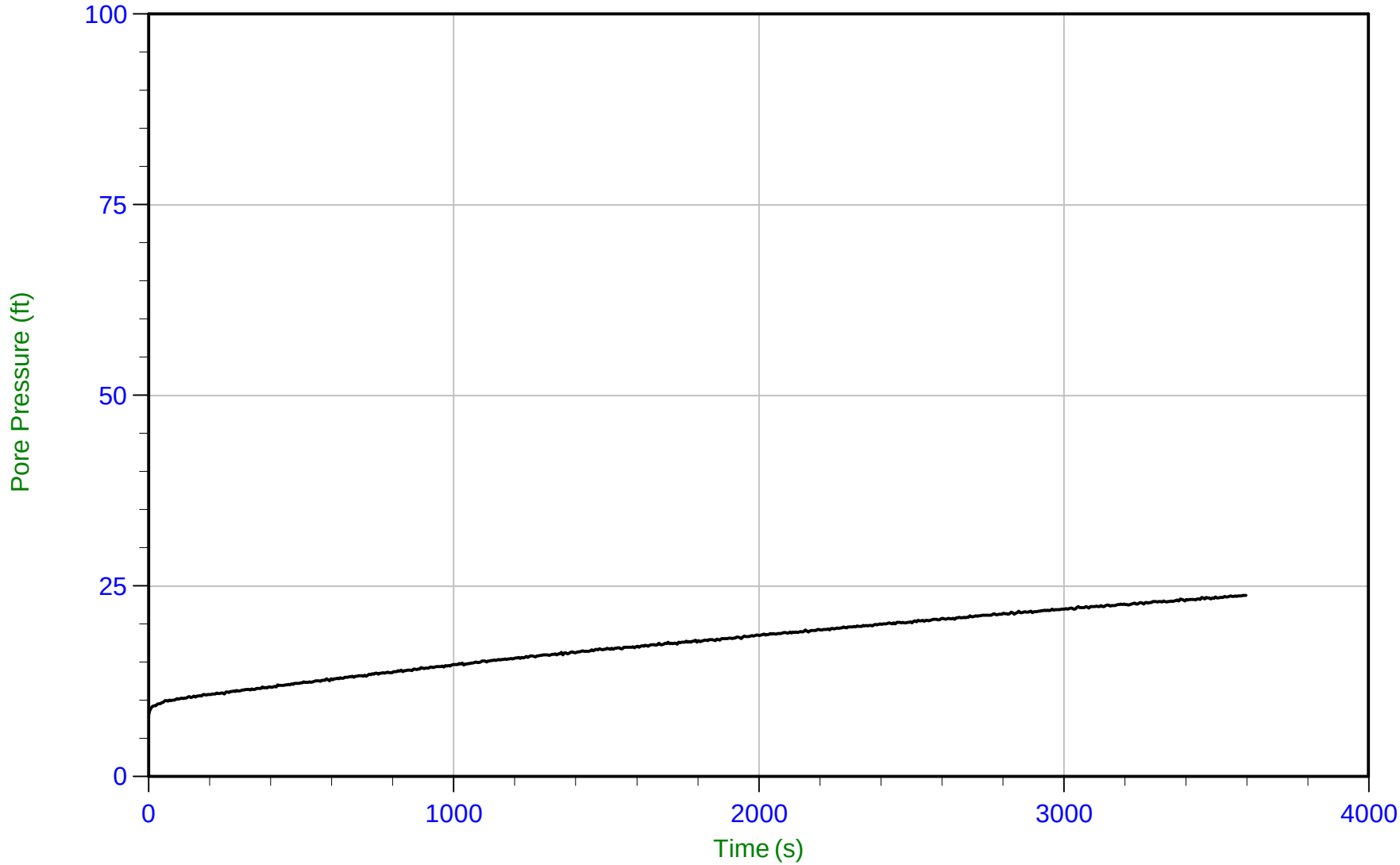
u Min: 10.7 ft
u Max: 16.0 ft
u Final: 16.0 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/14/2020 08:55
Site: DTE Monroe Power Plant

Sounding: CPT20-150
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP150.PPF
Depth: 13.800 m / 45.275 ft
Duration: 3600.0 s

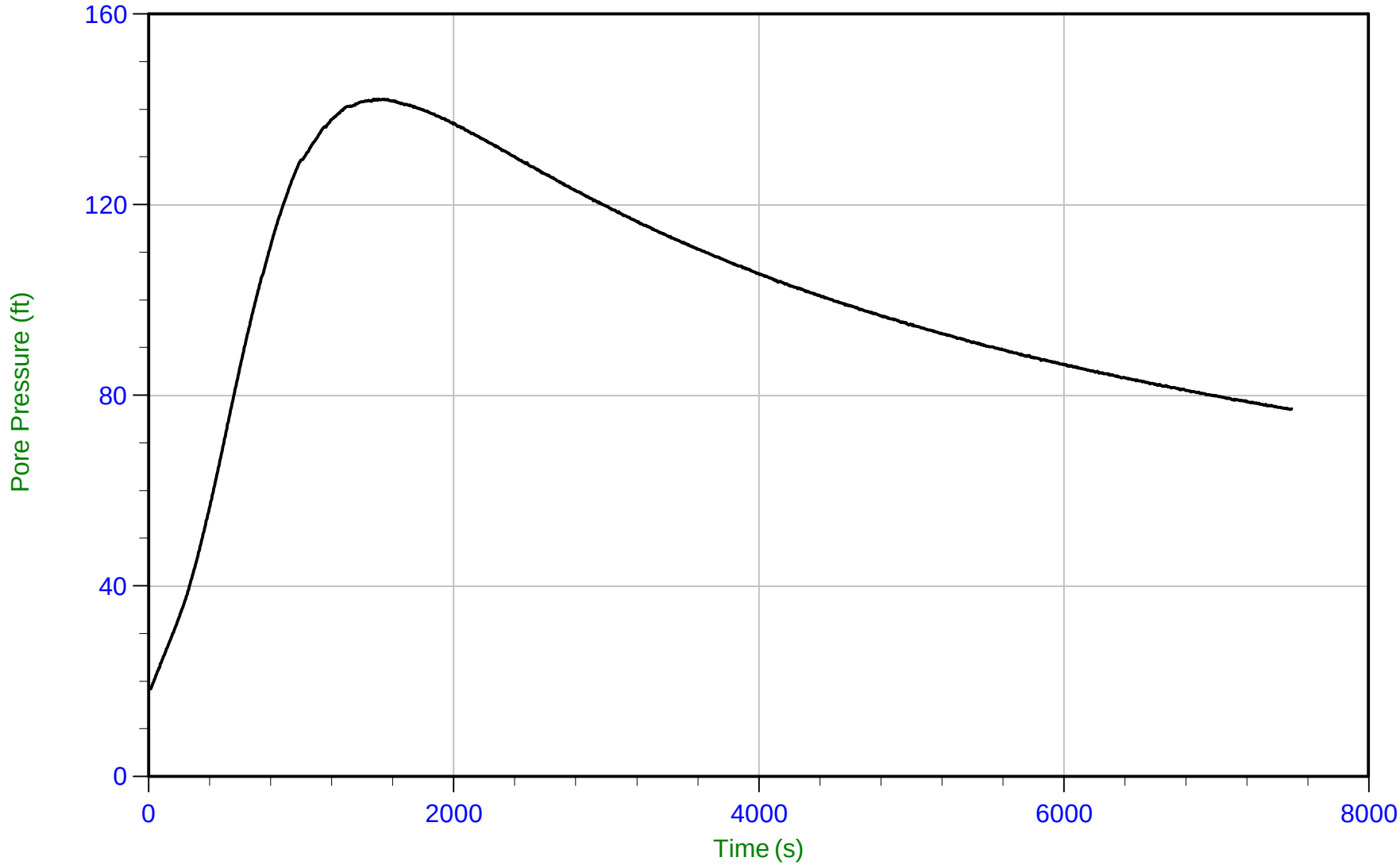
u Min: 8.0 ft
u Max: 23.8 ft
u Final: 23.8 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/14/2020 08:55
Site: DTE Monroe Power Plant

Sounding: CPT20-150
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP150.PPF
Depth: 16.800 m / 55.117 ft
Duration: 7500.0 s

u Min: 18.3 ft
u Max: 142.1 ft
u Final: 77.2 ft

WT: 7.620 m / 25.000 ft
Ueq: 30.1 ft
U(50): 86.13 ft

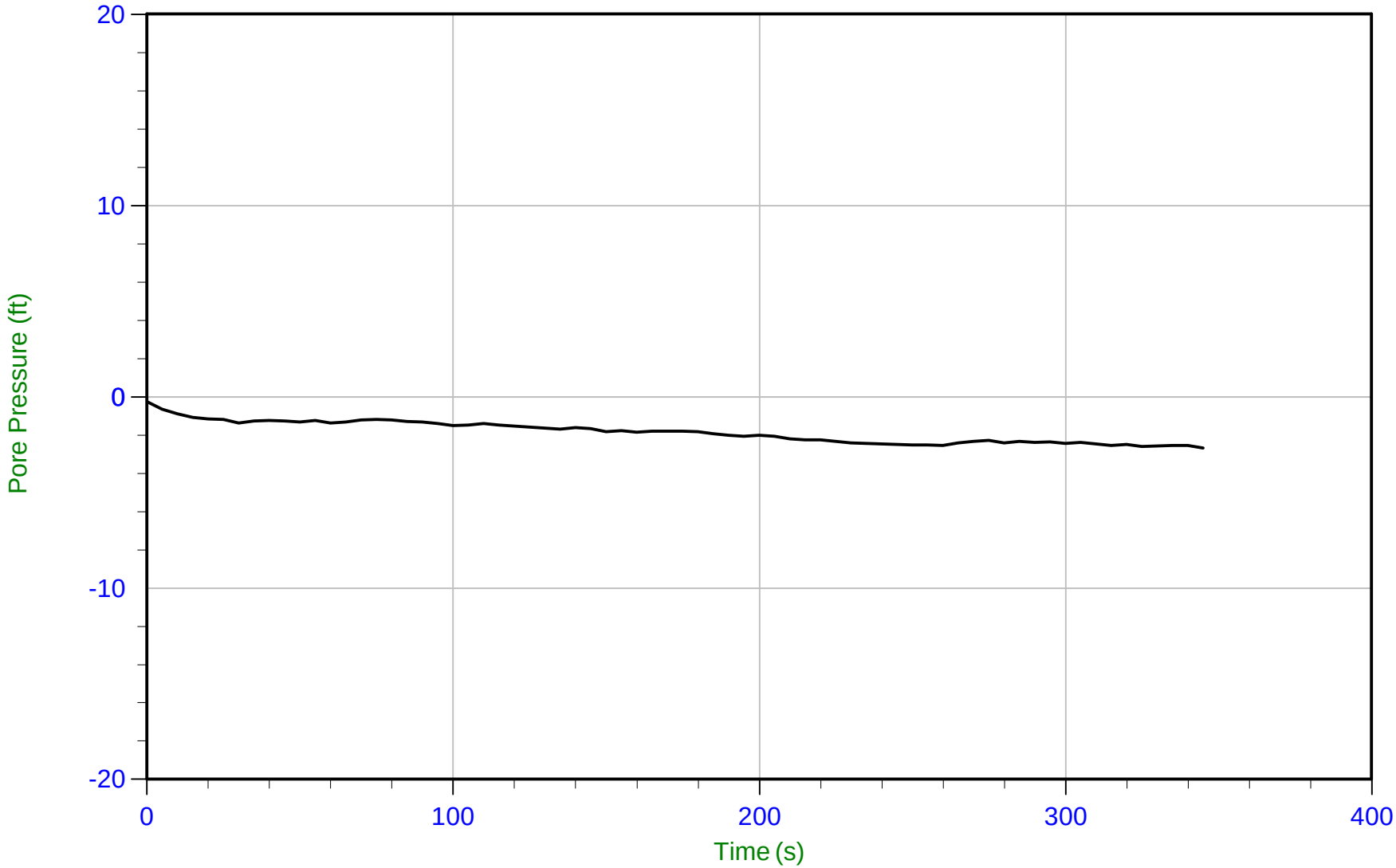
T(50): 4529.6 s
Ir: 100
Ch: 0.2 cm²/min

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/14/2020 08:55
Site: DTE Monroe Power Plant

Sounding: CPT20-150
Cone: 568:T1500F15U500 Area=15 cm²



Trace Summary:

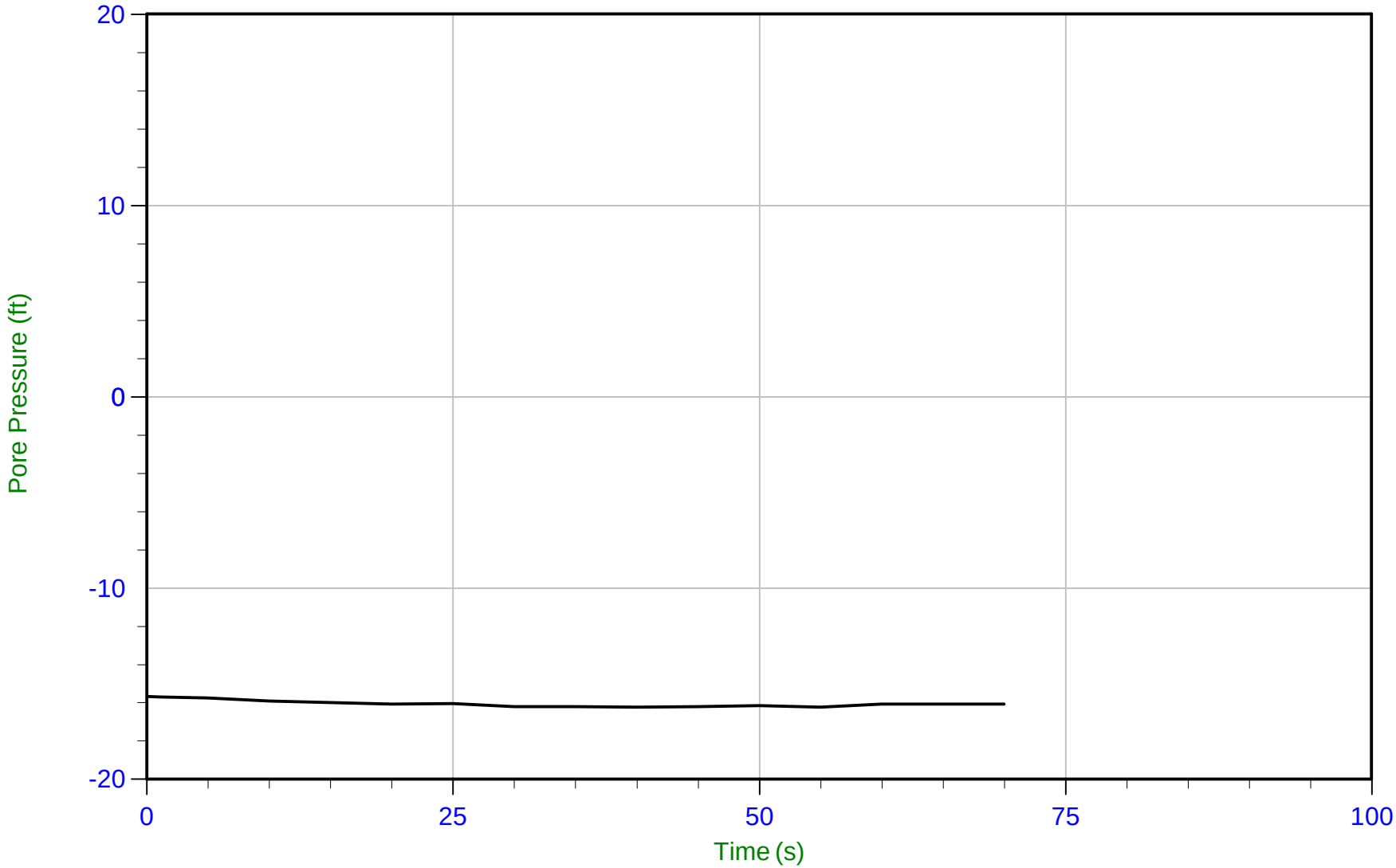
Filename: 20-61-21655_CP150.PPF
Depth: 20.100 m / 65.944 ft
Duration: 345.0 s

u Min: -2.7 ft
u Max: -0.3 ft
u Final: -2.7 ft

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 14:54
Site: DTE Monroe Power Plant

Sounding: CPT20-152
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

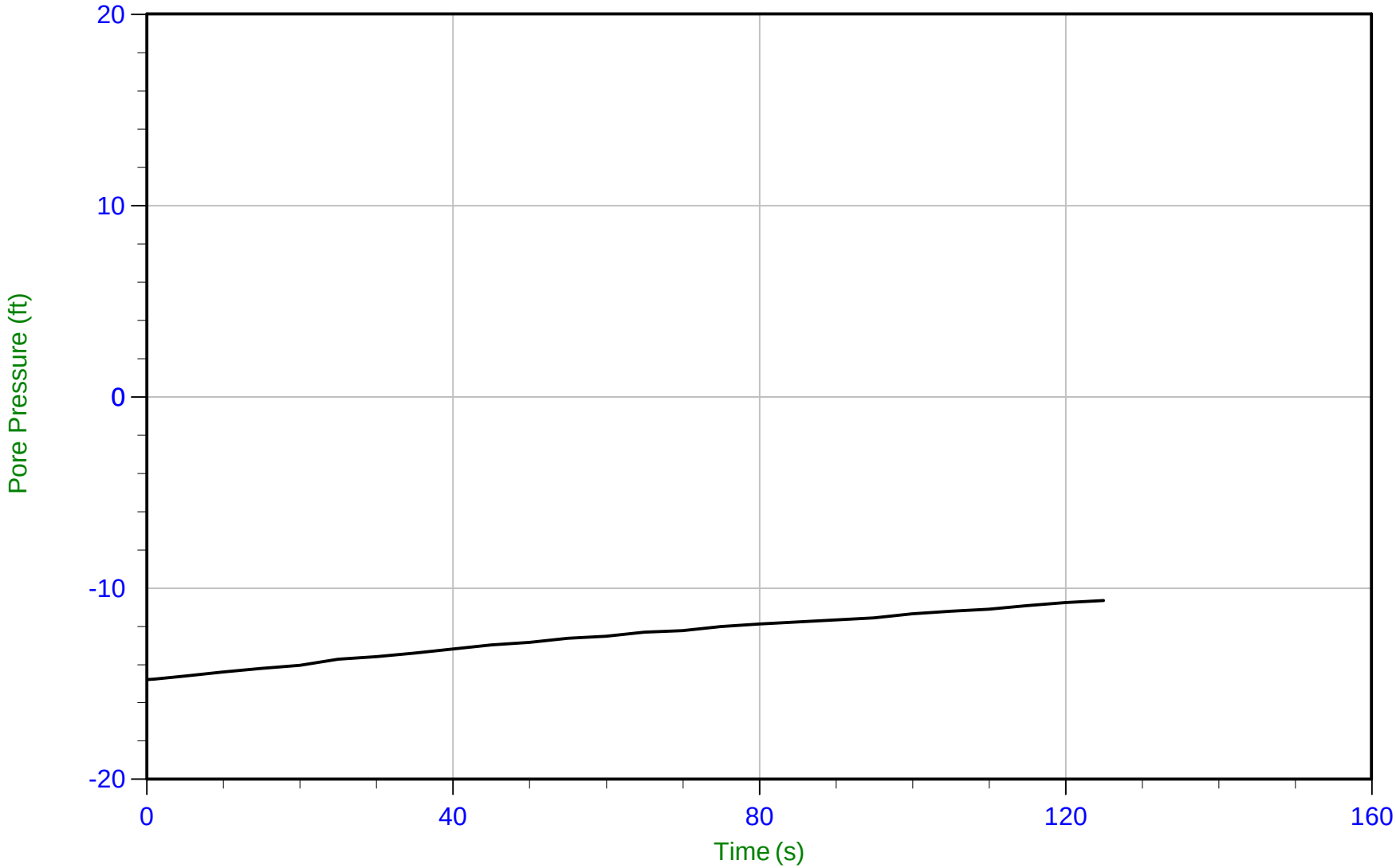
Filename: 20-61-21655_CP152.PPF
Depth: 8.850 m / 29.035 ft
Duration: 70.0 s

u Min: -16.2 ft
u Max: -15.7 ft
u Final: -16.1 ft

Geosyntec

Job No: 20-61-21655
Date: 12/08/2020 14:08
Site: DTE Monroe Power Plant

Sounding: CPT20-154
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP154.PPF
Depth: 6.850 m / 22.473 ft
Duration: 125.0 s

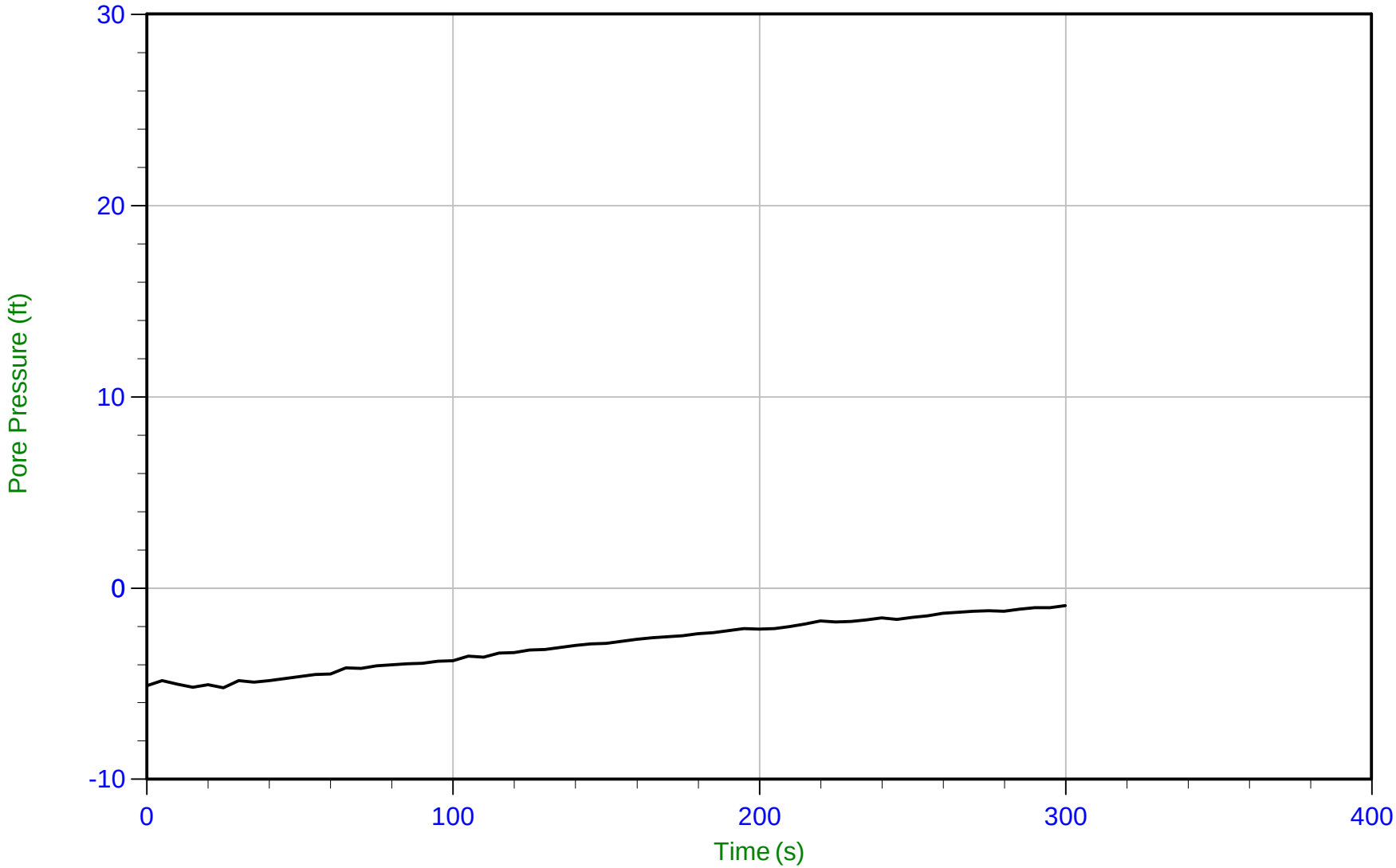
u Min: -14.8 ft
u Max: -10.6 ft
u Final: -10.6 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 13:59
Site: DTE Monroe Power Plant

Sounding: CPT20-170
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP170.PPF
Depth: 3.100 m / 10.170 ft
Duration: 300.0 s

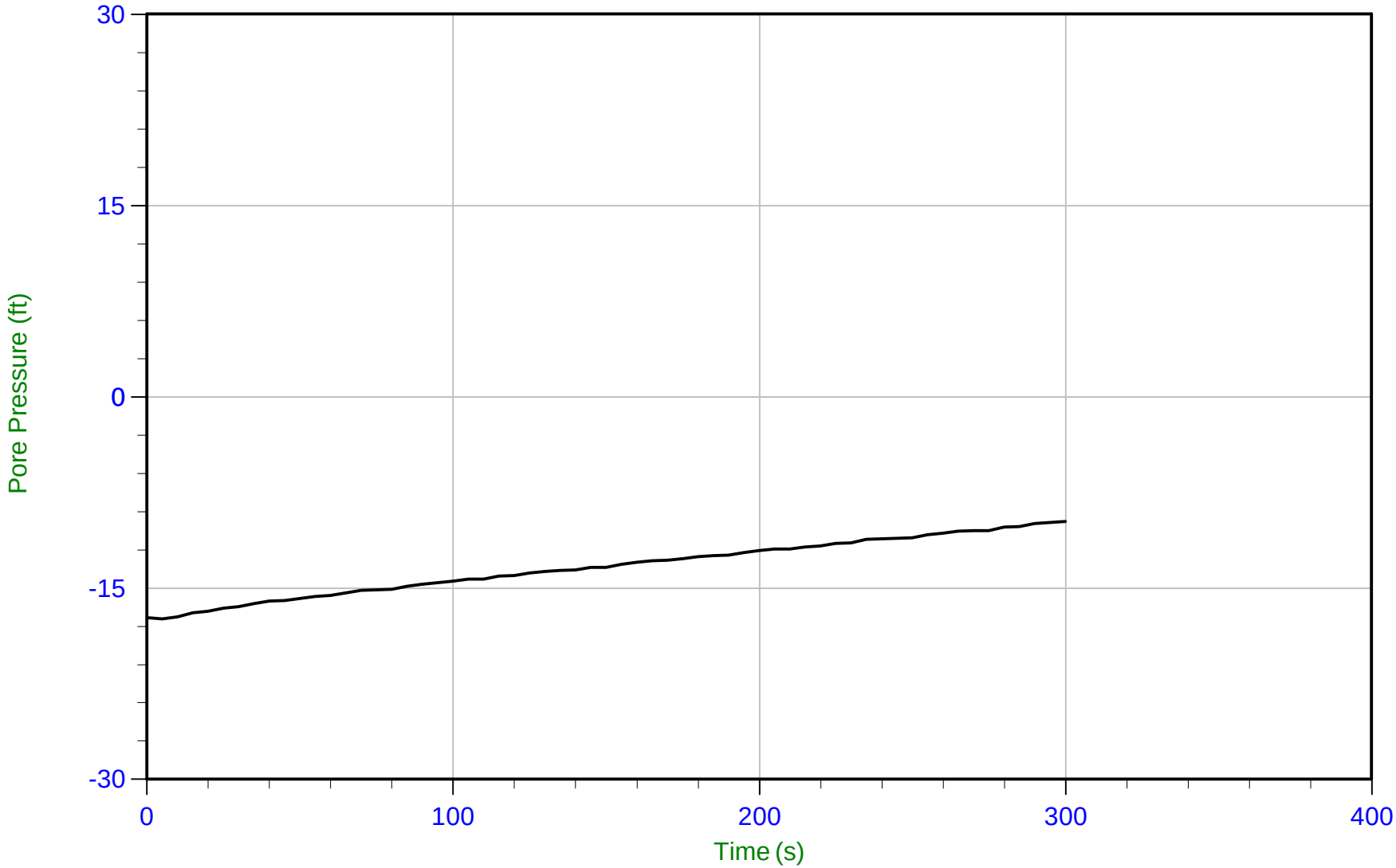
u Min: -5.2 ft
u Max: -0.9 ft
u Final: -0.9 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 13:59
Site: DTE Monroe Power Plant

Sounding: CPT20-170
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP170.PPF
Depth: 6.175 m / 20.259 ft
Duration: 300.0 s

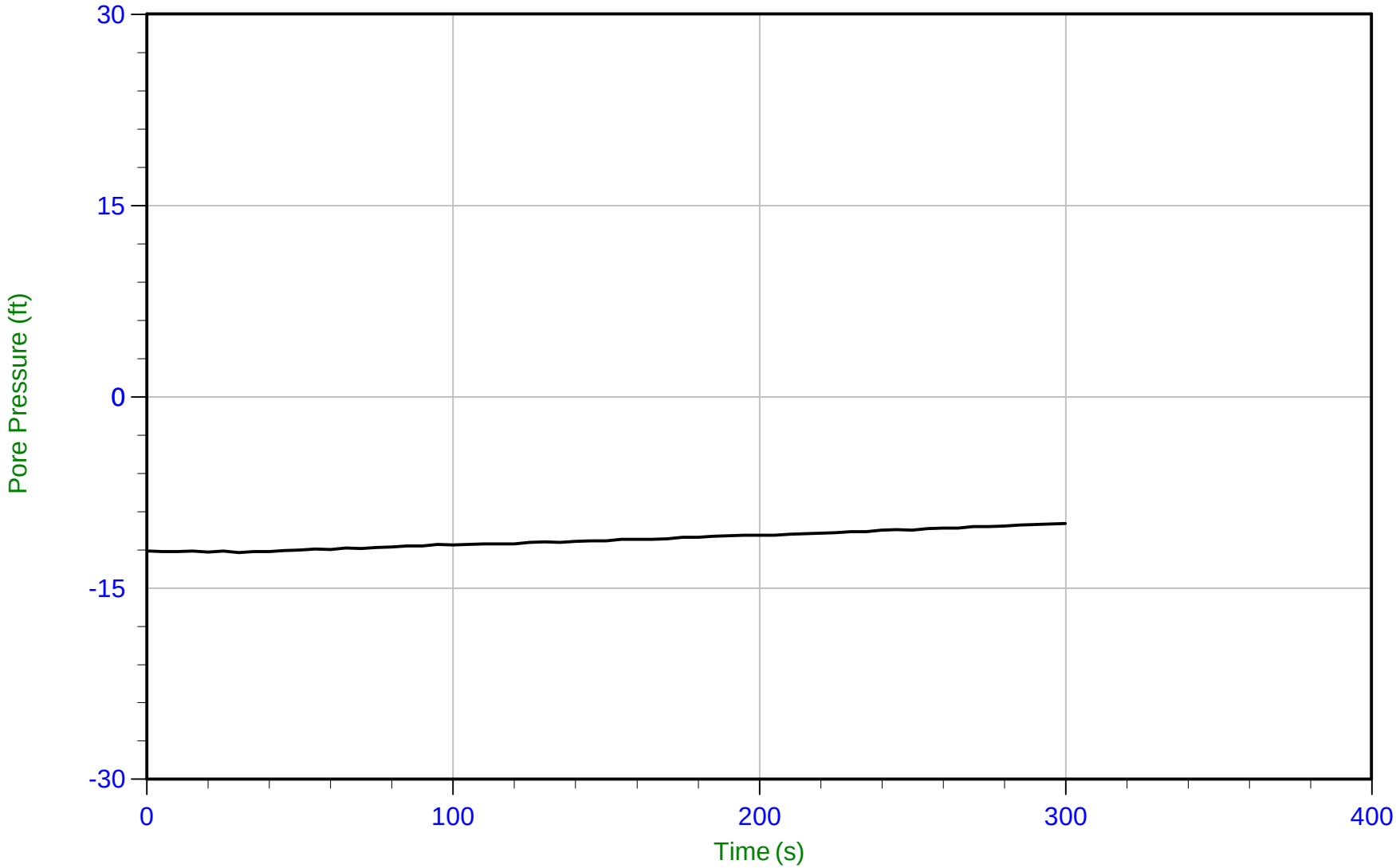
u Min: -17.4 ft
u Max: -9.8 ft
u Final: -9.8 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 13:59
Site: DTE Monroe Power Plant

Sounding: CPT20-170
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

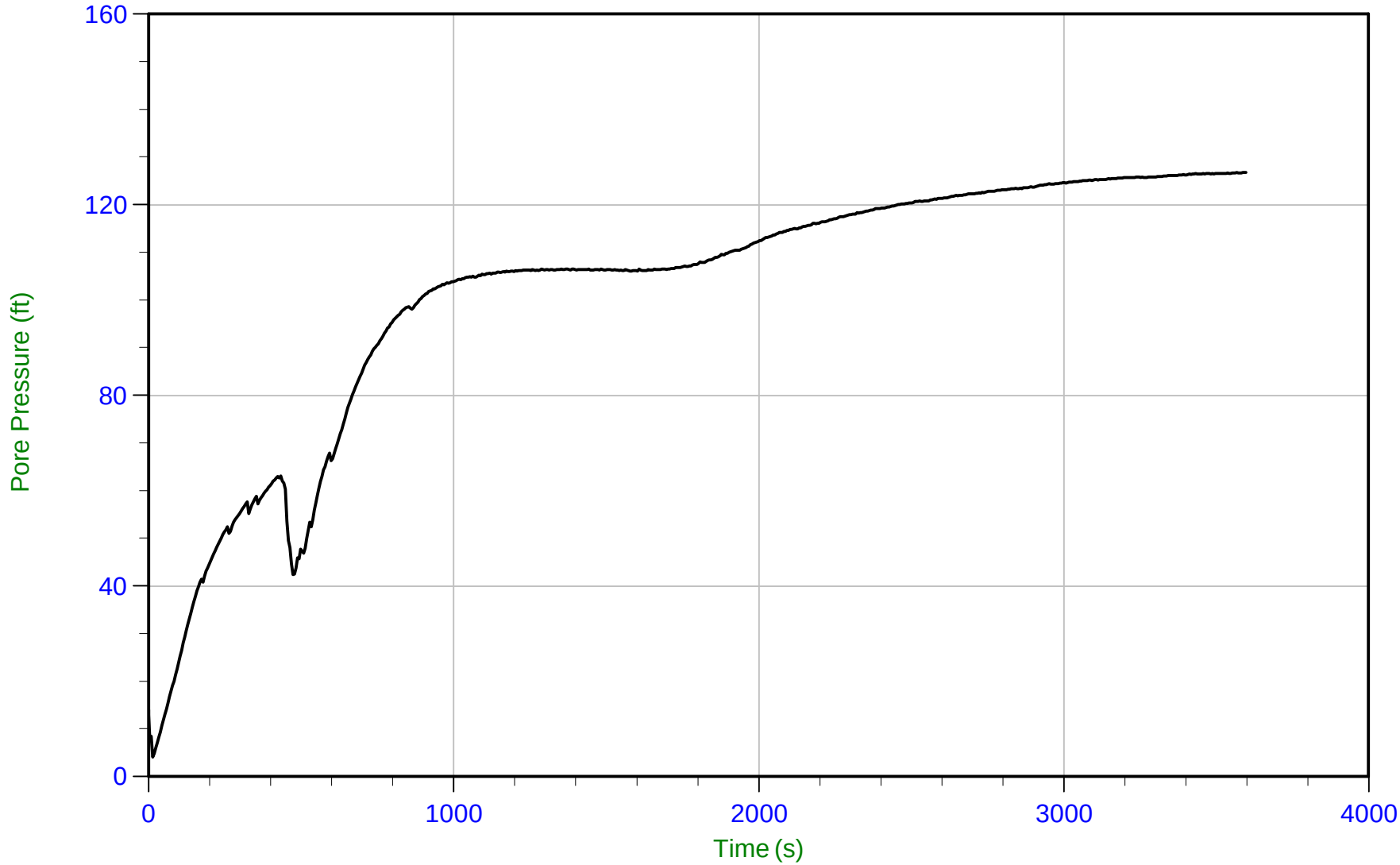
Filename: 20-61-21655_CP170.PPF
Depth: 12.250 m / 40.190 ft
Duration: 300.0 s

u Min: -12.2 ft
u Max: -9.9 ft
u Final: -9.9 ft

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 13:59
Site: DTE Monroe Power Plant

Sounding: CPT20-170
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

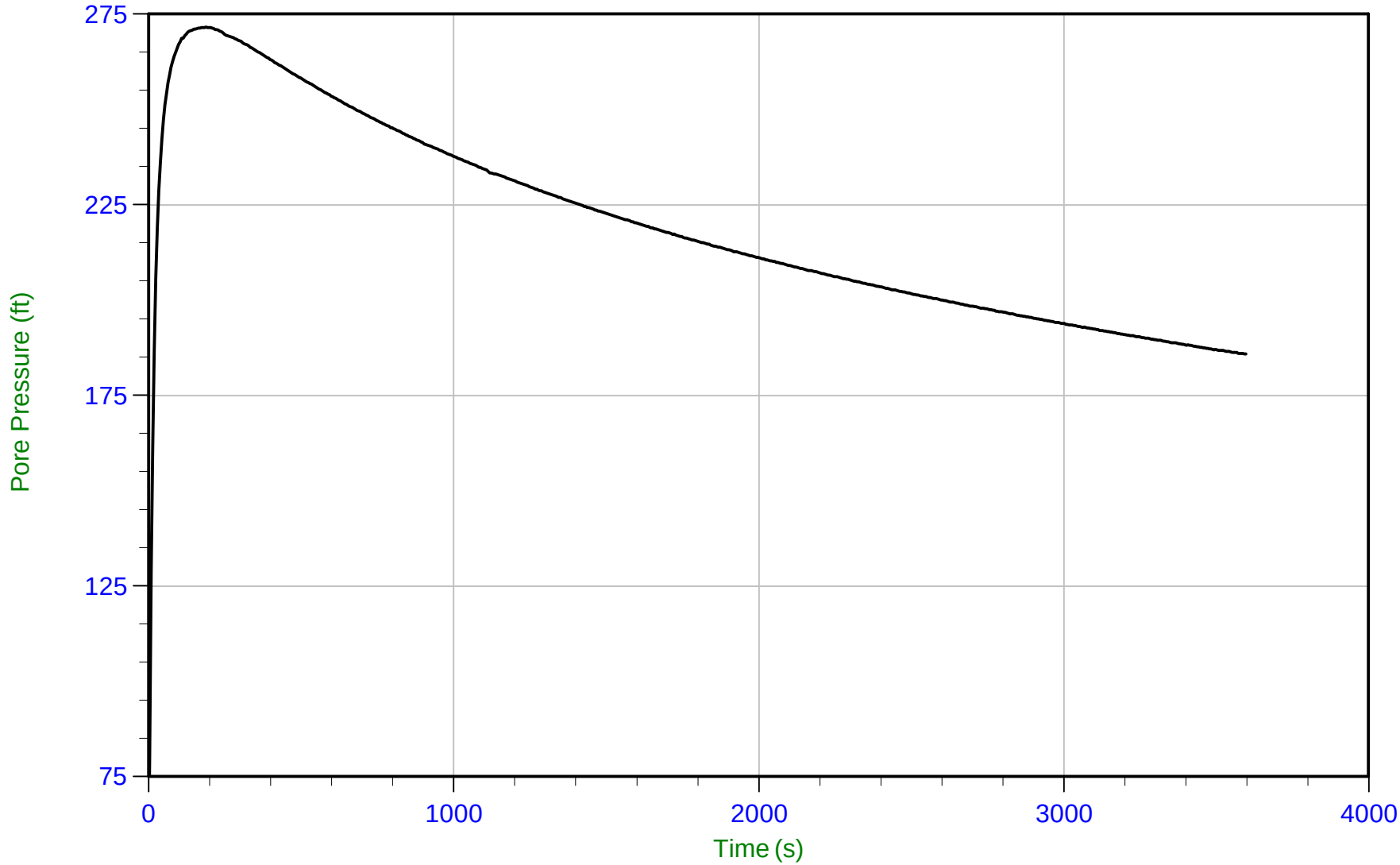
Filename: 20-61-21655_CP170.PPF
Depth: 20.775 m / 68.159 ft
Duration: 3600.0 s

u Min: 4.1 ft
u Max: 126.8 ft
u Final: 126.8 ft

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 10:33
Site: DTE Monroe Power Plant

Sounding: CPT20-176
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP176.PPF
Depth: 20.475 m / 67.174 ft
Duration: 3600.0 s

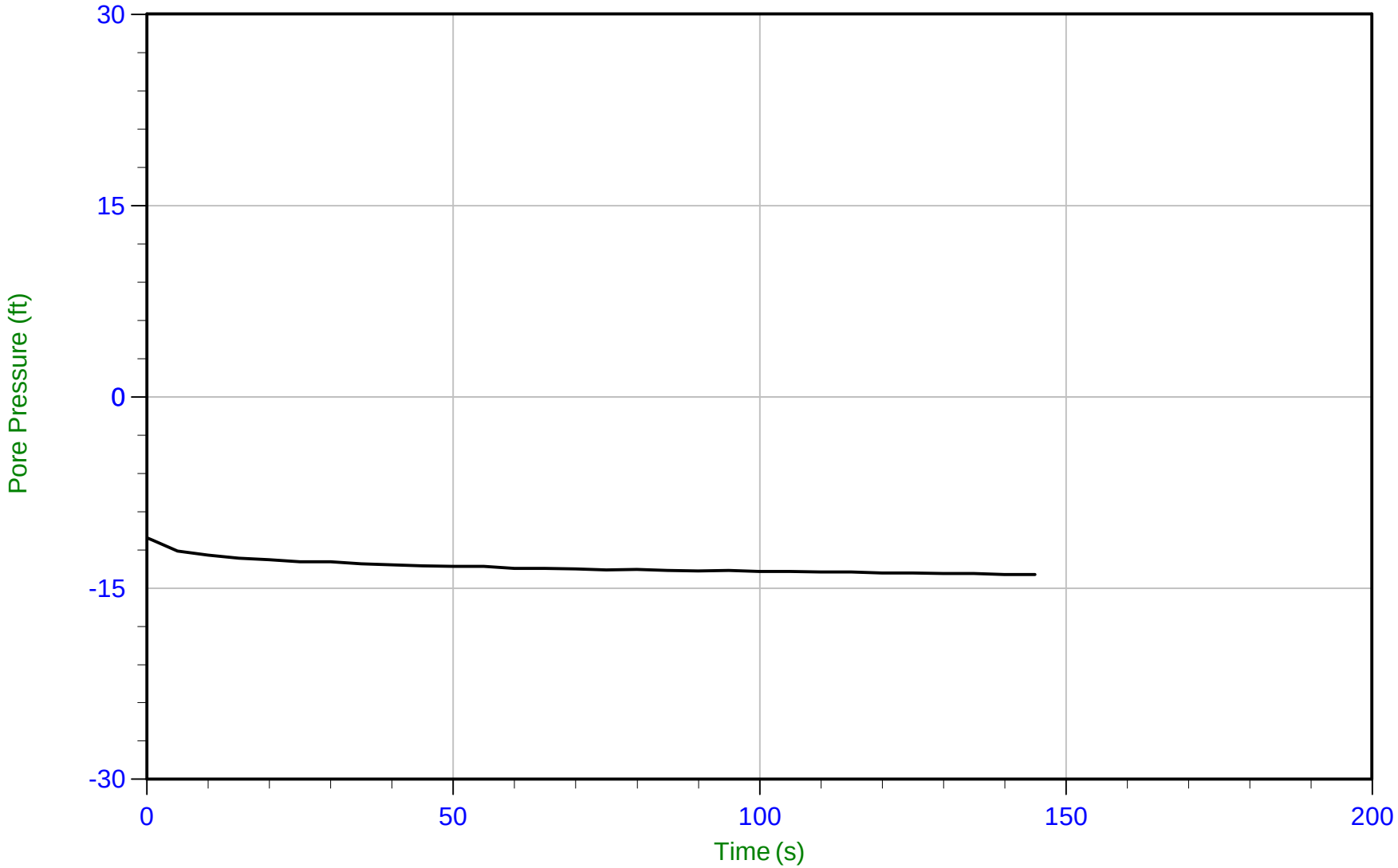
u Min: 51.2 ft
u Max: 271.6 ft
u Final: 185.9 ft

CONETEC

Geosyntec

Job No: 20-61-21655
Date: 12/07/2020 09:43
Site: DTE Monroe Power Plant

Sounding: CPT20-178
Cone: 551:T1500F15U500 Area=15 cm²



Trace Summary:

Filename: 20-61-21655_CP178.PPF
Depth: 7.900 m / 25.918 ft
Duration: 145.0 s

u Min: -13.9 ft
u Max: -11.0 ft
u Final: -13.9 ft

APPENDIX L – CHEMISTRY ANALYSIS OF SITE-SPECIFIC WATER

05-Jan-2021

Michael Coram
Geosyntec Consultants
2100 Commonwealth Blvd.
Suite 100
Ann Arbor, MI 48105

Re: **DTE- Monroe (GLP-8014)** Work Order: **20121750**

Dear Michael,

ALS Environmental received 5 samples on 18-Dec-2020 10:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 26.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Report of Laboratory Analysis

ALS Group, USA

Date: 05-Jan-21

Client: Geosyntec Consultants
Project: DTE- Monroe (GLP-8014)
Work Order: **20121750**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
20121750-01	PZ-1	Groundwater		12/14/2020 08:00	12/18/2020 10:00	☐
20121750-02	PZ-2	Groundwater		12/14/2020 09:00	12/18/2020 10:00	☐
20121750-03	PZ-3	Groundwater		12/15/2020 08:00	12/18/2020 10:00	☐
20121750-04	PZ-4	Groundwater		12/14/2020 10:00	12/18/2020 10:00	☐
20121750-05	PZ-5	Groundwater		12/15/2020 10:00	12/18/2020 10:00	☐

ALS Group, USA

Date: 05-Jan-21

Client: Geosyntec Consultants
Project: DTE- Monroe (GLP-8014)
Work Order: 20121750

Case Narrative

Samples for the above noted Work Order were received on 12/18/2020. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Metals:
No other deviations or anomalies were noted.

Wet Chemistry:

Batch R306912, Method SW9040C, Sample PZ-3 (20121750-03B): Possible bias due to sodium error at pH > 10. A low sodium electrode is not used in the measurement process.

Batch R306825, Method SW9040C, Sample LCS-R306825: Samples were processed outside of holding time for pH, as the analysis is a field test and holding time is defined as 15 minutes.Batch R307145, Method IC_9056_W, Sample 20121752-03B MSD: 1

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
°C	Degrees Celcius
mg/L	Milligrams per Liter
s.u.	Standard Units

ALS Group, USA

Date: *05-Jan-21*

Client: Geosyntec Consultants
Project: DTE- Monroe (GLP-8014)
Work Order: 20121750
Sample ID: PZ-1
Lab ID: 20121750-01
Collection Date: 12/14/2020 08:00 AM
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7470A**		Prep: SW7470 12/28/20 11:57	Analyst: **MAC**
Mercury	ND		0.00020	mg/L	1	12/28/2020 01:09 PM
METALS BY ICP-MS			**SW6020B**		Prep: SW3005A 12/30/20 15:00	Analyst: **STP**
Antimony	ND		0.0050	mg/L	1	12/30/2020 08:54 PM
Arsenic	**0.0098**		**0.0050**	**mg/L**	1	12/30/2020 08:54 PM
Barium	**2.1**		**0.050**	**mg/L**	10	12/31/2020 05:01 PM
Beryllium	ND		0.0020	mg/L	1	12/30/2020 08:54 PM
Boron	**4.8**		**0.20**	**mg/L**	10	12/31/2020 05:01 PM
Cadmium	ND		0.0020	mg/L	1	12/30/2020 08:54 PM
Calcium	**100**		**0.50**	**mg/L**	1	12/30/2020 08:54 PM
Chromium	ND		0.0050	mg/L	1	12/30/2020 08:54 PM
Cobalt	ND		0.0050	mg/L	1	12/30/2020 08:54 PM
Iron	**0.83**		**0.080**	**mg/L**	1	12/30/2020 08:54 PM
Lead	ND		0.0050	mg/L	1	12/30/2020 08:54 PM
Lithium	**0.016**		**0.010**	**mg/L**	1	12/30/2020 08:54 PM
Magnesium	**0.47**		**0.20**	**mg/L**	1	12/30/2020 08:54 PM
Manganese	ND		0.0050	mg/L	1	12/30/2020 08:54 PM
Molybdenum	**1.1**		**0.0050**	**mg/L**	1	12/30/2020 08:54 PM
Potassium	**21**		**0.20**	**mg/L**	1	12/30/2020 08:54 PM
Selenium	**0.051**		**0.0050**	**mg/L**	1	12/30/2020 08:54 PM
Sodium	**44**		**0.20**	**mg/L**	1	12/30/2020 08:54 PM
Thallium	ND		0.0050	mg/L	1	12/30/2020 08:54 PM
ALKALINITY			**A2320 B-11**			Analyst: **QTN**
Alkalinity, Bicarbonate (as CaCO3)	ND		10	mg/L	1	12/24/2020 05:06 PM
Alkalinity, Carbonate (as CaCO3)	**210**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Hydroxide (as CaCO3)	**240**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Phenolphthalein (as CaCO3	**340**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Total (as CaCO3)	**450**		**10**	**mg/L**	1	12/24/2020 05:06 PM
ANIONS BY ION CHROMATOGRAPHY			**SW9056A**			Analyst: **JDR**
Chloride	**43**		**10**	**mg/L**	10	12/30/2020 03:36 PM
Fluoride	**3.4**		**0.10**	**mg/L**	1	12/30/2020 05:34 PM
Sulfate	**11**		**1.0**	**mg/L**	1	12/30/2020 05:34 PM
PH (LABORATORY)			**SW9040C**			Analyst: **QTN**
pH (laboratory)	**11.0**	H	**0.100**	**s.u.**	1	12/24/2020 05:06 PM
Temperature	**20.6**	H	**0.100**	**°C**	1	12/24/2020 05:06 PM
TOTAL DISSOLVED SOLIDS			**A2540 C-11**		Prep: FILTER 12/20/20 17:42	Analyst: **ERW**
Total Dissolved Solids	**530**		**100**	**mg/L**	1	12/22/2020 02:09 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *05-Jan-21*

Client: Geosyntec Consultants
Project: DTE- Monroe (GLP-8014)
Work Order: 20121750
Sample ID: PZ-2
Lab ID: 20121750-02
Collection Date: 12/14/2020 09:00 AM
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7470A**		Prep: SW7470 12/28/20 11:57	Analyst: **MAC**
Mercury	ND		0.00020	mg/L	1	12/28/2020 01:11 PM
METALS BY ICP-MS			**SW6020B**		Prep: SW3005A 12/30/20 15:00	Analyst: **STP**
Antimony	ND		0.0050	mg/L	1	12/30/2020 08:56 PM
Arsenic	**0.0055**		**0.0050**	**mg/L**	1	12/30/2020 08:56 PM
Barium	**0.50**		**0.0050**	**mg/L**	1	12/30/2020 08:56 PM
Beryllium	ND		0.0020	mg/L	1	12/30/2020 08:56 PM
Boron	**4.3**		**0.20**	**mg/L**	10	12/31/2020 05:02 PM
Cadmium	ND		0.0020	mg/L	1	12/30/2020 08:56 PM
Calcium	**43**		**0.50**	**mg/L**	1	12/30/2020 08:56 PM
Chromium	ND		0.0050	mg/L	1	12/30/2020 08:56 PM
Cobalt	ND		0.0050	mg/L	1	12/30/2020 08:56 PM
Iron	**0.68**		**0.080**	**mg/L**	1	12/31/2020 05:04 PM
Lead	ND		0.0050	mg/L	1	12/30/2020 08:56 PM
Lithium	ND		0.010	mg/L	1	12/30/2020 08:56 PM
Magnesium	**0.46**		**0.20**	**mg/L**	1	12/30/2020 08:56 PM
Manganese	ND		0.0050	mg/L	1	12/30/2020 08:56 PM
Molybdenum	**2.5**		**0.050**	**mg/L**	10	12/31/2020 05:02 PM
Potassium	**180**		**0.20**	**mg/L**	1	12/30/2020 08:56 PM
Selenium	**0.085**		**0.0050**	**mg/L**	1	12/30/2020 08:56 PM
Sodium	**480**		**2.0**	**mg/L**	10	12/31/2020 05:02 PM
Thallium	ND		0.0050	mg/L	1	12/30/2020 08:56 PM
ALKALINITY			**A2320 B-11**			Analyst: **QTN**
Alkalinity, Bicarbonate (as CaCO3)	ND		10	mg/L	1	12/24/2020 05:06 PM
Alkalinity, Carbonate (as CaCO3)	**240**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Hydroxide (as CaCO3)	**1,000**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Phenolphthalein (as CaCO3	**1,100**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Total (as CaCO3)	**1,300**		**10**	**mg/L**	1	12/24/2020 05:06 PM
ANIONS BY ION CHROMATOGRAPHY			**SW9056A**			Analyst: **JDR**
Chloride	**31**		**20**	**mg/L**	20	12/30/2020 03:56 PM
Fluoride	**24**		**2.0**	**mg/L**	20	12/31/2020 02:21 PM
Sulfate	**51**		**20**	**mg/L**	20	12/30/2020 03:56 PM
PH (LABORATORY)			**SW9040C**			Analyst: **QTN**
pH (laboratory)	**11.8**	H	**0.100**	**s.u.**	1	12/24/2020 05:06 PM
Temperature	**19.7**	H	**0.100**	**°C**	1	12/24/2020 05:06 PM
TOTAL DISSOLVED SOLIDS			**A2540 C-11**		Prep: FILTER 12/20/20 17:42	Analyst: **ERW**
Total Dissolved Solids	**2,200**		**1,500**	**mg/L**	1	12/22/2020 02:09 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *05-Jan-21*

Client: Geosyntec Consultants
Project: DTE- Monroe (GLP-8014)
Work Order: 20121750
Sample ID: PZ-3
Lab ID: 20121750-03
Collection Date: 12/15/2020 08:00 AM
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7470A**		Prep: SW7470 12/28/20 11:57	Analyst: **MAC**
Mercury	ND		0.00020	mg/L	1	12/28/2020 01:13 PM
METALS BY ICP-MS			**SW6020B**		Prep: SW3005A 12/30/20 15:00	Analyst: **STP**
Antimony	ND		0.0050	mg/L	1	12/30/2020 08:57 PM
Arsenic	**0.010**		**0.0050**	**mg/L**	1	12/30/2020 08:57 PM
Barium	**1.3**		**0.0050**	**mg/L**	1	12/30/2020 08:57 PM
Beryllium	ND		0.0020	mg/L	1	12/30/2020 08:57 PM
Boron	**2.5**		**0.20**	**mg/L**	10	12/31/2020 05:06 PM
Cadmium	ND		0.0020	mg/L	1	12/30/2020 08:57 PM
Calcium	**88**		**0.50**	**mg/L**	1	12/30/2020 08:57 PM
Chromium	**0.0078**		**0.0050**	**mg/L**	1	12/30/2020 08:57 PM
Cobalt	ND		0.0050	mg/L	1	12/30/2020 08:57 PM
Iron	**2.1**		**0.080**	**mg/L**	1	12/30/2020 08:57 PM
Lead	**0.0053**		**0.0050**	**mg/L**	1	12/30/2020 08:57 PM
Lithium	**0.016**		**0.010**	**mg/L**	1	12/30/2020 08:57 PM
Magnesium	**1.2**		**0.20**	**mg/L**	1	12/30/2020 08:57 PM
Manganese	**0.0092**		**0.0050**	**mg/L**	1	12/30/2020 08:57 PM
Molybdenum	**0.20**		**0.0050**	**mg/L**	1	12/30/2020 08:57 PM
Potassium	**53**		**0.20**	**mg/L**	1	12/30/2020 08:57 PM
Selenium	**0.059**		**0.0050**	**mg/L**	1	12/30/2020 08:57 PM
Sodium	**88**		**0.20**	**mg/L**	1	12/30/2020 08:57 PM
Thallium	ND		0.0050	mg/L	1	12/30/2020 08:57 PM
ALKALINITY			**A2320 B-11**			Analyst: **QTN**
Alkalinity, Bicarbonate (as CaCO3)	ND		10	mg/L	1	12/29/2020 11:55 AM
Alkalinity, Carbonate (as CaCO3)	**93**		**10**	**mg/L**	1	12/29/2020 11:55 AM
Alkalinity, Hydroxide (as CaCO3)	**320**		**10**	**mg/L**	1	12/29/2020 11:55 AM
Alkalinity, Phenolphthalein (as CaCO3	**370**		**10**	**mg/L**	1	12/29/2020 11:55 AM
Alkalinity, Total (as CaCO3)	**420**		**10**	**mg/L**	1	12/29/2020 11:55 AM
ANIONS BY ION CHROMATOGRAPHY			**SW9056A**			Analyst: **JDR**
Chloride	**30**		**16**	**mg/L**	16	12/30/2020 04:48 PM
Fluoride	**0.87**		**0.10**	**mg/L**	1	12/30/2020 06:13 PM
Sulfate	**29**		**16**	**mg/L**	16	12/30/2020 04:48 PM
PH (LABORATORY)			**SW9040C**			Analyst: **QTN**
pH (laboratory)	**11.5**	H	**0.100**	**s.u.**	1	12/29/2020 11:55 AM
Temperature	**20.5**	H	**0.100**	**°C**	1	12/29/2020 11:55 AM
TOTAL DISSOLVED SOLIDS			**A2540 C-11**		Prep: FILTER 12/20/20 17:42	Analyst: **ERW**
Total Dissolved Solids	**740**		**300**	**mg/L**	1	12/22/2020 02:09 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *05-Jan-21*

Client: Geosyntec Consultants
Project: DTE- Monroe (GLP-8014)
Work Order: 20121750
Sample ID: PZ-4
Lab ID: 20121750-04
Collection Date: 12/14/2020 10:00 AM
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7470A**		Prep: SW7470 12/30/20 13:08	Analyst: **MAC**
Mercury	ND		0.00020	mg/L	1	12/30/2020 01:23 PM
METALS BY ICP-MS			**SW6020B**		Prep: SW3005A 12/30/20 15:00	Analyst: **STP**
Antimony	ND		0.0050	mg/L	1	12/30/2020 09:03 PM
Arsenic	**0.11**		**0.0050**	**mg/L**	1	12/30/2020 09:03 PM
Barium	**0.099**		**0.0050**	**mg/L**	1	12/30/2020 09:03 PM
Beryllium	ND		0.0020	mg/L	1	12/30/2020 09:03 PM
Boron	**2.6**		**0.20**	**mg/L**	10	12/31/2020 05:07 PM
Cadmium	ND		0.0020	mg/L	1	12/30/2020 09:03 PM
Calcium	**54**		**0.50**	**mg/L**	1	12/30/2020 09:03 PM
Chromium	ND		0.0050	mg/L	1	12/30/2020 09:03 PM
Cobalt	ND		0.0050	mg/L	1	12/30/2020 09:03 PM
Iron	**0.45**		**0.080**	**mg/L**	1	12/30/2020 09:03 PM
Lead	ND		0.0050	mg/L	1	12/30/2020 09:03 PM
Lithium	**0.36**		**0.010**	**mg/L**	1	12/30/2020 09:03 PM
Magnesium	ND		0.20	mg/L	1	12/30/2020 09:03 PM
Manganese	ND		0.0050	mg/L	1	12/30/2020 09:03 PM
Molybdenum	**2.2**		**0.050**	**mg/L**	10	12/31/2020 05:07 PM
Potassium	**66**		**0.20**	**mg/L**	1	12/30/2020 09:03 PM
Selenium	**0.030**		**0.0050**	**mg/L**	1	12/30/2020 09:03 PM
Sodium	**52**		**0.20**	**mg/L**	1	12/30/2020 09:03 PM
Thallium	ND		0.0050	mg/L	1	12/30/2020 09:03 PM
ALKALINITY			**A2320 B-11**			Analyst: **QTN**
Alkalinity, Bicarbonate (as CaCO3)	ND		10	mg/L	1	12/24/2020 05:06 PM
Alkalinity, Carbonate (as CaCO3)	**120**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Hydroxide (as CaCO3)	**390**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Phenolphthalein (as CaCO3	**450**		**10**	**mg/L**	1	12/24/2020 05:06 PM
Alkalinity, Total (as CaCO3)	**510**		**10**	**mg/L**	1	12/24/2020 05:06 PM
ANIONS BY ION CHROMATOGRAPHY			**SW9056A**			Analyst: **JDR**
Chloride	**33**		**8.0**	**mg/L**	8	12/30/2020 05:05 PM
Fluoride	ND		0.10	mg/L	1	12/30/2020 06:32 PM
Sulfate	**130**		**8.0**	**mg/L**	8	12/30/2020 05:05 PM
PH (LABORATORY)			**SW9040C**			Analyst: **QTN**
pH (laboratory)	**11.4**	H	**0.100**	**s.u.**	1	12/24/2020 05:06 PM
Temperature	**20.2**	H	**0.100**	**°C**	1	12/24/2020 05:06 PM
TOTAL DISSOLVED SOLIDS			**A2540 C-11**		Prep: FILTER 12/20/20 17:42	Analyst: **ERW**
Total Dissolved Solids	**450**		**100**	**mg/L**	1	12/22/2020 02:09 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *05-Jan-21*

Client: Geosyntec Consultants
Project: DTE- Monroe (GLP-8014)
Work Order: 20121750
Sample ID: PZ-5
Lab ID: 20121750-05
Collection Date: 12/15/2020 10:00 AM
Matrix: GROUNDWATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY BY CVAA			**SW7470A**		Prep: SW7470 12/30/20 13:08	Analyst: **MAC**
Mercury	ND		0.00020	mg/L	1	12/30/2020 01:25 PM
METALS BY ICP-MS			**SW6020B**		Prep: SW3005A 12/30/20 15:00	Analyst: **STP**
Antimony	ND		0.0050	mg/L	1	12/30/2020 09:04 PM
Arsenic	**0.038**		**0.0050**	**mg/L**	1	12/30/2020 09:04 PM
Barium	**0.16**		**0.0050**	**mg/L**	1	12/30/2020 09:04 PM
Beryllium	ND		0.0020	mg/L	1	12/30/2020 09:04 PM
Boron	**12**		**0.20**	**mg/L**	10	12/31/2020 05:12 PM
Cadmium	ND		0.0020	mg/L	1	12/30/2020 09:04 PM
Calcium	**270**		**5.0**	**mg/L**	10	12/31/2020 05:12 PM
Chromium	**0.0054**		**0.0050**	**mg/L**	1	12/30/2020 09:04 PM
Cobalt	ND		0.0050	mg/L	1	12/30/2020 09:04 PM
Iron	**0.79**		**0.080**	**mg/L**	1	12/30/2020 09:04 PM
Lead	ND		0.0050	mg/L	1	12/30/2020 09:04 PM
Lithium	ND		0.010	mg/L	1	12/30/2020 09:04 PM
Magnesium	**0.78**		**0.20**	**mg/L**	1	12/30/2020 09:04 PM
Manganese	**0.0050**		**0.0050**	**mg/L**	1	12/30/2020 09:04 PM
Molybdenum	**9.4**		**0.050**	**mg/L**	10	12/31/2020 05:12 PM
Potassium	**3.3**		**0.20**	**mg/L**	1	12/30/2020 09:04 PM
Selenium	**0.015**		**0.0050**	**mg/L**	1	12/30/2020 09:04 PM
Sodium	**1.4**		**0.20**	**mg/L**	1	12/30/2020 09:04 PM
Thallium	ND		0.0050	mg/L	1	12/30/2020 09:04 PM
ALKALINITY			**A2320 B-11**			Analyst: **QTN**
Alkalinity, Bicarbonate (as CaCO3)	ND		10	mg/L	1	12/29/2020 11:55 AM
Alkalinity, Carbonate (as CaCO3)	**110**		**10**	**mg/L**	1	12/29/2020 11:55 AM
Alkalinity, Hydroxide (as CaCO3)	**47**		**10**	**mg/L**	1	12/29/2020 11:55 AM
Alkalinity, Phenolphthalein (as CaCO3	**100**		**10**	**mg/L**	1	12/29/2020 11:55 AM
Alkalinity, Total (as CaCO3)	**150**		**10**	**mg/L**	1	12/29/2020 11:55 AM
ANIONS BY ION CHROMATOGRAPHY			**SW9056A**			Analyst: **JDR**
Chloride	**25**		**4.0**	**mg/L**	4	12/30/2020 05:22 PM
Fluoride	**0.36**		**0.10**	**mg/L**	1	12/30/2020 06:51 PM
Sulfate	**560**		**80**	**mg/L**	80	12/31/2020 02:40 PM
PH (LABORATORY)			**SW9040C**			Analyst: **QTN**
pH (laboratory)	**9.90**	H	**0.100**	**s.u.**	1	12/29/2020 11:55 AM
Temperature	**21.0**	H	**0.100**	**°C**	1	12/29/2020 11:55 AM
TOTAL DISSOLVED SOLIDS			**A2540 C-11**		Prep: FILTER 12/20/20 17:42	Analyst: **ERW**
Total Dissolved Solids	**970**		**100**	**mg/L**	1	12/22/2020 02:09 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 05-Jan-21

Client: Geosyntec Consultants

QC BATCH REPORT

Work Order: 20121750

Project: DTE- Monroe (GLP-8014)

Batch ID: **169919** Instrument ID **HG4** Method: **SW7470A**

MBLK Sample ID: **MBLK-169919-169919** Units: **mg/L** Analysis Date: **12/28/2020 01:00 PM**

Client ID: Run ID: **HG4_201228A** SeqNo: **7031216** Prep Date: **12/28/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								

LCS Sample ID: **LCS-169919-169919** Units: **mg/L** Analysis Date: **12/28/2020 01:02 PM**

Client ID: Run ID: **HG4_201228A** SeqNo: **7031217** Prep Date: **12/28/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.002235	0.00020	0.002	0	112	80-120	0			

MS Sample ID: **20122026-01CMS** Units: **mg/L** Analysis Date: **12/28/2020 01:41 PM**

Client ID: Run ID: **HG4_201228A** SeqNo: **7031239** Prep Date: **12/28/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.002235	0.00020	0.002	0.0000015	112	75-125	0			

MSD Sample ID: **20122026-01CMSD** Units: **mg/L** Analysis Date: **12/28/2020 01:43 PM**

Client ID: Run ID: **HG4_201228A** SeqNo: **7031240** Prep Date: **12/28/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.002235	0.00020	0.002	0.0000015	112	75-125	0.002235	0	20	

The following samples were analyzed in this batch: 20121750-01A 20121750-02A 20121750-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **170071** Instrument ID **HG4** Method: **SW7470A**

MBLK Sample ID: **MBLK-170071-170071** Units: **mg/L** Analysis Date: **12/30/2020 01:14 PM**
Client ID: Run ID: **HG4_201230A** SeqNo: **7040771** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	ND	0.00020								

LCS Sample ID: **LCS-170071-170071** Units: **mg/L** Analysis Date: **12/30/2020 01:16 PM**
Client ID: Run ID: **HG4_201230A** SeqNo: **7040772** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.002085	0.00020	0.002	0	104	80-120	0			

MS Sample ID: **20121813-10DMS** Units: **mg/L** Analysis Date: **12/30/2020 01:55 PM**
Client ID: Run ID: **HG4_201230A** SeqNo: **7040812** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00219	0.00020	0.002	0.000003	109	75-125	0			

MSD Sample ID: **20121813-10DMSD** Units: **mg/L** Analysis Date: **12/30/2020 01:57 PM**
Client ID: Run ID: **HG4_201230A** SeqNo: **7040815** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.002115	0.00020	0.002	0.000003	106	75-125	0.00219	3.48	20	

The following samples were analyzed in this batch: 20121750-04A 20121750-05A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **170083** Instrument ID **ICPMS4** Method: **SW6020B**

MBLK	Sample ID: **MBLK-170083-170083**				Units: **mg/L**			Analysis Date: **12/30/2020 08:51 PM**		
Client ID:		Run ID: **ICPMS4_201230A**			SeqNo: **7043005**		Prep Date: **12/30/2020**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	ND	0.0050								
Arsenic	ND	0.0050								
Barium	ND	0.0050								
Beryllium	ND	0.0020								
Boron	ND	0.020								
Cadmium	ND	0.0020								
Calcium	ND	0.50								
Chromium	ND	0.0050								
Cobalt	ND	0.0050								
Iron	ND	0.080								
Lead	ND	0.0050								
Lithium	ND	0.010								
Magnesium	ND	0.20								
Manganese	ND	0.0050								
Molybdenum	ND	0.0050								
Potassium	ND	0.20								
Selenium	ND	0.0050								
Sodium	ND	0.20								
Thallium	ND	0.0050								

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **170083** Instrument ID **ICPMS4** Method: **SW6020B**

LCS	Sample ID: **LCS-170083-170083**				Units: **mg/L**			Analysis Date: **12/30/2020 08:52 PM**		
Client ID:	Run ID: **ICPMS4_201230A**				SeqNo: **7043006**			Prep Date: **12/30/2020**		DF: **1**
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09984	0.0050	0.1	0	99.8	80-120	0			
Arsenic	0.099	0.0050	0.1	0	99	80-120	0			
Barium	0.1005	0.0050	0.1	0	100	80-120	0			
Beryllium	0.09793	0.0020	0.1	0	97.9	80-120	0			
Boron	0.4459	0.020	0.5	0	89.2	80-120	0			
Cadmium	0.1049	0.0020	0.1	0	105	80-120	0			
Calcium	9.959	0.50	10	0	99.6	80-120	0			
Chromium	0.09764	0.0050	0.1	0	97.6	80-120	0			
Cobalt	0.09865	0.0050	0.1	0	98.6	80-120	0			
Iron	9.742	0.080	10	0	97.4	80-120	0			
Lead	0.09896	0.0050	0.1	0	99	80-120	0			
Lithium	0.09939	0.010	0.1	0	99.4	80-120	0			
Magnesium	10.41	0.20	10	0	104	80-120	0			
Manganese	0.09726	0.0050	0.1	0	97.3	80-120	0			
Molybdenum	0.09949	0.0050	0.1	0	99.5	80-120	0			
Potassium	10.09	0.20	10	0	101	80-120	0			
Selenium	0.09876	0.0050	0.1	0	98.8	80-120	0			
Sodium	10.48	0.20	10	0	105	80-120	0			
Thallium	0.09419	0.0050	0.1	0	94.2	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **170083** Instrument ID **ICPMS4** Method: **SW6020B**

MS Sample ID: **20121813-01DMS** Units: **mg/L** Analysis Date: **12/30/2020 09:13 PM**
Client ID: Run ID: **ICPMS4_201230A** SeqNo: **7043018** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.0939	0.0050	0.1	0.000019	93.9	75-125	0			
Arsenic	0.09542	0.0050	0.1	0.000523	94.9	75-125	0			
Barium	0.1197	0.0050	0.1	0.01914	101	75-125	0			
Beryllium	0.1028	0.0020	0.1	0.003422	99.4	75-125	0			
Boron	0.5173	0.020	0.5	0.07866	87.7	75-125	0			
Cadmium	0.09866	0.0020	0.1	0.003046	95.6	75-125	0			
Calcium	63.88	0.50	10	53.04	108	75-125	0			O
Chromium	0.09053	0.0050	0.1	0.000351	90.2	75-125	0			
Cobalt	0.2039	0.0050	0.1	0.1134	90.5	75-125	0			
Iron	8.964	0.080	10	0.02083	89.4	75-125	0			
Lead	0.09794	0.0050	0.1	0.000674	97.3	75-125	0			
Lithium	0.1112	0.010	0.1	0.01095	100	75-125	0			
Magnesium	61.4	0.20	10	51.16	102	75-125	0			O
Molybdenum	0.09472	0.0050	0.1	0.001008	93.7	75-125	0			
Potassium	12.35	0.20	10	2.605	97.4	75-125	0			
Selenium	0.1012	0.0050	0.1	0.005949	95.3	75-125	0			
Sodium	65.82	0.20	10	55.83	99.9	75-125	0			O
Thallium	0.09224	0.0050	0.1	0.000037	92.2	75-125	0			

MS Sample ID: **20121813-10DMS** Units: **mg/L** Analysis Date: **12/30/2020 09:35 PM**
Client ID: Run ID: **ICPMS4_201230A** SeqNo: **7043031** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09845	0.0050	0.1	0.000041	98.4	75-125	0			
Arsenic	0.1005	0.0050	0.1	0.00021	100	75-125	0			
Barium	0.125	0.0050	0.1	0.02584	99.1	75-125	0			
Beryllium	0.1046	0.0020	0.1	0.002214	102	75-125	0			
Boron	0.5169	0.020	0.5	0.056	92.2	75-125	0			
Cadmium	0.1056	0.0020	0.1	0.005454	100	75-125	0			
Calcium	34.88	0.50	10	25.15	97.2	75-125	0			
Chromium	0.09457	0.0050	0.1	0.000785	93.8	75-125	0			
Cobalt	0.2768	0.0050	0.1	0.1806	96.2	75-125	0			
Iron	9.488	0.080	10	0.143	93.5	75-125	0			
Lead	0.09729	0.0050	0.1	0.001591	95.7	75-125	0			
Lithium	0.107	0.010	0.1	0.006549	100	75-125	0			
Magnesium	24.92	0.20	10	15.27	96.4	75-125	0			
Molybdenum	0.0977	0.0050	0.1	0.000386	97.3	75-125	0			
Potassium	12.88	0.20	10	3.03	98.5	75-125	0			
Selenium	0.09792	0.0050	0.1	0.001894	96	75-125	0			
Sodium	71.55	0.20	10	61.63	99.1	75-125	0			O
Thallium	0.09151	0.0050	0.1	0.000106	91.4	75-125	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **170083** Instrument ID **ICPMS4** Method: **SW6020B**

MS Sample ID: **20121813-01DMS** Units: **mg/L** Analysis Date: **12/31/2020 05:20 PM**
Client ID: Run ID: **ICPMS4_201231A** SeqNo: **7046543** Prep Date: **12/30/2020** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Manganese	3.991	0.050	0.1	3.949	41.3	75-125	0			SO

MS Sample ID: **20121813-10DMS** Units: **mg/L** Analysis Date: **12/31/2020 05:39 PM**
Client ID: Run ID: **ICPMS4_201231A** SeqNo: **7046555** Prep Date: **12/30/2020** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Manganese	4.091	0.050	0.1	3.865	227	75-125	0			SO

MSD Sample ID: **20121813-01DMSD** Units: **mg/L** Analysis Date: **12/30/2020 09:15 PM**
Client ID: Run ID: **ICPMS4_201230A** SeqNo: **7043019** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09655	0.0050	0.1	0.000019	96.5	75-125	0.0939	2.78	20	
Arsenic	0.09753	0.0050	0.1	0.000523	97	75-125	0.09542	2.18	20	
Barium	0.1208	0.0050	0.1	0.01914	102	75-125	0.1197	0.848	20	
Beryllium	0.1044	0.0020	0.1	0.003422	101	75-125	0.1028	1.59	20	
Boron	0.5179	0.020	0.5	0.07866	87.8	75-125	0.5173	0.103	20	
Cadmium	0.1013	0.0020	0.1	0.003046	98.3	75-125	0.09866	2.67	20	
Calcium	62.93	0.50	10	53.04	98.9	75-125	63.88	1.49	20	O
Chromium	0.09296	0.0050	0.1	0.000351	92.6	75-125	0.09053	2.65	20	
Cobalt	0.2064	0.0050	0.1	0.1134	92.9	75-125	0.2039	1.18	20	
Iron	9.236	0.080	10	0.02083	92.1	75-125	8.964	2.99	20	
Lead	0.09947	0.0050	0.1	0.000674	98.8	75-125	0.09794	1.55	20	
Lithium	0.1128	0.010	0.1	0.01095	102	75-125	0.1112	1.45	20	
Magnesium	61.51	0.20	10	51.16	104	75-125	61.4	0.185	20	O
Molybdenum	0.09663	0.0050	0.1	0.001008	95.6	75-125	0.09472	2	20	
Potassium	12.63	0.20	10	2.605	100	75-125	12.35	2.27	20	
Selenium	0.1029	0.0050	0.1	0.005949	96.9	75-125	0.1012	1.62	20	
Sodium	66.86	0.20	10	55.83	110	75-125	65.82	1.56	20	O
Thallium	0.09366	0.0050	0.1	0.000037	93.6	75-125	0.09224	1.53	20	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **170083** Instrument ID **ICPMS4** Method: **SW6020B**

MSD Sample ID: **20121813-10DMSD** Units: **mg/L** Analysis Date: **12/30/2020 09:37 PM**
Client ID: Run ID: **ICPMS4_201230A** SeqNo: **7043032** Prep Date: **12/30/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	0.09824	0.0050	0.1	0.000041	98.2	75-125	0.09845	0.211	20	
Arsenic	0.09954	0.0050	0.1	0.00021	99.3	75-125	0.1005	0.917	20	
Barium	0.1229	0.0050	0.1	0.02584	97	75-125	0.125	1.7	20	
Beryllium	0.1039	0.0020	0.1	0.002214	102	75-125	0.1046	0.636	20	
Boron	0.517	0.020	0.5	0.056	92.2	75-125	0.5169	0.0288	20	
Cadmium	0.1044	0.0020	0.1	0.005454	99	75-125	0.1056	1.11	20	
Calcium	34.42	0.50	10	25.15	92.7	75-125	34.88	1.31	20	
Chromium	0.09402	0.0050	0.1	0.000785	93.2	75-125	0.09457	0.58	20	
Cobalt	0.2727	0.0050	0.1	0.1806	92.2	75-125	0.2768	1.48	20	
Iron	9.402	0.080	10	0.143	92.6	75-125	9.488	0.913	20	
Lead	0.0969	0.0050	0.1	0.001591	95.3	75-125	0.09729	0.394	20	
Lithium	0.1057	0.010	0.1	0.006549	99.1	75-125	0.107	1.23	20	
Magnesium	24.72	0.20	10	15.27	94.4	75-125	24.92	0.809	20	
Molybdenum	0.09638	0.0050	0.1	0.000386	96	75-125	0.0977	1.36	20	
Potassium	12.71	0.20	10	3.03	96.8	75-125	12.88	1.33	20	
Selenium	0.09719	0.0050	0.1	0.001894	95.3	75-125	0.09792	0.75	20	
Sodium	70.5	0.20	10	61.63	88.7	75-125	71.55	1.48	20	O
Thallium	0.09051	0.0050	0.1	0.000106	90.4	75-125	0.09151	1.1	20	

MSD Sample ID: **20121813-01DMSD** Units: **mg/L** Analysis Date: **12/31/2020 05:22 PM**
Client ID: Run ID: **ICPMS4_201231A** SeqNo: **7046544** Prep Date: **12/30/2020** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Manganese	4.164	0.050	0.1	3.949	215	75-125	3.991	4.26	20	SO

MSD Sample ID: **20121813-10DMSD** Units: **mg/L** Analysis Date: **12/31/2020 05:41 PM**
Client ID: Run ID: **ICPMS4_201231A** SeqNo: **7046556** Prep Date: **12/30/2020** DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Manganese	4.094	0.050	0.1	3.865	229	75-125	4.091	0.0533	20	SO

The following samples were analyzed in this batch:

20121750-01A	20121750-02A	20121750-03A
20121750-04A	20121750-05A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **169592** Instrument ID **TDS** Method: **A2540 C-11**

MBLK Sample ID: **MBLK-169592-169592** Units: **mg/L** Analysis Date: **12/22/2020 02:09 PM**
Client ID: Run ID: **TDS_201222B** SeqNo: **7015778** Prep Date: **12/20/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	ND	30								

LCS Sample ID: **LCS-169592-169592** Units: **mg/L** Analysis Date: **12/22/2020 02:09 PM**
Client ID: Run ID: **TDS_201222B** SeqNo: **7015777** Prep Date: **12/20/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	466	30	495	0	94.1	85-109	0			

DUP Sample ID: **20121786-01A DUP** Units: **mg/L** Analysis Date: **12/22/2020 02:09 PM**
Client ID: Run ID: **TDS_201222B** SeqNo: **7015765** Prep Date: **12/20/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	896.7	50	0	0	0	0-0	850	5.34	10	

DUP Sample ID: **20121789-04A DUP** Units: **mg/L** Analysis Date: **12/22/2020 02:09 PM**
Client ID: Run ID: **TDS_201222B** SeqNo: **7015771** Prep Date: **12/20/2020** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids	510	50	0	0	0	0-0	500	1.98	10	

The following samples were analyzed in this batch:

20121750-01B	20121750-02B	20121750-03B
20121750-04B	20121750-05B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **R306822** Instrument ID **Titrator 1** Method: **A2320 B-11**

MBLK Sample ID: **MB-R306822-R306822** Units: **mg/L** Analysis Date: **12/24/2020 05:06 PM**
Client ID: Run ID: **TITRATOR 1_201224C** SeqNo: **7028950** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (as CaCO3)	ND	10								
Alkalinity, Carbonate (as CaCO3)	ND	10								
Alkalinity, Hydroxide (as CaCO3)	ND	10								
Alkalinity, Phenolphthalein (as CaCO3	ND	10								
Alkalinity, Total (as CaCO3)	ND	10								

LCS Sample ID: **LCS-R306822-R306822** Units: **mg/L** Analysis Date: **12/24/2020 05:06 PM**
Client ID: Run ID: **TITRATOR 1_201224C** SeqNo: **7028951** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Carbonate (as CaCO3)	922.4	10	925	0	99.7	88-110	0			
Alkalinity, Total (as CaCO3)	1005	10	1000	0	101	89-103	0			

DUP Sample ID: **20122120-01C DUP** Units: **mg/L** Analysis Date: **12/24/2020 05:06 PM**
Client ID: Run ID: **TITRATOR 1_201224C** SeqNo: **7028957** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	ND	10	0	0	0	0-0	-1.17	0	10	

The following samples were analyzed in this batch: 20121750-01B 20121750-02B 20121750-04B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **R306825** Instrument ID **Titrator 1** Method: **SW9040C**

LCS Sample ID: **LCS-R306825-R306825** Units: **s.u.** Analysis Date: **12/24/2020 05:06 PM**
Client ID: Run ID: **TITRATOR 1_201224D** SeqNo: **7029039** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.98	0.10	4	0	99.5	92-108	0			

DUP Sample ID: **20121750-01B DUP** Units: **s.u.** Analysis Date: **12/24/2020 05:06 PM**
Client ID: **PZ-1** Run ID: **TITRATOR 1_201224D** SeqNo: **7029041** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	11.16	0.10	0	0	0	0-0	10.96	1.81	5	H
Temperature	20.11	0.10	0	0	0		20.62	2.5		H

The following samples were analyzed in this batch: 20121750-01B 20121750-02B 20121750-04B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **R306910** Instrument ID **Titrator 1** Method: **A2320 B-11**

MBLK Sample ID: **MB-R306910-R306910** Units: **mg/L** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229A** SeqNo: **7033262** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (as CaCO3)	ND	10								
Alkalinity, Carbonate (as CaCO3)	ND	10								
Alkalinity, Hydroxide (as CaCO3)	ND	10								
Alkalinity, Phenolphthalein (as CaCO3	ND	10								
Alkalinity, Total (as CaCO3)	ND	10								

LCS Sample ID: **LCS-R306910-R306910** Units: **mg/L** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229A** SeqNo: **7033263** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Carbonate (as CaCO3)	923.7	10	925	0	99.9	88-110	0			
Alkalinity, Total (as CaCO3)	996.2	10	1000	0	99.6	89-103	0			

DUP Sample ID: **20121803-01E DUP** Units: **mg/L** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229A** SeqNo: **7033273** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Bicarbonate (as CaCO3)	219.1	10	0	0	0	0-0	224.9	2.6	10	
Alkalinity, Carbonate (as CaCO3)	ND	10	0	0	0	0-0	0	0	10	

DUP Sample ID: **20121990-05A DUP** Units: **mg/L** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229A** SeqNo: **7033276** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	66.2	10	0	0	0	0-0	62.95	5.03	10	

DUP Sample ID: **20122120-08C DUP** Units: **mg/L** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229A** SeqNo: **7033278** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Alkalinity, Total (as CaCO3)	127.7	10	0	0	0	0-0	127.9	0.11	10	

The following samples were analyzed in this batch: 20121750-03B 20121750-05B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **R306912** Instrument ID **Titrator 1** Method: **A4500-H B-11**

LCS Sample ID: **LCS-R306912-R306912** Units: **s.u.** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229B** SeqNo: **7033301** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.99	0.10	4	0	99.8	92-108	0			

LCS Sample ID: **LCS-R306912-R306912** Units: **s.u.** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229B** SeqNo: **7033308** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	3.99	0.10	4	0	99.8	92-108	0			

DUP Sample ID: **20122120-08C DUP** Units: **s.u.** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229B** SeqNo: **7033305** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	8.05	0.10	0	0	0	0-0	7.99	0.748	5	H
Temperature	20.95	0.10	0	0	0	0-0	20.76	0.911		H

DUP Sample ID: **20121990-05A DUP** Units: **s.u.** Analysis Date: **12/29/2020 11:55 AM**
Client ID: Run ID: **TITRATOR 1_201229B** SeqNo: **7033315** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH (laboratory)	7.51	0.10	0	0	0	0-0	7.56	0.664	5	H
Temperature	20.63	0.10	0	0	0		19.96	3.3		H

The following samples were analyzed in this batch: 20121750-03B 20121750-05B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **R307142** Instrument ID **IC3** Method: **SW9056A**

MBLK Sample ID: **MBLK-R307142** Units: **mg/L** Analysis Date: **12/30/2020 04:56 PM**
Client ID: Run ID: **IC3_201230A** SeqNo: **7043048** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	ND	0.10								
Sulfate	ND	1.0								

LCS Sample ID: **LCS-R307142** Units: **mg/L** Analysis Date: **12/30/2020 05:15 PM**
Client ID: Run ID: **IC3_201230A** SeqNo: **7043049** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	2.135	0.10	2	0	107	82-116	0			
Sulfate	9.666	1.0	10	0	96.7	90-110	0			

MS Sample ID: **20122223-01D MS** Units: **mg/L** Analysis Date: **12/31/2020**
Client ID: Run ID: **IC3_201230A** SeqNo: **7043070** Prep Date: DF: **40**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	84.26	4.0	80	0	105	82-116	0			
Sulfate	650	40	400	266.2	96	90-110	0			

MSD Sample ID: **20122223-01D MSD** Units: **mg/L** Analysis Date: **12/31/2020 12:19 AM**
Client ID: Run ID: **IC3_201230A** SeqNo: **7043071** Prep Date: DF: **40**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	83.74	4.0	80	0	105	82-116	84.26	0.614	20	
Sulfate	651.6	40	400	266.2	96.4	90-110	650	0.246	20	

The following samples were analyzed in this batch:

20121750-01B	20121750-02B	20121750-03B
20121750-04B	20121750-05B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **R307145** Instrument ID **IC4** Method: **SW9056A**

MBLK Sample ID: **MBLK-R307145** Units: **mg/L** Analysis Date: **12/30/2020 01:43 PM**
Client ID: Run ID: **IC4_201230A** SeqNo: **7043217** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	1.0								
Sulfate	ND	1.0								

LCS Sample ID: **LCS-R307145** Units: **mg/L** Analysis Date: **12/30/2020 02:39 PM**
Client ID: Run ID: **IC4_201230A** SeqNo: **7043218** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	9.353	1.0	10	0	93.5	88-110	0			
Sulfate	9.647	1.0	10	0	96.5	90-110	0			

MS Sample ID: **20121752-03B MS** Units: **mg/L** Analysis Date: **12/30/2020 07:14 PM**
Client ID: Run ID: **IC4_201230A** SeqNo: **7043233** Prep Date: DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	228.2	20	200	42.57	92.8	88-110	0			
Sulfate	1470	20	200	1251	109	90-110	0			EO

MSD Sample ID: **20121752-03B MSD** Units: **mg/L** Analysis Date: **12/30/2020 07:34 PM**
Client ID: Run ID: **IC4_201230A** SeqNo: **7043234** Prep Date: DF: **20**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	229.3	20	200	42.57	93.4	88-110	228.2	0.476	20	
Sulfate	1480	20	200	1251	114	90-110	1470	0.669	20	SEO

The following samples were analyzed in this batch:

20121750-01B	20121750-02B	20121750-03B
20121750-04B	20121750-05B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Geosyntec Consultants
Work Order: 20121750
Project: DTE- Monroe (GLP-8014)

QC BATCH REPORT

Batch ID: **R307276** Instrument ID **IC3** Method: **SW9056A**

MBLK Sample ID: **MBLK-R307276** Units: **mg/L** Analysis Date: **12/31/2020 01:42 PM**
Client ID: Run ID: **IC3_201231A** SeqNo: **7047811** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	ND	0.10								
Sulfate	ND	1.0								

LCS Sample ID: **LCS-R307276** Units: **mg/L** Analysis Date: **12/31/2020 02:01 PM**
Client ID: Run ID: **IC3_201231A** SeqNo: **7047812** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	1.976	0.10	2	0	98.8	82-116	0			
Sulfate	9.654	1.0	10	0	96.5	90-110	0			

MS Sample ID: **20122530-06A MS** Units: **mg/L** Analysis Date: **12/31/2020 06:35 PM**
Client ID: Run ID: **IC3_201231A** SeqNo: **7047826** Prep Date: DF: **40**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	87.34	4.0	80	0	109	82-116	0			
Sulfate	424.4	40	400	43.11	95.3	90-110	0			

MSD Sample ID: **20122530-06A MSD** Units: **mg/L** Analysis Date: **12/31/2020 06:54 PM**
Client ID: Run ID: **IC3_201231A** SeqNo: **7047827** Prep Date: DF: **40**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluoride	87.76	4.0	80	0	110	82-116	87.34	0.475	20	
Sulfate	425.5	40	400	43.11	95.6	90-110	424.4	0.255	20	

The following samples were analyzed in this batch: 20121750-02B 20121750-05B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Cincinnati, OH +1 513 733 5336
Everett, WA +1 425 356 2600
Fort Collins, CO +1 970 490 1511
Holland, MI +1 616 399 6070
Houston, TX +1 281 530 5656
Middletown, PA +1 717 944 5541
Spring City, PA +1 610 948 4903
Salt Lake City, UT +1 801 266 7700
South Charleston, WV +1 304 356 3168
York, PA +1 717 505 5280

Chain of Custody Form

Page ____ of ____

COC ID: 230464

ALS Project Manager:

ALS Work Order #: 20121750 33555

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	DTE - Manoe	A	Metals
Work Order		Project Number	GLP-8014	B	pH, Anions, TDS, Alkalinity
Company Name	Geosyntec Consultants	Bill To Company	Geosyntec Consultants	C	
Send Report To	Michael Coram	Invoice Attn	Michael Coram	D	
Address	2100 Commonwealth Blvd Suite 100	Address	2100 Commonwealth Blvd Suite 100	E F	
City/State/Zip	Ann Arbor, MI 48105	City/State/Zip	Ann Arbor, MI 48105	G	
Phone	(734) 794-1547	Phone	(734) 794-1547	H	
Fax	(734) 332-9063	Fax	(734) 332-9063	I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	PZ-1	12/14	8:00	GW	2	2	X	X									
2	PZ-2	12/14	9:00	↓	↓	↓	X	X									
3	PZ-3	12/15	8:00				X	X									
4	PZ-4	12/14	10:00				X	X									
5	PZ-5	12/15	10:00				X	X									
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Mike Coram

Shipment Method: FedEx

Required Turnaround Time: (Check Box) [X] Std 10 WK Days [ ] 5 WK Days [ ] Other [ ] 2 WK Days [ ] 24 Hour

Results Due Date:

Relinquished by:		Date: 12/17	Time: 3:00	Received by:	
Relinquished by:	FedEx	Date: 12/18/20	Time: 10:00	Received by (Laboratory):	
Logged by (Laboratory):	MTG	Date: 12/18/20	Time: 13:31	Checked by (Laboratory):	

Notes: Seperate Report

Cooler ID	Cooler Temp.
	5.8°C
	IR
	PH 2.3

QC Package: (Check One Box Below)
- [X] Level II Std QC
- [ ] Level III Std QC/Raw Data
- [ ] Level IV SW846/CLP
- [ ] Other
- [ ] TRRP CheckList
- [ ] TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

ALS Group, USA

Sample Receipt Checklist

Client Name: **GEOSYNTEC - AA** Date/Time Received: **18-Dec-20 10:00**

Work Order: **20121750** Received by: **MJG**

Checklist completed by Matthew Gaylord (eSignature) 18-Dec-20 (Date) Reviewed by: Chad Whelton (eSignature) 18-Dec-20 (Date)

Matrices: Groundwater

Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	5.8/5.8C	IR1	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	12/18/2020 1:33:02 PM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

Tuesday, January 19, 2021

Michael Coram
Geosyntec Consultants
2100 Commonwealth Blvd. Suite 100
Ann Arbor, MI 48105

Re: ALS Workorder: 2012398
Project Name: DTE - Monroe
Project Number: GLP-8014

Dear Mr. Coram:

Five water samples were received from Geosyntec Consultants, on 12/18/2020. The samples were scheduled for the following analyses:

Radium-226
Radium-228

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Julie Ellingson
Project Manager

Accreditations: ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
California (CA)	2926
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO010992018-1
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	TN02976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

40 CFR Part 136: All analyses for Clean Water Act samples are analyzed using the 40 CFR Part 136 specified method and include all the QC requirements.

2012398

Radium-228:
The samples were analyzed for the presence of ^{228}Ra by low background gas flow proportional counting of ^{228}Ac, which is the ingrown progeny of ^{228}Ra, according to the current revision of SOP 724.

All acceptance criteria were met.

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 2012398
Client Name: Geosyntec Consultants
Client Project Name: DTE - Monroe
Client Project Number: GLP-8014
Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
P2-1	2012398-1		WATER	14-Dec-20	8:00
P2-2	2012398-2		WATER	14-Dec-20	9:00
P2-3	2012398-3		WATER	14-Dec-20	8:00
P2-4	2012398-4		WATER	14-Dec-20	10:00
P2-5	2012398-5		WATER	14-Dec-20	10:00

Cincinnati, OH +1 513 733 5336
Fort Collins, CO +1 970 490 1511
Everett, WA +1 425 356 2600
Holland, MI +1 616 399 6070
Houston, TX +1 281 530 5656
Spring City, PA +1 610 948 4903
South Charleston, WV +1 304 356 3168
Middletown, PA +1 717 944 5541
Salt Lake City, UT +1 801 266 7700
York, PA +1 717 505 5280

Chain of Custody Form

Page 1 of 1

COC ID: 230463

2012398

ALS Project Manager:

ALS Work Order #: 33556

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order		Project Name	DTE - Monroe	A	Radium 226 and 228 combined
Work Order		Project Number	GLP - 8014	B	
Company Name	Geosyntec Consultants	Bill To Company	Geosyntec Consultants	C	
Send Report To	Michael Coram	Invoice Attn	Michael Coram	D	
Address	2100 Commonwealth Blvd Suite 100	Address	2100 Commonwealth Blvd Suite 100	E F	
City/State/Zip	Ann Arbor, MI 48105	City/State/Zip	Ann Arbor, MI 48105	G	
Phone	(734) 794-1547	Phone	(734) 794-1547	H	
Fax	(734) 332-8063	Fax	(734) 332-8063	I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	PZ-1 1	12/14	8:00	GW	2	2	X										
2	PZ-2 2	12/14	9:00	↓	↓	↓	X										
3	PZ-3 3	12/15	8:00				X										
4	PZ-4 4	12/14	10:00				X										
5	PZ-5 5	12/15	10:00				X										
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Mike Coram

Shipment Method: FedEx

Required Turnaround Time: (Check Box) ☒ Std 10 WK Days ☐ 5 WK Days ☐ Other ☐ 2 WK Days ☐ 24 Hour

Results Due Date:

Relinquished by:	Date: 12/17	Time: 3:00	Received by:	Notes: Seperate Report
Relinquished by:	Date:	Time:	Received by (Laboratory):	
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
☒ Level II Std QC ☐ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client Name/ID: Geosyntec MI Workorder No: 2012398

Project Manager: Initials: RGA Date: 12/18/2020

1. Are airbills / shipping documents present and/or removable?	☐ Drop Off	☑ YES	☐ NO			
2. Are custody seals on **shipping** containers intact?	☐ NONE	☑ YES	☐ NO*			
3. Are custody seals on **sample** containers intact?	☑ NONE	☐ YES	☐ NO*			
4. Is there a COC (chain-of-custody) present?		☑ YES	☐ NO*			
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		☑ YES	☐ NO*			
6. Are short-hold samples present?		☐ YES	☑ NO			
7. Are all samples within holding times for the requested analyses?		☑ YES	☐ NO*			
8. Were all sample containers received intact? (not broken or leaking)		☑ YES	☐ NO*			
9. Is there sufficient sample for the requested analyses?		☑ YES	☐ NO*			
10. Are samples in proper containers for requested analyses? (form 250, *Sample Handling Guidelines*)		☑ YES	☐ NO*			
11. Are all aqueous samples preserved correctly, if required?	☐ N/A	☐ YES	☑ NO*			
12. Were unpreserved samples pH checked, if required?	☑ N/A	☐ YES	☐ NO			
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm in diameter?	☑ N/A	☐ YES	☐ NO			
14. Were the samples shipped on ice?		☑ YES	☐ NO			
15. Were cooler temperatures measured at 0.1 - 6.0°C? IR gun used*: ☐ #3 ☑ #5	☐ Rad Only	☑ YES	☐ NO			

Cooler #: 1

Temperature (°C): 3.2

# of custody seals on cooler: 1

External mR/hr reading: 12

Background mR/hr reading: 9

Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? (If no, see Form 008) ☐ N/A ☑ YES ☐ NO

* Please provide details below for 'NO' responses in gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

11) Sample 2012398-1-1,2 had a pH of 4, 0.5mL of HNO3 was added to achieve a pH<2

All client bottle ID's vs ALS lab ID's double-checked by: RGA

If applicable, was the client contacted? ☐ YES ☒ N/A Contact Name Date:

Project Manager Signature / Date: 12/21/20

Form 201r30.xls
(06/04/2020)

+IR Gun #3, VWR SN 170647571
+IR Gun #5, VWR SN 192272629

ORIGIN ID:DEOA (248) 390-5748
MIKE CORAM

SUITE 100
2100 COMMONWEALTH BLVD STE 100
ANN ARBOR, MI 48105
UNITED STATES US

SHIP DATE: 17DEC20
ACTWGT: 56.90 LB
CAD: 6987568/SSFO2121
DIMS: 25x14x13 IN

BILL THIRD PARTY

Part # 156287-436 RRDB EXP 11/21

TO ALS FT. COLLINS
ATTN: SAMPLE RECIEVING
225 COMMERCE DR

FORT COLLINS CO 80524

(616) 582-5201 REF:
INV:
PO: DEPT:

12-1
3.2

FedEx Express

FRI - 18 DEC 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7816 0264 9731

DSR
80524
CO-US DEN

NA FTCA

Client:	Geosyntec Consultants	**Date:**	*19-Jan-21*
Project:	GLP-8014 DTE - Monroe	**Work Order:**	2012398
Sample ID:	P2-1	**Lab ID:**	2012398-1
Legal Location:		**Matrix:**	WATER
Collection Date:	12/14/2020 08:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **1/4/2021**	PrepBy: **TRB**
Ra-226	ND (+/- 0.13)	U	0.24	pCi/l	NA	1/12/2021 11:32
Carr: BARIUM	*99.8*		*40-110*	*%REC*	DL = NA	1/12/2021 11:32
Radium-228 Analysis by GFPC		**SOP 724**			Prep Date: **1/11/2021**	PrepBy: **RGS**
COMBINED RADIUM (226+228)	**1.89 (+/- 0)**		**0.85**	**pCi/l**	NA	1/15/2021 07:48
Ra-228	**1.89 (+/- 0.64)**		**0.85**	**pCi/l**	NA	1/15/2021 07:48
Carr: BARIUM	*92.1*		*40-110*	*%REC*	DL = NA	1/15/2021 07:48

Client:	Geosyntec Consultants	**Date:**	*19-Jan-21*
Project:	GLP-8014 DTE - Monroe	**Work Order:**	2012398
Sample ID:	P2-2	**Lab ID:**	2012398-2
Legal Location:		**Matrix:**	WATER
Collection Date:	12/14/2020 09:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **1/4/2021**	PrepBy: **TRB**
Ra-226	ND (+/- 0.19)	U	0.36	pCi/l	NA	1/12/2021 11:32
Carr: BARIUM	*91.2*		*40-110*	*%REC*	DL = NA	1/12/2021 11:32
Radium-228 Analysis by GFPC		**SOP 724**			Prep Date: **1/11/2021**	PrepBy: **RGS**
COMBINED RADIUM (226+228)	ND (+/- 0)	U	0.79	pCi/l	NA	1/15/2021 07:48
Ra-228	ND (+/- 0.42)	U	0.79	pCi/l	NA	1/15/2021 07:48
Carr: BARIUM	*92.8*		*40-110*	*%REC*	DL = NA	1/15/2021 07:48

Client:	Geosyntec Consultants	**Date:**	*19-Jan-21*
Project:	GLP-8014 DTE - Monroe	**Work Order:**	2012398
Sample ID:	P2-3	**Lab ID:**	2012398-3
Legal Location:		**Matrix:**	WATER
Collection Date:	12/14/2020 08:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **1/4/2021**	PrepBy: **TRB**
Ra-226	**0.55 (+/- 0.35)**		**0.37**	**pCi/l**	NA	1/12/2021 11:32
Carr: BARIUM	*92.2*		*40-110*	*%REC*	DL = NA	1/12/2021 11:32
Radium-228 Analysis by GFPC		**SOP 724**			Prep Date: **1/11/2021**	PrepBy: **RGS**
COMBINED RADIUM (226+228)	**1.74 (+/- 0)**		**0.85**	**pCi/l**	NA	1/15/2021 07:48
Ra-228	**1.19 (+/- 0.51)**		**0.85**	**pCi/l**	NA	1/15/2021 07:48
Carr: BARIUM	*92.5*		*40-110*	*%REC*	DL = NA	1/15/2021 07:48

Client:	Geosyntec Consultants	**Date:**	*19-Jan-21*
Project:	GLP-8014 DTE - Monroe	**Work Order:**	2012398
Sample ID:	P2-4	**Lab ID:**	2012398-4
Legal Location:		**Matrix:**	WATER
Collection Date:	12/14/2020 10:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **1/4/2021**	PrepBy: **TRB**
Ra-226	ND (+/- 0.27)	U	0.47	pCi/l	NA	1/12/2021 11:32
Carr: BARIUM	*96*		*40-110*	*%REC*	DL = NA	1/12/2021 11:32
Radium-228 Analysis by GFPC		**SOP 724**			Prep Date: **1/11/2021**	PrepBy: **RGS**
COMBINED RADIUM (226+228)	ND (+/- 0)	U	0.84	pCi/l	NA	1/15/2021 07:48
Ra-228	ND (+/- 0.38)	U	0.84	pCi/l	NA	1/15/2021 07:48
Carr: BARIUM	*91.4*		*40-110*	*%REC*	DL = NA	1/15/2021 07:48

Client:	Geosyntec Consultants	**Date:**	*19-Jan-21*
Project:	GLP-8014 DTE - Monroe	**Work Order:**	2012398
Sample ID:	P2-5	**Lab ID:**	2012398-5
Legal Location:		**Matrix:**	WATER
Collection Date:	12/14/2020 10:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **1/4/2021**	PrepBy: **TRB**
Ra-226	ND (+/- 0.25)	U	0.37	pCi/l	NA	1/12/2021 11:54
Carr: BARIUM	*97.7*		*40-110*	*%REC*	DL = NA	1/12/2021 11:54
Radium-228 Analysis by GFPC		**SOP 724**			Prep Date: **1/11/2021**	PrepBy: **RGS**
COMBINED RADIUM (226+228)	ND (+/- 0)	U	0.78	pCi/l	NA	1/15/2021 07:48
Ra-228	ND (+/- 0.34)	U	0.78	pCi/l	NA	1/15/2021 07:48
Carr: BARIUM	*91.4*		*40-110*	*%REC*	DL = NA	1/15/2021 07:48

Client:	Geosyntec Consultants	**Date:**	*19-Jan-21*
Project:	GLP-8014 DTE - Monroe	**Work Order:**	2012398
Sample ID:	P2-5	**Lab ID:**	2012398-5
Legal Location:		**Matrix:**	WATER
Collection Date:	12/14/2020 10:00	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE210104-1-3** Instrument ID: **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE210104-1** Units: **pCi/l** Analysis Date: **1/12/2021 12:16**

Client ID: Run ID: **RE210104-1A** Prep Date: **1/4/2021** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226	46 (+/- 12)	0	46.8		98.8	67-120					P
Carr: BARIUM	15230		15490		98.3	40-110					

LCSD Sample ID: **RE210104-1** Units: **pCi/l** Analysis Date: **1/12/2021 12:16**

Client ID: Run ID: **RE210104-1A** Prep Date: **1/4/2021** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226	40 (+/- 10)	1	46.8		84.5	67-120		46	0.44	2.13	P
Carr: BARIUM	15150		15500		97.8	40-110		15230			

MB Sample ID: **RE210104-1** Units: **pCi/l** Analysis Date: **1/12/2021 12:16**

Client ID: Run ID: **RE210104-1A** Prep Date: **1/4/2021** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Ra-226	ND	0.31									U
Carr: BARIUM	15370		15490		99.2	40-110					

The following samples were analyzed in this batch:

2012398-1	2012398-2	2012398-3
2012398-4	2012398-5	

Client: Geosyntec Consultants
Work Order: 2012398
Project: GLP-8014 DTE - Monroe

QC BATCH REPORT

Batch ID: **RA210111-1-5** Instrument ID: **GASPROP** Method: **Radium-228 Analysis by GFPC**

LCS Sample ID: **RA210111-1** Units: **ug** Analysis Date: **1/15/2021 07:48**
Client ID: Run ID: **RA210111-1A** Prep Date: **1/11/2021** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Carr: BARIUM	34290		36030		95.2	40-110					
Ra-228	17.3 (+/- 4.1)	0.7	22.86		75.6	70-130					P

LCSD Sample ID: **RA210111-1** Units: **ug** Analysis Date: **1/15/2021 07:48**
Client ID: Run ID: **RA210111-1A** Prep Date: **1/11/2021** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Carr: BARIUM	33960		36030		94.2	40-110		34290			
Ra-228	22.7 (+/- 5.3)	0.7	22.86		99.3	70-130		17.3	0.81	2.13	P

MB Sample ID: **RA210111-1** Units: **ug** Analysis Date: **1/15/2021 07:48**
Client ID: Run ID: **RA210111-1A** Prep Date: **1/11/2021** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref Value	DER	DER Limit	Qual
Carr: BARIUM	34280		36150		94.8	40-110					
Ra-228	ND	0.77									U

The following samples were analyzed in this batch:

2012398-1	2012398-2	2012398-3
2012398-4	2012398-5	

APPENDIX M – ALD HYDRAULIC CONDUCTIVITY TEST RESULTS

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B2-ST-1 (20-22')	20L128	17.5	115.6	-	-	2/19/2021	0	5.9E-09	0.0430	-	-	-	-	
						2/26/2021	7	5.8E-09	0.0430	-	-	-	-	
						3/05/2021	14	5.4E-09	0.0771	-	-	-	-	
						3/08/2021	17	5.1E-09	0.0870	12.8	8.2	-	-	
						3/12/2021	21	6.2E-09	0.1188	-	-	-	-	
						3/19/2021	28	5.5E-09	0.1594	-	-	-	-	
						3/26/2021	35	5.0E-09	0.1870	-	-	-	-	
						3/30/2021	39	5.1E-09	0.2014	12.7	8.3	-	-	
						4/02/2021	42	5.9E-09	0.2259	-	-	-	-	
						4/09/2021	49	5.9E-09	0.2683	-	-	-	-	
						4/16/2021	56	5.3E-09	0.2997	12.6	8.3	4800	3000	
						4/23/2021	63	5.9E-09	0.3492	-	-	-	-	
						4/30/2021	70	5.7E-09	0.3857	-	-	-	-	
						5/03/2021	73	5.3E-09	0.3969	12.9	8.4	-	-	
						5/07/2021	77	6.5E-09	0.4294	-	-	-	-	
						5/14/2021	84	5.7E-09	0.4700	-	-	-	-	
						5/19/2021	89	5.4E-09	0.4925	12.8	8.5	-	-	
						5/21/2021	91	5.1E-09	0.5106	-	-	-	-	
						5/28/2021	98	5.6E-09	0.5539	-	-	-	-	
						6/04/2021	105	4.7E-09	0.5836	12.6	8.5	4300	1744	
						6/11/2021	112	6.0E-09	0.6359	-	-	-	-	
						6/18/2021	119	5.5E-09	0.6717	-	-	-	-	
						6/22/2021	123	4.5E-09	0.6850	12.3	8.6	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.5 4553 2059

PN1016 MABA Geos Chic Omer Bozok 773-710-8885 obozok@geosyntec.com

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B2-ST-1 (20-22')	20L128	17.5	115.6	-	-	6/25/2021	126	6.0E-09	0.7110	-	-	-	-	
						7/02/2021	133	6.0E-09	0.7563	-	-	-	-	
						7/09/2021	140	5.2E-09	0.7901	-	-	-	-	
						7/12/2021	143	5.5E-09	0.7942	12.7	8.9	-	-	
						7/16/2021	147	6.5E-09	0.8273	-	-	-	-	
						7/23/2021	154	5.6E-09	0.8625	-	-	-	-	
						7/30/2021	161	5.2E-09	0.8929	12.6	8.6	4560	1434	
						8/6/2021	168	5.7E-09	0.9424	-	-	-	-	
						8/13/2021	175	4.9E-09	0.9762	-	-	-	-	
						8/18/2021	180	4.8E-09	0.9946	12.6	8.9	-	-	
						8/20/2021	182	5.4E-09	1.0116	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.5 4553 2059

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B4-ST-2 (40-42')	20L130	17.9	112.2	-	-	2/19/2021	0	4.6E-09	0.0176	-	-	-	-	
						2/26/2021	7	3.6E-09	0.0176	-	-	-	-	
						3/05/2021	14	3.6E-09	0.0406	-	-	-	-	
						3/12/2021	21	3.0E-09	0.0521	-	-	-	-	
						3/19/2021	28	2.8E-09	0.0651	-	-	-	-	
						3/22/2021	31	2.8E-09	0.0665	12.7	8.2	-	-	
						3/26/2021	35	3.6E-09	0.0760	-	-	-	-	
						4/02/2021	42	3.2E-09	0.0987	-	-	-	-	
						4/09/2021	49	3.2E-09	0.1175	-	-	-	-	
						4/16/2021	56	2.7E-09	0.1272	-	-	-	-	
						4/23/2021	63	2.4E-09	0.1388	12.9	8.6	-	-	
						4/30/2021	70	3.9E-09	0.1670	-	-	-	-	
						5/07/2021	77	3.7E-09	0.1900	-	-	-	-	
						5/14/2021	84	3.3E-09	0.2079	-	-	-	-	
						5/21/2021	91	3.0E-09	0.2231	-	-	-	-	
						5/23/2021	93	2.8E-09	0.2263	12.9	8.6	4840	1126	
						5/28/2021	98	3.7E-09	0.2461	-	-	-	-	
						6/04/2021	105	3.4E-09	0.2692	-	-	-	-	
						6/11/2021	112	3.5E-09	0.2888	-	-	-	-	
						6/18/2021	119	2.7E-09	0.3029	-	-	-	-	
						6/22/2021	123	2.6E-09	0.3092	12.4	8.4	-	-	
						6/25/2021	126	2.9E-09	0.3216	-	-	-	-	
						7/02/2021	133	3.9E-09	0.3512	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.4 4840 1126

PN1016 MABA Geos Chic Omer Bozok 773-710-8885 obozok@geosyntec.com

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B4-ST-2 (40-42')	20L130	17.9	112.2	-	-	7/09/2021	140	3.4E-09	0.3777	-	-	-	-	
						7/16/2021	147	3.3E-09	0.3976	-	-	-	-	
						7/23/2021	154	3.3E-09	0.4128	-	-	-	-	
						7/30/2021	161	3.0E-09	0.4261	12.4	8.5	-	-	
						8/06/2021	168	3.3E-09	0.4500	-	-	-	-	
						8/13/2021	175	3.3E-09	0.4724	-	-	-	-	
						8/20/2021	182	3.5E-09	0.4894	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.4 4840 1126

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B4-ST-4 (70-72.5')	20L132	10.4	130.4	-	-	2/19/2021	0	1.8E-08	0.1220	-	-	-	-	
						2/26/2021	7	1.4E-08	0.1220	-	-	-	-	
						3/02/2021	11	1.3E-08	0.1598	12.8	8.2	-	-	
						3/05/2021	14	1.5E-08	0.2297	-	-	-	-	
						3/10/2021	19	1.4E-08	0.2953	12.9	8.3	-	-	
						3/12/2021	21	1.5E-08	0.3452	-	-	-	-	
						3/16/2021	25	1.5E-08	0.4091	13.0	8.5	4700	1534	
						3/19/2021	28	1.4E-08	0.4646	-	-	-	-	
						3/26/2021	35	1.4E-08	0.5185	12.7	8.5	-		
						4/02/2021	42	1.4E-08	0.6449	12.9	8.7	-	-	
						4/09/2021	49	1.3E-08	0.7625	12.4	8.6	4980	1274	
						4/16/2021	56	1.3E-08	0.8772	12.5	8.7	-	-	
						4/23/2021	63	1.2E-08	0.9936	12.7	8.5	-	-	
						4/30/2021	70	1.3E-08	1.1112	12.6	8.8	4120	1082	
						5/07/2021	77	1.3E-08	1.2246	12.9	8.7	-	-	
						5/14/2021	84	1.2E-08	1.3353	12.5	8.8	-	-	
						5/21/2021	91	1.2E-08	1.4508	-	-	-	-	
						5/23/2021	93	1.1E-08	1.4695	13.1	8.8	5230	1179	
						5/28/2021	98	1.2E-08	1.5563	-	-	-	-	
						6/01/2021	102	1.1E-08	1.6019	13.1	8.8	-	-	
						6/04/2021	105	1.2E-08	1.6580	-	-	-	-	
						6/10/2021	111	1.2E-08	1.7352	12.8	8.9	-	-	
						6/11/2021	112	1.2E-08	1.7539	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.8 8.7 4650 1211

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B4-ST-4 (70-72.5')	20L132	10.4	130.4	-	-	6/18/2021	119	1.1E-08	1.8534	13.1	8.8	4630	1162	
						6/25/2021	126	1.2E-08	1.9671	12.5	8.9	-	-	
						7/02/2021	133	1.2E-08	2.0783	-	-	-	-	
						7/06/2021	137	1.2E-08	2.1222	12.8	8.6	-	-	
						7/09/2021	140	1.1E-08	2.1756	-	-	-	-	
						7/16/2021	147	1.1E-08	2.2568	12.4	8.7	4710	1135	
						7/23/2021	154	1.1E-08	2.3688	-	-	-	-	
						7/27/2021	158	1.1E-08	2.4088	12.7	8.8	-	-	
						7/30/2021	161	1.1E-08	2.4622	-	-	-	-	
						8/06/2021	168	1.0E-08	2.5386	12.7	8.8	-	-	
						8/13/2021	175	1.0E-08	2.6367	-	-	-	-	
						8/16/2021	178	1.1E-08	2.6663	12.7	8.8	4180	1110	
						8/20/2021	182	1.1E-08	2.7318	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.8 8.7 4650 1211

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Compatibility Test Results

Project Name: Monroe Ash Basin ALD

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Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B6-ST-1 (25-27')	20L134	17.5	115.3	-	-	2/19/2021	0	9.7E-09	0.0607	-	-	-	-	
						2/26/2021	7	8.8E-09	0.0607	-	-	-	-	
						3/05/2021	14	7.9E-09	0.1013	-	-	-	-	
						3/08/2021	17	7.2E-09	0.1117	12.9	8.4	-	-	
						3/12/2021	21	8.7E-09	0.1489	-	-	-	-	
						3/19/2021	28	7.8E-09	0.1933	-	-	-	-	
						3/24/2021	33	6.8E-09	0.2136	12.9	8.6	-	-	
						3/26/2021	35	8.1E-09	0.2311	-	-	-	-	
						4/02/2021	42	7.7E-09	0.2849	-	-	-	-	
						4/07/2021	47	7.8E-09	0.3065	12.7	8.2	5010	1614	
						4/09/2021	49	8.7E-09	0.3253	-	-	-	-	
						4/16/2021	56	8.3E-09	0.3794	-	-	-	-	
						4/20/2021	60	7.0E-09	0.3991	12.9	8.3	-	-	
						4/23/2021	63	7.9E-09	0.4307	-	-	-	-	
						4/30/2021	70	8.3E-09	0.4885	-	-	-	-	
						5/05/2021	75	7.5E-09	0.5154	13.0	8.5	-	-	
						5/07/2021	77	9.0E-09	0.5405	-	-	-	-	
						5/14/2021	84	7.9E-09	0.5927	-	-	-	-	
						5/18/2021	88	7.5E-09	0.6146	13.2	8.5	5040	1407	
						5/21/2021	91	8.4E-09	0.6440	-	-	-	-	
						5/28/2021	98	7.7E-09	0.6922	12.9	8.6	-	-	
						6/04/2021	105	7.7E-09	0.7585	-	-	-	-	
						6/11/2021	112	7.4E-09	0.8019	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.8 8.5 4685 1429

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B6-ST-1 (25-27')	20L134	17.5	115.3	-	-	6/14/2021	115	7.1E-09	0.8157	12.9	8.6	-	-	
						6/18/2021	119	8.0E-09	0.8520	-	-	-	-	
						6/25/2021	126	8.1E-09	0.8956	-	-	-	-	
						6/28/2021	129	6.9E-09	0.9095	12.6	8.7	4520	1515	
						7/02/2021	133	7.7E-09	0.9427	-	-	-	-	
						7/09/2021	140	6.8E-09	0.9877	-	-	-	-	
						7/13/2021	144	6.7E-09	1.0056	12.6	8.6	-	-	
						7/16/2021	147	7.0E-09	1.0312	-	-	-	-	
						7/23/2021	154	7.3E-09	1.0809	-	-	-	-	
						7/29/2021	160	6.6E-09	1.1091	12.4	8.9	-	-	
						7/30/2021	161	7.2E-09	1.1197	-	-	-	-	
						8/06/2021	168	7.0E-09	1.1713	-	-	-	-	
						8/13/2021	175	6.5E-09	1.2076	12.4	8.5	4170	1178	
						8/20/2021	182	7.6E-09	1.2755	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.8 8.5 4685 1429

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B6-ST-3 (55-57.5')	20L136	12.8	126.5	-	-	2/19/2021	0	1.2E-08	0.0817	-	-	-	-	
						2/26/2021	7	1.1E-08	0.0817	-	-	-	-	
						3/05/2021	14	9.8E-09	0.1325	12.9	8.2	-	-	
						3/12/2021	21	1.1E-08	0.1822	-	-	-	-	
						3/15/2021	24	1.1E-08	0.2045	13.0	8.1	-	-	
						3/19/2021	28	1.1E-08	0.2466	-	-	-	-	
						3/26/2021	35	1.1E-08	0.3111	-	-	-	-	
						3/29/2021	38	9.8E-09	0.3313	12.8	8.1	4900	1683	
						4/02/2021	42	1.0E-08	0.3547	-	-	-	-	
						4/09/2021	49	1.1E-08	0.4152	12.5	8.1	-	-	
						4/16/2021	56	1.1E-08	0.5045	-	-	-	-	
						4/19/2021	59	9.7E-09	0.5271	12.8	8.0	-	-	
						4/23/2021	63	1.1E-08	0.5790	-	-	-	-	
						4/29/2021	69	1.1E-08	0.6344	12.9	8.3	4800	1403	
						4/30/2021	70	1.1E-08	0.6524	-	-	-	-	
						5/07/2021	77	1.1E-08	0.7288	12.9	8.7	-	-	
						5/14/2021	84	1.1E-08	0.8141	-	-	-	-	
						5/18/2021	88	9.4E-09	0.8451	13.0	8.3	-	-	
						5/21/2021	91	1.1E-08	0.8872	-	-	-	-	
						5/28/2021	98	9.6E-09	0.9502	12.7	8.2	4720	1187	
						6/04/2021	105	1.0E-08	1.0309	-	-	-	-	
						6/07/2021	108	9.9E-09	1.0550	12.9	8.8	-	-	
						6/11/2021	112	1.1E-08	1.1108	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.5 4730 1342

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B6-ST-3 (55-57.5')	20L136	12.8	126.5	-	-	6/18/2021	119	9.5E-09	1.1713	13.0	8.6	-	-	
						6/25/2021	126	1.2E-08	1.2615	-	-	-	-	
						6/28/2021	129	1.0E-08	1.2869	12.5	8.8	4350	1128	
						7/02/2021	133	1.1E-08	1.3434	-	-	-	-	
						7/09/2021	140	9.4E-09	1.4097	12.5	8.9	-	-	
						7/16/2021	147	1.0E-08	1.5004	-	-	-	-	
						7/20/2021	151	1.0E-08	1.5342	12.4	8.7	-	-	
						7/23/2021	154	1.1E-08	1.5800	-	-	-	-	
						7/30/2021	161	1.0E-08	1.6498	12.5	8.7	4880	1309	
						8/06/2021	168	1.0E-08	1.7200	-	-	-	-	
						8/10/2021	172	1.0E-08	1.7524	12.5	8.6	-	-	
						8/13/2021	175	1.1E-08	1.7931	-	-	-	-	
						8/20/2021	182	9.8E-09	1.8601	12.7	8.8	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.5 4730 1342

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Compatibility Test Results

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Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B6-ST-4 (65-67.5')	20L137	10.4	130.7	-	-	2/19/2021	0	1.5E-08	0.1209	-	-	-	-	
						2/26/2021	7	1.3E-08	0.1209	-	-	-	-	
						3/02/2021	11	1.2E-08	0.1599	13.0	8.1	-	-	
						3/05/2021	14	1.4E-08	0.1949	-	-	-	-	
						3/12/2021	21	1.3E-08	0.2978	12.8	8.3	-	-	
						3/19/2021	28	1.3E-08	0.4196	-	-	-	-	
						3/22/2021	31	1.2E-08	0.4476	12.9	8.2	5090	1708	
						3/26/2021	35	1.3E-08	0.5204	-	-	-	-	
						3/30/2021	39	1.3E-08	0.5755	13.0	8.3	-	-	
						4/02/2021	42	1.3E-08	0.6386	-	-	-	-	
						4/08/2021	48	1.2E-08	0.7140	12.9	7.8	-	-	
						4/09/2021	49	1.2E-08	0.7367	-	-	-	-	
						4/16/2021	56	1.2E-08	0.8458	12.8	7.8	4960	1466	
						4/23/2021	63	1.2E-08	0.9356	-	-	-	-	
						4/26/2021	66	1.1E-08	0.9649	12.5	8.0	-	-	
						4/30/2021	70	1.3E-08	1.0398	-	-	-	-	
						5/04/2021	74	1.2E-08	1.0880	12.6	8.4	-	-	
						5/07/2021	77	1.0E-08	1.1362	-	-	-	-	
						5/14/2021	84	1.1E-08	1.2299	12.4	8.4	3970	1043	
						5/21/2021	91	1.1E-08	1.3434	-	-	-	-	
						5/25/2021	95	1.0E-08	1.3973	12.9	8.4	-	-	
						5/28/2021	98	1.1E-08	1.4411	-	-	-	-	
						6/03/2021	104	9.6E-09	1.5019	12.8	8.4	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.4 4522 1201

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

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Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B6-ST-4 (65-67.5')	20L137	10.4	130.7	-	-	6/04/2021	105	9.2E-09	1.5019	-	-	-	-	
						6/11/2021	112	1.0E-08	1.5970	-	-	-	-	
						6/14/2021	115	1.0E-08	1.6246	13.0	8.6	4300	1057	
						6/18/2021	119	1.1E-08	1.6903	-	-	-	-	
						6/24/2021	125	1.0E-08	1.7538	12.6	8.7	-	-	
						6/25/2021	126	1.0E-08	1.7735	-	-	-	-	
						7/02/2021	133	1.1E-08	1.8743	12.7	8.8	-	-	
						7/09/2021	140	1.1E-08	1.9833	-	-	-	-	
						7/12/2021	143	1.0E-08	2.0118	12.7	8.5	4100	966	
						7/16/2021	147	1.1E-08	2.0810	-	-	-	-	
						7/23/2021	154	1.1E-08	2.1607	12.3	8.5	-	-	
						7/30/2021	161	1.1E-08	2.2733	-	-	-	-	
						8/02/2021	164	1.1E-08	2.3057	12.7	8.6	-	-	
						8/06/2021	168	1.2E-08	2.3749	-	-	-	-	
						8/13/2021	175	9.9E-09	2.4489	12.4	8.6	4710	963	
						8/20/2021	182	1.0E-08	2.5584	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.8 8.3 4484 1248

PN1016 MABA Geos Chic Omer Bozok 773-710-8885 obozok@geosyntec.com

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

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Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B9-ST-2 (40-42')	20L140	15.4	111.4	-	-	2/19/2021	0	1.1E-08	0.0671	-	-	-	-	
						2/26/2021	7	1.0E-08	0.0671	-	-	-	-	
						3/05/2021	14	9.4E-09	0.1098	12.8	7.9	-	-	
						3/12/2021	21	1.0E-08	0.1712	12.7	8.2	-	-	
						3/19/2021	28	1.1E-08	0.2469	-	-	-	-	
						3/24/2021	33	9.4E-09	0.2790	12.9	8.3	4940	1796	
						3/26/2021	35	1.0E-08	0.2923	-	-	-	-	
						4/02/2021	42	1.0E-08	0.3574	12.9	8.6	-	-	
						4/09/2021	49	1.1E-08	0.4318	-	-	-	-	
						4/13/2021	53	1.0E-08	0.4605	12.8	8.6	-	-	
						4/16/2021	56	1.1E-08	0.5002	-	-	-	-	
						4/23/2021	63	9.8E-09	0.5583	13.0	8.6	4380	1263	
						4/30/2021	70	1.1E-08	0.6370	-	-	-	-	
						5/03/2021	73	1.1E-08	0.6580	12.9	8.7	-	-	
						5/07/2021	77	1.2E-08	0.7098	-	-	-	-	
						5/12/2021	82	1.1E-08	0.7525	13.0	8.7	-	-	
						5/14/2021	84	1.1E-08	0.7782	-	-	-	-	
						5/21/2021	91	1.0E-08	0.8449	12.6	8.7	4940	1092	
						5/28/2021	98	1.0E-08	0.9203	12.5	8.6	-	-	
						6/04/2021	105	1.1E-08	1.0004	-	-	-	-	
						6/07/2021	108	1.0E-08	1.0234	12.8	9.0	-	-	
						6/11/2021	112	1.1E-08	1.0732	-	-	-	-	
						6/17/2021	118	1.0E-08	1.1229	12.5	8.8	4450	1170	
										12.7	8.6	4692	1232	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings.

PN1016 MABA Geos Chic Omer Bozok 773-710-8885 obozok@geosyntec.com

Excel Geotechnical Testing, Inc.
"Excellence in Testing"

953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B9-ST-2 (40-42')	20L140	15.4	111.4	-	-	6/18/2021	119	1.1E-08	1.1396	-	-	-	-	
						6/25/2021	126	1.1E-08	1.2123	12.3	8.7	-	-	
						7/02/2021	133	1.1E-08	1.2964	-	-	-	-	
						7/06/2021	137	1.2E-08	1.3308	12.4	8.9	-	-	
						7/09/2021	140	1.1E-08	1.3715	-	-	-	-	
						7/16/2021	147	1.0E-08	1.4319	12.6	8.6	4770	1045	
						7/23/2021	154	1.1E-08	1.5143	-	-	-	-	
						7/27/2021	158	1.1E-08	1.5443	12.9	8.8	-	-	
						7/30/2021	161	1.1E-08	1.5854	-	-	-	-	
						8/06/2021	168	1.1E-08	1.6494	12.8	8.7	-	-	
						8/13/2021	175	1.1E-08	1.7319	-	-	-	-	
						8/17/2021	179	1.0E-08	1.7599	12.8	8.9	4670	1025	
						8/20/2021	182	1.1E-08	1.8013	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.6 4692 1232

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Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B9-ST-3 (55-57')	20L141	10.0	131.1	-	-	2/19/2021	0	2.7E-08	0.1538	-	-	-	-	
						2/26/2021	7	2.0E-08	0.1538	12.9	8.1	-	-	
						3/05/2021	14	1.9E-08	0.3054	12.6	8.2	-	-	
						3/12/2021	21	1.8E-08	0.4066	12.8	8.1	5030	1540	
						3/19/2021	28	1.7E-08	0.5500	12.8	8.6	-	-	
						3/26/2021	35	1.8E-08	0.6632	12.6	8.5	-	-	
						4/01/2021	41	2.0E-08	0.7959	13.0	8.4	4990	1302	
						4/02/2021	42	2.0E-08	0.7959	-	-	-	-	
						4/08/2021	48	1.7E-08	0.8691	12.7	7.9	-	-	
						4/09/2021	49	1.9E-08	0.8993	-	-	-	-	
						4/14/2021	54	1.7E-08	0.9992	13.0	8.4	-	-	
						4/16/2021	56	1.8E-08	1.0496	-	-	-	-	
						4/20/2021	60	1.6E-08	1.1198	13.0	8.4	4980	2430	
						4/23/2021	63	1.7E-08	1.1926	-	-	-	-	
						4/27/2021	67	1.5E-08	1.2546	12.4	8.2	-	-	
						4/30/2021	70	1.7E-08	1.3291	-	-	-	-	
						5/04/2021	74	1.6E-08	1.3881	12.6	8.5	-	-	
						5/07/2021	77	1.5E-08	1.4591	-	-	-	-	
						5/14/2021	84	1.4E-08	1.5690	12.3	8.8	4230	1155	
						5/21/2021	91	1.5E-08	1.6943	12.9	8.8	-	-	
						5/28/2021	98	1.5E-08	1.8231	12.6	9.0	-	-	
						6/04/2021	105	1.4E-08	1.9467	12.2	8.6	5080	885	
						6/11/2021	112	1.4E-08	2.0724	12.8	8.5	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.5 4811 1292

PN1016 MABA Geos Chic Omer Bozok 773-710-8885 obozok@geosyntec.com

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"Excellence in Testing"

953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Test Results Summary

Compatibility Test Results

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information												Remarks
		Initial Conditions		Final Conditions		Date	Number of Days After Injection	Permeability	Pore Volumes Passed After Injection	pH		Electrical Conductivity		
		Moisture Content	Dry Unit Weight	Moisture Content	Dry Unit Weight			Notes 1 & 2	Note 1	In Flow	Out Flow	In Flow	Out Flow	
(-)	(-)	(%)	(pcf)	(%)	(pcf)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)	
B9-ST-3 (55-57')	20L141	10.0	131.1	-	-	6/18/2021	119	1.4E-08	2.2003	13.0	8.5	-	-	
						6/25/2021	126	1.4E-08	2.3291	12.3	8.5	5010	900	
						7/02/2021	133	1.4E-08	2.4557	13.0	8.5	-	-	
						7/09/2021	140	1.4E-08	2.5936	13.2	8.6	-	-	
						7/16/2021	147	1.4E-08	2.7197	12.3	8.6	4520	1056	
						7/23/2021	154	1.4E-08	2.8455	12.4	8.6	-	-	
						7/30/2021	161	1.4E-08	2.9626	12.3	8.6	-	-	
						8/06/2021	168	1.3E-08	3.0832	12.8	8.8	4650	1065	
						8/13/2021	175	1.2E-08	3.1948	-	-	-	-	
						8/16/2021	178	1.2E-08	3.2249	12.5	8.4	-	-	
						8/20/2021	182	1.4E-08	3.3033	-	-	-	-	

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average Values: 12.7 8.5 4811 1292

PN1016 MABA Geos Chic Omer Bozok 773-710-8885 obozok@geosyntec.com

Excel Geotechnical Testing, Inc.
"Excellence in Testing"

953 Forrest Street, Roswell, Georgia 30075
Tel: (770) 910 7537, www.excelgeotesting.com

Test Results Summary

Compatibility Test Results as of August 20, 2021

Project Name: Monroe Ash Basin ALD

21H21 **Project No.: PN1016** **R23**

Site ID	Lab No.	Test Information															Remarks
		Initial Conditions				Specific Gravity ASTM D854	Date Test Started	Date Comp Started (Injection)	Number of Days After Injection	Permeability Notes 1 & 2	Pore Volumes Passed After Injection Note 1	pH		Electrical Conductivity			
		Moisture Content	Dry Unit Weight	Total Volume	Volume of Pores							In Flow	Out Flow	In Flow	Out Flow		
(-)	(-)	(%)	(pcf)	(cm3)	(cm3)	(-)	(-)	(-)	(-)	(cm/s)	(-)	(-)	(-)	(µs/cm)	(µs/cm)		
B2-ST-1 (20-22')	20L128	17.5	115.6	146.8	47.2	2.730	1/22/2021	2/19/2021	161	5.2E-09	0.8929	12.6	8.6	4560	1434		
									180	4.8E-09	0.9946	12.6	8.9				
									182	5.4E-09	1.0116	-	-	-	-		
B4-ST-2 (40-42')	20L130	17.9	112.2	146.6	52.4	2.797	1/24/2021	2/19/2021	93	2.8E-09	0.2263	12.9	8.6	4840	1126		
									161	3.0E-09	0.4261	12.4	8.5	-	-		
									182	3.5E-09	0.4894	-	-	-	-		
B4-ST-4 (70-72.5')	20L132	10.4	130.4	144.2	34.7	2.748	1/24/2021	2/19/2021	178	1.1E-08	2.6663	12.7	8.8	4180	1110		
									182	1.1E-08	2.7318	-	-	-	-		
B6-ST-1 (25-27')	20L134	17.5	115.3	144.7	48.2	2.770	1/24/2021	2/19/2021	175	6.5E-09	1.2076	12.4	8.5	4170	1178		
									182	7.6E-09	1.2755	-	-	-	-		
B6-ST-3 (55-57.5')	20L136	12.8	126.5	146.5	41.9	2.838	1/24/2021	2/19/2021	161	1.0E-08	1.6498	12.5	8.7	4880	1309		
									182	9.8E-09	1.8601	12.7	8.8	-	-		
B6-ST-4 (65-67.5')	20L137	10.4	130.7	143.5	34.4	2.754	1/25/2021	2/19/2021	175	9.9E-09	2.4489	12.4	8.6	4710	963		
									182	1.0E-08	2.5584	-	-	-	-		
B9-ST-2 (40-42')	20L140	15.4	111.4	151.3	55.3	2.811	1/29/2021	2/19/2021	179	1.0E-08	1.7599	12.8	8.9	4670	1025		
									182	1.1E-08	1.8013	-	-	-	-		
B9-ST-3 (55-57')	20L141	10.0	131.1	142.6	34.8	2.78	1/29/2021	2/19/2021	168	1.3E-08	3.0832	12.8	8.8	4650	1065		
									178	1.2E-08	3.2249	12.5	8.4	-	-		
									182	1.4E-08	3.3033	-	-	-	-		

Notes: 1- Based on Specimen Initial Conditions. 2- Based on average of four readings. Average: 12.6 4583

PN1016 MABA Geos Chic Omer Bozok 773-710-8885 obozok@geosyntec.com

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Appendix N
Groundwater Protection Standard
Calculations

1540 Eisenhower Pl.
Ann Arbor, MI 48108

T 734.971.7080
TRCcompanies.com

Technical Memorandum

Date:	November 24, 2021
To:	Chris Scieszka, DTE Electric Company
From:	Vince Buening, TRC Sarah Holmstrom, TRC Kristin Lowery, TRC
Project No.:	413591.0001.0000 Phase 1 Task 1
Subject:	Groundwater Protection Standard Calculation – DTE Electric Company, Monroe Power Plant Fly Ash Basin

DTE Electric Company (DTE Electric) is pursuing an Alternate Liner Demonstration (ALD) for the Monroe Power Plant (MONPP) Fly Ash Basin (FAB) coal combustion residual (CCR) unit. On November 12, 2020, the U.S. EPA published the Part B: Alternate Demonstration for Unlined Surface Impoundments amendments to the CCR Rule[1] ("Part B") that allows a facility to prepare a demonstration to request approval to operate an existing CCR surface impoundment with an alternate liner. Although the MONPP FAB remains in detection monitoring, per § 257.71(d)(1)(ii)(C)(2), the ALD must demonstrate that, for each Appendix IV constituent, there is no reasonable probability that the peak groundwater concentration that may result from releases that occur over the active life of the CCR surface impoundment will exceed the groundwater protection standard (GWPS) at the waste boundary.

GWPSs are set as either specific regulatory standards identified in the CCR Rule or background groundwater concentrations, whichever is higher, for the Appendix IV constituents. Per the CCR Rule §257.95(h)[2], the EPA maximum contaminant levels (MCLs) will be the GWPSs for those constituents that have established MCLs. For Appendix IV constituents that do not have established MCLs, the GWPSs are based upon the EPA Regional Screening Levels (RSLs). For constituents that have statistically derived background levels higher than the MCL and/or RSL, the GWPS becomes equal to the background level.

This memorandum presents the background statistical limits and GWPS derived for the Appendix IV parameters for the MONPP FAB CCR unit using the aforementioned approach pursuant to §257.95(h). Per 40 CFR §257.94, a minimum of eight rounds of background sampling for the Appendix IV constituents were completed at the MONPP FAB from August 2016 through July 2017, as part of

[1] On April 17, 2015, the U.S. EPA issued the Final Rule: Disposal of CCR from Electric Utilities (CCR Rule), 40 CFR 257, Subpart D, to regulate the disposal of CCR materials generated at coal-fired units.
[2] As amended per Phase One, Part One of the CCR Rule (83 FR 36435).

initiating the detection monitoring program. Since fluoride is in both the Appendix III and Appendix IV constituent lists, additional fluoride data were collected under the detection monitoring program subsequent to July 2017 and were also used in the development of the GWPS. All of the Appendix IV data used in this analysis (August 2016 through December 2020) and details on how the data were collected are included in the annual reports prepared in accordance with the CCR Rule through January 2021.

The background data for the MONPP FAB were evaluated in accordance with the *Groundwater Statistical Evaluation Plan* (Stats Plan) (TRC, October 2017). Per the Stats Plan, the MONPP FAB CCR unit uses an intra-well statistical approach. For intra-well methods, the background data set is comprised of the historical data established at each individual monitoring well, which accounts for natural spatial variability that occurs in background encountered across the site. Background data were evaluated utilizing ChemStat™ statistical software. ChemStat™ is a software tool that is commercially available for performing statistical evaluation consistent with procedures outlined in U.S. EPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* (Unified Guidance; UG). Within the ChemStat™ statistical program (and the UG), tolerance limits were selected to perform the statistical calculation for background limits. Use of tolerance limits is a streamlined approach that offers adequate statistical power and is an acceptable approach under the CCR Rule. As such, upper tolerance limits (UTLs) were calculated for each of the CCR Appendix IV parameters, and, given that intra-well methods have been established for this site, a background UTL was calculated for each monitoring well and used to compare to the respective MCL or RSL The following narrative describes the methods employed and the results obtained for the UTL calculations and the resulting GWPSs. The ChemStat™ output files are included as an attachment.

The set of background wells utilized for MONPP FAB includes MW-16-01 through MW-16-07. The background data evaluation included the following steps:

- Review of data quality checklists for the baseline/background data sets for CCR Appendix IV constituents;
- Graphical representation of the baseline data as time versus concentration (T v. C) by well/constituent pair;
- Outlier testing of individual data points that appear from the graphical representations as potential outliers;
- Evaluation of percentage of non-detects for each baseline/background well-constituent (w/c) pair;
- Distribution of the data;
- Calculation of the UTLs for each cumulative baseline/background data set; and
- Establishment of GWPS as the higher of the MCL/RSL or the UTL for each Appendix IV constituent.

The results of these evaluations are presented and discussed below.

Data Quality

Data from each sampling round were evaluated for completeness, overall quality and usability, method-specified sample holding times, precision and accuracy, and potential sample contamination. The review was completed using the following quality control (QC) information which at a minimum included chain-of-custody forms, investigative sample results including blind field duplicates, and, as provided by the laboratory, method blanks, laboratory control spikes, laboratory duplicates. The data were found to be complete and usable for the purposes of the CCR monitoring program.

Time versus Concentration Graphs

The time versus concentration (T v. C) graphs (Attachment A) do not show potential or suspect outliers for any of the Appendix IV parameters.

While variations in results are present, the graphs show consistent baseline data and do not suggest that data sets, as a whole, likely have overall trending or seasonality. However, due to limitations on CCR Rule implementation timelines, the data sets, with the exception of fluoride, are of relatively short duration for making such observations regarding overall trending or seasonality.

Outlier Testing

No outliers were identified in the T v. C graphs. Therefore, outlier testing was not applicable.

Distribution of the Data Sets

ChemStat™ was utilized to evaluate each data set for normality. If the skewness coefficient was calculated to be between negative one and one, then the data were assumed to be approximately normally distributed. If the skewness coefficient was calculated as greater than one (or less than negative one) then the calculation was performed on the natural log (Ln) of the data. If the Ln of the data still determined that the data appeared to be skewed, then the Shapiro-Wilk test of normality (Shapiro-Wilk) was performed. The Shapiro-Wilk statistic was calculated on both non-transformed data and the Ln-transformed data. If the Shapiro-Wilk statistic indicated that normal distributional assumptions were not valid, then the parameter was considered a candidate for non-parametric statistical evaluation. The data distributions are summarized in Table 1.

Tolerance Limits

Table 1 presents the calculated UTLs for the background/baseline data sets. As discussed above, the MONPP FAB CCR unit uses intra-well statistical methods; therefore, UTLs were calculated for each individual monitoring well. For normal and lognormal distributions, UTLs are calculated for 95 percent confidence using parametric methods. For nonnormal background datasets, a nonparametric UTL is utilized, resulting in the highest value from the background dataset as the UTL. The achieved confidence levels for nonparametric tolerance limits depend entirely on the number of background data points, which are shown in the ChemStat™ outputs. The intra-well tolerance limits for each parameter were compared to the MCL/RSL and the higher value was established as the GWPS for that well.

Groundwater Protection Standards

The resulting GWPSs were established as the higher of the MCL/RSL or the UTL for each Appendix IV constituent at each monitoring well. The GWPSs are summarized in Table 2.

Attachments

Table 1 – Summary of Descriptive Statistics and Tolerance Limit Calculations
Table 2 – Summary of Groundwater Protection Standards

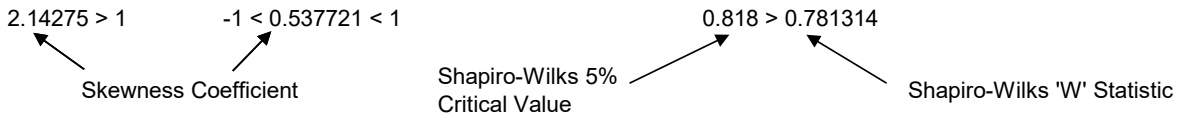
Attachment A – ChemStat™ Outputs

Tables

Table 1
Summary of Descriptive Statistics and Tolerance Limit Calculations
DTE Electric Company – Monroe Fly Ash Basin

Monitoring Well	Skewness Test		Shapiro-Wilks Test (5% Critical Value)		Outliers Removed	Tolerance Limit Test	95% Tolerance Limit
	Un-Transformed Data	Natural Log Transformed Data	Un-Transformed Data	Natural Log Transformed Data			
Antimony (µg/L)							
MW-16-01	> 50% Non-Detect				N	Non-Parametric	2.1
MW-16-02	100% Non-Detect				N	PQL	2.0
MW-16-03	100% Non-Detect				N	PQL	2.0
MW-16-04	100% Non-Detect				N	PQL	2.0
MW-16-05	100% Non-Detect				N	PQL	2.0
MW-16-06	100% Non-Detect				N	PQL	2.0
MW-16-07	100% Non-Detect				N	PQL	2.0
Arsenic (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	5.0
MW-16-02	100% Non-Detect				N	PQL	5.0
MW-16-03	100% Non-Detect				N	PQL	5.0
MW-16-04	100% Non-Detect				N	PQL	5.0
MW-16-05	100% Non-Detect				N	PQL	5.0
MW-16-06	100% Non-Detect				N	PQL	5.0
MW-16-07	100% Non-Detect				N	PQL	5.0
Barium (µg/L)							
MW-16-01	1 < 1.24799	1 < 1.14617	0.818 > 0.773186	0.818 > 0.796129	N	Non-Parametric	22
MW-16-02	-1 < 0.250149 < 1	--	--	--	N	Parametric	10
MW-16-03	1 < 1.70053	1 < 1.34927	0.818 > 0.724093	0.818 > 0.813257	N	Non-Parametric	21
MW-16-04	-1 < -0.0503771 < 1	--	--	--	N	Parametric	13
MW-16-05	-1 < 0.148075 < 1	--	--	--	N	Parametric	18
MW-16-06	1 < 2.07628	1 < 1.70345	0.818 > 0.616693	0.818 > 0.74454	N	Non-Parametric	34
MW-16-07	-1 < 0.362311 < 1	--	--	--	N	Parametric	10

Notes:

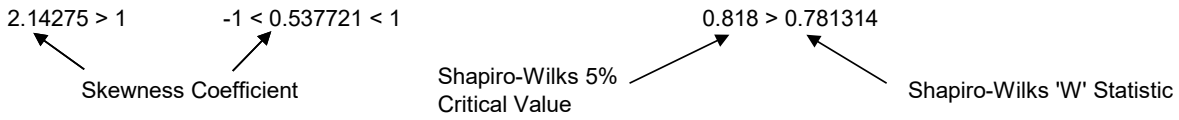


PQL = Practical Quantitation Limit
ug/L = micrograms per liter
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 1
Summary of Descriptive Statistics and Tolerance Limit Calculations
DTE Electric Company – Monroe Fly Ash Basin

Monitoring Well	Skewness Test		Shapiro-Wilks Test (5% Critical Value)		Outliers Removed	Tolerance Limit Test	95% Tolerance Limit
	Un-Transformed Data	Natural Log Transformed Data	Un-Transformed Data	Natural Log Transformed Data			
Beryllium (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	1.0
MW-16-02	100% Non-Detect				N	PQL	1.0
MW-16-03	100% Non-Detect				N	PQL	1.0
MW-16-04	100% Non-Detect				N	PQL	1.0
MW-16-05	100% Non-Detect				N	PQL	1.0
MW-16-06	100% Non-Detect				N	PQL	1.0
MW-16-07	100% Non-Detect				N	PQL	1.0
Cadmium (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	1.0
MW-16-02	100% Non-Detect				N	PQL	1.0
MW-16-03	100% Non-Detect				N	PQL	1.0
MW-16-04	100% Non-Detect				N	PQL	1.0
MW-16-05	100% Non-Detect				N	PQL	1.0
MW-16-06	100% Non-Detect				N	PQL	1.0
MW-16-07	100% Non-Detect				N	PQL	1.0
Chromium (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	2.0
MW-16-02	100% Non-Detect				N	PQL	2.0
MW-16-03	> 50% Non-Detect				N	Non-Parametric	3.1
MW-16-04	100% Non-Detect				N	PQL	2.0
MW-16-05	100% Non-Detect				N	PQL	2.0
MW-16-06	100% Non-Detect				N	PQL	2.0
MW-16-07	100% Non-Detect				N	PQL	2.0

Notes:

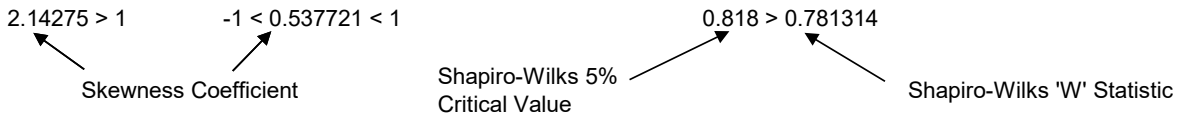


PQL = Practical Quantitation Limit
ug/L = micrograms per liter
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 1
Summary of Descriptive Statistics and Tolerance Limit Calculations
DTE Electric Company – Monroe Fly Ash Basin

Monitoring Well	Skewness Test		Shapiro-Wilks Test (5% Critical Value)		Outliers Removed	Tolerance Limit Test	95% Tolerance Limit
	Un-Transformed Data	Natural Log Transformed Data	Un-Transformed Data	Natural Log Transformed Data			
Cobalt (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	1.0
MW-16-02	100% Non-Detect				N	PQL	1.0
MW-16-03	100% Non-Detect				N	PQL	1.0
MW-16-04	100% Non-Detect				N	PQL	1.0
MW-16-05	100% Non-Detect				N	PQL	1.0
MW-16-06	> 50% Non-Detect				N	Non-Parametric	1.6
MW-16-07	100% Non-Detect				N	PQL	1.0
Fluoride (mg/L)							
MW-16-01	-1.46198 < -1	-1.68889 < -1	0.881 > 0.738606	0.881 > 0.704751	N	Non-Parametric	1.8
MW-16-02	-1 < 0.305853 < 1	--	--	--	N	Parametric	1.8
MW-16-03	-1 < 0.519238 < 1	--	--	--	N	Parametric	1.7
MW-16-04	-1 < 0.0678206 < 1	--	--	--	N	Parametric	1.1
MW-16-05	-1 < 0.234243 < 1	--	--	--	N	Parametric	1.7
MW-16-06	-1 < 0.477107 < 1	--	--	--	N	Parametric	1.8
MW-16-07	-1 < 0.268653 < 1	--	--	--	N	Parametric	1.8
Lead (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	1.0
MW-16-02	100% Non-Detect				N	PQL	1.0
MW-16-03	> 50% Non-Detect				N	Non-Parametric	2.5
MW-16-04	100% Non-Detect				N	PQL	1.0
MW-16-05	100% Non-Detect				N	PQL	1.0
MW-16-06	> 50% Non-Detect				N	Non-Parametric	1.1
MW-16-07	100% Non-Detect				N	PQL	1.0

Notes:

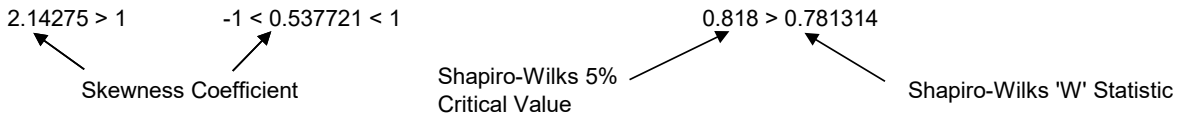


PQL = Practical Quantitation Limit
ug/L = micrograms per liter
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 1
Summary of Descriptive Statistics and Tolerance Limit Calculations
DTE Electric Company – Monroe Fly Ash Basin

Monitoring Well	Skewness Test		Shapiro-Wilks Test (5% Critical Value)		Outliers Removed	Tolerance Limit Test	95% Tolerance Limit
	Un-Transformed Data	Natural Log Transformed Data	Un-Transformed Data	Natural Log Transformed Data			
Lithium (µg/L)							
MW-16-01	-1 < -0.00922775 < 1	--	--	--	N	Parametric	92
MW-16-02	-1 < 0.354013 < 1	--	--	--	N	Parametric	120
MW-16-03	-1 < 0.238026 < 1	--	--	--	N	Parametric	130
MW-16-04	-1 < 0.528018 < 1	--	--	--	N	Parametric	23
MW-16-05	1 < 1.20828	1 < 1.11889	0.818 < 0.850222	--	N	Parametric	50
MW-16-06	-1 < 0.69322 < 1	--	--	--	N	Parametric	100
MW-16-07	-1 < 0.578591 < 1	--	--	--	N	Parametric	43
Mercury (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	0.20
MW-16-02	100% Non-Detect				N	PQL	0.20
MW-16-03	100% Non-Detect				N	PQL	0.20
MW-16-04	100% Non-Detect				N	PQL	0.20
MW-16-05	100% Non-Detect				N	PQL	0.20
MW-16-06	100% Non-Detect				N	PQL	0.20
MW-16-07	100% Non-Detect				N	PQL	0.20
Molybdenum (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	10
MW-16-02	100% Non-Detect				N	PQL	10
MW-16-03	100% Non-Detect				N	PQL	10
MW-16-04	100% Non-Detect				N	PQL	10
MW-16-05	100% Non-Detect				N	PQL	10
MW-16-06	100% Non-Detect				N	PQL	10
MW-16-07	100% Non-Detect				N	PQL	10

Notes:

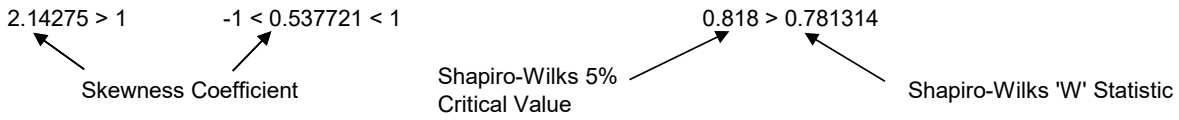


PQL = Practical Quantitation Limit
ug/L = micrograms per liter
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 1
Summary of Descriptive Statistics and Tolerance Limit Calculations
DTE Electric Company – Monroe Fly Ash Basin

Monitoring Well	Skewness Test		Shapiro-Wilks Test (5% Critical Value)		Outliers Removed	Tolerance Limit Test	95% Tolerance Limit
	Un-Transformed Data	Natural Log Transformed Data	Un-Transformed Data	Natural Log Transformed Data			
Radium 226/228 (pCi/L)							
MW-16-01	-1 < -0.526697 < 1	--	--	--	N	Parametric	1.30
MW-16-02	-1 < 0.246436 < 1	--	--	--	N	Parametric	3.96
MW-16-03	-1 < -0.900004 < 1	--	--	--	N	Parametric	3.01
MW-16-04	-1 < 0.590727 < 1	--	--	--	N	Parametric	1.20
MW-16-05	-1 < 0.745027 < 1	--	--	--	N	Parametric	2.73
MW-16-06	1 < 1.03253	-1 < 0.756658 < 1	--	--	N	Parametric	1.09
MW-16-07	1 < 1.42309	1 < 1.05411	0.818 > 0.810823	0.818 < 0.876893	N	Parametric	1.42
Selenium (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	5.0
MW-16-02	100% Non-Detect				N	PQL	5.0
MW-16-03	100% Non-Detect				N	PQL	5.0
MW-16-04	100% Non-Detect				N	PQL	5.0
MW-16-05	100% Non-Detect				N	PQL	5.0
MW-16-06	100% Non-Detect				N	PQL	5.0
MW-16-07	100% Non-Detect				N	PQL	5.0
Thallium (µg/L)							
MW-16-01	100% Non-Detect				N	PQL	1.0
MW-16-02	100% Non-Detect				N	PQL	1.0
MW-16-03	100% Non-Detect				N	PQL	1.0
MW-16-04	100% Non-Detect				N	PQL	1.0
MW-16-05	100% Non-Detect				N	PQL	1.0
MW-16-06	100% Non-Detect				N	PQL	1.0
MW-16-07	100% Non-Detect				N	PQL	1.0

Notes:



PQL = Practical Quantitation Limit
ug/L = micrograms per liter
mg/L = milligrams per liter
pCi/L = picocuries per liter

Table 2
Summary of Groundwater Protection Standards
DTE Electric Company – Monroe Fly Ash Basin

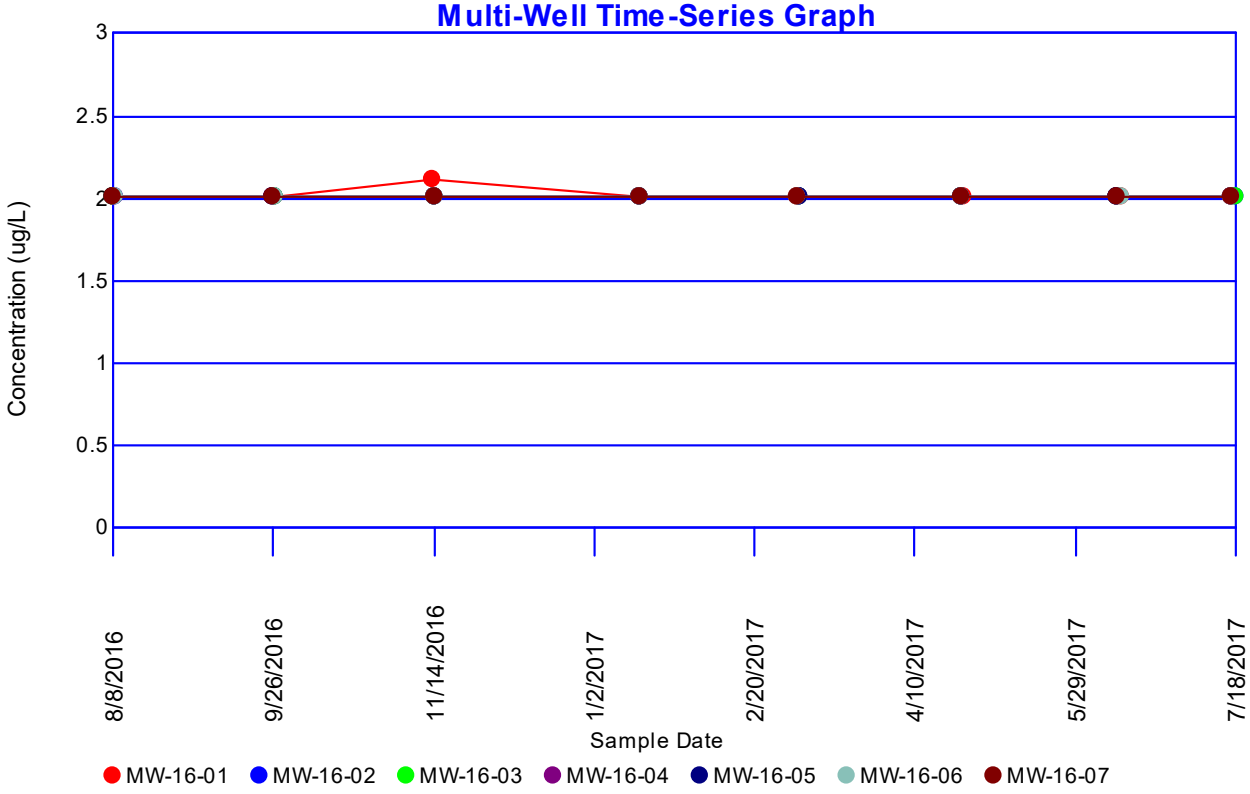
Constituent	Unit	GWPS Selection	MCL/RSL	MW-16-01		MW-16-02		MW-16-03		MW-16-04		MW-16-05		MW-16-06		MW-16-07	
				UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS	UTL	GWPS
Antimony	ug/L	MCL	6	2.1	**6.0**	2.0	**6.0**	2.0	**6.0**	2.0	**6.0**	2.0	**6.0**	2.0	**6.0**	2.0	**6.0**
Arsenic	ug/L	MCL	10	5.0	**10**	5.0	**10**	5.0	**10**	5.0	**10**	5.0	**10**	5.0	**10.0**	5.0	**10**
Barium	ug/L	MCL	2,000	22	**2,000**	10	**2,000**	21	**2,000**	13	**2,000**	18	**2,000**	34	**2,000**	10	**2,000**
Beryllium	ug/L	MCL	4	1.0	**4.0**	1.0	**4.0**	1.0	**4.0**	1.0	**4.0**	1.0	**4.0**	1.0	**4.0**	1.0	**4.0**
Cadmium	ug/L	MCL	5	1.0	**5.0**	1.0	**5.0**	1.0	**5.0**	1.0	**5.0**	1.0	**5.0**	1.0	**5.0**	1.0	**5.0**
Chromium	ug/L	MCL	100	2.0	**100**	2.0	**100**	3.1	**100**	2.0	**100**	2.0	**100**	2.0	**100**	2.0	**100**
Cobalt	ug/L	RSL	6	1.0	**6.0**	1.0	**6.0**	1.0	**6.0**	1.0	**6.0**	1.0	**6.0**	1.6	**6.0**	1.0	**6.0**
Fluoride	mg/L	MCL	4	1.8	**4.0**	1.8	**4.0**	1.7	**4.0**	1.1	**4.0**	1.7	**4.0**	1.8	**4.0**	1.8	**4.0**
Lead	ug/L	RSL	15	1.0	**15**	1.0	**15**	2.5	**15**	1.0	**15**	1.0	**15**	1.1	**15**	1.0	**15**
Lithium	ug/L	Background or RSL	40	92	**92**	120	**120**	130	**130**	23	**40**	50	**50**	100	**100**	43	**43**
Mercury	ug/L	MCL	2	0.20	**2.0**	0.20	**2.0**	0.20	**2.0**	0.20	**2.0**	0.20	**2.0**	0.20	**2.0**	0.20	**2.0**
Molybdenum	ug/L	RSL	100	10	**100**	10	**100**	10	**100**	10	**100**	10	**100**	10	**100**	10	**100**
Radium-226/228	pCi/L	MCL	5	1.30	**5.00**	3.96	**5.00**	3.01	**5.00**	1.20	**5.00**	2.73	**5.00**	1.09	**5.00**	1.42	**5.00**
Selenium	ug/L	MCL	50	5.0	**50**	5.0	**50**	5.0	**50**	5.0	**50**	5.0	**50**	5.0	**50**	5.0	**50**
Thallium	ug/L	MCL	2	1.0	**2.0**	1.0	**2.0**	1.0	**2.0**	1.0	**2.0**	1.0	**2.0**	1.0	**2.0**	1.0	**2.0**

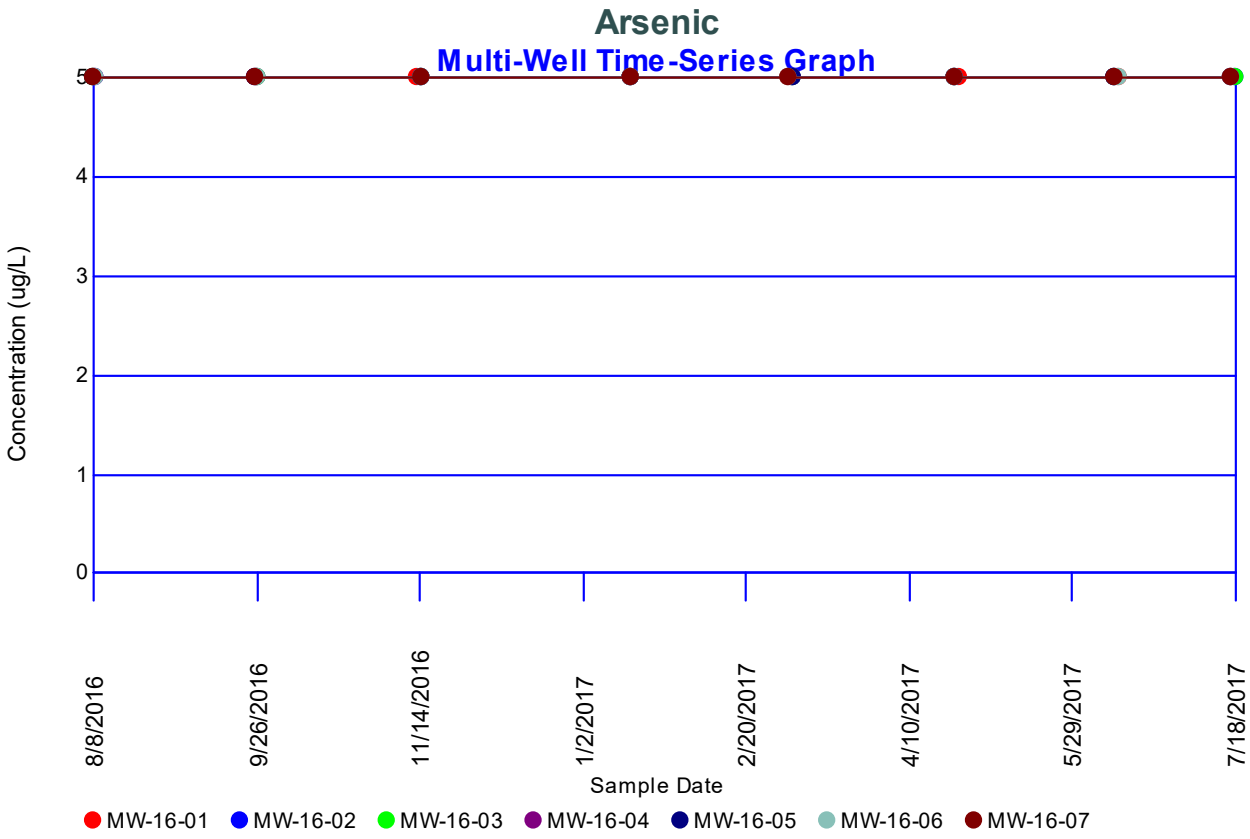
Notes:
MCL - Maximum Contaminant Level, EPA Drinking Water Standards and Health Advisories, April 2012.
RSL - Regional Screening Level from 83 FR 36435.
UTL - Upper Tolerance Limit (95%) of the background data set.
GWPS - Groundwater Protection Standard. Appendix IV GWPS is the higher of the MCL/RSL and UTL.
ug/L = micrograms per liter
mg/L = milligrams per liter
pCi/L = picocuries per liter

Attachment A
ChemStat™ Outputs

Antimony

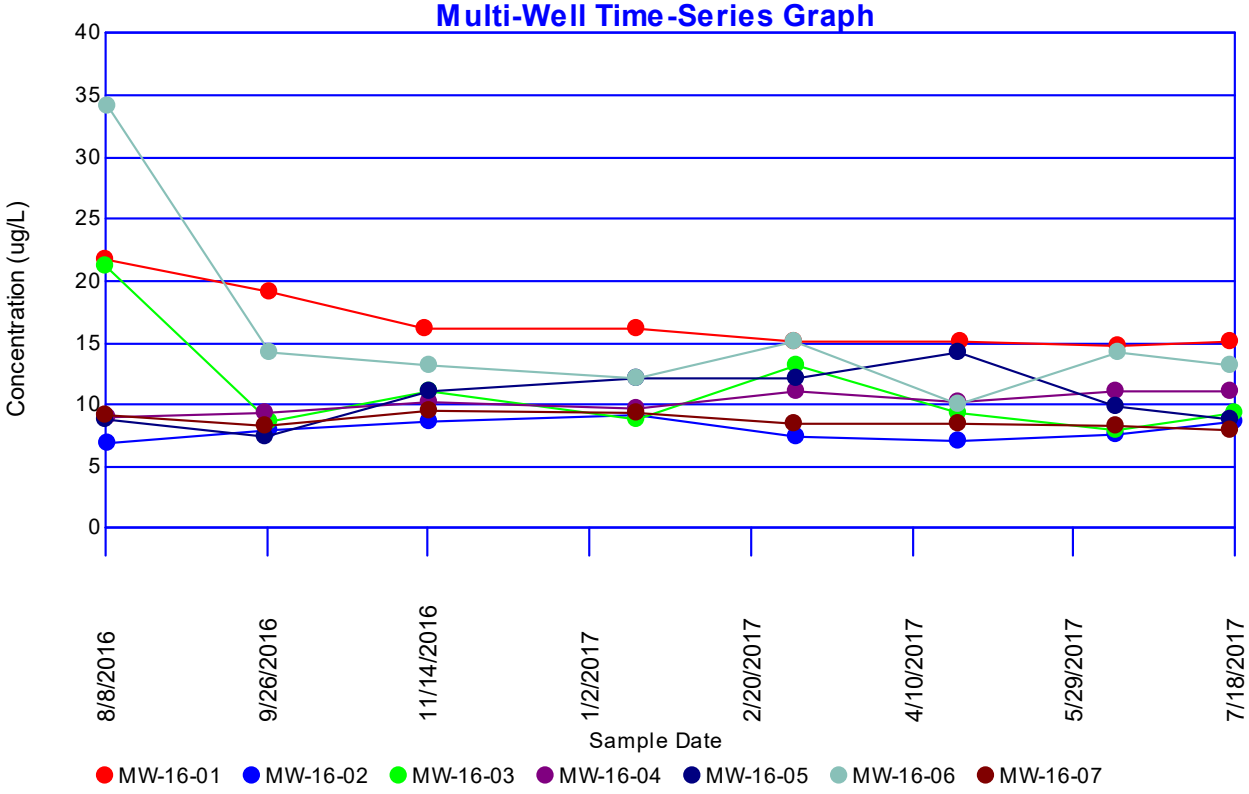
Multi-Well Time-Series Graph

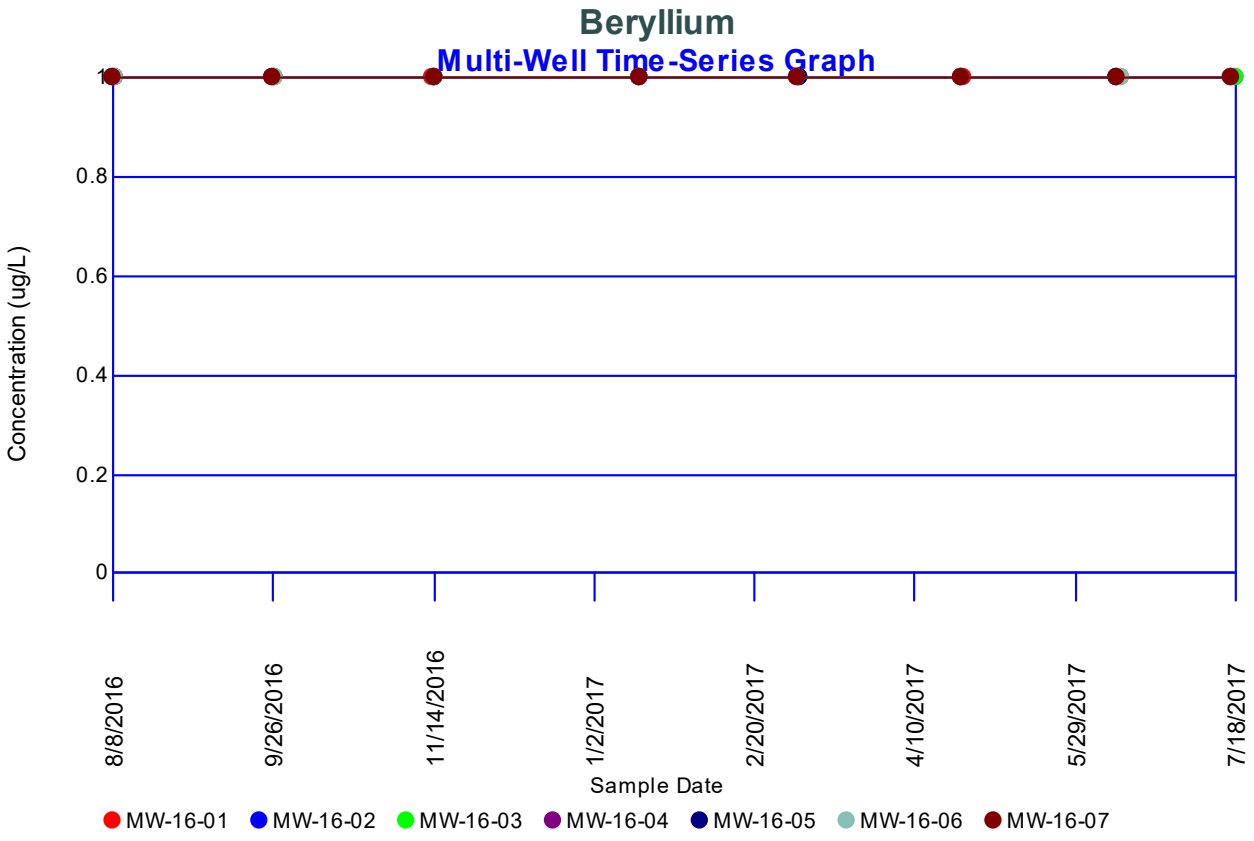


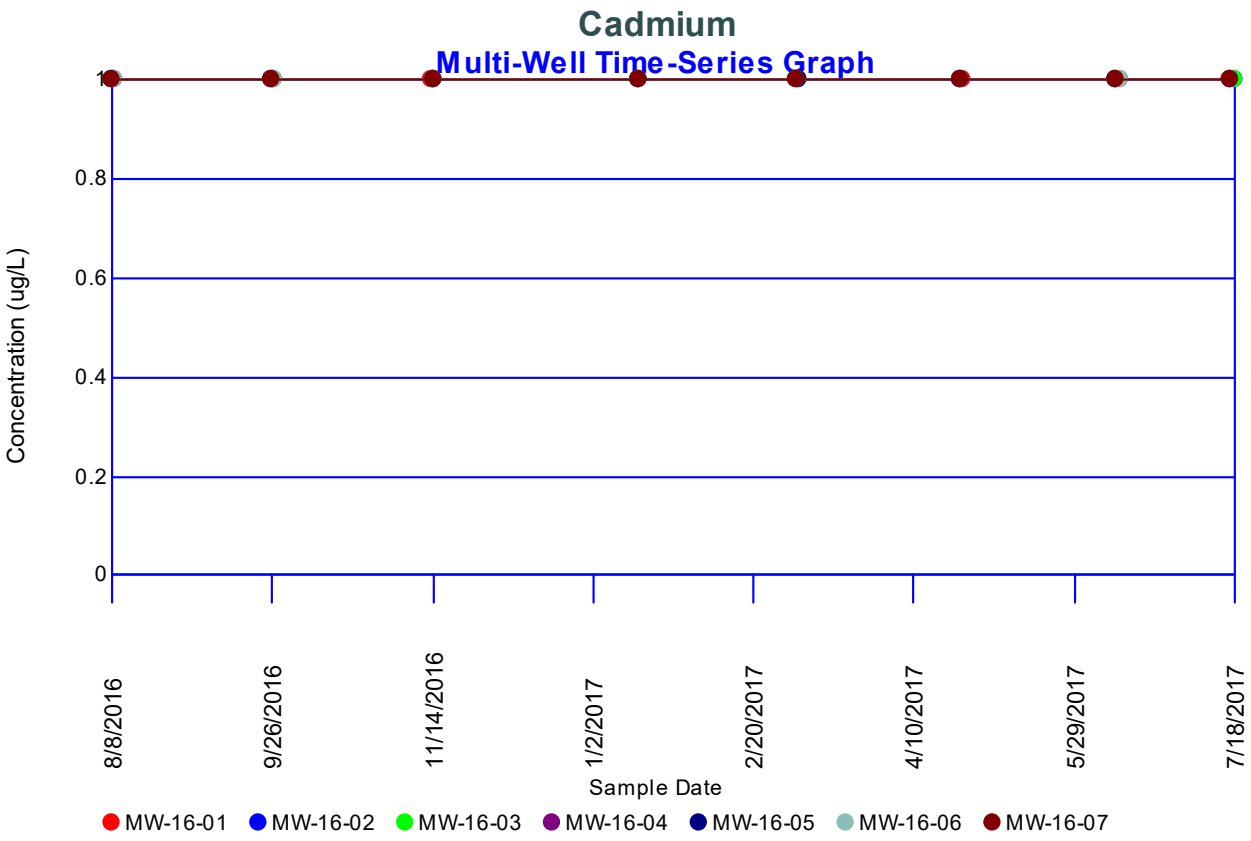

Arsenic
Multi-Well Time-Series Graph
Concentration (ug/L)
5
4
3
2
1
0
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07

Barium

Multi-Well Time-Series Graph

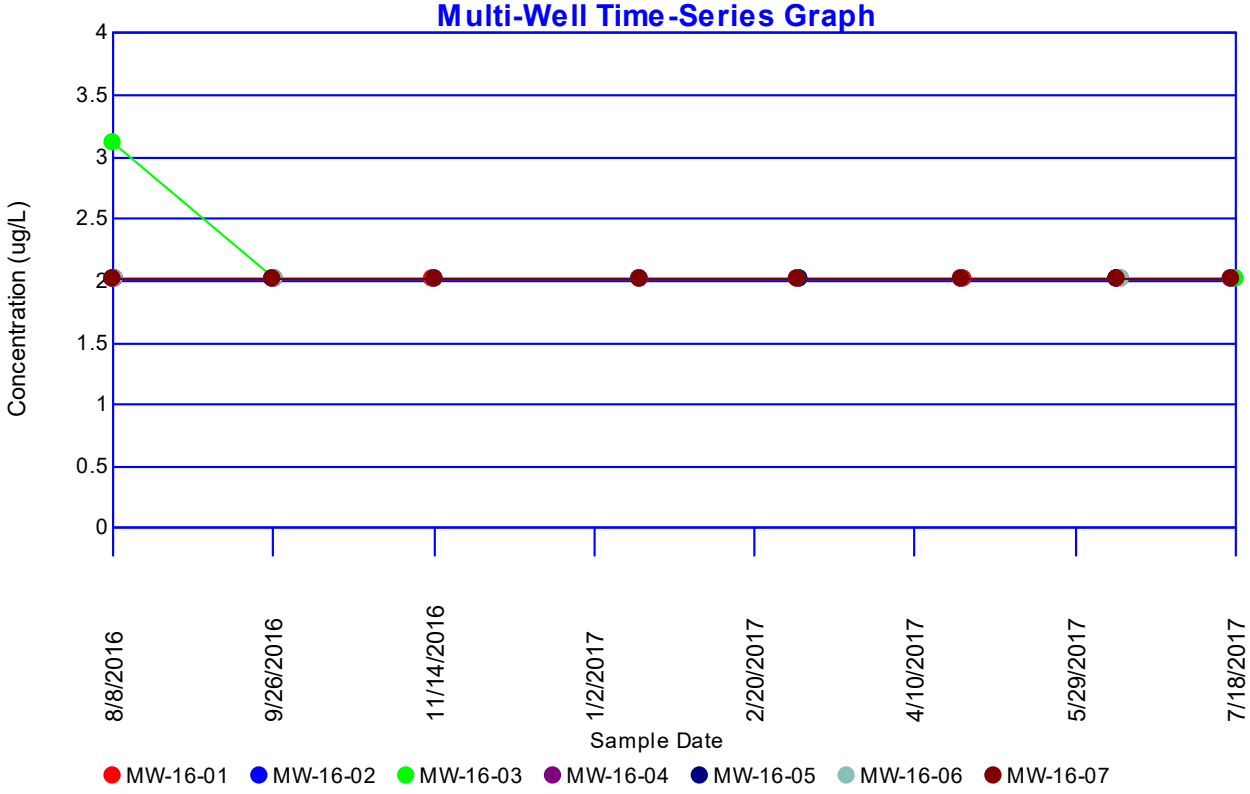



Beryllium
Multi-Well Time-Series Graph
Concentration (ug/L)
1
0.8
0.6
0.4
0.2
0
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07


Cadmium
Multi-Well Time-Series Graph
Concentration (ug/L)
1
0.8
0.6
0.4
0.2
0
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07

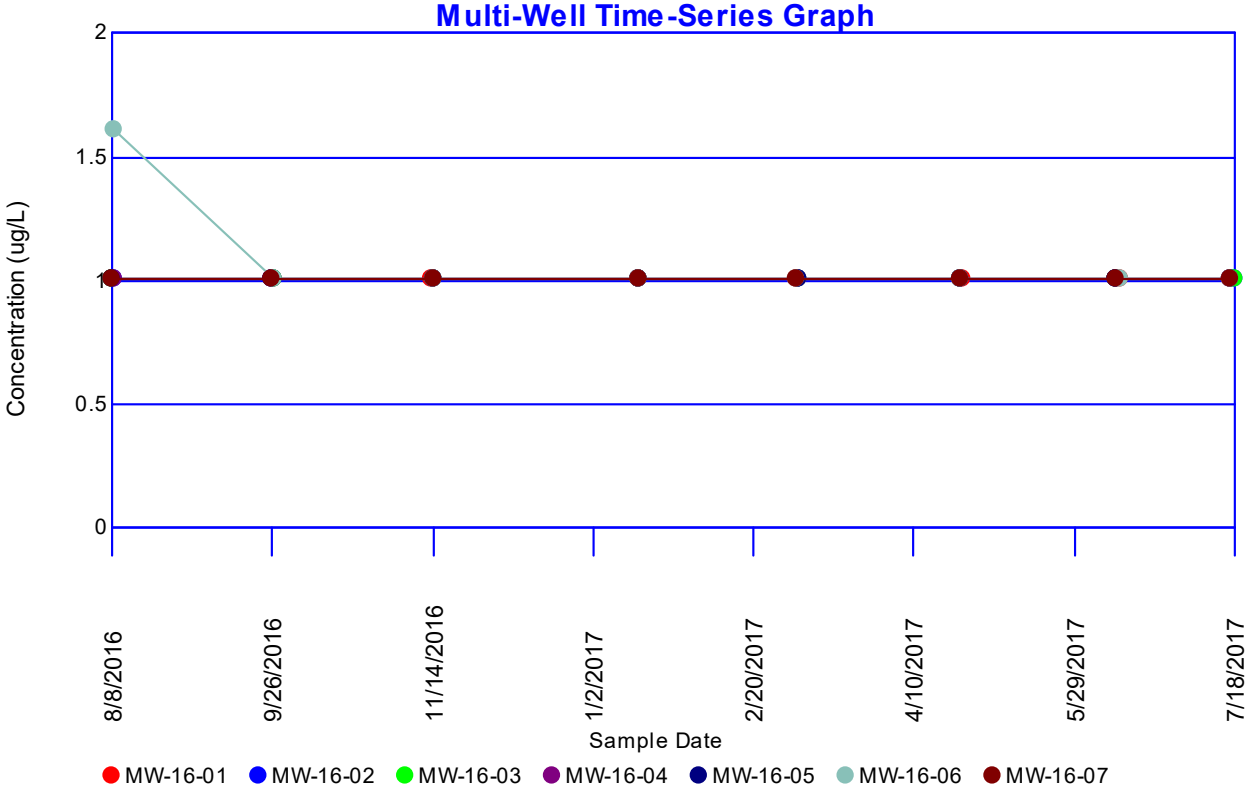
Chromium

Multi-Well Time-Series Graph



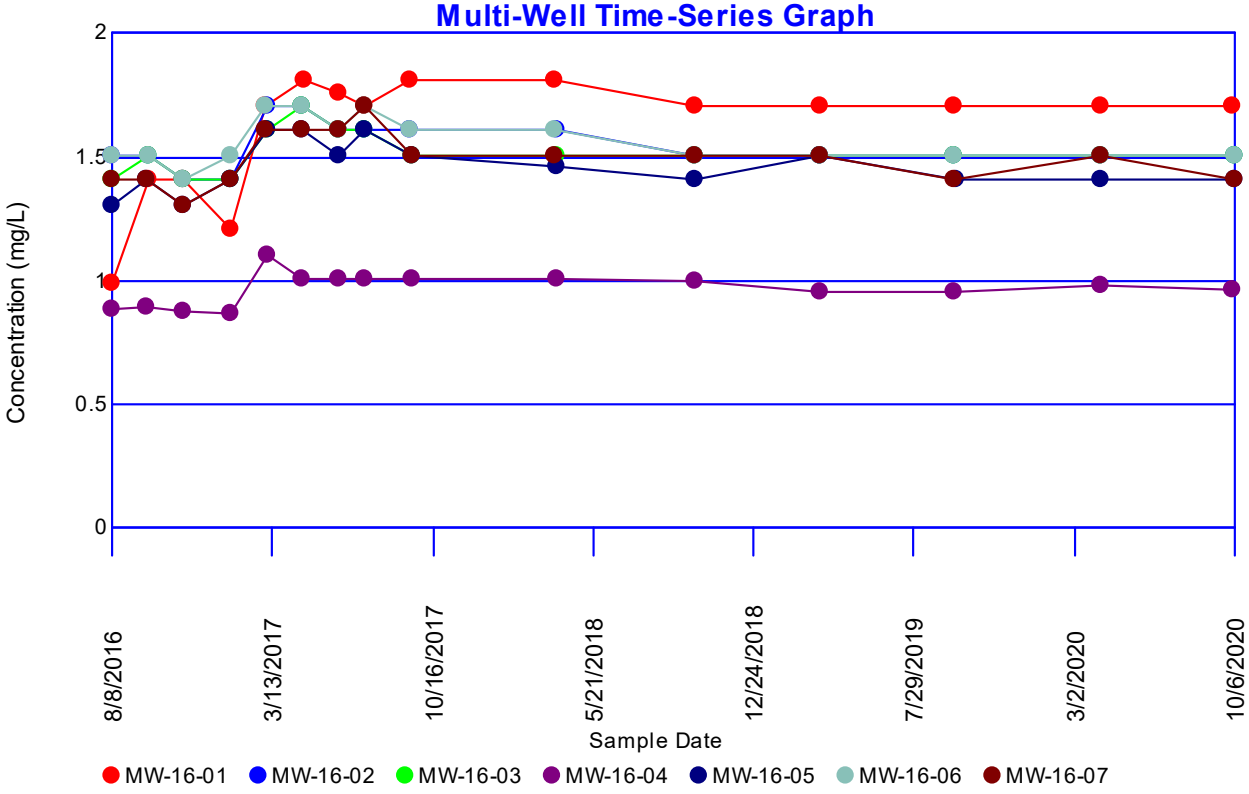
Cobalt

Multi-Well Time-Series Graph



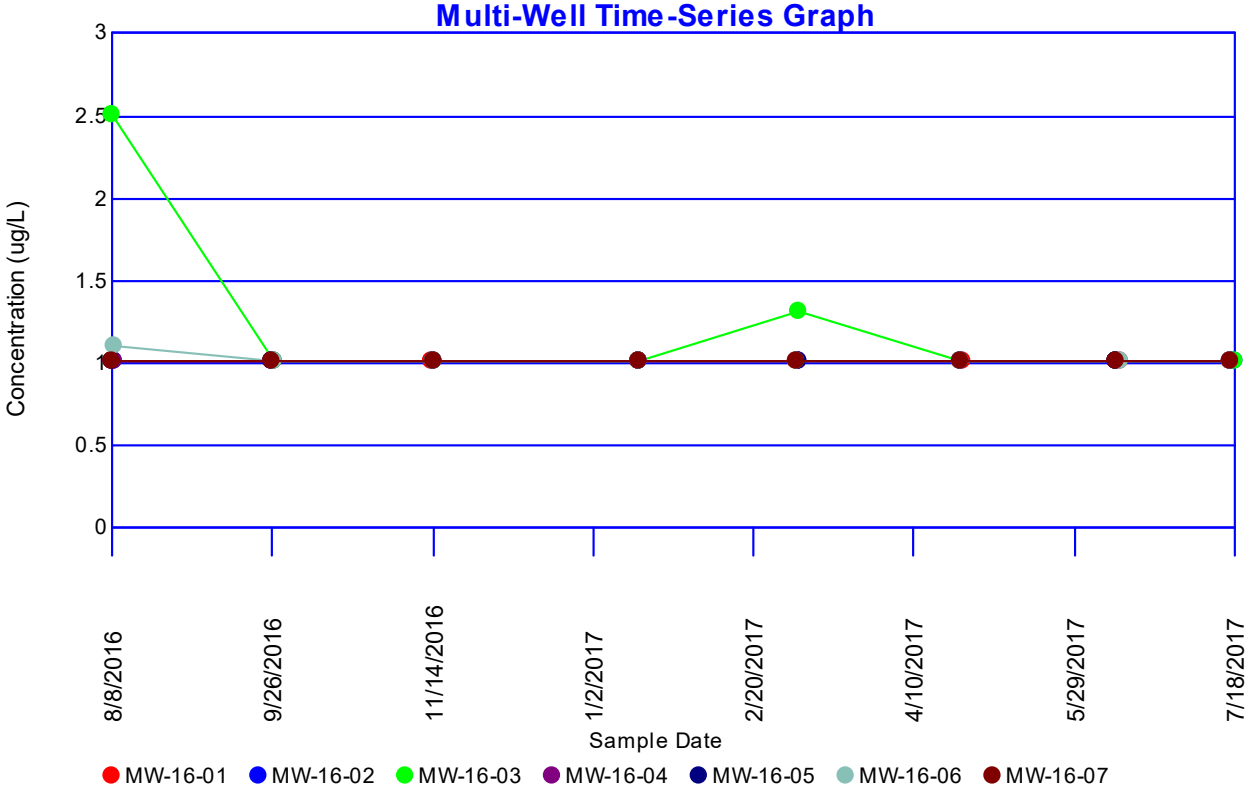
Fluoride

Multi-Well Time-Series Graph



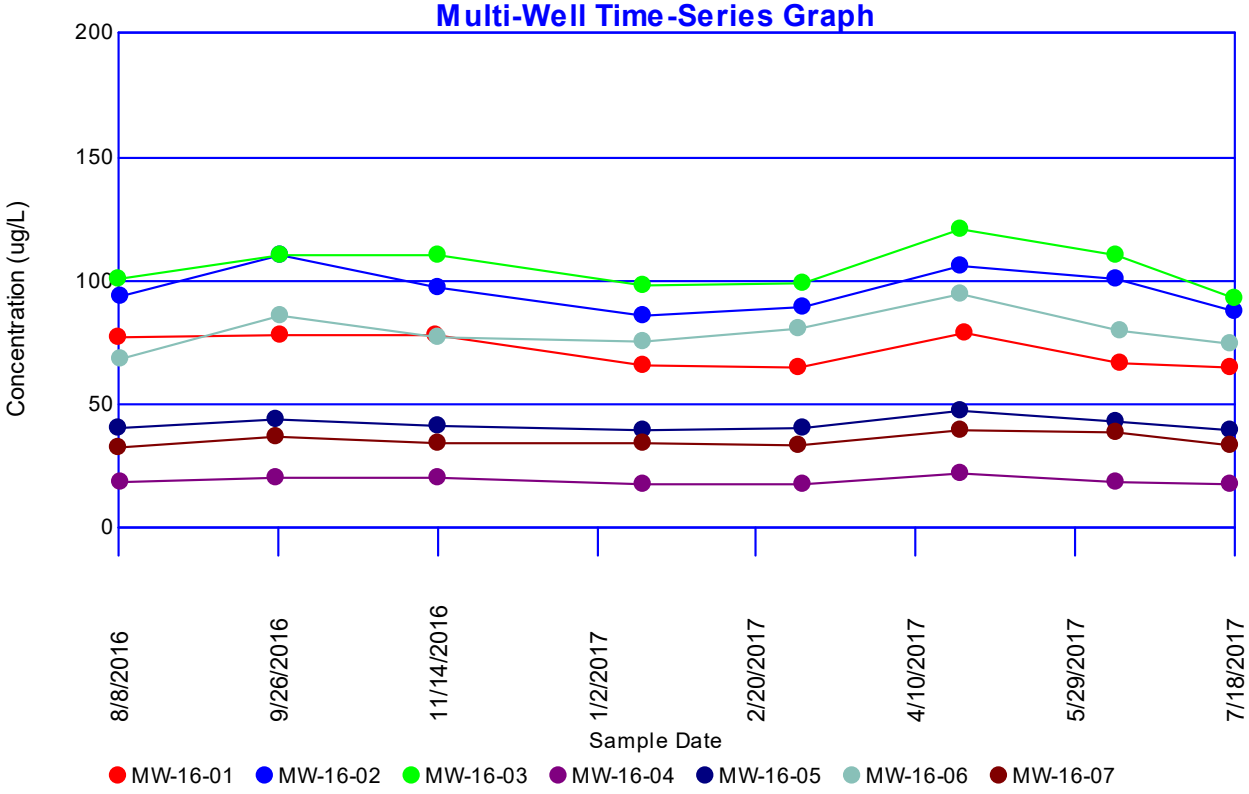
Lead

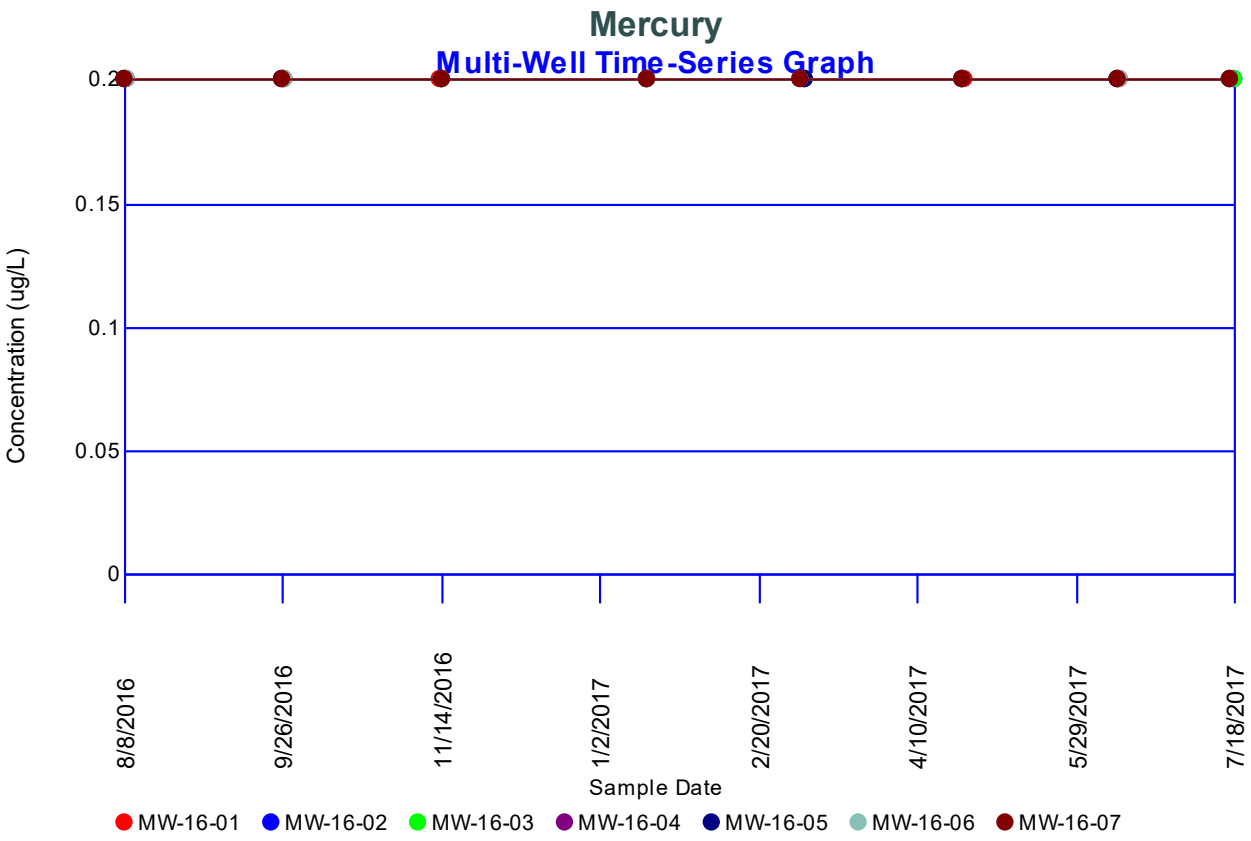
Multi-Well Time-Series Graph

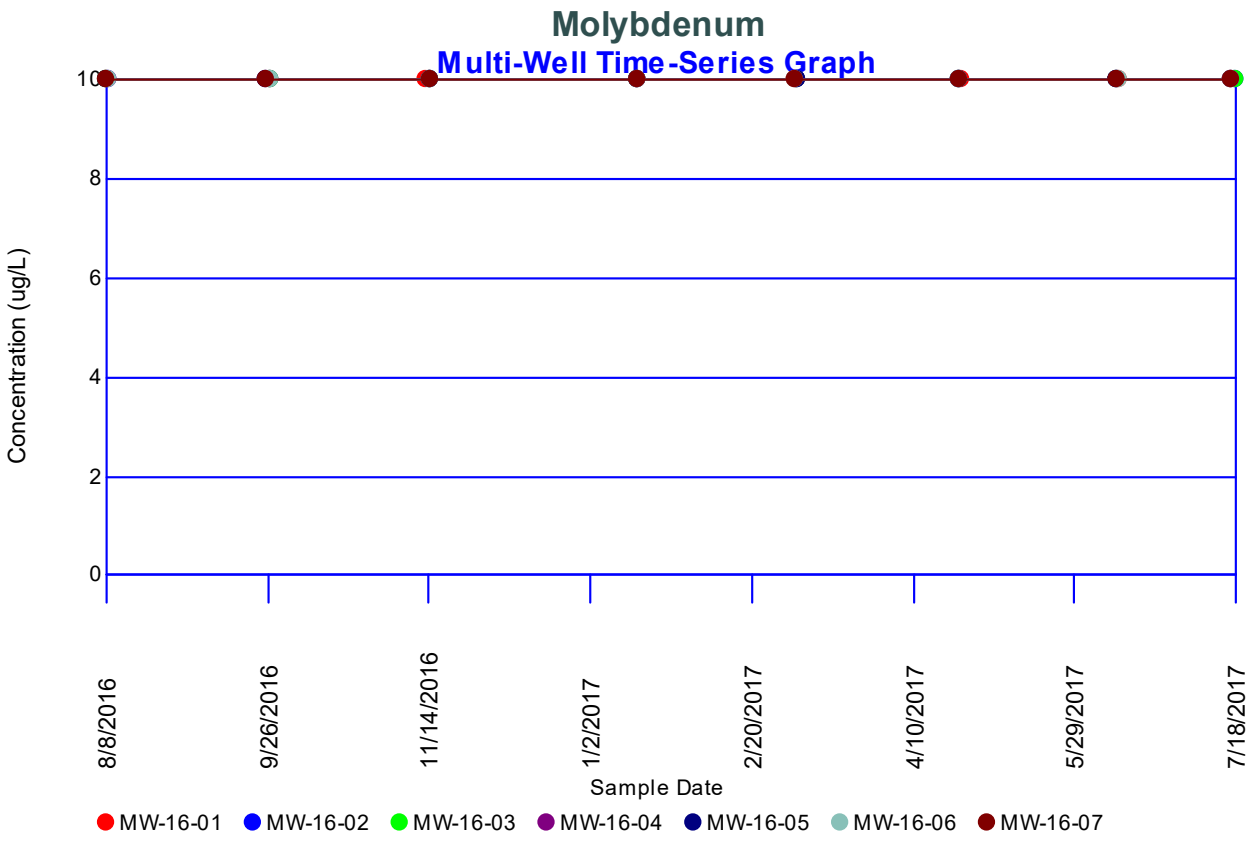


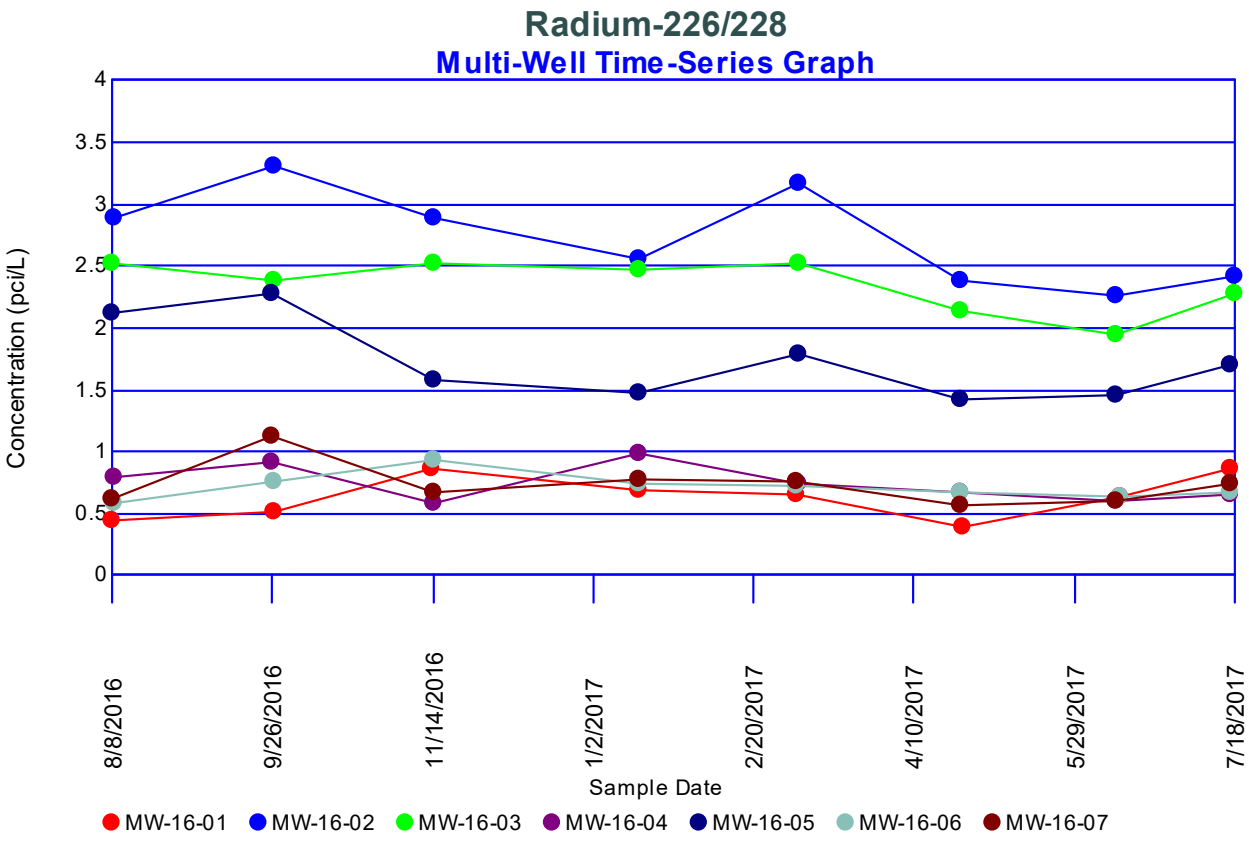
Lithium

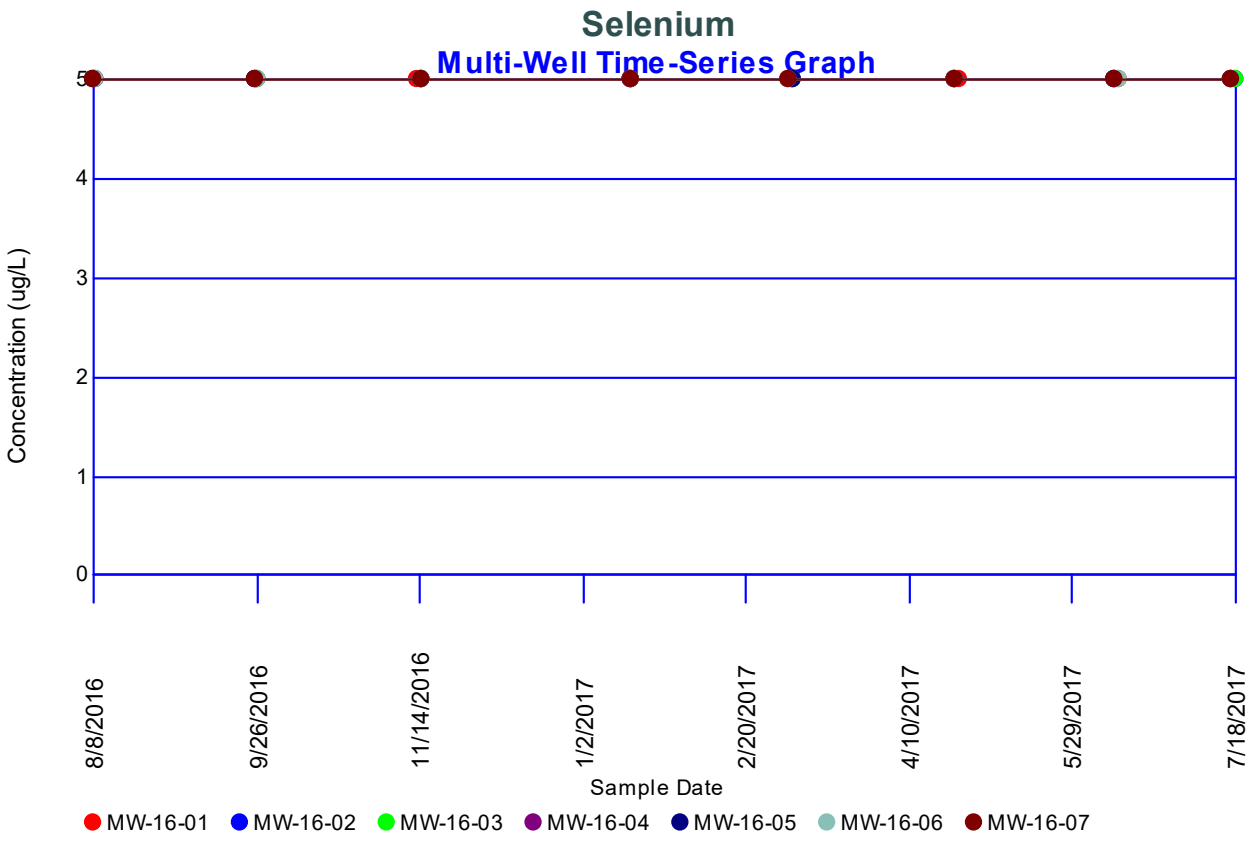
Multi-Well Time-Series Graph

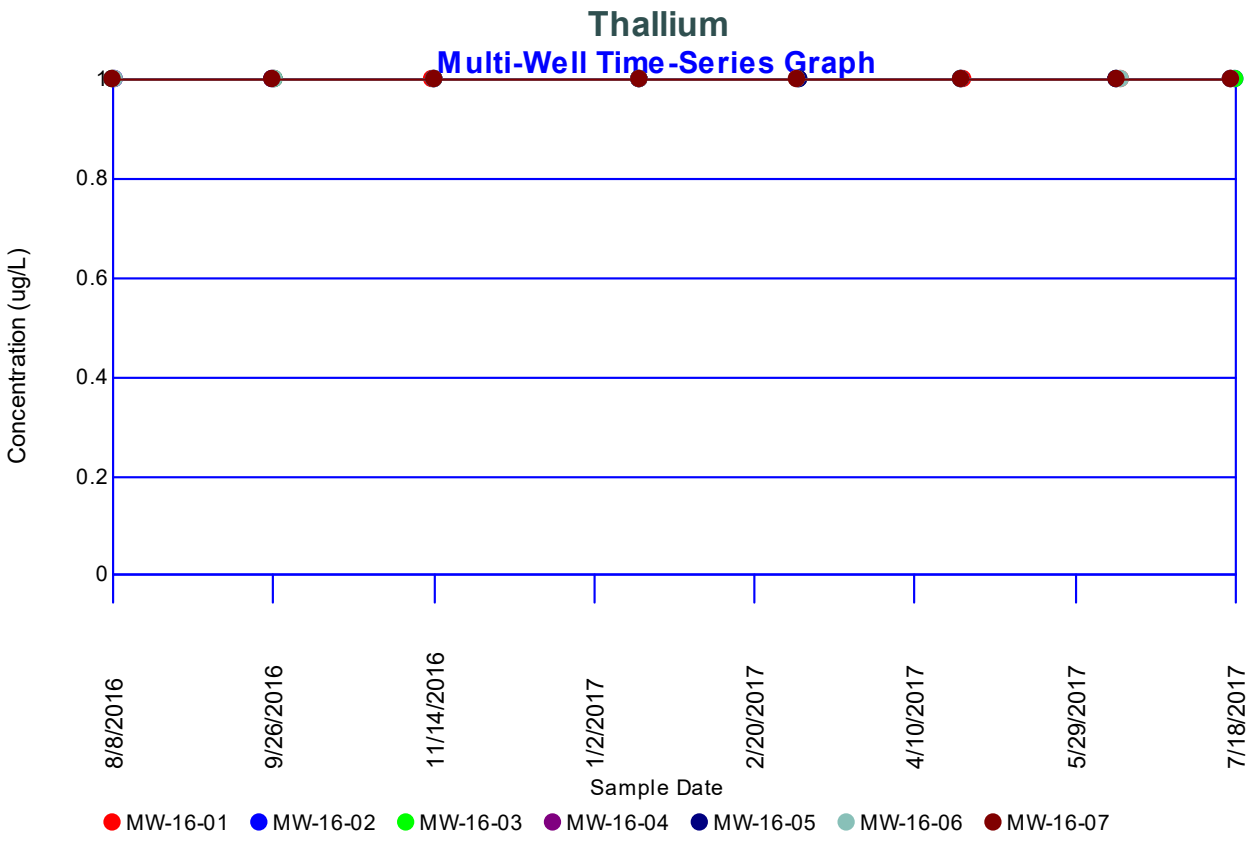



Mercury
Multi-Well Time-Series Graph
Concentration (ug/L)
0.2
0.15
0.1
0.05
0
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07


Molybdenum
Multi-Well Time-Series Graph
Concentration (ug/L)
10
8
6
4
2
0
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07


Radium-226/228
Multi-Well Time-Series Graph
Concentration (pci/L)
4
3.5
3
2.5
2
1.5
1
0.5
0
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07


Selenium
Multi-Well Time-Series Graph
Concentration (ug/L)
0
1
2
3
4
5
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07


Thallium
Multi-Well Time-Series Graph
Concentration (ug/L)
1
0.8
0.6
0.4
0.2
0
8/8/2016
9/26/2016
11/14/2016
1/2/2017
2/20/2017
4/10/2017
5/29/2017
7/18/2017
Sample Date
MW-16-01
MW-16-02
MW-16-03
MW-16-04
MW-16-05
MW-16-06
MW-16-07

Concentrations (ug/L)

Parameter: Antimony

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 55
Percent Non-Detects: 98.2143%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	7 (87.5%)	8/8/2016 ~	ND<2 U	ND<2 U
			9/27/2016	ND<2 U	ND<2 U
			11/14/2016	2.1	2.1
			1/17/2017	ND<2 U	ND<2 U
			3/6/2017 ~	ND<2 U	ND<2 U
			4/26/2017	ND<2 U	ND<2 U
			6/13/2017 ~	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-02	8	8 (100%)	8/9/2016	ND<2 U	ND<2 U
			9/27/2016	ND<2 U	ND<2 U
			11/15/2016 ~	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017 ~	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/18/2017	ND<2 U	ND<2 U
MW-16-03	8	8 (100%)	8/8/2016	ND<2 U	ND<2 U
			9/27/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/18/2017	ND<2 U	ND<2 U
MW-16-04	8	8 (100%)	8/9/2016	ND<2 U	ND<2 U
			9/26/2016 ~	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-05	8	8 (100%)	8/8/2016	ND<2 U	ND<2 U
			9/26/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-06	8	8 (100%)	8/9/2016	ND<2 U	ND<2 U
			9/27/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/6/2017	ND<2 U	ND<2 U

			4/25/2017	ND<2 U	ND<2 U
			6/13/2017	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-07	8	8 (100%)	8/8/2016	ND<2 U	ND<2 U
			9/26/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/6/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/17/2017 ~	ND<2 U	ND<2 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Arsenic

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 56
Percent Non-Detects: 100%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/14/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/6/2017 ~	ND<5 U	ND<5 U
			4/26/2017	ND<5 U	ND<5 U
			6/13/2017 ~	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-02	8	8 (100%)	8/9/2016	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/15/2016 ~	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017 ~	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/18/2017	ND<5 U	ND<5 U
MW-16-03	8	8 (100%)	8/8/2016	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/18/2017	ND<5 U	ND<5 U
MW-16-04	8	8 (100%)	8/9/2016	ND<5 U	ND<5 U
			9/26/2016 ~	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-05	8	8 (100%)	8/8/2016	ND<5 U	ND<5 U
			9/26/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-06	8	8 (100%)	8/9/2016	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/6/2017	ND<5 U	ND<5 U

			4/25/2017	ND<5 U	ND<5 U
			6/13/2017	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-07	8	8 (100%)	8/8/2016	ND<5 U	ND<5 U
			9/26/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/6/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/17/2017 ~	ND<5 U	ND<5 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	0 (0%)	8/8/2016 ~	21.5	21.5
			9/27/2016	19	19
			11/14/2016	16	16
			1/17/2017	16	16
			3/6/2017 ~	15	15
			4/26/2017	15	15
			6/13/2017 ~	14.5	14.5
			7/17/2017	15	15
MW-16-02	8	0 (0%)	8/9/2016	6.7	6.7
			9/27/2016	7.7	7.7
			11/15/2016 ~	8.55	8.55
			1/17/2017	9	9
			3/7/2017	7.3	7.3
			4/25/2017 ~	6.9	6.9
			6/12/2017	7.4	7.4
			7/18/2017	8.4	8.4
MW-16-03	8	0 (0%)	8/8/2016	21	21
			9/27/2016	8.5	8.5
			11/15/2016	11	11
			1/17/2017	8.6	8.6
			3/7/2017	13	13
			4/25/2017	9.1	9.1
			6/12/2017	7.8	7.8
			7/18/2017	9.1	9.1
MW-16-04	8	0 (0%)	8/9/2016	8.9	8.9
			9/26/2016 ~	9.25	9.25
			11/15/2016	10	10
			1/17/2017	9.6	9.6
			3/7/2017	11	11
			4/25/2017	10	10
			6/12/2017	11	11
			7/17/2017	11	11
MW-16-05	8	0 (0%)	8/8/2016	8.7	8.7
			9/26/2016	7.2	7.2
			11/15/2016	11	11
			1/17/2017	12	12
			3/7/2017	12	12
			4/25/2017	14	14
			6/12/2017	9.7	9.7
			7/17/2017	8.7	8.7
MW-16-06	8	0 (0%)	8/9/2016	34	34
			9/27/2016	14	14
			11/15/2016	13	13
			1/17/2017	12	12
			3/6/2017	15	15

			4/25/2017	9.9	9.9
			6/13/2017	14	14
			7/17/2017	13	13
MW-16-07	8	0 (0%)	8/8/2016	9	9
			9/26/2016	8.2	8.2
			11/15/2016	9.4	9.4
			1/17/2017	9.2	9.2
			3/6/2017	8.3	8.3
			4/25/2017	8.3	8.3
			6/12/2017	8.2	8.2
			7/17/2017 ~	7.8	7.8

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Beryllium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 56
Percent Non-Detects: 100%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/14/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017 ~	ND<1 U	ND<1 U
			4/26/2017	ND<1 U	ND<1 U
			6/13/2017 ~	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-02	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016 ~	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017 ~	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-03	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-04	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/26/2016 ~	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-05	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-06	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U

			4/25/2017	ND<1 U	ND<1 U
			6/13/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-07	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017 ~	ND<1 U	ND<1 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Cadmium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 56
Percent Non-Detects: 100%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/14/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017 ~	ND<1 U	ND<1 U
			4/26/2017	ND<1 U	ND<1 U
			6/13/2017 ~	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-02	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016 ~	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017 ~	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-03	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-04	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/26/2016 ~	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-05	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-06	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U

			4/25/2017	ND<1 U	ND<1 U
			6/13/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-07	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017 ~	ND<1 U	ND<1 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Chromium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 55
Percent Non-Detects: 98.2143%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<2 U	ND<2 U
			9/27/2016	ND<2 U	ND<2 U
			11/14/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/6/2017 ~	ND<2 U	ND<2 U
			4/26/2017	ND<2 U	ND<2 U
			6/13/2017 ~	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-02	8	8 (100%)	8/9/2016	ND<2 U	ND<2 U
			9/27/2016	ND<2 U	ND<2 U
			11/15/2016 ~	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017 ~	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/18/2017	ND<2 U	ND<2 U
MW-16-03	8	7 (87.5%)	8/8/2016	3.1	3.1
			9/27/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/18/2017	ND<2 U	ND<2 U
MW-16-04	8	8 (100%)	8/9/2016	ND<2 U	ND<2 U
			9/26/2016 ~	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-05	8	8 (100%)	8/8/2016	ND<2 U	ND<2 U
			9/26/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/7/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-06	8	8 (100%)	8/9/2016	ND<2 U	ND<2 U
			9/27/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/6/2017	ND<2 U	ND<2 U

			4/25/2017	ND<2 U	ND<2 U
			6/13/2017	ND<2 U	ND<2 U
			7/17/2017	ND<2 U	ND<2 U
MW-16-07	8	8 (100%)	8/8/2016	ND<2 U	ND<2 U
			9/26/2016	ND<2 U	ND<2 U
			11/15/2016	ND<2 U	ND<2 U
			1/17/2017	ND<2 U	ND<2 U
			3/6/2017	ND<2 U	ND<2 U
			4/25/2017	ND<2 U	ND<2 U
			6/12/2017	ND<2 U	ND<2 U
			7/17/2017 ~	ND<2 U	ND<2 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Cobalt

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 55
Percent Non-Detects: 98.2143%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/14/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017 ~	ND<1 U	ND<1 U
			4/26/2017	ND<1 U	ND<1 U
			6/13/2017 ~	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-02	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016 ~	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017 ~	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-03	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-04	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/26/2016 ~	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-05	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-06	8	7 (87.5%)	8/9/2016	1.6	1.6
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U

			4/25/2017	ND<1 U	ND<1 U
			6/13/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-07	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017 ~	ND<1 U	ND<1 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (mg/L)

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 105
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	15	0 (0%)	8/8/2016 ~	0.98	0.98
			9/27/2016	1.4	1.4
			11/14/2016	1.4	1.4
			1/17/2017	1.2	1.2
			3/6/2017 ~	1.7	1.7
			4/26/2017	1.8	1.8
			6/13/2017 ~	1.75	1.75
			7/17/2017	1.7	1.7
			9/18/2017	1.8	1.8
			4/2/2018	1.8	1.8
			10/8/2018 ~	1.7	1.7
			3/26/2019	1.7	1.7
			9/23/2019	1.7	1.7
			4/8/2020	1.7	1.7
			10/5/2020	1.7	1.7
MW-16-02	15	0 (0%)	8/9/2016	1.5	1.5
			9/27/2016	1.5	1.5
			11/15/2016 ~	1.4	1.4
			1/17/2017	1.4	1.4
			3/7/2017	1.7	1.7
			4/25/2017 ~	1.7	1.7
			6/12/2017	1.6	1.6
			7/18/2017	1.6	1.6
			9/18/2017	1.6	1.6
			4/3/2018	1.6	1.6
			10/8/2018	1.5	1.5
			3/25/2019	1.5	1.5
			9/23/2019 ~	1.5	1.5
			4/8/2020	1.5	1.5
			10/6/2020	1.5	1.5
MW-16-03	15	0 (0%)	8/8/2016	1.4	1.4
			9/27/2016	1.5	1.5
			11/15/2016	1.4	1.4
			1/17/2017	1.4	1.4
			3/7/2017	1.6	1.6
			4/25/2017	1.7	1.7
			6/12/2017	1.6	1.6
			7/18/2017	1.6	1.6
			9/19/2017	1.5	1.5
			4/3/2018	1.5	1.5
			10/8/2018	1.5	1.5
			3/25/2019 ~	1.5	1.5
			9/23/2019	1.5	1.5
			4/8/2020	1.5	1.5
			10/6/2020	1.5	1.5
MW-16-04	15	0 (0%)	8/9/2016	0.88	0.88
			9/26/2016 ~	0.885	0.885

			11/15/2016	0.87	0.87
			1/17/2017	0.86	0.86
			3/7/2017	1.1	1.1
			4/25/2017	1	1
			6/12/2017	1	1
			7/17/2017	1	1
			9/19/2017	1	1
			4/3/2018	1	1
			10/8/2018	0.99	0.99
			3/25/2019	0.95	0.95
			9/23/2019	0.95	0.95
			4/8/2020	0.97	0.97
			10/5/2020 ~	0.96	0.96
MW-16-05	15	0 (0%)	8/8/2016	1.3	1.3
			9/26/2016	1.4	1.4
			11/15/2016	1.3	1.3
			1/17/2017	1.4	1.4
			3/7/2017	1.6	1.6
			4/25/2017	1.6	1.6
			6/12/2017	1.5	1.5
			7/17/2017	1.6	1.6
			9/19/2017	1.5	1.5
			4/3/2018 ~	1.45	1.45
			10/8/2018	1.4	1.4
			3/25/2019	1.5	1.5
			9/25/2019	1.4	1.4
			4/8/2020 ~	1.4	1.4
			10/6/2020	1.4	1.4
MW-16-06	15	0 (0%)	8/9/2016	1.5	1.5
			9/27/2016	1.5	1.5
			11/15/2016	1.4	1.4
			1/17/2017	1.5	1.5
			3/6/2017	1.7	1.7
			4/25/2017	1.7	1.7
			6/13/2017	1.6	1.6
			7/17/2017	1.7	1.7
			9/18/2017	1.6	1.6
			4/2/2018	1.6	1.6
			10/8/2018	1.5	1.5
			3/25/2019	1.5	1.5
			9/23/2019	1.5	1.5
			4/8/2020	1.5	1.5
			10/6/2020	1.5	1.5
MW-16-07	15	0 (0%)	8/8/2016	1.4	1.4
			9/26/2016	1.4	1.4
			11/15/2016	1.3	1.3
			1/17/2017	1.4	1.4
			3/6/2017	1.6	1.6
			4/25/2017	1.6	1.6
			6/12/2017	1.6	1.6
			7/17/2017 ~	1.7	1.7
			9/19/2017 ~	1.5	1.5
			4/2/2018	1.5	1.5
			10/8/2018	1.5	1.5
			3/26/2019	1.5	1.5
			9/23/2019	1.4	1.4
			4/8/2020	1.5	1.5
			10/6/2020	1.4	1.4

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Lead

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 53
Percent Non-Detects: 94.6429%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/14/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017 ~	ND<1 U	ND<1 U
			4/26/2017	ND<1 U	ND<1 U
			6/13/2017 ~	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-02	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016 ~	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017 ~	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-03	8	6 (75%)	8/8/2016	2.5	2.5
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	1.3	1.3
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-04	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/26/2016 ~	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-05	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-06	8	7 (87.5%)	8/9/2016	1.1	1.1
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U

			4/25/2017	ND<1 U	ND<1 U
			6/13/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-07	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017 ~	ND<1 U	ND<1 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 0
Percent Non-Detects: 0%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	0 (0%)	8/8/2016 ~	76.5	76.5
			9/27/2016	77	77
			11/14/2016	77	77
			1/17/2017	65	65
			3/6/2017 ~	64.5	64.5
			4/26/2017	78	78
			6/13/2017 ~	66	66
			7/17/2017	64	64
MW-16-02	8	0 (0%)	8/9/2016	93	93
			9/27/2016	110	110
			11/15/2016 ~	96.5	96.5
			1/17/2017	85	85
			3/7/2017	89	89
			4/25/2017 ~	105	105
			6/12/2017	100	100
			7/18/2017	87	87
MW-16-03	8	0 (0%)	8/8/2016	100	100
			9/27/2016	110	110
			11/15/2016	110	110
			1/17/2017	97	97
			3/7/2017	98	98
			4/25/2017	120	120
			6/12/2017	110	110
			7/18/2017	92	92
MW-16-04	8	0 (0%)	8/9/2016	18	18
			9/26/2016 ~	19.5	19.5
			11/15/2016	20	20
			1/17/2017	17	17
			3/7/2017	17	17
			4/25/2017	21	21
			6/12/2017	18	18
			7/17/2017	17	17
MW-16-05	8	0 (0%)	8/8/2016	40	40
			9/26/2016	43	43
			11/15/2016	41	41
			1/17/2017	39	39
			3/7/2017	40	40
			4/25/2017	47	47
			6/12/2017	42	42
			7/17/2017	39	39
MW-16-06	8	0 (0%)	8/9/2016	68	68
			9/27/2016	85	85
			11/15/2016	76	76
			1/17/2017	75	75
			3/6/2017	80	80

			4/25/2017	94	94
			6/13/2017	79	79
			7/17/2017	74	74
MW-16-07	8	0 (0%)	8/8/2016	32	32
			9/26/2016	36	36
			11/15/2016	34	34
			1/17/2017	34	34
			3/6/2017	33	33
			4/25/2017	39	39
			6/12/2017	38	38
			7/17/2017 ~	32.5	32.5

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Mercury

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 56
Percent Non-Detects: 100%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<0.2 U	ND<0.2 U
			9/27/2016	ND<0.2 U	ND<0.2 U
			11/14/2016	ND<0.2 U	ND<0.2 U
			1/17/2017	ND<0.2 U	ND<0.2 U
			3/6/2017 ~	ND<0.2 U	ND<0.2 U
			4/26/2017	ND<0.2 U	ND<0.2 U
			6/13/2017 ~	ND<0.2 U	ND<0.2 U
			7/17/2017	ND<0.2 U	ND<0.2 U
MW-16-02	8	8 (100%)	8/9/2016	ND<0.2 U	ND<0.2 U
			9/27/2016	ND<0.2 U	ND<0.2 U
			11/15/2016 ~	ND<0.2 U	ND<0.2 U
			1/17/2017	ND<0.2 U	ND<0.2 U
			3/7/2017	ND<0.2 U	ND<0.2 U
			4/25/2017 ~	ND<0.2 U	ND<0.2 U
			6/12/2017	ND<0.2 U	ND<0.2 U
			7/18/2017	ND<0.2 U	ND<0.2 U
MW-16-03	8	8 (100%)	8/8/2016	ND<0.2 U	ND<0.2 U
			9/27/2016	ND<0.2 U	ND<0.2 U
			11/15/2016	ND<0.2 U	ND<0.2 U
			1/17/2017	ND<0.2 U	ND<0.2 U
			3/7/2017	ND<0.2 U	ND<0.2 U
			4/25/2017	ND<0.2 U	ND<0.2 U
			6/12/2017	ND<0.2 U	ND<0.2 U
			7/18/2017	ND<0.2 U	ND<0.2 U
MW-16-04	8	8 (100%)	8/9/2016	ND<0.2 U	ND<0.2 U
			9/26/2016 ~	ND<0.2 U	ND<0.2 U
			11/15/2016	ND<0.2 U	ND<0.2 U
			1/17/2017	ND<0.2 U	ND<0.2 U
			3/7/2017	ND<0.2 U	ND<0.2 U
			4/25/2017	ND<0.2 U	ND<0.2 U
			6/12/2017	ND<0.2 U	ND<0.2 U
			7/17/2017	ND<0.2 U	ND<0.2 U
MW-16-05	8	8 (100%)	8/8/2016	ND<0.2 U	ND<0.2 U
			9/26/2016	ND<0.2 U	ND<0.2 U
			11/15/2016	ND<0.2 U	ND<0.2 U
			1/17/2017	ND<0.2 U	ND<0.2 U
			3/7/2017	ND<0.2 U	ND<0.2 U
			4/25/2017	ND<0.2 U	ND<0.2 U
			6/12/2017	ND<0.2 U	ND<0.2 U
			7/17/2017	ND<0.2 U	ND<0.2 U
MW-16-06	8	8 (100%)	8/9/2016	ND<0.2 U	ND<0.2 U
			9/27/2016	ND<0.2 U	ND<0.2 U
			11/15/2016	ND<0.2 U	ND<0.2 U
			1/17/2017	ND<0.2 U	ND<0.2 U
			3/6/2017	ND<0.2 U	ND<0.2 U

			4/25/2017	ND<0.2 U	ND<0.2 U
			6/13/2017	ND<0.2 U	ND<0.2 U
			7/17/2017	ND<0.2 U	ND<0.2 U
MW-16-07	8	8 (100%)	8/8/2016	ND<0.2 U	ND<0.2 U
			9/26/2016	ND<0.2 U	ND<0.2 U
			11/15/2016	ND<0.2 U	ND<0.2 U
			1/17/2017	ND<0.2 U	ND<0.2 U
			3/6/2017	ND<0.2 U	ND<0.2 U
			4/25/2017	ND<0.2 U	ND<0.2 U
			6/12/2017	ND<0.2 U	ND<0.2 U
			7/17/2017 ~	ND<0.2 U	ND<0.2 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Molybdenum

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 56
Percent Non-Detects: 100%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<10 U	ND<10 U
			9/27/2016	ND<10 U	ND<10 U
			11/14/2016	ND<10 UF1	ND<10 UF1
			1/17/2017	ND<10 U	ND<10 U
			3/6/2017 ~	ND<10 U	ND<10 U
			4/26/2017	ND<10 U	ND<10 U
			6/13/2017 ~	ND<10 U	ND<10 U
			7/17/2017	ND<10 U	ND<10 U
MW-16-02	8	8 (100%)	8/9/2016	ND<10 U	ND<10 U
			9/27/2016	ND<10 U	ND<10 U
			11/15/2016 ~	ND<10 U^	ND<10 U^
			1/17/2017	ND<10 U	ND<10 U
			3/7/2017	ND<10 U	ND<10 U
			4/25/2017 ~	ND<10 U	ND<10 U
			6/12/2017	ND<10 U	ND<10 U
			7/18/2017	ND<10 U	ND<10 U
MW-16-03	8	8 (100%)	8/8/2016	ND<10 U	ND<10 U
			9/27/2016	ND<10 U	ND<10 U
			11/15/2016	ND<10 U^	ND<10 U^
			1/17/2017	ND<10 U	ND<10 U
			3/7/2017	ND<10 U	ND<10 U
			4/25/2017	ND<10 U	ND<10 U
			6/12/2017	ND<10 U	ND<10 U
			7/18/2017	ND<10 U	ND<10 U
MW-16-04	8	8 (100%)	8/9/2016	ND<10 U	ND<10 U
			9/26/2016 ~	ND<10 U	ND<10 U
			11/15/2016	ND<10 U^	ND<10 U^
			1/17/2017	ND<10 U	ND<10 U
			3/7/2017	ND<10 U	ND<10 U
			4/25/2017	ND<10 U	ND<10 U
			6/12/2017	ND<10 U	ND<10 U
			7/17/2017	ND<10 U	ND<10 U
MW-16-05	8	8 (100%)	8/8/2016	ND<10 U	ND<10 U
			9/26/2016	ND<10 U	ND<10 U
			11/15/2016	ND<10 U^	ND<10 U^
			1/17/2017	ND<10 U	ND<10 U
			3/7/2017	ND<10 U	ND<10 U
			4/25/2017	ND<10 U	ND<10 U
			6/12/2017	ND<10 U	ND<10 U
			7/17/2017	ND<10 U	ND<10 U
MW-16-06	8	8 (100%)	8/9/2016	ND<10 U	ND<10 U
			9/27/2016	ND<10 U	ND<10 U
			11/15/2016	ND<10 U^	ND<10 U^
			1/17/2017	ND<10 U	ND<10 U
			3/6/2017	ND<10 U	ND<10 U

			4/25/2017	ND<10 U	ND<10 U
			6/13/2017	ND<10 U	ND<10 U
			7/17/2017	ND<10 U	ND<10 U
MW-16-07	8	8 (100%)	8/8/2016	ND<10 U	ND<10 U
			9/26/2016	ND<10 U	ND<10 U
			11/15/2016	ND<10 U^	ND<10 U^
			1/17/2017	ND<10 U	ND<10 U
			3/6/2017	ND<10 U	ND<10 U
			4/25/2017	ND<10 U	ND<10 U
			6/12/2017	ND<10 U	ND<10 U
			7/17/2017 ~	ND<10 U	ND<10 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (pci/L)

Parameter: Radium-226/228

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 1
Percent Non-Detects: 1.78571%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	1 (12.5%)	8/8/2016 ~	0.428 U	0.428 U
			9/27/2016	0.497	0.497
			11/14/2016	0.852	0.852
			1/17/2017	0.668	0.668
			3/6/2017 ~	0.6415	0.6415
			4/26/2017	ND<0.367 U	ND<0.367 U
			6/13/2017 ~	0.6165	0.6165
			7/17/2017	0.852	0.852
MW-16-02	8	0 (0%)	8/9/2016	2.88	2.88
			9/27/2016	3.3	3.3
			11/15/2016 ~	2.87	2.87
			1/17/2017	2.54	2.54
			3/7/2017	3.16	3.16
			4/25/2017 ~	2.375	2.375
			6/12/2017	2.24	2.24
			7/18/2017	2.41	2.41
MW-16-03	8	0 (0%)	8/8/2016	2.51	2.51
			9/27/2016	2.36	2.36
			11/15/2016	2.51	2.51
			1/17/2017	2.45	2.45
			3/7/2017	2.51	2.51
			4/25/2017	2.13	2.13
			6/12/2017	1.93	1.93
			7/18/2017	2.27	2.27
MW-16-04	8	0 (0%)	8/9/2016	0.775	0.775
			9/26/2016 ~	0.908	0.908
			11/15/2016	0.574	0.574
			1/17/2017	0.974	0.974
			3/7/2017	0.723	0.723
			4/25/2017	0.65	0.65
			6/12/2017	0.578	0.578
			7/17/2017	0.639	0.639
MW-16-05	8	0 (0%)	8/8/2016	2.11	2.11
			9/26/2016	2.26	2.26
			11/15/2016	1.56	1.56
			1/17/2017	1.46	1.46
			3/7/2017	1.78	1.78
			4/25/2017	1.41	1.41
			6/12/2017	1.44	1.44
			7/17/2017	1.68	1.68
MW-16-06	8	0 (0%)	8/9/2016	0.575	0.575
			9/27/2016	0.751	0.751
			11/15/2016	0.918	0.918
			1/17/2017	0.732	0.732
			3/6/2017	0.7	0.7

			4/25/2017	0.648	0.648
			6/13/2017	0.623	0.623
			7/17/2017	0.65	0.65
MW-16-07	8	0 (0%)	8/8/2016	0.595	0.595
			9/26/2016	1.11	1.11
			11/15/2016	0.654	0.654
			1/17/2017	0.763	0.763
			3/6/2017	0.751	0.751
			4/25/2017	0.558	0.558
			6/12/2017	0.585	0.585
			7/17/2017 ~	0.729	0.729

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Selenium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 56
Percent Non-Detects: 100%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/14/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/6/2017 ~	ND<5 U	ND<5 U
			4/26/2017	ND<5 U	ND<5 U
			6/13/2017 ~	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-02	8	8 (100%)	8/9/2016	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/15/2016 ~	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017 ~	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/18/2017	ND<5 U	ND<5 U
MW-16-03	8	8 (100%)	8/8/2016	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/18/2017	ND<5 U	ND<5 U
MW-16-04	8	8 (100%)	8/9/2016	ND<5 U	ND<5 U
			9/26/2016 ~	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-05	8	8 (100%)	8/8/2016	ND<5 U	ND<5 U
			9/26/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/7/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-06	8	8 (100%)	8/9/2016	ND<5 U	ND<5 U
			9/27/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/6/2017	ND<5 U	ND<5 U

			4/25/2017	ND<5 U	ND<5 U
			6/13/2017	ND<5 U	ND<5 U
			7/17/2017	ND<5 U	ND<5 U
MW-16-07	8	8 (100%)	8/8/2016	ND<5 U	ND<5 U
			9/26/2016	ND<5 U	ND<5 U
			11/15/2016	ND<5 U	ND<5 U
			1/17/2017	ND<5 U	ND<5 U
			3/6/2017	ND<5 U	ND<5 U
			4/25/2017	ND<5 U	ND<5 U
			6/12/2017	ND<5 U	ND<5 U
			7/17/2017 ~	ND<5 U	ND<5 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Concentrations (ug/L)

Parameter: Thallium

Original Data (Not Transformed)

Non-Detects Replaced with Detection Limit

Total Measurements: 56
Total Non-Detect: 56
Percent Non-Detects: 100%
Total Background Measurements: 0
There are 0 background locations

Loc.	Meas.	ND	Date	Conc.	Original

There are 7 compliance locations

Loc.	Meas.	ND	Date	Conc.	Original
MW-16-01	8	8 (100%)	8/8/2016 ~	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/14/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017 ~	ND<1 U	ND<1 U
			4/26/2017	ND<1 U	ND<1 U
			6/13/2017 ~	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-02	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016 ~	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017 ~	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-03	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/18/2017	ND<1 U	ND<1 U
MW-16-04	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/26/2016 ~	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-05	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/7/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-06	8	8 (100%)	8/9/2016	ND<1 U	ND<1 U
			9/27/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U

			4/25/2017	ND<1 U	ND<1 U
			6/13/2017	ND<1 U	ND<1 U
			7/17/2017	ND<1 U	ND<1 U
MW-16-07	8	8 (100%)	8/8/2016	ND<1 U	ND<1 U
			9/26/2016	ND<1 U	ND<1 U
			11/15/2016	ND<1 U	ND<1 U
			1/17/2017	ND<1 U	ND<1 U
			3/6/2017	ND<1 U	ND<1 U
			4/25/2017	ND<1 U	ND<1 U
			6/12/2017	ND<1 U	ND<1 U
			7/17/2017 ~	ND<1 U	ND<1 U

There are 0 unused locations

Loc.	Meas.	ND	Date	Conc.	Original

Skewness Coefficient

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	8	16.5	2.46403	**1.24799**
MW-16-02	8	7.74375	0.826109	0.250149
MW-16-03	8	11.0125	4.36657	**1.70053**
MW-16-04	8	10.0938	0.833426	-0.0503771
MW-16-05	8	10.4125	2.23443	0.148075
MW-16-06	8	15.6125	7.58767	**2.07628**
MW-16-07	8	8.55	0.570714	0.362311

All Locations

Obs.	Mean	Std. Dev.	Skewness
56	11.4179	4.61312	**2.50201**

Skewness Coefficient

Parameter: Barium

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	8	2.7945	0.138965	**1.14617**
MW-16-02	8	2.04195	0.106019	0.154402
MW-16-03	8	2.34623	0.325539	**1.34927**
MW-16-04	8	2.30891	0.0830288	-0.11872
MW-16-05	8	2.32245	0.218192	-0.142986
MW-16-06	8	2.67748	0.36549	**1.70345**
MW-16-07	8	2.14401	0.0661568	0.308397

All Locations

Obs.	Mean	Std. Dev.	Skewness
56	2.3765	0.32531	**1.08806**

Shapiro-Wilks Test of Normality

Parameter: Barium

Location: MW-16-01

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	14.5	21.5	7	0.6052	4.2364
2	15	19	4	0.3164	1.2656
3	15	16	1	0.1743	0.1743
4	15	16	1	0.0561	0.0561
5	16	15	-1		
6	16	15	-1		
7	19	15	-4		
8	21.5	14.5	-7		

Sum of b values = 5.7324

Sample Standard Deviation = 2.46403

W Statistic = 0.773186

5% Critical value of 0.818 exceeds 0.773186

Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 is less than 0.773186

Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium

Location: MW-16-01

Normality Test of Parameter Concentrations

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	2.67415	3.06805	0.393904	0.6052	0.238391
2	2.70805	2.94444	0.236389	0.3164	0.0747934
3	2.70805	2.77259	0.0645385	0.1743	0.0112491
4	2.70805	2.77259	0.0645385	0.0561	0.00362061
5	2.77259	2.70805	-0.0645385		
6	2.77259	2.70805	-0.0645385		
7	2.94444	2.70805	-0.236389		
8	3.06805	2.67415	-0.393904		

Sum of b values = 0.328054

Sample Standard Deviation = 0.138965

W Statistic = 0.796129

5% Critical value of 0.818 exceeds 0.796129

Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 is less than 0.796129

Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium

Location: MW-16-03

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	7.8	21	13.2	0.6052	7.98864
2	8.5	13	4.5	0.3164	1.4238
3	8.6	11	2.4	0.1743	0.41832
4	9.1	9.1	0	0.0561	0
5	9.1	9.1	0		
6	11	8.6	-2.4		
7	13	8.5	-4.5		
8	21	7.8	-13.2		

Sum of b values = 9.83076
Sample Standard Deviation = 4.36657
W Statistic = 0.724093

5% Critical value of 0.818 exceeds 0.724093
Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 exceeds 0.724093
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium

Location: MW-16-03

Normality Test of Parameter Concentrations

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	2.05412	3.04452	0.990399	0.6052	0.599389
2	2.14007	2.56495	0.424883	0.3164	0.134433
3	2.15176	2.3979	0.246133	0.1743	0.042901
4	2.20827	2.20827	0	0.0561	0
5	2.20827	2.20827	0		
6	2.3979	2.15176	-0.246133		
7	2.56495	2.14007	-0.424883		
8	3.04452	2.05412	-0.990399		

Sum of b values = 0.776723

Sample Standard Deviation = 0.325539

W Statistic = 0.813257

5% Critical value of 0.818 exceeds 0.813257

Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 is less than 0.813257

Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium

Location: MW-16-06

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	9.9	34	24.1	0.6052	14.5853
2	12	15	3	0.3164	0.9492
3	13	14	1	0.1743	0.1743
4	13	14	1	0.0561	0.0561
5	14	13	-1		
6	14	13	-1		
7	15	12	-3		
8	34	9.9	-24.1		

Sum of b values = 15.7649
Sample Standard Deviation = 7.58767
W Statistic = 0.616693

5% Critical value of 0.818 exceeds 0.616693
Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 exceeds 0.616693
Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Barium

Location: MW-16-06

Normality Test of Parameter Concentrations

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	2.29253	3.52636	1.23383	0.6052	0.746711
2	2.48491	2.70805	0.223144	0.3164	0.0706026
3	2.56495	2.63906	0.074108	0.1743	0.012917
4	2.56495	2.63906	0.074108	0.0561	0.00415746
5	2.63906	2.56495	-0.074108		
6	2.63906	2.56495	-0.074108		
7	2.70805	2.48491	-0.223144		
8	3.52636	2.29253	-1.23383		

Sum of b values = 0.834388

Sample Standard Deviation = 0.36549

W Statistic = 0.74454

5% Critical value of 0.818 exceeds 0.74454

Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 exceeds 0.74454

Evidence of non-normality at 99% level of significance

Skewness Coefficient

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	15	1.602	0.244488	**-1.46198**
MW-16-02	15	1.54	0.0910259	0.305853
MW-16-03	15	1.51333	0.0833809	0.519238
MW-16-04	15	0.961	0.064868	0.0678206
MW-16-05	15	1.45	0.0981981	0.234243
MW-16-06	15	1.55333	0.0915475	0.477107
MW-16-07	15	1.48667	0.10601	0.268653

All Locations

Obs.	Mean	Std. Dev.	Skewness
105	1.44376	0.236359	**-1.04709**

Skewness Coefficient

Parameter: Fluoride

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	15	0.458162	0.175662	**-1.68889**
MW-16-02	15	0.430165	0.0587741	0.193174
MW-16-03	15	0.412918	0.0545162	0.385798
MW-16-04	15	-0.0419129	0.0676644	-0.0910013
MW-16-05	15	0.369435	0.0674477	0.125752
MW-16-06	15	0.438806	0.0582966	0.390163
MW-16-07	15	0.394179	0.0709773	0.124949

All Locations

Obs.	Mean	Std. Dev.	Skewness
105	0.351679	0.184912	**-1.35865**

Shapiro-Wilks Test of Normality

Parameter: Fluoride

Location: MW-16-01

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

K = 7 for 15 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.98	1.8	0.82	0.515	0.4223
2	1.2	1.8	0.6	0.3306	0.19836
3	1.4	1.8	0.4	0.2495	0.0998
4	1.4	1.75	0.35	0.1878	0.06573
5	1.7	1.7	0	0.1353	0
6	1.7	1.7	0	0.088	0
7	1.7	1.7	0	0.0433	0
8	1.7	1.7	0		
9	1.7	1.7	0		
10	1.7	1.7	0		
11	1.7	1.7	0		
12	1.75	1.4	-0.35		
13	1.8	1.4	-0.4		
14	1.8	1.2	-0.6		
15	1.8	0.98	-0.82		

Sum of b values = 0.78619

Sample Standard Deviation = 0.244488

W Statistic = 0.738606

5% Critical value of 0.881 exceeds 0.738606

Evidence of non-normality at 95% level of significance

1% Critical value of 0.835 exceeds 0.738606

Evidence of non-normality at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Fluoride

Location: MW-16-01

Normality Test of Parameter Concentrations

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

K = 7 for 15 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	-0.0202027	0.587787	0.607989	0.515	0.313115
2	0.182322	0.587787	0.405465	0.3306	0.134047
3	0.336472	0.587787	0.251314	0.2495	0.0627029
4	0.336472	0.559616	0.223144	0.1878	0.0419064
5	0.530628	0.530628	0	0.1353	0
6	0.530628	0.530628	0	0.088	0
7	0.530628	0.530628	0	0.0433	0
8	0.530628	0.530628	0		
9	0.530628	0.530628	0		
10	0.530628	0.530628	0		
11	0.530628	0.530628	0		
12	0.559616	0.336472	-0.223144		
13	0.587787	0.336472	-0.251314		
14	0.587787	0.182322	-0.405465		
15	0.587787	-0.0202027	-0.607989		

Sum of b values = 0.551771

Sample Standard Deviation = 0.175662

W Statistic = 0.704751

5% Critical value of 0.881 exceeds 0.704751

Evidence of non-normality at 95% level of significance

1% Critical value of 0.835 exceeds 0.704751

Evidence of non-normality at 99% level of significance

Skewness Coefficient

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	8	71	6.58461	-0.00922775
MW-16-02	8	95.6875	8.88392	0.354013
MW-16-03	8	104.625	9.30342	0.238026
MW-16-04	8	18.4375	1.54544	0.528018
MW-16-05	8	41.375	2.66927	**1.20828**
MW-16-06	8	78.875	7.8638	0.69322
MW-16-07	8	34.8125	2.59033	0.578591

All Locations

Obs.	Mean	Std. Dev.	Skewness
56	63.5446	31.0169	-0.00517004

Skewness Coefficient

Parameter: Lithium

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	8	4.2589	0.0930265	-0.0150376
MW-16-02	8	4.55737	0.0918904	0.261514
MW-16-03	8	4.64695	0.0884951	0.129581
MW-16-04	8	2.91138	0.0824102	0.467853
MW-16-05	8	3.72093	0.0624385	**1.11889**
MW-16-06	8	4.36365	0.0974141	0.488391
MW-16-07	8	3.54761	0.0731464	0.522889

All Locations

Obs.	Mean	Std. Dev.	Skewness
56	4.00097	0.595772	-0.617011

Shapiro-Wilks Test of Normality

Parameter: Lithium

Location: MW-16-05

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	39	47	8	0.6052	4.8416
2	39	43	4	0.3164	1.2656
3	40	42	2	0.1743	0.3486
4	40	41	1	0.0561	0.0561
5	41	40	-1		
6	42	40	-2		
7	43	39	-4		
8	47	39	-8		

Sum of b values = 6.5119
Sample Standard Deviation = 2.66927
W Statistic = 0.850222

5% Critical value of 0.818 is less than 0.850222
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.850222
Data is normally distributed at 99% level of significance

Skewness Coefficient

Parameter: Radium-226/228

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	8	0.592313	0.222588	-0.526697
MW-16-02	8	2.72188	0.388403	0.246436
MW-16-03	8	2.33375	0.212464	-0.900004
MW-16-04	8	0.727625	0.148982	0.590727
MW-16-05	8	1.7125	0.319855	0.745027
MW-16-06	8	0.699625	0.105496	**1.03253**
MW-16-07	8	0.718125	0.177044	**1.42309**

All Locations

Obs.	Mean	Std. Dev.	Skewness
56	1.35797	0.863432	0.646626

Skewness Coefficient

Parameter: Radium-226/228

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

Skewness > 1 indicates positively skewed data
Skewness < -1 indicates negatively skewed data

Compliance Locations

Location	Obs.	Mean	Std. Dev.	Skewness
MW-16-01	8	-0.611848	0.49773	**-1.34561**
MW-16-02	8	0.992483	0.141867	0.132414
MW-16-03	8	0.843627	0.0952202	-0.996009
MW-16-04	8	-0.335504	0.198021	0.417552
MW-16-05	8	0.523602	0.178365	0.610595
MW-16-06	8	-0.366475	0.143131	0.756658
MW-16-07	8	-0.353994	0.220765	**1.05411**

All Locations

Obs.	Mean	Std. Dev.	Skewness
56	0.0988416	0.662125	-0.0202772

Shapiro-Wilks Test of Normality

Parameter: Radium-226/228

Location: MW-16-07

Normality Test of Parameter Concentrations

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.558	1.11	0.552	0.6052	0.33407
2	0.585	0.763	0.178	0.3164	0.0563192
3	0.595	0.751	0.156	0.1743	0.0271908
4	0.654	0.729	0.075	0.0561	0.0042075
5	0.729	0.654	-0.075		
6	0.751	0.595	-0.156		
7	0.763	0.585	-0.178		
8	1.11	0.558	-0.552		

Sum of b values = 0.421788

Sample Standard Deviation = 0.177044

W Statistic = 0.810823

5% Critical value of 0.818 exceeds 0.810823

Evidence of non-normality at 95% level of significance

1% Critical value of 0.749 is less than 0.810823

Data is normally distributed at 99% level of significance

Shapiro-Wilks Test of Normality

Parameter: Radium-226/228

Location: MW-16-07

Normality Test of Parameter Concentrations

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

K = 4 for 8 measurements

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	-0.583396	0.10436	0.687756	0.6052	0.41623
2	-0.536143	-0.270497	0.265646	0.3164	0.0840505
3	-0.519194	-0.28635	0.232844	0.1743	0.0405848
4	-0.424648	-0.316082	0.108566	0.0561	0.00609057
5	-0.316082	-0.424648	-0.108566		
6	-0.28635	-0.519194	-0.232844		
7	-0.270497	-0.536143	-0.265646		
8	0.10436	-0.583396	-0.687756		

Sum of b values = 0.546956
Sample Standard Deviation = 0.220765
W Statistic = 0.876893

5% Critical value of 0.818 is less than 0.876893
Data is normally distributed at 95% level of significance

1% Critical value of 0.749 is less than 0.876893
Data is normally distributed at 99% level of significance

Non-Parametric Tolerance Interval MW-16-01

Parameter: Antimony

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 87.5%
Background measurements (n) = 8
Maximum Background Concentration = 2.1
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Non-Parametric Tolerance Interval

MW-16-01

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 0%
Background measurements (n) = 8
Maximum Background Concentration = 21.5
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Non-Parametric Tolerance Interval

MW-16-01

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 0%
Background measurements (n) = 15
Maximum Background Concentration = 1.8
Minimum Coverage = 81.9%
Average Coverage = 93.75%

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-01

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 71
Background standard deviation = 6.58461
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 91.9917

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-01

Parameter: Radium-226/228

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 0.592313
Background standard deviation = 0.222588
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 1.30192

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis

MW-16-02

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 7.74375
Background standard deviation = 0.826109
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 10.3774

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-02

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 15
Background mean = 1.54
Background standard deviation = 0.0910259
One-sided normal tolerance factor (K) at 95% confidence = 2.566
Upper tolerance limit = 1.77357

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-02

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 95.6875
Background standard deviation = 8.88392
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 124.009

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-02

Parameter: Radium-226/228

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 2.72188
Background standard deviation = 0.388403
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 3.9601

Location	Date	Value	Significant

Non-Parametric Tolerance Interval MW-16-03

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 0%
Background measurements (n) = 8
Maximum Background Concentration = 21
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Non-Parametric Tolerance Interval MW-16-03

Parameter: Chromium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 87.5%
Background measurements (n) = 8
Maximum Background Concentration = 3.1
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-03

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 15
Background mean = 1.51333
Background standard deviation = 0.0833809
One-sided normal tolerance factor (K) at 95% confidence = 2.566
Upper tolerance limit = 1.72729

Location	Date	Value	Significant

Non-Parametric Tolerance Interval MW-16-03

Parameter: Lead

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 75%
Background measurements (n) = 8
Maximum Background Concentration = 2.5
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-03

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 104.625
Background standard deviation = 9.30342
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 134.284

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis

MW-16-03

Parameter: Radium-226/228

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 2.33375
Background standard deviation = 0.212464
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 3.01109

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis

MW-16-04

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 10.0938
Background standard deviation = 0.833426
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 12.7507

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-04

Parameter: Fluoride
Original Data (Not Transformed)
Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 15
Background mean = 0.961
Background standard deviation = 0.064868
One-sided normal tolerance factor (K) at 95% confidence = 2.566
Upper tolerance limit = 1.12745

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-04

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 18.4375
Background standard deviation = 1.54544
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 23.3644

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-04

Parameter: Radium-226/228

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 0.727625
Background standard deviation = 0.148982
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 1.20258

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis

MW-16-05

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 10.4125
Background standard deviation = 2.23443
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 17.5359

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-05

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 15
Background mean = 1.45
Background standard deviation = 0.0981981
One-sided normal tolerance factor (K) at 95% confidence = 2.566
Upper tolerance limit = 1.70198

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-05

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 41.375
Background standard deviation = 2.66927
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 49.8846

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis

MW-16-05

Parameter: Radium-226/228

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 1.7125
Background standard deviation = 0.319855
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 2.7322

Location	Date	Value	Significant

Non-Parametric Tolerance Interval

MW-16-06

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 0%
Background measurements (n) = 8
Maximum Background Concentration = 34
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Non-Parametric Tolerance Interval MW-16-06

Parameter: Cobalt

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 87.5%
Background measurements (n) = 8
Maximum Background Concentration = 1.6
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-06

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 15
Background mean = 1.55333
Background standard deviation = 0.0915475
One-sided normal tolerance factor (K) at 95% confidence = 2.566
Upper tolerance limit = 1.78824

Location	Date	Value	Significant

Non-Parametric Tolerance Interval

MW-16-06

Parameter: Lead

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

Total Percent Non-Detects = 87.5%
Background measurements (n) = 8
Maximum Background Concentration = 1.1
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-06

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 78.875
Background standard deviation = 7.8638
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 103.945

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-06

Parameter: Radium-226/228

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = -0.366475
Background standard deviation = 0.143131
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 0.0898265

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis

MW-16-07

Parameter: Barium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 8.55
Background standard deviation = 0.570714
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 10.3694

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-07

Parameter: Fluoride

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 15
Background mean = 1.48667
Background standard deviation = 0.10601
One-sided normal tolerance factor (K) at 95% confidence = 2.566
Upper tolerance limit = 1.75869

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis

MW-16-07

Parameter: Lithium

Original Data (Not Transformed)

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = 34.8125
Background standard deviation = 2.59033
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 43.0705

Location	Date	Value	Significant

Parametric Tolerance Interval Analysis MW-16-07

Parameter: Radium-226/228

Natural Logarithm Transformation

Non-Detects Replaced with 1/2 DL

USEPA 1989 Guidance Tolerance Limit Formula (One-Tailed)

Background observations = 8
Background mean = -0.353994
Background standard deviation = 0.220765
One-sided normal tolerance factor (K) at 95% confidence = 3.188
Upper tolerance limit = 0.349805

Location	Date	Value	Significant

Geosyntec
consultants

Appendix O

Fate and Transport Model Inputs

Calculation Package

Geosyntec consultants

COMPUTATION COVER SHEET

Client: **DTE** Project: **FAB ALD** Project/ Proposal No.: **GLP8014** Task No.

Title of Computations: **Vertical Darcy Velocity and Travel Time Calculations**

Computations by:	Signature		11/17/2021
	Printed Name	Nick Williams	Date
	Title	Senior Staff Professional	
Assumptions and Procedures Checked by: (peer reviewer)	Signature		11/17/2021
	Printed Name	Jesse Varsho	Date
	Title		
Computations Checked by:	Signature		11/17/2021
	Printed Name	Isaiah Vaught	Date
	Title		
Computations backchecked by: (originator)	Signature		11/17/2021
	Printed Name	Nick Williams	Date
	Title		
Approved by: (pm or designate)	Signature		11/24/2021
	Printed Name	Omer Bozok	Date
	Title		

Approval notes:

Revisions (number and initial all revisions)

No.	Sheet	Date	By	Checked by	Approval

TABLE OF CONTENTS

1. PURPOSE

The purpose of this calculation package is to calculate the vertical Darcy velocity of the model lithology for input in Fate and Transport numerical model at the Monroe Power Plant Fly Ash Basin (FAB). Following Darcy velocity calculation, the solution is used to calculate the time of travel from the FAB to the Uppermost Aquifer.

2. ASSUMPTIONS

- Vertical flow is the dominant influence on contaminant transport; horizontal flow is not considered since a one-dimensional model was selected.
- Vertical hydraulic conductivity calculated in the laboratory using samples collected from borings is representative of subsurface conditions.

3. DARCY VELOCITY SOLUTION

The Darcy velocity (q) through the model lithologies/layers is expressed in m/year =

$$= K(i) = K\left(\frac{H_1 - H_2}{l_1 - l_2}\right)$$

Where,

K = vertical hydraulic conductivity (laboratory measured)

i = vertical gradient

$H_1 - H_2$ = difference in hydraulic head between the FAB water level and the upper most aquifer potentiometric surface

$l_1 - l_2$ = distance in direction of flow

Thus:

K = Geomean of Sandy Lean Clay hydraulic conductivity value (data provided in Attachment 1) = 2.27×10^{-8} cm/s

H_1 = Total head at the bottom of FAB = 609 ft

H_2 = Average water level elevation from monitoring wells (data provided in Attachment 2) = 583.8[1] ft

l_1 = Elevation of bottom of FAB = 563 ft

l_2 = Average elevation of well screen midpoints = 532.95[1] ft

q = Darcy velocity in m/year (= cm/s * 315360) = 6.08×10^{-3} m/year

1. Value is an average taken from all monitoring wells with the exception of the outlier MW-16-04

4. TRAVEL TIME SOLUTION

Travel time through the model lithology is expressed in years =

$$T = t / \left(\frac{K * i}{n}\right)$$

Where:

t =	minimum model thickness
K =	vertical hydraulic conductivity (laboratory measured)
i =	vertical gradient
n =	effective porosity

Thus:

t =	Minimum model thickness per EVS model =	4.33 m
K =	Hydraulic conductivity =	2.27 x 10^{-8} cm/s
i =	Calculated using variables in Section 3 =	0.85
n =	Average of available porosity data, converted to effective porosity using Sara (1994) =	0.19
***T* =**	**Travel time in years (= s / 31536000) =**	**135.20 years**

Note: Time travel is not an input to Pollute model. It has been calculated to provide time estimate for the travel of water molecule from the bottom of FAB to top of uppermost aquifer.

Attachment 1

Table O-1

Location ID	Layer	Elevation (ft)	Vertical Hydraulic Conductivity, k_v (cm/s)			
			DDW	Site Water	Lean Clay	Sandy Lean Clay
TB2(1994)	Lean Clay	573.0	3.30E-08		3.30E-08	
	Sandy Lean Clay	568.0	5.80E-08			5.80E-08
	Sandy Lean Clay	563.0	1.30E-08			1.30E-08
	Sandy Lean Clay	558.0	1.50E-08			1.50E-08
	Sandy Lean Clay	553.0	2.00E-08			2.00E-08
	Sandy Lean Clay	548.0	2.00E-08			2.00E-08
TB4(1994)	Lean Clay	573.0	6.60E-08		6.60E-08	
	Sandy Lean Clay	568.0	2.10E-08			2.10E-08
	Sandy Lean Clay	563.0	4.70E-08			4.70E-08
	Sandy Lean Clay	558.0	2.10E-08			2.10E-08
	Sandy Lean Clay	553.0	3.00E-08			3.00E-08
	Sandy Lean Clay	548.0	1.80E-08			1.80E-08
TB6(1994)	Lean Clay	582.0	7.40E-08		7.40E-08	
	Lean Clay	577.0	1.80E-08		1.80E-08	
	Lean Clay	572.0	4.00E-08		4.00E-08	
	Sandy Lean Clay	567.0	6.50E-08			6.50E-08
TB8(1994)	Lean Clay	573.0	1.50E-08		1.50E-08	
	Sandy Lean Clay	568.0	2.20E-08			2.20E-08
	Sandy Lean Clay	563.0	4.80E-08			4.80E-08
	Sandy Lean Clay	558.0	1.60E-08			1.60E-08
	Sandy Lean Clay	553.0	1.70E-08			1.70E-08
	Sandy Lean Clay	548.0	4.70E-08			4.70E-08
	Sandy Lean Clay	543.0	3.80E-08			3.80E-08
	Sandy Lean Clay	538.0	1.90E-07			1.90E-07
TB10(1994)	Lean Clay	573.0	3.60E-08		3.60E-08	
	Sandy Lean Clay	568.0	1.20E-08			1.20E-08
	Sandy Lean Clay	563.0	5.30E-08			5.30E-08
	Sandy Lean Clay	558.0	3.70E-08			3.70E-08
	Sandy Lean Clay	553.0	1.50E-08			1.50E-08
B2-ST-1	Lean Clay	594.0		5.40E-09	5.40E-09	
B4-ST-2	Lean Clay	574.0		3.50E-09	3.50E-09	
B4-ST-4	Sandy Lean Clay	543.8		1.10E-08		1.10E-08
B6-ST-1	Lean Clay	589.0		7.60E-09	7.60E-09	
B6-ST-3	Sandy Lean Clay	558.8		9.80E-09		9.80E-09
B6-ST-4	Sandy Lean Clay	548.8		1.00E-08		1.00E-08
B9-ST-2	Lean Clay	574.0		1.10E-07	1.10E-07	
B9_ST-3	Sandy Lean Clay	559.0		1.40E-08		1.40E-08
MW-16-01	Sandy Lean Clay	558.5	1.60E-08			1.60E-08
MW-16-02	Sandy Lean Clay	549.0	1.30E-08			1.30E-08
MW-16-03	Sandy Lean Clay	556.9	1.20E-08			1.20E-08
MW-16-04	Sandy Lean Clay	562.2	1.20E-08			1.20E-08

Statistical Parameter	Lean Clay	Sandy Lean Clay
Mean	3.71E-08	3.07E-08
GeoMean	**2.31E-08**	**2.27E-08**
Maximum	1.10E-07	1.90E-07
Minimum	3.50E-09	9.80E-09
Count	11	30
Standard Deviation	3.38E-08	3.41E-08
GeoMean of All Data	2.28E-08	

Attachment 2

Edited by Geosyntec to assess vertical gradient - OB

Table 1

Groundwater Elevation Summary – April and October 2020

Monroe Power Plant Fly Ash Basin and Vertical Extension Landfill – RCRA CCR Monitoring Program

Monroe, Michigan

Well ID	MW-16-01		MW-16-02		MW-16-03		MW-16-04		MW-16-05		MW-16-06		MW-16-07	
Date Installed	2/17/2016		2/18/2016		2/16/2016		2/15/2016		4/13/2016		4/13/2016		4/14/2016	
TOC Elevation	581.74		581.81		579.95		585.54		580.42		581.94		578.40	
Geologic Unit of Screened Interval	Silt/Limestone Interface		Silt/Limestone Interface		Sand & Silty Clay Limestone Interface		Silty Sand and Gravel		Limestone		Gravel and Cobbles		Silt/Limestone Interface	
Screened Interval Elevation	530.9 to 525.9		526.4 to 521.4		540.3 to 535.3		541.6 to 536.6		540.5 to 535.5		534.2 to 529.2		540.4 to 535.4	
Unit	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft	ft BTOC	ft
Measurement Date	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation	Depth to Water	GW Elevation
04/08/2020	4.10	577.64	-4.50	586.3	-11.60	591.6	-15.00	600.5	-15.00	595.4	-1.10	583.0	-6.80	585.2
10/05/2020	4.68	577.06[1]	-0.85	582.7	-7.30	587.3	-15.00	600.5	-11.50	591.9	0.80	581.14	-4.40	582.8

Notes:

Negative depth to water measurement indicates artesian conditions, actual measured water level is above the top of casing.

Elevations are reported in feet relative to the North American Vertical Datum of 1988.

ft BTOC - feet below top of casing

(1) Water level meaured on October 6, 2020.

Well ID	MW-16-01	MW-16-02	MW-16-03	MW-16-04	MW-16-05	MW-16-06	MW-16-07
Screen Mid Point Elevation, l_2 (ft)	528.4	523.9	537.8	539.1	538.0	531.7	537.9
Aquifer Water Level, H_2 (ft)	577.1	582.7	587.3	600.5	591.9	581.1	582.8
Total Head Difference, $H_1 - H_2$ (ft)	31.9	26.3	21.7	8.5	17.1	27.9	26.2
Flow Distance, $l_1 - l_2$ (ft)	34.6	39.1	25.2	23.9	25.0	31.3	25.1
Gradient, i	0.92	0.67	0.86	0.36	0.68	0.89	1.04

Pond Water Elevation, H_1 (ft)	609
Elevation of Pond Outflow, l_1 (ft)	563

Average Gradient	0.78
Average Gradient (no NW-16-04)	0.85

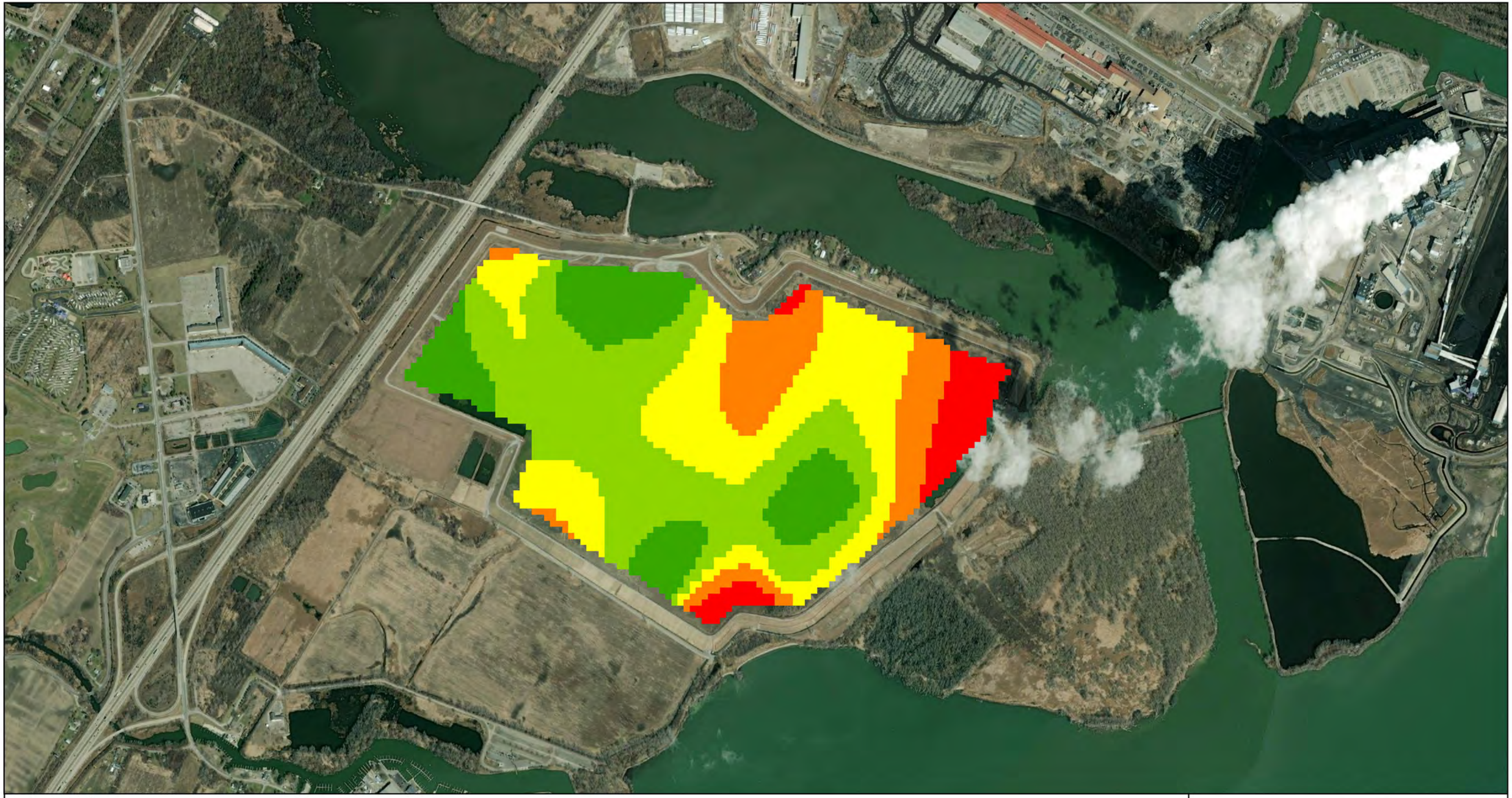
POLLUTE Model Inputs

Basin	Layer	Darcy Velocity (m/year)	Darcy Velocity for Sensitivity - Doubled (m/year)	Thickness (m)	Max Thickness (m)	Min Thickness (m)	Sublayers	Kv (cm/s)	CoHD	CoHD +25%	CoHD -25%	Effective Porosity	Effective Porosity Max	Effective Porosity Min	Modeling Period (years)	Modeling Period for Sensitvity	Distribution Coefficient (See Note 5)	Dry Density (kg/m3)
FAB	Sandy Lean Clay	6.08E-03	1.22E-02	6.31	10.42	4.33	10	2.27E-08	0.019	0.024	0.014	0.19	0.31	0.14	67	97	0	1919

Notes:

1. Kv = Vertical Hydraulic conductivity as determined by the analysis of field and laboratory data summarized in Table O-1.
2. Analysis of vertical hydraulic conductivity includes data from long term tests updated on 8/20/2021
3. CoHD = Coefficient of Hydrodynamic Dispersion
4. Effective Porosity determined by multiplying estimated porosity from field and lab data by 0.81, based on data provided by Sara, 1994.
5. Distribution Coefficient, Kd of 0.0082 m3/kg was used for Molybdenum, for minimum thickness sensitivity analysis.

Model Thickness



Legend

FAB Sandy Lean Clay Thickness (ft)

- 14.3 - 18.3
- 18.4 - 20.4
- 20.5 - 22.6
- 22.7 - 25.9
- 26 - 34.2

0 500 1,000 2,000 Feet

Sandy Lean Clay Thickness
Monroe Power Plant Flyash Basin (FAB)
Monroe, MI

Geosyntec consultants

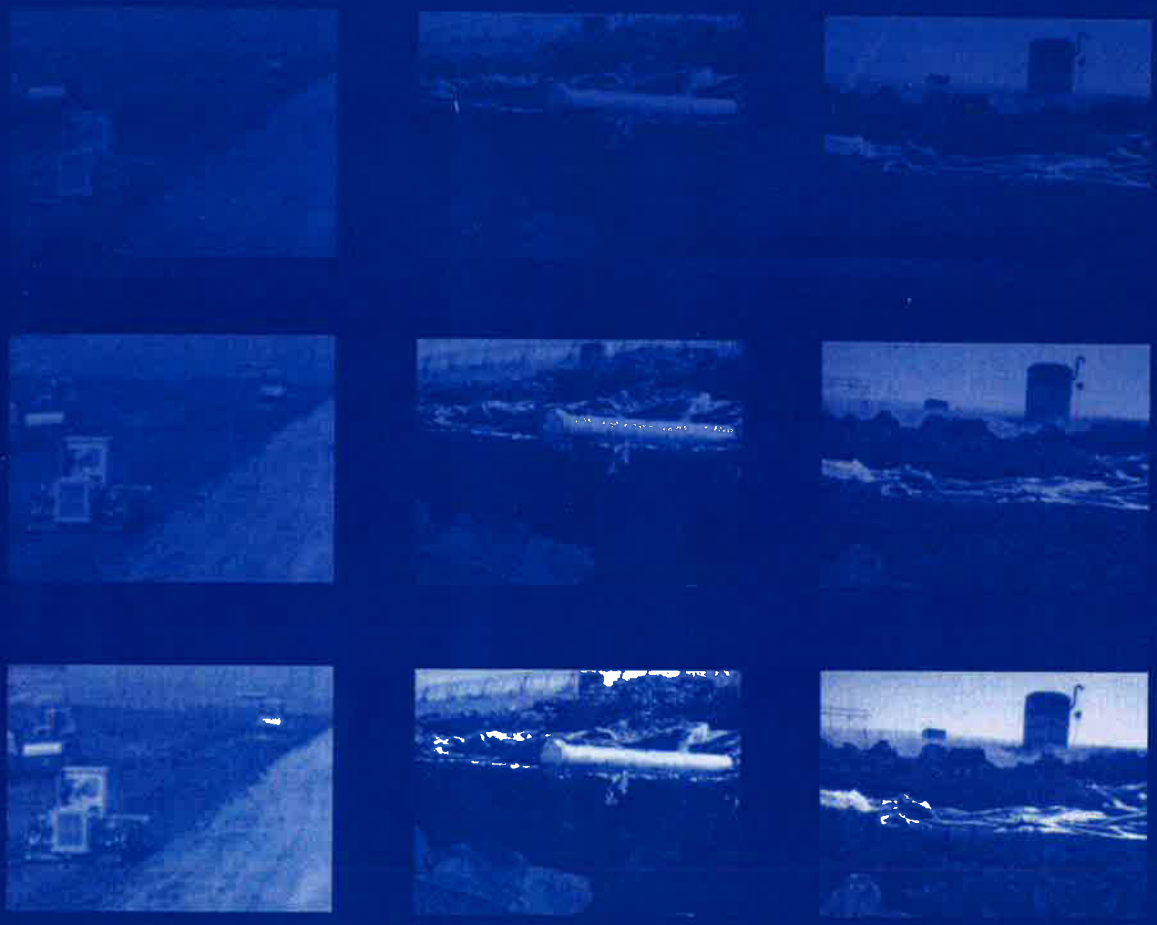
GLP8014 | October 2021

Figure O-1

\\chicago-01\Data\prj1\CWP\GLP8014 - Monroe Ash Basin Beneficial Reuse and Geotech Investigation\500 - Technical\GIS\Monroe_Sections\Monroe_Sections_NJW.aprx 10/29/2021 11:48 AM

Reference Material

CRC Press
Taylor & Francis Group
A CHAPMAN & HALL BOOK



BARRIER SYSTEMS FOR WASTE DISPOSAL FACILITIES

2ND EDITION

R. Kerry Rowe, Robert M. Quigley,
Richard W.I. Brachman & John R. Booker

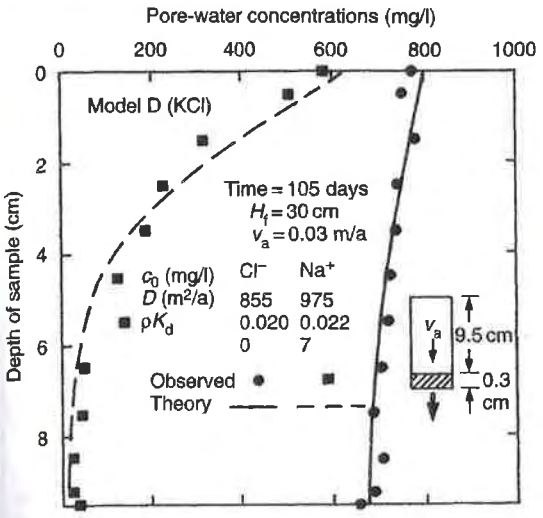


Figure 8.10 Chloride and potassium concentration versus depth in sample for model D (modified from Rowe *et al.*, 1988).

variation in concentration with depth in the soil at the end of each test. The consistency of results demonstrates the power of the analytical model (program POLLUTE) and provides some confidence in the parameters D and ρK_d for the clay and source fluids examined.

To provide an indication of parameter variation that might be expected for a given soil, a number of tests were duplicated. The diffusion coefficient, D, for chloride was deduced for each model and ranged between 0.018 and 0.02 m^2/a with an average value of 0.019 m^2/a. This small variation in D does not appear to be related to small differences in Darcy velocity, nor does it appear to be particularly related to the nature of the associated cation (see Table 8.3). Rather, the variability from 0.018 to 0.02 m^2/a is seen as an indication of the level of repeatability that may be achieved for this type of test.

The application of an effective stress to the soil sample adopted in these tests is not an essential part of the proposed technique for determining the parameters D and K_d. Tests performed for the particular combination of clay and permeants considered herein gave similar results both with and without the application of the effective stress. However, for some combinations of clay and permeant, shrinkage of the clay may occur in the absence of a confining stress and this can give quite misleading results (e.g., see Quigley and Fernandez, 1989). For these clays, and for GCLs (see Chapter 12), tests should be performed at an effective stress similar to that anticipated in the field.

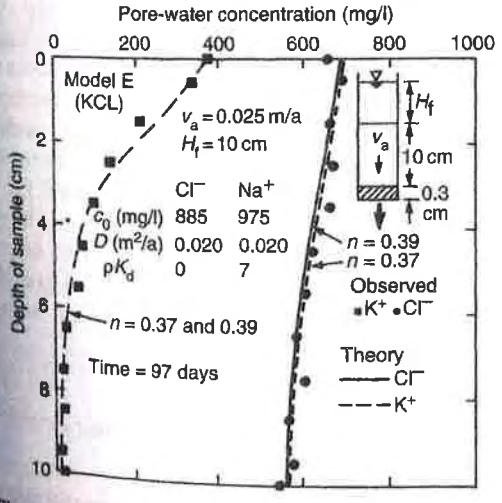


Figure 8.11 Chloride and potassium concentration versus depth in sample for model E (modified from Rowe *et al.*, 1988).

8.3.2 Pure diffusion tests

In many cases, it is not necessary to perform an advection–diffusion test. Under these circumstances, a simple diffusion test can be performed for boundary conditions shown in Figure 8.2. In this test, the soil sample is placed in a Plexiglass cylinder by trimming the sample to a size marginally greater than the specimen and then pressing the specimen into the cylinder, using a cutting shoe attached to the cylinder, to perform the final trim. This procedure is found to work well for many clays. However, it does not work well for clays with a significant stone content because the

SITE ASSESSMENT and REMEDIATION Handbook Second Edition

Martin N. Sara

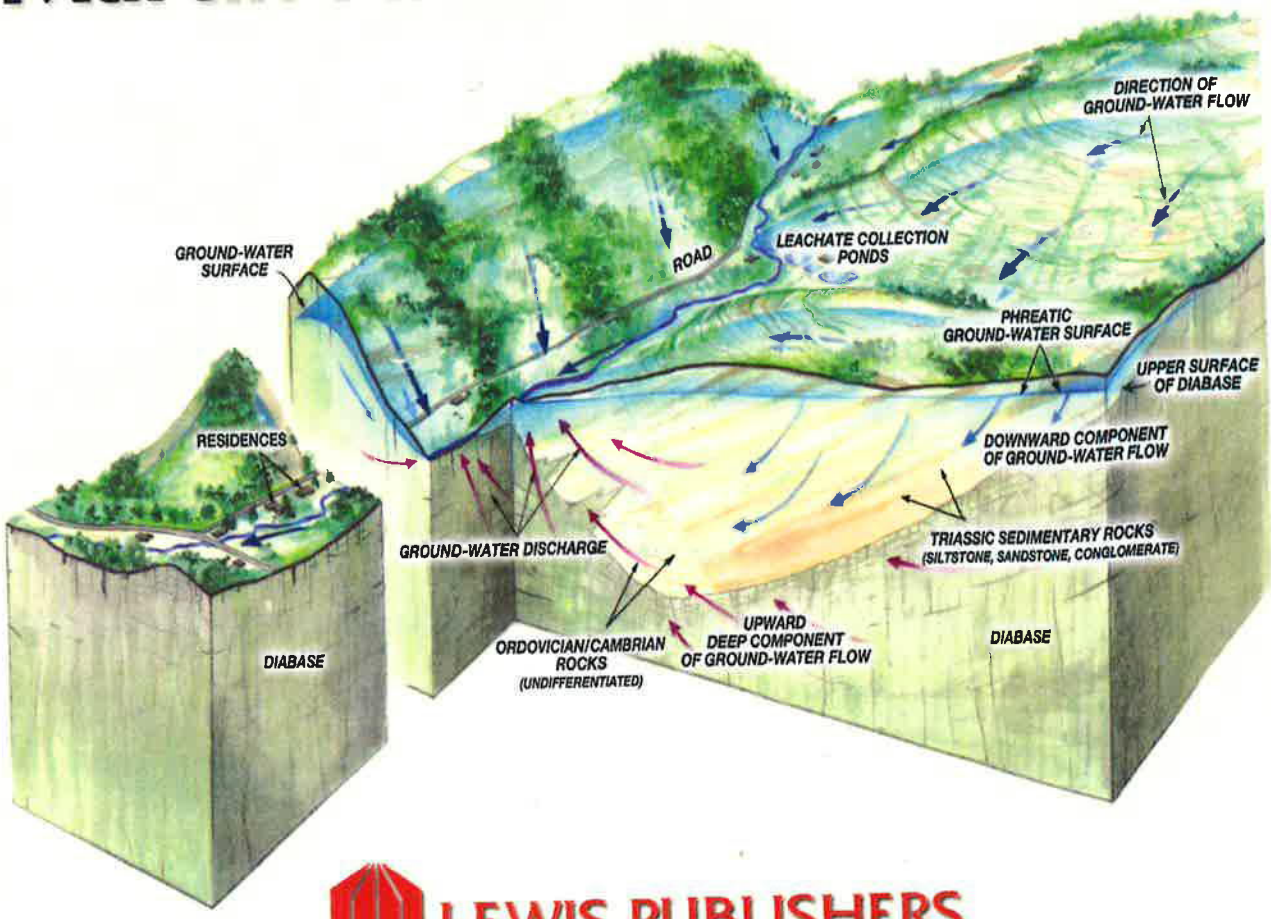


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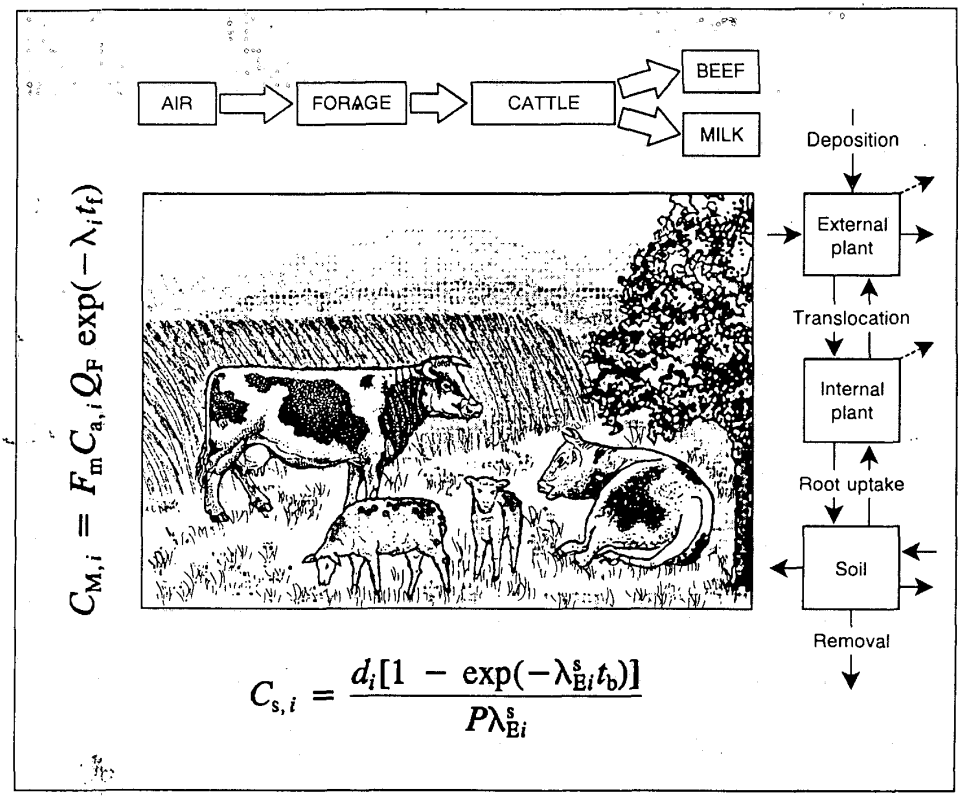
Table 5-9 Porosity, Residual Saturation and Effective Porosity of Common Soils

Texture Class	Sample Size	Total Porosity (ϕ) cm^3/cm^3	Residual Saturation (ϕr) cm^3/cm^3	Effective Porosity (ϕ_c) cm^3/cm^3
Sand	762	0.437 (0.374: 0.500)	0.020 (0.001: 0.039)	0.417 (0.354: 0.480)
Loamy Sand	338	0.437 0.368: 0.506)	0.035 (0.003: 0.067)	0.401 (0.329: 0.473)
Sandy Loam	666	0.453 (0.351: 0.555)	0.041 (0.0: 0.106)	0.412 (0.283: 0.541)
Loam	383	0.463 0.375: 0.551)	0.027 (0.0: 0.074)	0.434 (0.334: 0.534)
Silt Loam	1206	0.501 (0.420: 0.582)	0.015 (0.0: 0.058)	0.486 (0.394: 0.578)
Sandy Clay Loam	498	0.398 (0.332: 0.464)	0.068 (0.0: 0.137)	0.330 (0.235: 0.425)
Clay Loam	366	0.464 (0.409: 0.519)	0.076 (0.0: 0.174)	0.390 (0.279: 0.501)
Silty Clay Loam	689	0.471 (0.428: 0.524)	0.040 (0.0: 0.118)	0.432 (0.347: 0.517)
Sandy Clay	45	0.430 (0.370: 0.490)	0.109 (0.0: 0.205)	0.321 (0.207: 0.435)
Silty Clay	127	0.479 (0.425: 0.533)	0.056 (0.0: 0.136)	0.423 (0.334: 0.512)
Clay	291	0.475 (0.427: 0.523)	0.090 (0.0: 0.195)	0.385 (0.269: 0.501)

First line is the mean value
Second line is + one standard deviation about the mean

Adapted from: Rawls, W.J., D.C. Brakensiek, K.E. Saxton, 1982

The ratio of effective porosity to total porosity is 0.81 for Clay, and 0.88 for Silty Clay. Use 0.81 to be conservative.



TECHNICAL REPORTS SERIES No. 364

Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Temperate Environments

Produced in collaboration with the International Union of Radioecologists

INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, 1994

TABLE IX. PARTITION COEFFICIENT K_D OF RADIONUCLIDES IN SOILS (L/Kg) [37]

Nuclide	Soil type							
	Sand		Loam		Clay		Organic	
	Expected	Range	Expected	Range	Expected	Range	Expected	Range
Ac	4.5×10^{2}		1.5×10^{3}		2.4×10^{3}		5.4×10^{3}	
Ag	9.0×10^{1}	2.5×10^{0} - 3.3×10^{3}	1.2×10^{2}	1.3×10^{1} - 1.1×10^{3}	1.8×10^{2}	8.1×10^{1} - 4.0×10^{2}	1.5×10^{4}	2.4×10^{3} - 8.9×10^{4}
Am	2.0×10^{3}	1.1×10^{1} - 2.6×10^{5}	9.9×10^{2}	6.0×10^{2} - 1.6×10^{5}	8.1×10^{3}	4.5×10^{1} - 1.5×10^{6}	1.1×10^{5}	3.6×10^{3} - 3.3×10^{6}
Be	2.4×10^{2}		8.1×10^{2}		1.3×10^{3}		3.0×10^{3}	
Bl	1.2×10^{2}		4.0×10^{2}		6.7×10^{2}		1.5×10^{3}	
Br	1.5×10^{1}		4.9×10^{1}		7.4×10^{1}		1.8×10^{2}	
Ca	9.0×10^{0}		3.0×10^{1}		4.9×10^{1}		1.1×10^{2}	
Cd	7.4×10^{1}	3.7×10^{0} - 1.5×10^{3}	4.0×10^{1}	1.6×10^{0} - 9.9×10^{2}	5.4×10^{2}	9.0×10^{1} - 3.3×10^{3}	8.1×10^{2}	8.2×10^{0} - 8.1×10^{4}
Ce	4.9×10^{2}	2.0×10^{1} - 1.2×10^{4}	8.1×10^{3}	4.0×10^{2} - 1.6×10^{5}	2.0×10^{4}	7.3×10^{3} - 5.4×10^{4}	3.0×10^{3}	
Cm	4.0×10^{3}		1.8×10^{4}	4.4×10^{3} - 7.3×10^{4}	5.4×10^{3}		1.2×10^{4}	
Co	6.0×10^{1}	2.2×10^{-1} - 1.6×10^{4}	1.3×10^{3}	9.9×10^{1} - 1.8×10^{4}	5.4×10^{2}	1.5×10^{1} - 2.0×10^{4}	9.9×10^{2}	4.9×10^{1} - 2.0×10^{4}
Cr	6.7×10^{1}	1.0×10^{0} - 4.4×10^{3}	3.0×10^{1}	9.1×10^{-2} - 9.9×10^{3}	1.5×10^{3}		2.7×10^{2}	1.2×10^{0} - 6.0×10^{4}
Cs	2.7×10^{2}	1.8×10^{0} - 4.0×10^{4}	4.4×10^{3}	3.3×10^{2} - 6.0×10^{4}	1.8×10^{3}	7.4×10^{1} - 4.4×10^{4}	2.7×10^{2}	2.0×10^{-1} - 3.6×10^{5}
Fe	2.2×10^{2}	1.2×10^{0} - 4.0×10^{4}	8.1×10^{2}	2.0×10^{2} - 3.3×10^{3}	1.6×10^{2}	6.7×10^{0} - 4.0×10^{3}	4.9×10^{3}	
Hf	4.5×10^{2}		1.5×10^{3}		2.4×10^{3}		5.4×10^{3}	
Ho	2.4×10^{2}		8.1×10^{2}		1.3×10^{3}		3.0×10^{3}	
I	1.0×10^{0}	1.3×10^{-2} - 8.5×10^{1}	4.5×10^{0}	8.2×10^{-2} - 2.4×10^{2}	1.8×10^{2}	8.2×10^{-2} - 3.3×10^{1}	2.7×10^{1}	5.0×10^{-1} - 1.5×10^{3}
Mn	4.9×10^{1}	3.0×10^{0} - 8.1×10^{2}	7.2×10^{2}	4.1×10^{0} - 1.3×10^{5}	1.8×10^{2}	3.3×10^{0} - 9.9×10^{3}	4.9×10^{2}	
Mo	7.4×10^{0}	8.2×10^{-1} - 6.7×10^{1}	1.3×10^{2}		9.0×10^{1}	8.2×10^{0} - 9.9×10^{2}	2.7×10^{1}	1.0×10^{1} - 7.4×10^{1}
Nb	1.6×10^{2}		5.4×10^{2}		9.0×10^{2}		2.0×10^{3}	
Ni	4.0×10^{2}	2.0×10^{1} - 8.1×10^{3}	3.0×10^{2}		6.7×10^{2}	1.6×10^{2} - 2.7×10^{3}	1.1×10^{3}	1.8×10^{2} - 6.6×10^{3}
Np	4.1×10^{0}	1.4×10^{-1} - 1.2×10^{2}	2.5×10^{1}	2.2×10^{0} - 2.7×10^{2}	5.5×10^{1}	2.7×10^{-2} - 1.1×10^{5}	1.2×10^{3}	5.4×10^{2} - 2.7×10^{3}

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Appendix O

Fate and Transport Model Outputs

POLLUTEv7

Version 7.13

Monroe_Baseline

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	6.31 m	10	0.019 m2/a	0.19	0 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	6.310E-01	2.406E-01
	1.262E+00	1.036E-02
	1.893E+00	6.512E-05
	2.524E+00	5.518E-08
	3.155E+00	7.884E-12

	3.786E+00	1.784E-13
	4.417E+00	1.050E-14
	5.048E+00	3.552E-16
	5.679E+00	6.599E-18
	6.310E+00	6.382E-20
10	0.000E+00	1.000E+00
	6.310E-01	4.848E-01
	1.262E+00	1.063E-01
	1.893E+00	9.369E-03
	2.524E+00	3.137E-04
	3.155E+00	3.878E-06
	3.786E+00	1.742E-08
	4.417E+00	3.273E-11
	5.048E+00	1.136E-12
	5.679E+00	2.115E-13
	6.310E+00	3.070E-14
20	0.000E+00	1.000E+00
	6.310E-01	7.137E-01
	1.262E+00	3.598E-01
	1.893E+00	1.198E-01
	2.524E+00	2.531E-02
	3.155E+00	3.320E-03
	3.786E+00	2.666E-04
	4.417E+00	1.299E-05
	5.048E+00	3.816E-07
	5.679E+00	6.762E-09
	6.310E+00	8.328E-11
40	0.000E+00	1.000E+00
	6.310E-01	8.760E-01
	1.262E+00	6.701E-01
	1.893E+00	4.315E-01
	2.524E+00	2.278E-01
	3.155E+00	9.681E-02
	3.786E+00	3.272E-02
	4.417E+00	8.723E-03
	5.048E+00	1.824E-03
	5.679E+00	2.979E-04
	6.310E+00	3.789E-05
67	0.000E+00	1.000E+00
	6.310E-01	9.472E-01
	1.262E+00	8.471E-01
	1.893E+00	7.007E-01
	2.524E+00	5.265E-01
	3.155E+00	3.543E-01
	3.786E+00	2.111E-01
	4.417E+00	1.105E-01
	5.048E+00	5.054E-02
	5.679E+00	2.010E-02
	6.310E+00	6.926E-03

NOTICE

Although this program has been tested and experience would indicate that it is accurate within the limits given by the assumptions of the theory used, we make no warranty as to workability of this software or any other licensed material. No warranties either expressed or implied (including warranties of fitness) shall apply. No responsibility is assumed for any errors, mistakes or misrepresentations that may occur from the use of this computer program. The user accepts full responsibility for assessing the validity and applicability of the results obtained with this program for any specific case.

POLLUTEv7

Version 7.13

Monroe_ExtendedRun_Kd

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	6.31 m	10	0.019 m2/a	0.19	0.0082 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
10	0.000E+00	1.000E+00
	6.310E-01	3.507E-15
	1.262E+00	6.010E-30
	1.893E+00	3.839E-44
	2.524E+00	0.000E+00
	3.155E+00	0.000E+00

	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
25	0.000E+00	1.000E+00
	6.310E-01	5.228E-09
	1.262E+00	8.355E-18
	1.893E+00	9.295E-28
	2.524E+00	2.197E-36
	3.155E+00	1.618E-46
	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
50	0.000E+00	1.000E+00
	6.310E-01	4.689E-05
	1.262E+00	5.082E-14
	1.893E+00	1.512E-18
	2.524E+00	2.079E-25
	3.155E+00	2.673E-32
	3.786E+00	3.334E-38
	4.417E+00	1.540E-45
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
97	0.000E+00	1.000E+00
	6.310E-01	4.400E-03
	1.262E+00	5.038E-09
	1.893E+00	2.101E-14
	2.524E+00	1.336E-17
	3.155E+00	5.858E-22
	3.786E+00	1.145E-27
	4.417E+00	5.317E-32
	5.048E+00	4.724E-36
	5.679E+00	7.080E-41
	6.310E+00	3.637E-46

POLLUTEv7

Version 7.13

Monroe_DoubleDarcy_Kd

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.0122 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	6.31 m	10	0.019 m2/a	0.19	0.0082 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	6.310E-01	9.584E-20
	1.262E+00	5.786E-41
	1.893E+00	0.000E+00
	2.524E+00	0.000E+00
	3.155E+00	0.000E+00

	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
10	0.000E+00	1.000E+00
	6.310E-01	5.876E-15
	1.262E+00	1.709E-29
	1.893E+00	1.851E-43
	2.524E+00	0.000E+00
	3.155E+00	0.000E+00
	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
20	0.000E+00	1.000E+00
	6.310E-01	9.978E-11
	1.262E+00	2.683E-19
	1.893E+00	1.035E-30
	2.524E+00	4.585E-40
	3.155E+00	1.494E-50
	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
40	0.000E+00	1.000E+00
	6.310E-01	7.909E-06
	1.262E+00	1.583E-14
	1.893E+00	4.306E-20
	2.524E+00	1.309E-28
	3.155E+00	1.232E-34
	3.786E+00	4.003E-42
	4.417E+00	3.407E-49
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
67	0.000E+00	1.000E+00
	6.310E-01	8.217E-04
	1.262E+00	4.765E-12
	1.893E+00	1.025E-15
	2.524E+00	2.389E-20
	3.155E+00	6.917E-27
	3.786E+00	8.473E-32
	4.417E+00	8.991E-37
	5.048E+00	7.293E-43
	5.679E+00	4.968E-48
	6.310E+00	0.000E+00

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POLLUTEv7

Version 7.13

Monroe_CoHD_High_Kd

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	6.31 m	10	0.0238 m2/a	0.19	0.0082 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	6.310E-01	4.639E-18
	1.262E+00	6.835E-37
	1.893E+00	0.000E+00
	2.524E+00	0.000E+00
	3.155E+00	0.000E+00

	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
10	0.000E+00	1.000E+00
	6.310E-01	2.805E-14
	1.262E+00	6.445E-26
	1.893E+00	5.670E-39
	2.524E+00	0.000E+00
	3.155E+00	0.000E+00
	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
20	0.000E+00	1.000E+00
	6.310E-01	4.885E-09
	1.262E+00	7.038E-18
	1.893E+00	7.428E-28
	2.524E+00	1.576E-36
	3.155E+00	1.085E-46
	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
40	0.000E+00	1.000E+00
	6.310E-01	4.306E-05
	1.262E+00	4.224E-14
	1.893E+00	1.156E-18
	2.524E+00	1.485E-25
	3.155E+00	1.704E-32
	3.786E+00	1.974E-38
	4.417E+00	8.453E-46
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
67	0.000E+00	1.000E+00
	6.310E-01	1.846E-03
	1.262E+00	2.287E-10
	1.893E+00	3.269E-15
	2.524E+00	5.068E-19
	3.155E+00	3.001E-24
	3.786E+00	2.289E-30
	4.417E+00	1.823E-34
	5.048E+00	2.422E-39
	5.679E+00	4.359E-45
	6.310E+00	7.177E-50

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POLLUTEv7

Version 7.13

Monroe_CoHD_Low

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	6.31 m	10	0.01425 m2/a	0.19	0 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	6.310E-01	1.806E-01
	1.262E+00	3.160E-03
	1.893E+00	4.092E-06
	2.524E+00	3.625E-10
	3.155E+00	4.662E-13

	3.786E+00	2.122E-14
	4.417E+00	4.657E-16
	5.048E+00	4.575E-18
	5.679E+00	1.847E-20
	6.310E+00	2.778E-23
10	0.000E+00	1.000E+00
	6.310E-01	4.345E-01
	1.262E+00	6.471E-02
	1.893E+00	2.798E-03
	2.524E+00	3.269E-05
	3.155E+00	9.978E-08
	3.786E+00	8.567E-11
	4.417E+00	1.626E-12
	5.048E+00	2.459E-13
	5.679E+00	2.638E-14
	6.310E+00	1.942E-15
20	0.000E+00	1.000E+00
	6.310E-01	6.951E-01
	1.262E+00	3.050E-01
	1.893E+00	7.634E-02
	2.524E+00	1.031E-02
	3.155E+00	7.304E-04
	3.786E+00	2.667E-05
	4.417E+00	4.970E-07
	5.048E+00	4.728E-09
	5.679E+00	3.706E-11
	6.310E+00	5.747E-12
40	0.000E+00	1.000E+00
	6.310E-01	8.799E-01
	1.262E+00	6.537E-01
	1.893E+00	3.868E-01
	2.524E+00	1.751E-01
	3.155E+00	5.906E-02
	3.786E+00	1.460E-02
	4.417E+00	2.618E-03
	5.048E+00	3.380E-04
	5.679E+00	3.127E-05
	6.310E+00	2.067E-06
67	0.000E+00	1.000E+00
	6.310E-01	9.553E-01
	1.262E+00	8.550E-01
	1.893E+00	6.943E-01
	2.524E+00	4.973E-01
	3.155E+00	3.072E-01
	3.786E+00	1.611E-01
	4.417E+00	7.086E-02
	5.048E+00	2.594E-02
	5.679E+00	7.857E-03
	6.310E+00	1.961E-03

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POLLUTEv7

Version 7.13

Monroe Porosity High

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	6.31 m	10	0.019 m2/a	0.31	0 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	6.310E-01	2.013E-01
	1.262E+00	7.114E-03
	1.893E+00	3.651E-05
	2.524E+00	2.522E-08
	3.155E+00	3.021E-12

	3.786E+00	6.110E-14
	4.417E+00	2.930E-15
	5.048E+00	8.059E-17
	5.679E+00	1.216E-18
	6.310E+00	9.539E-21
10	0.000E+00	1.000E+00
	6.310E-01	4.126E-01
	1.262E+00	7.503E-02
	1.893E+00	5.431E-03
	2.524E+00	1.487E-04
	3.155E+00	1.500E-06
	3.786E+00	5.496E-09
	4.417E+00	8.727E-12
	5.048E+00	3.019E-13
	5.679E+00	4.601E-14
	6.310E+00	5.441E-15
20	0.000E+00	1.000E+00
	6.310E-01	6.227E-01
	1.262E+00	2.655E-01
	1.893E+00	7.349E-02
	2.524E+00	1.280E-02
	3.155E+00	1.378E-03
	3.786E+00	9.049E-05
	4.417E+00	3.600E-06
	5.048E+00	8.635E-08
	5.679E+00	1.250E-09
	6.310E+00	1.361E-11
40	0.000E+00	1.000E+00
	6.310E-01	7.902E-01
	1.262E+00	5.276E-01
	1.893E+00	2.897E-01
	2.524E+00	1.284E-01
	3.155E+00	4.539E-02
	3.786E+00	1.267E-02
	4.417E+00	2.780E-03
	5.048E+00	4.769E-04
	5.679E+00	6.377E-05
	6.310E+00	6.633E-06
67	0.000E+00	1.000E+00
	6.310E-01	8.794E-01
	1.262E+00	7.088E-01
	1.893E+00	5.152E-01
	2.524E+00	3.335E-01
	3.155E+00	1.905E-01
	3.786E+00	9.533E-02
	4.417E+00	4.160E-02
	5.048E+00	1.576E-02
	5.679E+00	5.174E-03
	6.310E+00	1.467E-03

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POLLUTEv7

Version 7.13

Monroe_Porosity_Low_Kd

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	6.31 m	10	0.019 m2/a	0.14	0.0082 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	6.310E-01	1.968E-23
	1.262E+00	6.574E-49
	1.893E+00	0.000E+00
	2.524E+00	0.000E+00
	3.155E+00	0.000E+00

	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
10	0.000E+00	1.000E+00
	6.310E-01	9.082E-17
	1.262E+00	6.210E-34
	1.893E+00	0.000E+00
	2.524E+00	0.000E+00
	3.155E+00	0.000E+00
	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
20	0.000E+00	1.000E+00
	6.310E-01	1.653E-13
	1.262E+00	4.000E-23
	1.893E+00	1.698E-35
	2.524E+00	2.696E-48
	3.155E+00	0.000E+00
	3.786E+00	0.000E+00
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
40	0.000E+00	1.000E+00
	6.310E-01	1.026E-07
	1.262E+00	1.821E-16
	1.893E+00	1.428E-24
	2.524E+00	2.512E-33
	3.155E+00	1.118E-41
	3.786E+00	2.433E-50
	4.417E+00	0.000E+00
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00
67	0.000E+00	1.000E+00
	6.310E-01	5.156E-05
	1.262E+00	6.659E-14
	1.893E+00	2.147E-18
	2.524E+00	2.982E-25
	3.155E+00	4.881E-32
	3.786E+00	6.312E-38
	4.417E+00	3.087E-45
	5.048E+00	0.000E+00
	5.679E+00	0.000E+00
	6.310E+00	0.000E+00

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POLLUTEv7

Version 7.13

Monroe_Thick

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	10.4 m	10	0.019 m2/a	0.19	0 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	1.040E+00	3.877E-02
	2.080E+00	9.884E-06
	3.120E+00	1.266E-11
	4.160E+00	3.550E-14
	5.200E+00	1.439E-16

	6.240E+00	1.105E-19
	7.280E+00	1.237E-23
	8.320E+00	4.146E-28
	9.360E+00	6.878E-31
	1.040E+01	6.438E-34
10	0.000E+00	1.000E+00
	1.040E+00	2.003E-01
	2.080E+00	3.794E-03
	3.120E+00	5.081E-06
	4.160E+00	4.440E-10
	5.200E+00	7.695E-13
	6.240E+00	3.854E-14
	7.280E+00	9.158E-16
	8.320E+00	9.567E-18
	9.360E+00	4.018E-20
	1.040E+01	6.121E-23
20	0.000E+00	1.000E+00
	1.040E+00	4.787E-01
	2.080E+00	7.932E-02
	3.120E+00	3.764E-03
	4.160E+00	4.724E-05
	5.200E+00	1.513E-07
	6.240E+00	1.342E-10
	7.280E+00	3.164E-12
	8.320E+00	5.384E-13
	9.360E+00	6.450E-14
	1.040E+01	5.270E-15
40	0.000E+00	1.000E+00
	1.040E+00	7.497E-01
	2.080E+00	3.649E-01
	3.120E+00	1.021E-01
	4.160E+00	1.539E-02
	5.200E+00	1.206E-03
	6.240E+00	4.822E-05
	7.280E+00	9.730E-07
	8.320E+00	9.891E-09
	9.360E+00	7.898E-11
	1.040E+01	1.309E-11
67	0.000E+00	1.000E+00
	1.040E+00	8.880E-01
	2.080E+00	6.508E-01
	3.120E+00	3.633E-01
	4.160E+00	1.462E-01
	5.200E+00	4.100E-02
	6.240E+00	7.851E-03
	7.280E+00	1.014E-03
	8.320E+00	8.750E-05
	9.360E+00	5.025E-06
	1.040E+01	1.914E-07

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POLLUTEv7

Version 7.13

Monroe_Thin_Kd

THE DARCY VELOCITY (Flux) THROUGH THE LAYERS Va = 0.00608 m/year

Layer Properties

Layer	Thickness	Number of Sublayers	Coefficient of Hydrodynamic Dispersion	Matrix Porosity	Distributon Coefficient	Dry Density
Lower Native	4.33 m	10	0.019 m2/a	0.19	0.0082 m3/kg	1919 kg/m3

Boundary Conditions

Contant Concentration
Source Concentration = 1 mg/L

Infinite Thickness Bottom Boundary

Laplace Transform Parameters

TAU = 7 **N =** 20 **SIG =** 0 **RNU =** 2

Calculated Concentrations at Selected Times and Depths

Time year	Depth m	Concentration mg/L
5	0.000E+00	1.000E+00
	4.330E-01	5.594E-15
	8.660E-01	5.373E-29
	1.299E+00	8.305E-43
	1.732E+00	0.000E+00
	2.165E+00	0.000E+00

	2.598E+00	0.000E+00
	3.031E+00	0.000E+00
	3.464E+00	0.000E+00
	3.897E+00	0.000E+00
	4.330E+00	0.000E+00
10	0.000E+00	1.000E+00
	4.330E-01	1.833E-10
	8.660E-01	2.558E-19
	1.299E+00	8.161E-31
	1.732E+00	6.736E-40
	2.165E+00	1.295E-50
	2.598E+00	0.000E+00
	3.031E+00	0.000E+00
	3.464E+00	0.000E+00
	3.897E+00	0.000E+00
	4.330E+00	0.000E+00
20	0.000E+00	1.000E+00
	4.330E-01	7.801E-06
	8.660E-01	7.981E-15
	1.299E+00	2.554E-20
	1.732E+00	1.104E-28
	2.165E+00	4.434E-35
	2.598E+00	2.442E-42
	3.031E+00	7.572E-50
	3.464E+00	0.000E+00
	3.897E+00	0.000E+00
	4.330E+00	0.000E+00
40	0.000E+00	1.000E+00
	4.330E-01	1.865E-03
	8.660E-01	2.628E-10
	1.299E+00	3.170E-15
	1.732E+00	5.208E-19
	2.165E+00	3.450E-24
	2.598E+00	2.364E-30
	3.031E+00	1.905E-34
	3.464E+00	2.807E-39
	3.897E+00	5.506E-45
	4.330E+00	7.651E-50
67	0.000E+00	1.000E+00
	4.330E-01	1.852E-02
	8.660E-01	1.382E-06
	1.299E+00	5.860E-13
	1.732E+00	2.216E-15
	2.165E+00	3.040E-18
	2.598E+00	6.476E-22
	3.031E+00	1.599E-26
	3.464E+00	8.031E-31
	3.897E+00	6.203E-34
	4.330E+00	1.604E-37

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