APPENDIX F: GEOTECHNICAL INVESTIGATION REPORT

Report of Geotechnical Investigation and Analysis

Slope Stability Evaluation
Pickles Butte Sanitary Landfill Expansion
Canyon County, Idaho

Tetra Tech Project No. 114-571040-2022

August 16, 2022

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ACRONYMS/ABBREVIATIONS

Acronyms/ Abbreviations	Definition
AASHTO	American Association of State Highway and Transportation Officials
ASTM	ASTM International (formerly known as American Society for Testing and Materials)
bgs	Below ground surface
CFR	Code of Federal Regulations
IDEQ	Idaho Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
FS	factors of safety
ksf	kips per square foot
MCE	Maximum Credible Earthquake
mm	millimeter
MSWLF	Municipal Solid Waste Landfills
PBSL	Pickles Butte Sanitary Landfill
PGA	Peak Ground Acceleration
PSHA	Peak spectral horizontal acceleration
SPT	Standard Penetration Testing
USGS	United States Geological Survey

EXECUTIVE SUMMARY

The Pickles Butte Sanitary Landfill is developing a plan for the expansion of the landfill to include an additional four phases, (Phase 5 through Phase 8). The proposed expansion consists of approximately 231 acres of unlined cells pending the approval of an arid exemption. Proposed permanent excavation slopes are planned to be on the order of 3H:1V to 4H:1V, with maximum cut depths on the order of 150 to 165 feet.

Tetra Tech previously completed a slope stability evaluation that included static and seismic stability evaluations for Phases 2 through 4 of the Canyon County Landfill (October 7, 2015). Tetra Tech also reviewed the previous evaluations conducted by Holladay Engineering Company for the Pickles Butte Sanitary Landfill, dated 1998, and conducted a seismic survey that was dated February 21, 2022 titled, 'Pickles Butte Sanitary Landfill 3D Seismic Survey Report'. The survey was designed to image and delineate a suspected fault in support of the proposed expansion program at the PBSL.

For this stability evaluation, Tetra Tech incorporated the following information: 1) the soils strength data available from previous analysis, 2) materials strength properties assigned based on the laboratory testing of the geotechnical samples collected in 2021 and also correlated from the Standard Penetration Testing (SPT) N-value (blow count) data collected during the geotechnical drilling and previous well installation reports.

Based on findings from former and 2021 site investigations, the subsurface conditions beneath the areas of proposed landfill expansion are assumed to generally consist of silty and clayey sand, clay, and gravel overlying the Glenns Ferry Formation (300 to 950 feet thick), which includes younger lacustrine and fluvial sediments. The surrounding local geology includes an igneous basalt group of the Hat Butte-McElroy Butte type[1] that was not encountered in area of the proposed expansion.

Slope stability and pseudo-static analyses were performed using the computer program Slide2 (2020), developed by Rocscience, Inc., to determine the factors of safety (FS) of critical slip surfaces using both circular (rotational) and block failure analyses and vertical slice limit equilibrium methods. Circular failures can be viewed as a soil 'slump' with a remnant head 'scarp' or drop in elevation where the slide started, and a resultant 'hump' or bulge at the slide terminus. A block failure represents a large mass or 'chunk' of soil failing outwardly as a larger intact mass. Where the pseudo-static analysis indicated a factor of safety of equal to or less than 1.3 (industry standard for pseudo-static factor of safety for landfills), the internal slope of the landfill cell prior to waste emplacement was evaluated using the Newmark displacement analysis method to determine a range of potential seismic-induced deformations of the refuse mass.

Results of the slope stability evaluations indicate that the preliminary design for the expansion phases will meet the requirements of the Idaho Administrative Rules IDAPA 58.01.06 for the Idaho DEQ's administration of municipal solid waste landfills (MSWLF). The analyses indicate static FS values on the order of 1.38 to 2.43, and 1.83 to 3.11 for circular and block failure respectively, while the pseudo-static FS values were on the order of 0.99 to 1.88, and 1.45 to 2.16 for circular and block failure, respectively. Subsequent seismic deformation analyses indicate maximum probable displacements on the order of 0.25 to 3.19 inches (0.5 to 8 cm) for the anticipated peak ground acceleration of 0.12g generated during the design seismic event at the project site. In general, the seismic displacement analyses indicate permanent seismic-induced displacements within the tolerances 6 to 12 inches (15 to 30 cm) that are typically considered acceptable for design of landfill systems with no liner.

Multiple slope angles were considered for Tetra Tech's slope analyses, ranging from 2.5:1 to 4:1 depending on the soil and bedrock types at each location. Based on Tetra Tech's analysis and the required FS's, the following two slope angles are recommended for the preliminary landfill site grading plans:

3H:1V: for the majority of the site slopes

4H:1V: where silt is encountered (Section F discussed below)

[1]Mancos - Macrostrat.org

The 4:1 slope was analyzed and recommended for Section F because silt was interbedded between poorly-graded sand and fine sand and created a weakened soil profile. In areas where a high concentration of silt is predominant during construction, a slope of 4H:1V is recommended for cut areas. The soil profile within Section F was identified as having a high concentration of silt in the upper 135 feet of the proposed slope cut, thus decreasing the factor of safety. There are other areas where the silt was present; however, based on the analysis the proposed cut slope of 3H:1V was allowable for the silts as they were interbedded into stronger soil deposits. As the stratification is exposed during excavation of future cells, it is recommended that the soil conditions be reviewed to verify they match the design criteria.

The slope with compacted refuse were modeled to confirm the slope angles that were allowable during the backfilling process. Slopes of 3H:1V are recommended as a maximum angle for the backfill process. A steeper slope of 2.75H:1V was modeled as an iteration to confirm the recommendations, and in this situation the pseudo static conditions produced a factor of safety below 1.3 and is not recommended.

Portions of the soil profile were defined as claystone, and have unconfined compression strengths higher than the site soils; however, the claystone had interbedded layers of softer soils, and for this reason Tetra tech has treated these areas as a soil rather than a rock and also recommends a slope cut of 3H:1V for the claystone zones.

This executive summary has been prepared solely to provide a general overview and should not be relied upon for any purpose except for that for which it was prepared. The full geotechnical report must be referenced for information about findings, recommendations, and other concerns.

1. INTRODUCTION AND BACKGROUND

The following report is the geotechnical evaluation of the slope stability that provides recommendations for the planned lateral expansion of the landfill. The Pickles Butte Sanitary Landfill (PBSL) is located at 15500 Missouri Ave. in Nampa, Idaho. The landfill is located approximately 6-miles south of Nampa, north of Missouri Avenue, south of Deer Flat Road, and ¼- mile west of Farner Road. Canyon County (County) owns approximately 1,180 acres of land in the area, which includes the active area of the PBSL. The County has operated the landfill since it began accepting waste in April 1983. PBSL currently services the residents of Canyon and Owyhee Counties.

The Idaho Department of Environmental Quality (DEQ) approved the original design and operating plan for the PBSL in June 1973, and reconfirmed approval in May 1975 (Holladay, 1994). The Southwest District Health Department approved the landfill in December 1979. Then when Subtitle D was implemented, the County obtained a site certification for the landfill from the DEQ in August 1993 for 116.7 acre. The County applied to modify the site certification boundary in 2020 and received approval from DEQ in February 2021 for approximately 600 acres. The current waste disposal area occupies the original footprint of approximately 116.7 acres, which has a natural soil liner. The Site Certification for the planned lateral expansion was approved on February 26, 2021.

The DEQ Site Certification approval included a request that engineering design considerations be evaluated for resisting peak ground accelerations, prior to the design and construction of containment structures. This report addresses that request and discusses the seismic considerations and slope stability. After the approval was received, a data gaps analysis was conducted in 2021 to identify missing or additional data required for the design focusing on geotechnical and seismic considerations. The evaluation identified locations where additional data would be beneficial and proposed a geotechnical drilling program that was initiated in November 2021 to collect additional data for the analysis.

This report is organized as follows: **Section 1** presents the introduction and background; **Section 2** presents the purpose and the scope; **Section 3** provides information on the proposed expansion; **Section 4** provides highlights of the field exploration; **Section 5** provides information on the geotechnical laboratory testing; **Section 7** discusses the engineering analysis and recommendations; **Section 8 Section 9** provides limitations of the study; and **Section 10** provides references. **Appendix A** provides miscellaneous figures and details, **Appendix B** provides exploratory boring logs, **Appendix C** provides the laboratory testing, **Appendix D** provides slope analysis, **Appendix E** provides deformation analysis, and **Appendix F** provides previous boring logs.

2. PURPOSE AND SCOPE OF STUDY

Tetra Tech performed stability analyses and seismic evaluations of the proposed expansion cell geometries to verify adequate stability or to indicate if flatter slopes are required to achieve stability. The analyses were performed in accordance with Tetra Tech's proposal and contract with Canyon County Solid Waste.

The regulatory requirements for the stability analysis are discussed in the administrative rules for the Idaho Solid Waste Facilities Act (Idaho Statutes, Title 39 – Health and Safety, Chapter 74, Section 39-7407) for the Idaho Department of Environmental Quality's (IDEQ) administration of municipal solid waste landfills (MSWLF) and are discussed further in **Section 7.1**.

The purpose of this study is to demonstrate that slope stability requirements are met for the conceptual design of the following containment structures:

- Phase 5-1, 5-2, 5-3 Temporary Cut Slope, Maximum Section (Section E)
- Phase 6-1, 6-2, 6-3 Temporary Cut Slope, Maximum Sections (Sections C and F)
- Phase 7-1, 7-2, 7-3 Temporary Cut Slope, Maximum Section (Sections B, C, D, F, G)
- Phase 8-1, 8-2, 8-3 Temporary Cut Slope, Maximum Section (Sections B, C, D, F, G)

- Final Slope with Waste Backfilled (Section A was used to represent final slope criteria).

This report details and summarizes the analyses, the material properties selected for the analyses, the seismic design criteria, and presents conclusions based on the existing subsurface conditions and proposed landfill design and construction.

3. PROPOSED EXPANSION

The proposed area for the expansion has been sectioned into smaller units and labeled as the phases listed in Figure 1040-1, Data Gap Areas & Proposed Boring Plan (**Appendix A**). The proposed conceptual expansion of Phases 5 through Phase 8 will consist of approximately 231.4 acres of unlined cells. Proposed fill slopes are planned to be on the order of 5.3H:1V (horizontal to vertical) to 4H:1V, with maximum waste fill depths on the order of 254 feet. Proposed excavation slopes are planned to be on the order of 3H:1V to 4H:1V, with maximum cut depths on the order of 150 to 165 feet. The finished fill slopes will consist of a sequence of slopes with 20-foot-wide storm water/erosion-control benches for every 40 to 60 feet of elevation gain. The purpose for selecting flatter slopes includes more effective erosion and stormwater control on the final slopes.

If the design, locations, or conditions are significantly different from those described above, Tetra Tech should be notified to reevaluate the recommendations contained in this report.

4. FIELD EXPLORATION

Tetra Tech conducted a field investigation for Phases 5 through 8 between the dates of November 15 and December 19, 2021. The field investigation consisted of drilling eight boreholes to explore subsurface conditions at the locations shown on Figure 1040-1 (Data Gap Areas & Proposed boring Plan, **Appendix A**). Figure 1040-1 includes the conceptual expansion cells for the landfill, the locations of the exploration borings, and the location of borings drilled in previous phases. Prior to mobilization, Tetra Tech contacted Idaho One Call to request the location and clearance of public underground utilities before performing drilling. Well logs from the previous well installations are included in **Appendix F**, and they include extracted pages from the Geotechnical Evaluation by Holiday Engineering Company (Holiday), Borehole Logs GT-1 through GT-5, and the combination of Well Driller's Reports and Well Logs PB logs 5 through 15 by Holiday and Daniel B. Stephens & Associates, Inc. The logs provide general descriptions and depths of the site soils at each location.

Canyon County's drilling subcontracted with Holt Drilling to advance the borings through overburden soils with a track-mounted TS150 Crawler drilling rig equipped with auger, 6-inch diameter outer casing and core barrel. The TS150 Crawler provides very accurate and detailed soil profiles when compared to other drilling methods like auger. Tetra Tech's field engineer provided technical oversight during the field investigation, logged the borings, and obtained samples. The borings were backfilled with grout.

Sampling of the borings included determination of the N values, collection of split spoon samples, and bulk samples. Split-spoon samplers were driven into the various strata using a 140-pound hammer falling 30 inches. Sampling was done every 2 feet in the first 10 feet to obtain accurate soil strengths in the depths most critical to the evaluation of the dust control system and landfill gas flare pad. After 10 feet sampling was done every 5 feet to the final depth. For the expansion design sampling was done every 5 feet done to a depth of 50 feet and every 10 feet to 170 feet to collect information about the relative densities of the soil stratum.

The number of blows required to advance the sampler each of three successive 6-inch increments was recorded. When using the split-spoon sampler, the total number of blows required to advance the sampler the second and third 6-inch increments is the penetration resistance (N value), as described by ASTM International (ASTM) Method D1586. Penetration resistance values generally indicate the relative density or consistency of the subsurface soils.

Samples of the subsurface materials were obtained with both 2-inch and 2.5-inch outside- diameter split-spoon samplers. Bulk, Shelby tube and modified California samples were collected at various layers by the field engineer under the direction of a senior geotechnical engineer. More specific drilling and subsurface information regarding individual borings is listed below. Bulk samples of soil were obtained from cuttings based on visual observations in the field.

B2021-1/B2021-2

- Geotechnical borings for dust control system drilled to 30 ft
- Deep layer of poorly graded sand

B2021-3

- Geotechnical boring for landfill expansion
- Winch line snapped imbedding sampling rod deep into a clay layer at 170 feet.

B2021-4

- Geotechnical boring for landfill expansion
- Thick layers of loose sand extended to 90 feet, which created an issue with keeping the hole open. The hole collapse was especially problematic between 50 - 90 feet.
- The deep clay layers were not encountered as in all other deep borings.

B2021-5

- This boring was sited after geophysical seismic testing
- Samples were collected for analysis in the zone geophysics indicated the fault splay was located
- No visual evidence was found during drilling to confirm the existence of a fault plane

B2021-6

- Geotechnical boring for landfill expansion
- Altering layers silt and sand were encountered till 75 feet
- Dense clay to 200 feet with occasional silt seams between 100 - 110 feet

B2021-7

- Geotechnical boring for landfill expansion
- Altering layers of dense sand and silt were encountered till approximately 65 feet followed by dense clay with varying amounts of silt to 145 feet.
- Dense blue-gray clay continued to 200 feet.

B2021-8

- Geotechnical boring for Landfill Gas Flare Station
- Type II cement should be used for concrete in contact with silt soils

Boring logs were prepared noting the borehole location, equipment and drill methods used, subsurface profile and descriptions per ASTM D2487. Groundwater was not encountered in any of the borings. Boring depths are referenced to the existing ground surface elevation. Depths at which the samples were obtained along with the penetration resistance values are shown on the logs of exploratory borings, presented in **Appendix B** (Figures 1-B through 8-B).

5. LABORATORY TESTING

Samples obtained during the field exploration were taken to Tetra Tech's accredited laboratory, where they were observed and visually classified in accordance with ASTM Method D2488, which is based on the Unified Soil Classification System.

Following the field exploration, a senior Tetra Tech geotechnical engineer reviewed all the boring logs and samples obtained and created an inventory of samples available for testing. The senior engineer reviewed the potential depths of cut, and locations of fill, and selected samples along the depths of each boring for testing. The tests assigned in each boring were intended primarily to identify the precise type of soil at each depth, as well as the associated strength properties of each soil type, with the ultimate goal of incorporating all of the strength testing directly into the slope stability models in each cross section analyzed. The laboratory testing data was directly utilized in the slope stability models to determine the resultant factor of safety at each cross-section location.

The laboratory testing was performed in general accordance with the Idaho Materials Manual of Test Procedures, American Association of State Highway and Transportation Officials (AASHTO), ASTM, or other approved procedures. Tetra Tech's laboratory is an AASHTO Materials Reference Laboratory (AMRL) and Concrete and Cement Reference Laboratory (CCRL) accredited facility conforming to ASTM E 329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

Table 1 describes laboratory testing performed for this investigation, and their purpose:

Table 1. Laboratory Testing Completed by Tetra Tech

Test Conducted:	To Determine:	Test Procedure:
Natural Moisture Content	Moisture content representative of field conditions at the time samples were taken.	ATM D2216
Grain-size Distribution	Size and distribution of soil particles (i.e., clay, silt, sand, and gravel).	ASTM D6913
Natural Moisture Content	Moisture content representative of field conditions at the time samples were collected.	ATM D2216
Atterberg Limits	The effect of varying water content on the consistency of fine-grained soils.	ASTM D4318
Moisture-Density Relationship	The optimum moisture content for compacting soil and the maximum dry unit weight (density) for a given compactive effort.	MT 210-16 MT 230-16
Unconfined Compression	Unconfined compressive strength of soil and rock.	ASTM D2166 ASTM D7012
Direct Shear	Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions	ASTM D3080
Triaxial Shear	Consolidated-Undrained soil strength properties.	ASTM D4767
Resistivity and pH	The combination of these characteristics determines the potential of soil to corrode metal.	ASTM G187/D4972 MT 232-16
Consolidation	The amount a soil sample compresses with loading and the influence of wetting on its behavior. For use in settlement analysis, determining expansive potential and foundation design.	ASTM D2435

Field and laboratory test results are presented graphically and summarized in **Appendix C**. This data, along with the field information, were used to prepare the exploration boring logs in **Appendix B**.

6. SUBSURFACE CONDITIONS

Subsurface soil conditions are variable throughout the boring depths; elevations ranged between 2956.6 to 2436.6 feet. The borings contained interbedded layers of poorly graded sand, poorly graded sand with silt, silty sand, silty with sand, silt, lean clay with sand, and silty clay. One layer of fat clay was observed in boring B2021-6 as described below. Given the variability of the site soils, other variations in the soil classifications are entirely possible. The top elevation of the individual borings varied, so the boring descriptions were broken into sections based on elevation for a more defined classification throughout the proposed cells.

Subsurface soils were classified in accordance with standards set by AASHTO. Descriptive terms were obtained using the ASTM Soil Classification System. Both the AASHTO and ASTM classifications are noted on the logs and laboratory data presented in **Appendix C** for each soil sample. **Appendix C** includes a summary of all the soil types and properties obtained in the borings drilled along the project length. Each soil type encountered is briefly described below.

6.1 Sand

Sand was encountered in all borings, B2021-1 through B2021-7, at depths ranging in elevations on the order of 2799 to 2470 feet. The sand gradations included poorly-graded sand, poorly-graded sand with silt, and silty sand. The poorly-graded sand generally consisted of a fine to medium-grained matrix, while the silty sand was fine-grained. In Boring B2021-8, the sand included 10 feet of fine-grained, silty sand, and 2.5 feet of a poorly-graded fine to medium grained sand.

Penetration resistance values in the sand ranged from 2 to greater than 50 blows per foot which indicates a potentially very loose to very dense soil stratum. The looser densities were encountered near the surface, with an increase in density at depths of approximately 10 feet and deeper. The natural moisture contents in the sand ranged from 2 to 22 percent at the time of drilling.

Laboratory testing performed on bulk and split spoon samples of the sands indicated a range of maximum dry density between 100.2 and 111.7 pcf, and an optimum moisture content between 11 and 16 percent. (**Appendix C**). Results of the Unconfined Compression Test for boring B2021-3 between 61 and 65 feet indicates an unconfined compression strength on the order of 0.143 kips per square foot (ksf). Direct shear testing of the sand in Boring B2021-3 between 60 to 62 feet indicates a cohesion of 0.282 ksf and a friction angle of 20.2 degrees, and between 80 and 82 feet a cohesion of 0.413 ksf, and a friction angle of 32.81 degrees. Consolidation testing indicated an under-consolidated soil in with preconsolidation pressure 3.0 ksf and a swell pressure of 2.6 percent. (**Appendix C**).

In Boring B2021-4 between 90 and 91 feet, the direct shear testing indicated a cohesion of 0.198 ksf, and a friction angle of 22.83 degrees, and between 120 and 120.9 feet, the cohesion was on the order of 0.588 ksf, with a friction angle on the order of 29.51 degrees. Direct shear testing in Boring B2021-5 between 90 and 91.5 feet indicated a cohesion of 0.260 ksf, and a friction angle of 31.18 degrees.

In Boring B2021-3 between 25 and 27 feet, the triaxial shear testing indicated a cohesion of 0 ksf, and a friction angle of 25.86 degrees. Triaxial shear testing of the soil in Boring B2021-5 between 50 and 51.5 feet indicated a cohesion of 0.123 ksf, and a friction angle of 27.04 degrees.

6.2 Silt

Silt was encountered in Borings B2021-3 through B2021-7 at depths ranging in elevations from 2,784 to 2,490 feet. The silt classifications varied between silt and silt with sand. The silt and silt with sand layers varied in thickness between 1 and 28 feet.

Generally the silt was tan to gray and had low plasticity. Penetration resistance values in the silt ranged from 10 to greater than 50 blows per foot which indicates a potentially stiff to hard matrix soil stratum.

Laboratory testing performed on bulk and split spoon samples of the silt soils indicated natural moisture content of samples ranged from 4 to 29 percent at the time of drilling. Boring B2021-5 was sited to attempt to intersect the suspected fault in the area. In Boring B2021-5 at 70 feet, the liquid limits were on the order of 27 with a plastic index of 21 and a dry density of 112 pounds per cubic feet (pcf). The soils and soil matrix in this boring did not differ substantially from the other borings, and therefore there was not conclusive evidence to indicate the presence of a fault. In Boring 2021-8 at 100 feet the liquid limits were non plastic, and the dry density was 97 pcf.

In Boring the B2021-5 between 69 and 70 feet, the triaxial shear testing indicated a cohesion of 0.037 ksf, and a friction angle of 19.09 degrees (**Appendix C**).

6.3 Lean Clay

Lean Clay and lean clay with sand was encountered in Borings B2021-5 through B2021-7, at depths ranging in elevations on the order of 2,615 to 2,456 feet. The clay layers varied between 1 foot and 54 feet thick. Penetration resistance values in the lean clay ranged from 45 to greater than 50 blows per foot which indicates a potentially hard to very hard soil stratum. The clay color was gray to tan to blue and had high plasticity.

Laboratory testing performed on bulk and split spoon samples of the clay soils indicated natural moisture content of samples ranged from 20 to 21 percent at the time of drilling. In Boring B2021-5 between 80 and 81.5 feet, the liquid limits were on the order of 35 with a plastic index of 14. In Boring 2021-6 at 106 feet the liquid limit was 47 with a plastic Index of 25, with a maximum dry density of 100.0 pcf and an optimum water content of 20.5 percent.

In Boring the B2021-7 between 120 and 121.3 feet, the triaxial shear testing indicated a cohesion of 0.053 ksf, and a friction angle of 18.02 degrees (**Appendix C**).

6.4 Silty Clay

Silty clay was encountered in Borings B2021-4 through B2021-7, at elevations on the order of 2,774 to 2,510 feet. The layers of silty clay were not as prevalent as the other soil types and averaged in thicknesses between 2 and 15 feet.

Generally, the silt clay was tan to gray and has higher plasticity. Penetration resistance values in the silt ranged from 26 to greater than 50 blows per foot which indicates a potentially hard to very hard soil stratum.

Laboratory testing performed on Shelby, bulk and split spoon samples of the silt soils indicated natural moisture content of samples ranged from 16 to 24 percent at the time of drilling. In Boring B2021-5 at 50 feet, and in Boring B2021-7 at 120 feet, the consolidation testing indicated an under-consolidated soil in with pre-consolidation pressures of 4.8 and 1.5 ksf. Boring B2021-5 had a swell pressure of 2.8 percent.

In Boring B2021-5 between 50 and 51.5 feet the triaxial shear testing indicated a cohesion of 0.489 ksf, and a friction angle of 14.95 degrees (**Appendix C**).

Boring B2021-5 was sited to attempt to intersect the suspected fault in the area. The soils and soil matrix in this boring did not differ substantially from the other borings, and therefore there was not conclusive evidence to indicate the presence of a fault.

6.5 Fat Clay

Silty clay was encountered in Boring B2021-6 from elevations 2,555 to 2,531 feet. The fat clay was very dark gray, had a high plasticity, and consolidated similar to claystone. It was identified in this single boring; however, may exist in surrounding areas. Penetration resistance values were greater than 50 blows per foot which indicates a potentially very hard soil stratum.

Laboratory testing performed on split spoon samples of the fat clay indicated liquid limits were on the order of 56 to 67 with a plastic index of 19 to 22. (**Appendix C**).

6.6 Groundwater

Groundwater was not encountered in any of the previous or more current borings drilled at this site. Based on the well data presented in previous reports, the natural groundwater elevation is assumed to be below the proposed excavation depths of up to 200 to 250 feet for the proposed landfill expansion. Numerous factors contribute to groundwater fluctuations, and evaluation of such factors is beyond the scope of this report.

7. ENGINEERING ANALYSIS AND RECOMMENDATIONS

7.1 Seismic Impact Zone Characterization

The seismic evaluation of the landfill was completed to comply with the Idaho Department of Environmental Quality's administration of municipal solid waste landfills. The Canyon County Landfill is located within a "seismic impact zone" as defined by the Administrative Rules for the for the Idaho Solid Waste Facilities Act (Idaho Statutes, Title 39 – Health and Safety, Chapter 74, Section 39-7407) that states:

> *"A MSWLF unit shall not be located: …(ii)within seismic impact zones except as provided in 40 CFR §258.14;".*

The United States Environmental Protection Agency (EPA) 40 CFR §258.14 defines a seismic impact zone as;

> *"…an area with a ten percent or greater probability that the maximum horizontal acceleration…will exceed 0.10g in 250 years."*

The EPA requires that MSWLF units located within a seismic impact zone shall demonstrate that all landfill containment structures are designed to resist the maximum horizontal acceleration in lithified earth material for the site. Based on the United States Geological Survey (USGS) National Seismic Hazard Mapping application, the peak horizontal ground acceleration at the project site having a 10 percent probability of exceedance in any 250-year period is 0.12g, which exceeds the criteria above and therefore classifies or designates the site by rule definition to be within a seismic impact zone.

The results for the USGS National Seismic Hazard Mapping application were based on a risk category II, with the landfill as a moderate risk to human life determined based on the normal-day operations with human operators processing and covering the trash. The soil conditions were considered Site Class D for stiff soils with Standard penetration Resistance, N values, between 15 and 50.

Tetra Tech reviewed the most recent published USGS probabilistic earthquake hazard information for seismic events with a 10 percent probability of exceedance in a 250-year period (USGS 2008 NSHMP PSHA Interactive Deaggregation Web Application), as current state of practice warrants, to select a peak spectral horizontal acceleration (PSHA). Based on our review of the USGS probabilistic earthquake hazard information, including site specific deaggregation characteristics of the Maximum Credible Earthquake (MCE), including magnitude, distance, and probability, a PSHA of 0.23g was selected to represent the extreme seismic case.

Based on recommendations in the EPA's Seismic Design Guidance for Municipal Solid Waste Landfill Facilities (1995), the maximum horizontal acceleration was reduced by 50 percent to represent the average horizontal acceleration for the given slope. In this case, 50 percent of the maximum horizontal acceleration (0.23g) yields an average horizontal acceleration of 0.115g. An adjusted horizontal acceleration of 0.12g was applied for pseudo-static analysis of the modeled slope configurations. The above acceleration values were applied for pseudo-static analysis of the modeled slope configurations.

To model the proposed slope cuts an initial angle between 2.25H:1V to 2.75:H:1V was removed to the proposed base elevation and the factor of safety for slope stability was calculated. The slope angle was adjusted using iterations of the same process until a resulting factor of safety was established that was above the criteria of 1.5 for static, and 1.3 for pseudo-static. The proposed fill was then added into the cut section and iterations were used with varied slopes between 2.75H:1V and 3H:1V to achieve a long-term factor of safety as described.

7.2 Material Strength Properties

Tetra Tech previously completed a slope stability evaluation that included static and seismic stability evaluations for Phases 2 through 4 of the Canyon County Landfill (October 7, 2015). Additionally, Tetra Tech reviewed the previous evaluations from Holladay Engineering Company for the Pickles Butte Sanitary Landfill, dated 1998.

For this stability evaluation, Tetra Tech incorporated the following information: 1) the soils strength data available from the previous analysis, 2) materials strength properties assigned based on the laboratory testing of the geotechnical samples collected in 2021 and correlated data from the SPT N-value (blow count) data collected during the geotechnical drilling and well installation.

As discussed in the laboratory testing section, Tetra Tech's senior geotechnical engineer specifically selected samples for testing in each boring to directly incorporate into the slope stability models at each cross-section location. An attempt was also made to provide duplicate or crossover testing to identify variations in strength parameters for similar soil types. Several different tests were also performed to obtain a range of soil strength properties for each soil type. **Tables 2** and **3** presents a detailed breakdown of some of the data utilized to analyze the cross sections.

Conservative (lower bound) shear strength values were used to evaluate slope stability for static and seismic conditions. The following **Tables 2** and **3** present the material values that were assumed for this analysis.

Table 2. Material Strength Properties - Soil

Material	ASTM Classification	Unit Weight (pcf)	Friction Angle (deg)	Cohesion (psf)
Waste Fill		75	28	300
Poorly-Graded Silty Sand	SP-SM	110	20	280
Poorly-Graded Silty Sand	SP-SM	110	27	123
Silt (B,C)	ML	110	19	37
Silt (D,E)	ML	110	0	908
Lean Clay	CL	130	14	2000
Lean Clay-Silty Clay	CL-ML	109	15	489
Clay (Hard)	CL	125	0	6211
Clay (Hard)	CL	125	10	7831
Silty Sand - B3	SP-SM	115	32	400
Silty Sand - _B4	SP-SM	115	30	580
Sand B3	SP	110	36.2	0
Sand/Gravel Interbedded	GW	135	37	0
Clayey Gravel	GW	138	36	1

Table 3. Material Strength Properties - Rock

Generalized Hoek-Brown Material	UCS (ksf)	GSI	mi	Unit Weight (pcf)
Basalt	3,500	30	25	146
Claystone	7,000	10	4	135

7.3 Slope Stability Analyses

Slope stability and pseudo-static analyses were performed using the computer program Slide2 v.9.023, developed by Rocscience, Inc., to determine the factors of safety of critical slip surfaces using both circular and block failure searches and vertical slice limit equilibrium methods. Because the proposed expansion of the landfill would be unlined, the potential of a critical interface between the waste fill and the natural subgrade soil is low. Therefore, circular failure analyses were performed at the critical sections. A screening analysis for block failure was performed to verify the potential for failure along the waste-soil interface is low compared to circular failure through the waste fill.

The EPA recommends a minimum FS of 1.5 for static slope stability analysis and a FS of 1.3 for pseudo-static slope stability analysis, based on Table 2-4 of the EPA's Solid Waste Disposal Facility Criteria Technical Manual (1998). For temporary cut slopes, a minimum FS of 1.2 is typically considered acceptable. Tetra Tech did not analyze temporary slopes given that it is anticipated that most all of the cut slopes will be open for a minimum of 6 months to 1 year, which per geotechnical standard of practice, are considered permanent slopes for purposes of slope analyses. Higher values for the FS indicate that the design is less likely to fail.

The cross-sections were created in the areas with the highest proposed cut and fill slopes where the critical soil slope conditions were identified, and in the areas incorporating the existing landfill with the proposed additional cells. There are seven section profile views, A through G, shown on Figures 2D to 5D, and included in **Appendix D**. A summary of the slope stability analysis results are presented in **Table 4** below and the corresponding output plots are Figures 6D through 37D in **Appendix D**.

Table 4. Factors of Safety for Slope Stability Analyses

		Factor of Safety			
Section	Analyzed Slope Long term	Static Analysis, Circular Failure	Pseudo-Static Analysis, Circular Failure	Static Analysis, Block Failure	Pseudo-Static Analysis, Block Failure
A	3H:1V	2.3	1.53	2.85	2.02
A – Final Slope Configuration	2.75H:1V 3H:1V	1.73 1.94	1.28 1.40	- 2.21	- 1.68
B	2.27H:1V	2.43	1.88	2.52	2.00
C	2.85H:1V	1.85	1.35	2.16	1.63
D	2.87H:1V	1.93	1.37	3.11	2.33
E	2.27H:1V	1.96	1.51	-	-
E	1.87H:1V	1.66	1.34	1.77	1.45
F	3H:1V	1.38	0.99	-	-
F- 2 Tier	3H:1V on lower, and 4H:1V on upper	1.81	1.19	2.14	1.53
F	4H:1V	2.06	1.35	1.83	1.69
G	2.6H:1V	2.22	1.68	2.65	2.16

The analysis as represented above indicates FS values for the static determinate loading on the order of 1.38 to 2.43, and 1.83 to 3.11 for circular and block failure, respectively. The seismic FS values were on the order of 0.99 to 1.88, and 1.45 to 2.16 for circular and block failure, respectively. The silty soils within the proposed cut in Section F produced a FS below 1 for the seismic loading condition. The slope was modeled with 4H:1V slope cut and a FS of 1.35 was obtained which met the minimum requirements of 1.3. Various degrees of slope cuts were modeled in an iterative manner to define the most effective slope cut for the soil conditions. The final slope

configuration was modeled on Section A and was representative of the backfill method and slope for the remaining project area. An iterative process was used to define which slope complied with the required factor of safety criteria of 1.5 for static stability and 1.3 for pseudo-static stability.

7.4 Pseudo-static

When the pseudo-static analysis indicates a factor of safety of equal to or less than 1.3, the containment structure is required to be evaluated utilizing at least two independent methods to estimate permanent seismic induced displacement of the refuse mass. The displacement analysis methods are typically used as a screening method to evaluate if the structure or slope under analysis is within the range of critical displacement. For design of municipal solid waste landfill facilities, a maximum displacement less than 0.5 to 1.2 inches (1 to 3 cm) is typically acceptable for design. Where the pseudo-static analysis indicated a factor of safety of equal to or less than 1.3, the containment structure was evaluated using the Newmark displacement analysis method to determine a range of seismic-induced deformation. There was one cross-section, Section F, where the pseudo-static analyses indicated a factor of safety below 1.3. Yield accelerations were performed using Slide2 and are provided in the **Table 5** below.

The Slide2 program calculates the Newmark displacement based on the program SLAMMER (2013), developed by the USGS. The Slide2 program allows the user to enter a seismic record directly (time and acceleration data) or choose from a database of available historical seismic records. For the seismic analysis, a historical earthquake record was selected based on comparison to the design seismic event stated above. The earthquake record selected was the Mammoth Lakes – 1 1980, CVK-090 record, with a magnitude of 6.1 and Peak Ground Acceleration (PGA) of 0.416g, and represents an average high magnitude earthquake in similar soil conditions.

The performance of landfills subjected to strong earthquake ground motions is an extremely complicated process for which all of the variables affecting the behavior are not yet fully understood or capable of being analyzed. The historical performance of landfills subjected to seismic events similar to the design earthquake generally indicates satisfactory performance for the landfills studied.

For Section F, a conceptual slope was evaluated based on the methods above. Two different slope angles were analyzed, 3H:1V (20.8- degrees) and 4H:1V (14-degrees) with the 0.12g peak ground acceleration and the section F geometry. A summary of the analyses results is presented in **Table 5** and the corresponding output plots (Figures 1E through 12E) are included in **Appendix E**.

Table 5. Section F Stability Analysis Results for Displacement

	Static Analysis		Pseudo-static Analysis	
Slope 3H:1V	**Circular Failure**	**Block Failure**	**Circular Failure**	**Block Failure**
Factor of Safety	1.38	1.90	0.99	1.41
Yield Acceleration (%g)	-	-	-	0.12
Estimated Displacement (in)	-	-	-	3.19
Slope 4H:1V				
Factor of Safety	2.06	2.49	1.35	1.69
Yield Acceleration (%g)	-	-	-	0.23
Estimated Displacement (in)	-	-	-	0.25

7.5 Comprehensive Seismic Survey for Fault identification

Tetra Tech prepared a 3D Seismic Survey report dated February 21, 2022. The project site is located within the Western Snake River Plain (WSRP) fault system and a portion of an undifferentiated Quaternary aged northeast-dipping WSRP normal fault is mapped within the project boundaries, extending northwest through the proposed expansion area. The mapped fault is labeled as a normal fault with an approximate slip rate of less than 0.2

mm/year. Proposed excavations within the fault areas are expected to extend up to 150 feet below ground surface, potentially intercepting this fault.

The report prepared by Tetra Tech presented the results from an active-source 3D seismic survey. The seismic survey was designed to image and delineate the suspected fault. Seismic imaging over the suspected fault area was attained by using 3D seismic velocity tomography and reflection processing. Seismic reflection is a reliable method for imaging faults when present and can help to orient the faults and subsurface structure. The 3D seismic tomography provides the information needed to accurately convert seismic reflection data in time to depth and elevation. The information gained from this survey was used to site the location of Boring B5 to aid in the evaluation of the fault.

The summary of the seismic investigation and report were as follows:

1) The USGS NW-striking NE-dipping WSRP normal fault that is mapped as extending into the project site from the northwest does not appear to displace ~100ka age sedimentary units.

2) From a probabilistic perspective there seems to be little possibility of significant shallow (< 200 feet) faulting within the project site southeast of the west edges of the mapped tip splay faults.

3) To best characterize the potential movement and absolute location of faulting would require geologic mapping during excavation of the future landfill cell. This area of the proposed landfill expansion would be constructed in >50 years in the future. When the area is excavated for cover material in the future before waste is placed in this area it is recommended that geologic mapping of the fault is conducted, with particular attention to identifying narrow fault zones with evidence of recent activity and areas of potential materials suitable to date the most recent age of fault activity to determine if any detected fault activity is recent (unlikely) or > 100 ka in age (most likely).

Tetra Tech's slope evaluation recommendations presented in **Section 7.3** are not affected or altered by the results of the results of the February Seismic Survey Report. We suggest that a geotechnical engineer observe the slope cuts in the future to determine the potential presence of a faulted area. Should a faulted area be identified, the geotechnical engineer should determine at that time whether further investigation or analysis is required for the specific cells in the suspect fault area.

7.6 Conclusions and Recommendations

The material strength properties incorporated in the geotechnical analyses were based on lower bound shear strength values and are considered conservative estimates. The stability analyses performed are considered to be the worst-case slope configurations with conservative material strengths and resulted in the factors of safety and displacements indicated above.

Results of the geotechnical investigation and analyses indicate that the proposed excavation and design as shown on Figure 1D in **Appendix D** will meet the Factor of Safety requirements of the Idaho Administrative Rules for the Idaho Solid Waste Facilities Act for the Idaho DEQ's administration of MSWLF.

Multiple slope angles were considered for Tetra Tech's slope analyses, ranging from 2.5:1 to 4:1 depending on the soil and bedrock types at each location. Based on Tetra Tech's analysis and the required FS's, the following two slope angles are recommended for the preliminary landfill site grading plans:

3H:1V: for the majority of the site slopes

4H:1V: where silt is encountered (Section F)

The 4:1 slope was analyzed and recommended for Section F because silt was interbedded between poorly-graded sand and fine sand and created a weakened soil profile. In areas where a high concentration of silt is predominant during construction, a slope of 4H:1V is recommended for cut areas. For now, Section F is the only area identified as having a high concentration of silt.

If it can be confirmed that bedrock exists for the entire depth of cut during construction, a 2:1 slope may be utilized. However, if there are any soft silt or clay seams interbedded withing the bedrock layer at any location along the

cut, a 3:1 slope must be used. If slope angles are proposed to be steepened to a 2:1 slope during construction, a licensed geotechnical engineer from Tetra Tech must observe and evaluate the slope prior to make the determination if the slopes can be steepened, otherwise the slope must remain at 3:1.

In general, the seismic displacement analyses indicate permanent seismic-induced displacements are within the tolerances of 6 to 12 inches (15 to 30 cm) that are typically considered acceptable for landfill design. The preliminary seismic evaluation presented above was performed in accordance with generally accepted standards of the geotechnical engineering profession.

Because it is anticipated that most all of the cut slopes will be exposed for a minimum of 6 months to 1 year, Tetra Tech analyzed all slopes as permanent, and did not consider reducing the factor of safety for temporary slopes.

Some states specify the maximum allowable steepness of landfill cut or fill slopes, sometimes also based on the height of the slopes. In Pennsylvania for example, the maximum allowable slope steepness is 3:1. Other states have varying specifications or slope steepness limits for short term or longer-term slope exposures. The requirements are based both on historical slope failure data and slope analysis data, along with added factors of safety. Therefore, states have somewhat calibrated requirements based on the soil types and rainfall. The 3:1 maximum slope steepness for Pennsylvania landfills matches that determined for this investigation.

8. CONTINUING SERVICES

Two additional elements of geotechnical engineering service are important to the successful completion of this project.

1) **Design Phase**. During the design phase, it is essential to ensure that the intent of the recommendations is incorporated in design decisions related to the project and that changes in the design concept consider geotechnical aspects. If issues arise, Tetra Tech's geotechnical engineers should be consulted for clarification and additional analysis on an as needed basis.

2) **Observation and monitoring during construction**. PBSL Operations should be trained to observe the types of materials encountered during the earthwork phases of the project, including the site grading and landfill cell excavations, to determine that the subsurface conditions are compatible with those used in the analysis and design. If conditions change, a geotechnical engineer should be consulted to evaluate the stability or potential impact on the design. During site grading, placement of fill should be observed and tested to confirm that the proper compaction has been achieved. PBSL should continue the annual aerial evaluation of the site and performance analysis to verify that the compaction remains consistent.

9. LIMITATIONS

The subsurface conditions and recommendations presented in this document are based on conditions encountered at the boring locations and based on the laboratory analysis. Due to the complexity and variability of natural earth and rock formations and materials, significant variations may occur between and around these locations or with time. Because these data represent a very small statistical sampling of subsurface conditions, it is possible that conditions may be encountered that are substantially different from those indicated. In these instances, modification and adjustment to the recommendations presented may be warranted.

This study has been conducted in accordance with generally accepted geotechnical engineering practices in the region where the work was conducted. The conclusions and recommendations submitted in this report are based upon project information collected and provided to Tetra Tech. The nature and extent of subsurface variations across the site may not become evident until construction. Tetra Tech should be on site during construction, to verify that actual subsurface conditions are consistent with those described herein.

This report has been prepared exclusively for the client. This report and the data included herein shall not be used by any third party without the express written consent of both the client and Tetra Tech. Tetra Tech is not responsible for technical interpretations by others. As the project evolves, Tetra Tech or another qualified geotechnical engineer should provide continued consultation and field services during construction to review and monitor the implementation of the recommendations and verify that the recommendations have been appropriately interpreted. Significant design changes may require additional analysis or modifications of the recommendations presented herein. On-site observation of excavations and foundation bearing strata and testing of fill should be performed by a representative of the geotechnical engineer.

10. REFERENCES

Ambraseys N.N., Menu J.M. (1988). Earthquake-Induced Ground Displacements. Journal of Earthquake Engineering and Structural Dynamics 16: 985-1006.

Bray, J.D., Zekkos, D., Kavazanjian, E., Jr., Athanasopoulos, G.A., Riemer, M.F. (2009). "Shear Strength of Municipal Solid Waste." Journal of Geotechnical and Geoenvironmental Engineering, June.

Bray J.D., Rathje E.M. (1998). Earthquake-induced displacements of solid-waste landfills. Journal of Geotechnical and Geoenvironmental Engineering, ASCE 124(3): 242-253.

Holladay Engineering Company, February 1998. "Geotechnical Evaluation Pickles Butte Sanitary Landfill, Canyon County, Idaho."

Koerner, R.N. and Soong, T.-Y. (1998). "Analysis and Design of Veneer Cover Soils", 6th International Conference on Geosynthetics.

Makdisi F.J., Seed H.B., (1978). Simplified Procedure for Estimating Dam and Embankment Earthquake-Induced Deformations. Journal of Geotechnical Engineering 104(7): 849-867.

Petersen, Mark D., et al, 2008, Documentation for the 2008 Update of the United States National Seismic Hazard Maps: U.S. Geological Survey Open-File Report 2008–1128, 61 p.

Tetra Tech, September 2015. Technical Memorandum. "Pickles Butte Sanitary Landfill, Canyon County, Idaho. Draft Conceptual Fill Plan Report & Capacity Estimate."

US Environmental Protection Agency, 1995. "RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities". EPA/600/R-95/051.

US Environmental Protection Agency, 1998. "Solid Waste Disposal Facility Criteria Technical Manual". EPA530-R-93-017.

USGS, 2008. National Seismic Hazard Mapping Project (NSHMP) PSHA Interactive Deaggregation Web Application. https://earthquake.usgs.gov/hazards/interactive/

APPENDIX A: MISCELLANEOUS FIGURES AND DETAILS

Important Information About Your Geotechnical Engineering Report (Published by ASFE)

Tetra Tech Boring Log Descriptive Terminology Key to Soil and Rock Symbols and Descriptive Terms

Classification of Soils for Engineering Purposes

Tetra Tech Exploratory Boring Locatsions – Figure 1040-1

APPENDIX B: LOGS OF EXPLORATORY BORINGS

Figures 1-B through 16-B

APPENDIX C: LABORATORY TESTING

Summary of Laboratory Results - Table 1-C

Sieve Analysis Results

Moisture Density Relationship Results

Consolidation Tests

Unconfined Compressive Strength Results

Triaxial Tests

APPENDIX D: SLOPE ANALYSIS

Figures 1D through 43D

APPENDIX E: DEFORMATION ANALYSIS

Figures 1E through 12E

Static and Pseudo-Static Slope Stability Stability Analyses with Associated Circular and Block Failure Factor of Safety, Newmark Displacement, and Critical Acceleration for Slope 3H:1V Figures 1E through 6E

Static and Pseudo-Static Slope Stability Stability Analyses with Associated Circular and Block Failure Factor of Safety, Newmark Displacement, and Critical Acceleration for Slope 4H:1V Figures 7E through 12E

APPENDIX F: PREVIOUS BORING LOGS

Logs GT-1 through GT-8

Logs PB-5 through PB-15

APPENDIX A: Miscellaneous Figures and Details

Important Information about Your Geotechnical Engineering Report (Published by ASFE/GBA)

Tetra Tech Boring Log Descriptive Terminology Key to Soil and Rock Symbols and Terms

Classification of Soils for Engineering Purposes

Figure No. 2001-1 – Location of Exploratory Borings

IMPORTANT INFORMATION
ABOUT YOUR
GEOTECHNICAL ENGINEERING REPORT

More construction problems are caused by site subsurface conditions than any other factor. As troublesome as subsurface problems can be, their frequency and extent have been lessened considerably in recent years, due in large measure to programs and publications of ASFE/The Association of Engineering Firms Practicing in the Geosciences.

The following suggestions and observations are offered to help you reduce the Geotechnical-related delays, cost-overruns and other costly headaches that can occur during a construction project.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

A Geotechnical engineering report is based on a subsurface exploration plan designed to incorporate a unique set of project-specific factors. These typically include: the general nature of the structure involved, its size and configuration; the location of the structure on the site and its orientation; physical concomitants such as access roads, parking lots, and underground utilities, and the level of additional risk which the client assumed by virtue of limitations imposed upon the exploratory program. To help avoid costly problems, consult the geotechnical engineer to determine how any factors which change subsequent to the date of the report may affect its recommendations.

Unless your consulting Geotechnical engineer indicates otherwise, *your Geotechnical engineer report should not be used:*

- When the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified:
- when there is a change of ownership, or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems which may develop if they are not consulted after factors considered in their reports' development have changed.

MOST GEOTECHNICAL "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site exploration identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are extrapolated by Geotechnical engineers who then render an opinion about overall subsurface conditions, their likely reaction to proposed conditions, their likely reaction to proposed construction activity, and appropriate foundation design. Even under optimal circumstances actual conditions may differ from those inferred to exist, because no Geotechnical engineer, no matter how qualified, and not subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be fare more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. *Nothing can be done to prevent the unanticipated, but steps can be taken to help minimize their impact.* For this reason, *most experienced owners retain their Geotechnical consultants through the construction stage*, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Subsurface conditions may be modified by constantly-changing natural forces. Because a Geotechnical engineering report is based on conditions which existed at the time of subsurface exploration, *construction decisions should not be based on a Geotechnical engineering report whose adequacy may have been affected by time.* Speak with the Geotechnical consultant to learn if additional tests are advisable before construction starts.

Construction operations at or adjacent to the site and natural events such as flood, earthquakes or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Geotechnical engineers' reports are prepared to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Unless indicated otherwise, this report was prepared expressly for the client involved and expressly for purposes indicated by the client. Use by any other persons for any purpose, or by the client for a different purpose, may result in problems. *No individual other than the client should apply this report for its intended purpose without first conferring with the*

geotechnical engineer. No person should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professionals develop their plants based on misinterpretations of a geotechnical engineering report. To help avoid these problems, the geotechnical engineer should be retained to work with other appropriate design professionals to explain relevant geotechnical findings and to review the adequacy of their plans and specifications relative to geotechnical issues.

BORING LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final boring logs are developed by geotechnical engineers based upon their interpretation of field logs (assembled by site personnel) and laboratory evalution of field samples. Only final boring logs customarily are included in geotechnical engineering reports. *These logs should not under any circumstances be redrawn* for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, *give contractors ready access to the complete geotechnical engineering report* prepared or authorized for their use. Those who do not provide such access may proceed under the *mistaken* impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes which aggravate them to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical consultants. To help prevent this problem, geotechnical engineers have developed model clauses for use in written transmittals. These are *not* exculpatory clauses designed to foist geotechnical engineers' liabilities onto someone else. Rather, they are definitive clauses which identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report, and you are encouraged to read them closely. your geotechnical engineer will be pleased to give full and frank answers to your questions.

OTHER STEPS YOU CAN TAKE TO REDUCE RISK

Your consulting geotechnical engineer will be pleased to discuss other techniques which can be employed to mitigate risk. In addition, ASFE as developed a variety of materials which may be beneficial. Contact ASFE for a complimentary copy of its publications directory.

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Tetra Tech Boring Log Descriptive Terminology
Key to Soil Symbols and Terms

12/06/12

TETRA TECH

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	Well-graded gravels, gravel sand mixtures, little or no fines.
				GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	Silty gravels, gravel-sand-silt mixtures.
				GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	Well-graded sands, gravelly sands, little or no fines.
				SP	Poorly graded sands, gravelly sands, little or no fines.
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	Silty sands, sand-silt mixtures.
				SC	Clayey sands, sand-clay mixures.
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)			ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
				CH	Inorganic clays of high plasticity, fat clays.
				OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils.

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Order of Descriptors

- Group Name
- Consistency or Relative Density
- Moisture Condition
- Color
- Particle size descriptor(s) (coarse grained soils only)
- Angularity of coarse grained soils
- Other relevant notes

Criteria For Descriptors

Consistency of Fine Grained Soils

Consistency	N-Value (uncorrected)
Very Soft	< 2
Soft	2 - 4
Medium Stiff	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	> 30

Apparent Density of Coarse Grained Soils

Relative Density	N-Value (uncorrected)
Very Loose	< 4
Loose	4 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

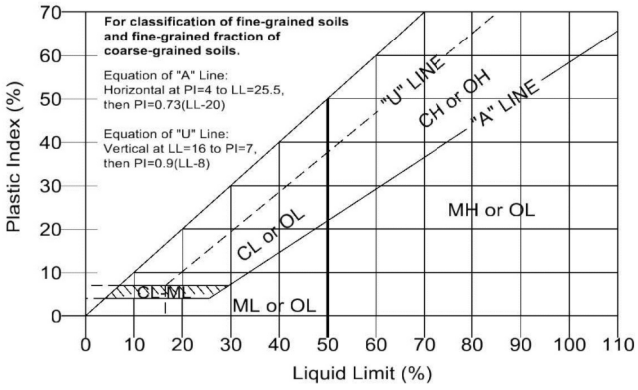
Moisture Condition

Dry	-Absence of moisture, dusty, dry to the touch.
Moist	-Damp, but no visible water.
Wet	-Visible free water.

Definition of Particle Size Ranges

Soil Component	Size Range
Boulder	> 12 in (300 mm)
Cobble	3 in (75 mm) - 12 in (300 mm)
Gravel	No. 4 Sieve (4.75 mm) to 3 in (75 mm)
Sand	No. 200 (0.075 mm) to No. 4 Sieves (4.75 mm)
Silt	< No. 200 Sieve (0.075 mm)*
Clay	< No. 200 Sieve (0.075 mm)*

*Atterberg limits and chart below to differentiate between silt and clay.



Notes

See Soil Boring Information Special Provision.

SPT (Standard Penetration Test-ASTM D1586):
The number of blows of a 140 lb (63.6 kg) hammer falling 2.5 ft (750 mm) used to drive a 2 in (50 mm) O.D. Split Spoon sampler for a total of 1.5 ft (0.45 m) of penetration.
Written as follows:
first 0.5 ft (0.15 m) - second 0.5 ft (0.15 m) - third 0.5 ft (0.15 m) (ex: 1-3-9)
Note: if the number of blows exceeds 50 before 0.5 ft (0.15 m) of penetration is achieved, the actual penetration rounded to the nearest 0.1 ft (0.03 m) follows the number of blows in parentheses (ex: 12-24-50 (0.09 m), 34-50 (0.4 ft), or 100 (0.3 ft)).WR denotes a zero blow count with the weight of the rods only.
WH denotes a zero blow count with the weight of the rods plus the weight of the hammer.

MC=Moisture Content, LL=Liquid limit, PL=Plastic Limit
-200%=percent soil passing 200 sieve, DD=Dry Density

Soil Classifications are Based on the Unified Soil Classification System, ASTM D2487 and D2488. Also included are the AASHTO group classifications (M145). Descriptions are based on visual observation, except where they have been modified to reflect results of laboratory tests as deemed appropriate.

Angularity of Coarse-Grained Particles

Angular	-Particles have sharp edges and relative plane sides with unpolished surfaces.
Subangular	-Particles are similar to angular description, but have rounded edges.
Subrounded	-Particles have nearly plane sides, but have no edges.
Rounded	-Particles have smoothly curved sides and well-rounded corners and edges.

Example soil description: Sandy FAT CLAY (CH), soft, wet, brown. (A-7)

Tetra Tech Boring Log Descriptive Terminology
Key to Rock Symbols and Terms

12/06/12

TETRA TECH

Rock Type	Symbol	Rock Type	Symbol	Rock Type	Symbol
Argillite		Dolomite		Quartzite	
Basalt		Gneiss		Rhyolite	
Bedrock (other)		Granitic		Sandstone	
Breccia		Limestone		Schist	
Claystone		Siltstone		Shale	
		Conglomerate			

Order of Descriptors

- Rock Type
- Color
- Grain size (if applicable)
- Stratification/Foliation (as applicable)
- Field Hardness
- Other relevant notes

Criteria For Descriptors

Grain Size

Description	Characteristic
Coarse Grained	-Individual grains can be easily distinguished by eye
Fine Grained	-Individual grains can be distinguished with difficulty

Stratum Thickness

Thickly Bedded	3-10 ft (1-3 m)
Medium Bedded	1-3 ft (300 mm - 1 m)
Thinly Bedded	2-12 in (50-300 mm)
Very Thinly Bedded	< 2 in (50 mm)

Rock Field Hardness

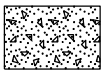
Very Soft	-Can be carved with knife. Can be excavated readily with point of rock hammer. Can be scratched readily by fingernail.
Soft	-Can be grooved or gouged readily by knife or point of rock hammer. Can be excavated in fragments from chips to several inches in size by moderate blows of the point of a rock hammer.
Medium	-Can be grooved or gouged 0.05 in (2 mm) deep by firm pressure of knife or rock hammer point. Can be excavated in small chips to pieces about 1 in (25 mm) maximum size by hard blows of the point of a rock hammer.
Moderately hard	-Can be scratched with knife or pick. Gouges or grooves to 0.25 in (6 mm) can be excavated by hard blow of rock hammer. Hand specimen can be detached by moderate blows.
Hard	-Can be scratched with knife or pick only with difficulty. Hard hammer blows required to detach hand specimen.
Very Hard	-Cannot be scratched with knife or sharp rock hammer point. Breaking of hand specimens requires several hard blows of a rock hammer.

Notes:

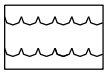
UCS = Unconfined Compressive Strength obtained from laboratory testing at the given depth.

See Soil Boring Information Special Provision.

Miscellaneous Soil/Rock Symbols and Terms

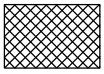

Concrete

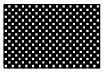

Asphalt

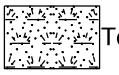

Water


Boulders and Cobbles


Coal


Fill


Millings


Topsoil

Explanation of Text Fields In Boring Logs:

Material Description: Lithologic Description of soil or rock encountered.

Remarks: Comments on drilling, including method, bit type, and problems encountered.

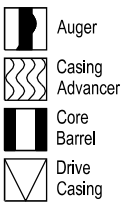
Unless stated on logs as being surveyed by district survey, all locations are considered approximate.

General Notes

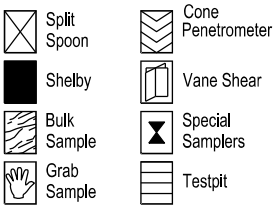
- Descriptions on these boring logs apply only at the specific boring, and at the time the time the borings were made. These logs are not warranted to be representative of subsurface conditions at other locations or times.
- Water level observations apply only at the specific boring, and at the time the borings were made. Due to the variability of groundwater measurements given the type of drilling used, and the stratification of the soil in the boring, these logs are not warranted to be representative of groundwater conditions at other locations or times.
- Other terms may be used as descriptors, as defined by the profession.

-Soil and Rock descriptions are based on visual observation, except where they have been modified to reflect results of laboratory tests as deemed appropriate.

Operation Types:



Sample Types:



Example Rock Log

SANDSTONE, gray, fine grained, thickly bedded, hard field hardness.

TETRA TECH

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation: D 2487 – 83

(Based on Unified Soil Classification System)

MAJOR DIVISIONS				GROUP SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines	Cu ≥ 4 and 1 ≤ Cc ≤ 3[E]	GW	Well graded gravel [F]
			Cu < 4 and/or 1 > Cc > 3[E]	GP	Poorly graded gravel [F]
		Gravels with Fines More than 12% fines	Fines classify as ML or MH	GM	Silty gravel [F G H]
			Fines classify as CL or CH	GC	Clayey gravel [F G H]
	Sands 50% or more of coarse faction passes No. 4 sieve	Clean Sands Less than 5% fines	Cu ≥ 6 and 1 ≤ Cc ≤ 3[E]	SW	Well-graded sand [I]
			Cu < 6 and/or 1 > Cc > 3[E]	SP	Poorly graded sand [I]
		Sands with Fines More than 12% fines	Fines classify as ML or MH	SM	Silty Sand [G H I]
			Fines classify as CL or CH	SC	Clayey sand [G H I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line	CL	Lean clay [K L M]
			PI < 4 or plots below "A" line	ML	Silt [K L M]
		Organic	Liquid limit – oven dried / Liquid limit – not dried < 0.75	OL	Organic clay [K L M N] Organic silt [K L M O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay [K L M]
			PI plots below "A" line	MH	Elastic silt [K L M]
		Organic	Liquid limit – oven dried / Liquid limit – not dried < 0.75	OH	Organic clay [K L M O] Organic silt [K L M O]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $Cc=(D_{30})^2 / (D_{10} \times D_{90})$

[F] If soil contains ≥15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥15% gravel, add "with gravel" to group name.
If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K]. If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

[L] If solid contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.

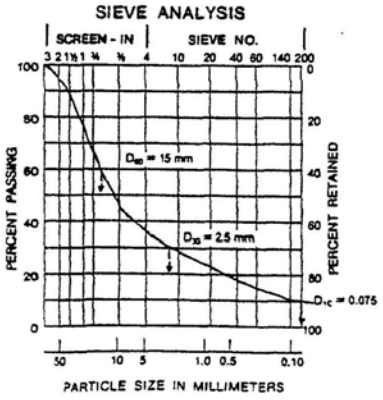
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

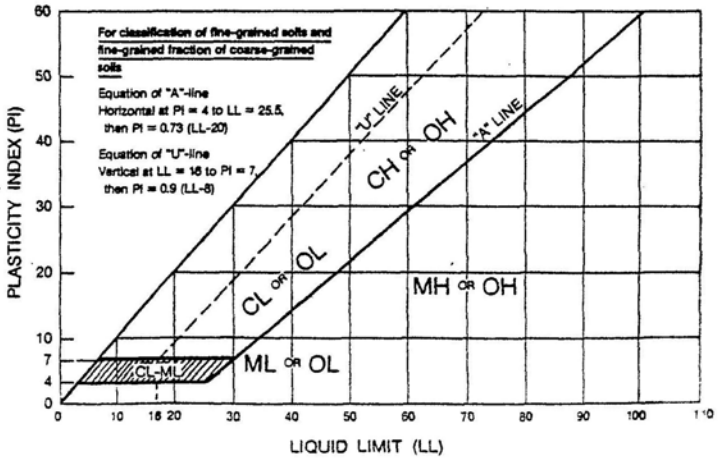
[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A: line.

[P] PI plots on or above "A: line.

[Q] PI plots below "A: line.





$C_u = \frac{D_{50}}{D_{1e}} = \frac{15}{0.075} = 200$ $C_c = \frac{(D_{30})2}{D_{12} \times 10_{36}} + \frac{(2.5)-}{0.075 \times 15} = 5.6$

LEGEND

- EXISTING GROUND MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- FAULT (USGS)
- ID NO. (DEPTH) MONITORING WELL
- ID NO. (DEPTH) GEOTECHNICAL BORING

Stuard Well
B2021-1 (32 FT)
B2021-2 (32 FT)
B2021-3 (170 FT)
B2021-4 (400 FT)
B2021-5 (225 FT)
B2021-6 (165 FT)
B2021-7 (200 FT)
B2021-8 (22 FT)
PB-1 (420 FT)
PB-2 (ABND) (660 FT)
PB-3 (ABND)
PB-4 (ABND) (645 FT)
PB-5 (ABND) (660 FT)
PB-6 (ABND) (700 FT)
PB-7 (630 FT)
PB-8 (424 FT)
PB-9 (544 FT)
PB-10 (560 FT)
PB-12 (555 FT)
PB-13 (625 FT)
PB-14 (750 FT)
PB-15 (605 FT)
PB-16 (597 FT)
Water Supply Well (998 FT)
GT(98)-1 (201 FT)
GT(98)-2 (27 FT)
GT(98)-3 (102 FT)
GT(98)-4 (102 FT)
GT(98)-5 (102 FT)
PH-8-3 18.9 ACRES
PH-6-3 17.9 ACRES
PH-7-3 15.9 ACRES
PH-6-2 20.0 ACRES
PH-7-2 17.3 ACRES
PH-6-1 16.1 ACRES
PH-8-2 21.3 ACRES
PH-7-1 20.1 ACRES
PH-2-1 11.3 ACRES
PH-8-1 20.6 ACRES
PH-3-1 7.5 ACRES
PH-1-2 41.2 ACRES
PH-5-3 17.1 ACRES
PH-1-1 33.2 ACRES
PH-5-1 24.2 ACRES
PH-3-2 25.5 ACRES
PH-5-2 22.0 ACRES

N

0 125 250 500

TETRA TECH
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Boise, ID 83706
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PICKLES BUTTE SANITARY LANDFILL, CANYON COUNTY, IDAHO

2022 CONCEPTUAL EXPANSION
GEOTECHNICAL INVESTIGATION

BORING LOCATIONS PLAN

Project No.:	114-571040-2022
Date:	7/29/2022
Designed By:	SEF/MAM

Figure
1040-1

Bar Measures 1 inch

8/1/2022 3:05 PM - O:\T-Z\TTMISSOULA\114-571040-PICKLES BUTTE LANDFILL\07-CAD\SHEETFILES\GEOTECH\F-1040-1 BORING LOCATIONS.DWG

APPENDIX B: Logs of Exploratory Borings

Figures 1 through 8

2525 Palmer St
59808
Phone: 406-543-3045
Fax:

Figure No. 1

LOG OF BORING

Boring B2021-1

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.502927 **Coordinates** E: -116.624204
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2740.4 ft
Date Started: 11/15/21	**Date Finished:** 11/15/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
			100		3 - 3 - 4		TOPSOIL, moist, tan/brown.	0.3 2740.1						
			100		2 - 3 - 3		Poorly-Graded SAND with silt (SP-SM), loose, moist, brown to gray, fine to medium grained, subangular.		9	NV	NP	12	110	
5 2735.4			100		2 - 3 - 5									
			100		3 - 6 - 9		Poorly-Graded SAND (SP), loose to medium dense, moist, gray to tan, medium grained, subangular to angular.	5.3 2735.1	8					
			100		9 - 13 - 13									
10 2730.4			100		8 - 11 - 13				6					
							Silty SAND (SM), medium dense, moist, gray to tan, fine grained, medium plasticity, Pockets of clay.	11.2 2729.2						
							Poorly-Graded SAND (SP), medium dense, slightly moist, gray, fine to medium grained, subangular to angular, medium plasticity, Small pockets of grey clay.	14.1 2726.3						
15 2725.4			100		10 - 13 - 15				5					
20 2720.4			100		10 - 12 - 13									
							Poorly-Graded SAND with silt (SP-SM), dense to very dense, slightly moist, gray, fine to medium grained.	24.1 2716.3						
25 2715.4			100							NV	NP	6	113	Cc= 0.03
			100		13 - 21 - 23									
30 2710.4			100		13 - 25 - 34									
							Boring Depth: 31.5 ft, *Elevation: 2708.9 ft*	31.5 2708.9						

Water Level Observations		Remarks:
▽ During Drilling: Not Encountered	▽ After Drilling: Not Recorded	
▼ After Drilling: Not Recorded		

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Figure No. 2

LOG OF BORING

Boring B2021-2

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.501658 **Coordinates** E: -116.713829
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2739.0 ft
Date Started: 11/16/21	**Date Finished:** 11/16/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
			100		2 - 1 - 3		Silty SAND (SM), very loose, slightly moist, brown to tan, fine grained, subangular to angular.		7					
			100		2 - 1 - 1		Poorly-Graded SAND with silt (SP-SM), very loose to very dense, slightly moist to moist, brown to gray, fine to medium grained, angular to subangular.	2.3 *2736.7*						
5 *2734.0*			100		3 - 3 - 4				3					
			100		2 - 4 - 6									
			100		7 - 10 - 14				3					
10 *2729.0*			100		10 - 15 - 20									
15 *2724.0*			100		7 - 11 - 17				5					
20 *2719.0*			150		11 - 17 - 21				3					
25 *2714.0*			100		11 - 16 - 21									
30 *2709.0*			100		15 - 25 - 34			31.5 *2707.5*						

Boring Depth: 31.5 ft, *Elevation: 2707.5 ft*

Water Level Observations		Remarks:
During Drilling: Not Encountered	After Drilling: Not Recorded	
After Drilling: Not Recorded		

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Figure No. 3

LOG OF BORING

Boring B2021-3

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.500874 **Coordinates** E: -116.716768
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 — **Top of Boring Elevation:** 2737.7 ft
Date Started: 11/16/21	**Date Finished:** 11/22/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
							Slightly moist, tan.	0.7 / 2737.0						
5 / 2732.7			100		2-3-7		SILT (ML), stiff, slightly moist, light tan, low plasticity.							
							Silty SAND (SM), loose to medium dense, slightly moist to slightly moist, light tan, very fine grained.	8.0 / 2729.7						
10 / 2727.7			100		7-9-9									
15 / 2722.7			100		11-11-12									
20 / 2717.7			93		10-12-13				3					
25 / 2712.7			80							NV	NP	29		Friction Angle= 25.86 degrees Cohesion= 0 ksf Cc= 0.04
			100		11-15-15									
30 / 2707.7			100		10-12-14				3					
35 / 2702.7			100		11-14-21									
40 / 2697.7			93		10-14-16									
							SILT (ML), very stiff, slightly moist, gray, low plasticity.	41.1 / 2696.6						
45 / 2692.7			100		12-12-12		Silty SAND (SM), medium dense to dense, slightly moist, tan to gray, fine grained, subangular to angular.	41.9 / 2695.8						
							SILT (ML), very stiff, slightly moist, gray, low plasticity.	47.0 / 2690.7						
50 / 2687.7							Silty SAND (SM), medium dense to	47.7 / 2690.0	3					

Water Level Observations		Remarks:
▽ During Drilling: Not Encountered	▼ After Drilling: Not Recorded	
▼ After Drilling: Not Recorded		

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59808
Phone: 406-543-3045
Fax:

Figure No. 3

LOG OF BORING

Boring B2021-3

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.500874 **Coordinates** E: -116.716768
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2737.7 ft
Date Started: 11/16/21	**Date Finished:** 11/22/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
			100		4 - 18 - 19		dense, slightly moist, tan to gray, fine grained, subangular to angular.	52.0 2685.7						
55 2682.7							SILT (ML), very stiff, slightly moist, gray to tan, low plasticity, Hard consolidated pieces.	56.2 2681.5						
60 2677.7			100				Poorly-Graded SAND with silt (SP), medium dense to dense, slightly moist, tan to gray, fine grained, subangular to angular.			NV NV	NP NP	19 8	100	Friction Angle= 20.21 degrees Cohesion= 0.282 ksf UCS= 0.143 ksf
65 2672.7														
70 2667.7			100		15 - 25 - 50									
75 2662.7														
							Sandy SILT (ML), stiff, dry, gray to red, fine grained, Broken siltstone.	76.5 2661.2						
80 2657.7			75				Silty SAND (SM), medium dense to dense, slightly moist, tan to gray, fine grained, subangular to angular.	78.5 2659.2		NV	NP	24		Friction Angle= 32.81 degrees Cohesion= 0.413 ksf
			100		4 - 11 - 50		Poorly-Graded SAND (SP), very dense, dry, salt & pepper, fine to medium grained, subangular to angular.	82.0 2655.7	2					
85 2652.7														
90 2647.7			100		23 - 40 - 50									
95 2642.7							Poorly-Graded SAND with silt (SP-SM), very stiff, dry, tan, fine to medium grained, subangular, Large amounts of broken sandstone.	95.0 2642.7						
100 2637.7			0		50/0.2ft		Silty SAND (SM), very dense, dry, gray to red, fine to coarse grained.	100.0 2637.7						

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Water Level Observations		Remarks:
▽ During Drilling: Not Encountered	▽ After Drilling: Not Recorded	
▼ After Drilling: Not Recorded		

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Figure No. 3

LOG OF BORING

Boring B2021-3

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.500874 **Coordinates** E: -116.716768
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2737.7 ft
Date Started: 11/16/21	**Date Finished:** 11/22/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
105 2632.7							subangular, Mixed with large pieces of siltstone.							
110 2627.7			143		31 - 50/0.2ft									
115 2622.7							Silty SAND (SM), very dense, dry to moist, salt & pepper to gray, fine to medium grained, subangular to angular, Minimal pieces of sandstone. Decreasing with depth.	115.0 2622.7		NV	NP	16	104	
120 2617.7			88		47 - 50/0.3ft				4					
125 2612.7														
130 2607.7														
135 2602.7							Poorly-Graded SAND with silt (SP-SM), very stiff, dry, tan, fine to coarse grained, subangular, Large amounts of broken sandstone and siltstone.	135.0 2602.7						
140 2597.7			100		14 - 33 - 50		Poorly-Graded SAND (SP), very dense, dry to moist, salt & pepper to gray, fine to medium grained, subangular to angular, Minimal pieces of sandstone..	138.6 2599.1						
145 2592.7														
150 2587.7			100		16 - 33 - 50		Silty CLAY (CL-ML), hard, very moist, gray, high plasticity.	146.5 2591.2						

Water Level Observations		Remarks:
During Drilling: Not Encountered		
After Drilling: Not Recorded	After Drilling: Not Recorded	

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Fax:

Figure No. 3

LOG OF BORING

Boring B2021-3

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.500874 **Coordinates** E: -116.716768
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2737.7 ft
Date Started: 11/16/21	**Date Finished:** 11/22/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
155 2582.7														
160 2577.7			100		16 - 24 - 36									
165 2572.7														
170 2567.7							Boring Depth: 170.0 ft, *Elevation: 2567.7 ft*	170.0 2567.7						

Water Level Observations		Remarks:
During Drilling: Not Encountered	After Drilling: Not Recorded	
After Drilling: Not Recorded		

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Figure No. 4

LOG OF BORING

Boring B2021-4

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.665364 **Coordinates** E: -116.688388
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 — **Top of Boring Elevation:** 2797.2 ft
Date Started: 12/8/21	**Date Finished:** 12/14/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
							TOPSOIL, moist, dark brown.	0.7 / 2796.5						
							Silty SAND (SM), medium dense, moist to slightly moist, tan, fine grained, angular.							
5 / 2792.2			67		2 - 9 - 7				6					
10 / 2787.2			67		5 - 9 - 7									
15 / 2782.2			80		5 - 12 - 14		SILT (ML), very stiff, slightly moist, tan, low plasticity.	15.0 / 2782.2						
20 / 2777.2			100		18 - 37 - 48		Silty SAND (SM), medium dense, moist to slightly moist, tan, fine grained.	20.0 / 2777.2	5					
25 / 2772.2			100		16 - 35 - 48		Silty CLAY (CL-ML), very stiff, slightly moist, tan, medium plasticity.	25.2 / 2772.0						
							SILT (ML), very stiff, slightly moist, tan, low plasticity.	27.7 / 2769.5						
30 / 2767.2			100		16 - 27 - 33									
35 / 2762.2			80		15 - 30 - 34				8					
40 / 2757.2			100		11 - 23 - 18		Silty SAND (SM), medium dense, moist to slightly moist, tan, fine grained, angular to subangular.	40.0 / 2757.2						
							Silty CLAY (CL-ML), very stiff, slightly moist, tan to black, medium plasticity, Broken pieces of consolidated clay and sit.	41.0 / 2756.2						
45 / 2752.2			100		9 - 13 - 13				16					
50 / 2747.2							Poorly-Graded SAND with silt (SP-SM),	50.0		NV	NP	6		Friction Angle= 27.04

Water Level Observations		Remarks:
▽ During Drilling: Not Recorded	▽ After Drilling: Not Recorded	
▼ After Drilling: Not Encountered		

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Figure No. 4

LOG OF BORING

Boring B2021-4

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.665364 **Coordinates** E: -116.688388
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2797.2 ft
Date Started: 12/8/21	**Date Finished:** 12/14/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
55 / 2742.2			100		9 - 26 - 41		medium dense to very dense, slightly moist, tan to salt & pepper, fine to medium grained, subangular to angular.	2747.2						degrees Cohesion= 0.123 ksf
60 / 2737.2			80		2 - 5 - 18				2					
65 / 2732.2														
70 / 2727.2			67		6 - 13 - 23									
75 / 2722.2							Silty SAND (SM), medium dense, moist to slightly moist, tan, fine grained, angular to subangular.	73.0 / 2724.2						
80 / 2717.2			80		2 - 7 - 23									
85 / 2712.2							Poorly-Graded SAND (SP), stiff, dry, tan to yellow, fine to medium grained, angular to subangular.	87.0 / 2710.2						
90 / 2707.2			100		13 - 40 - 50		Silty SAND (SM), hard, moist, tan to brown, fine grained, angular to subangular, Broken pieces of consolidated clay.	90.0 / 2707.2		NV	NP	38		Friction Angle= 22.83 degrees Cohesion= 0.198 ksf
95 / 2702.2														
100 / 2697.2			100		9 - 18 - 20				22					

Water Level Observations

- During Drilling: Not Recorded
- After Drilling: Not Encountered
- After Drilling: Not Recorded

Remarks:

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Figure No. 4

LOG OF BORING

Boring B2021-4

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.665364 **Coordinates** E: -116.688388
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2797.2 ft
Date Started: 12/8/21	**Date Finished:** 12/14/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
105 2692.2							Sandy SILT (ML), very stiff, slightly moist, tan, low plasticity.	104.0 2693.2						
								105.0 2692.2						
110 2687.2			100		6 - 12 - 20		Silty CLAY (CL-ML), hard, moist, tan to brown, medium plasticity, Broken pieces of consolidated clay.							
115 2682.2														
							Sandy SILT (ML), very stiff, slightly moist, tan, low plasticity.	117.5 2679.7						
120 2677.2			100		31 - 70/0.4ft		Silty SAND (SM), medium dense to very dense, slightly moist, tan to salt & pepper, fine to medium grained, subangular to angular.	120.0 2677.2		NV	NP	49		Friction Angle= 29.51 degrees Cohesion= 0.588 ksf
125 2672.2														
130 2667.2			100		9 - 21 - 26		Poorly-Graded SAND (SP), dense to very dense, slightly moist, salt & pepper, fine to medium grained, angular to subangular.	129.0 2668.2						
135 2662.2														
140 2657.2			100		30 - 48 - 44				2					
145 2652.2							Sandy SILT (ML), very stiff, slightly moist, tan to brown, low plasticity.	145.0 2652.2						
150 2647.2			111		31 - 50/0.4ft									

Water Level Observations		Remarks:
After Drilling: Not Encountered	During Drilling: Not Recorded After Drilling: Not Recorded	

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Figure No. 4

LOG OF BORING

Boring B2021-4

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.665364 **Coordinates** E: -116.688388
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2797.2 ft
Date Started: 12/8/21	**Date Finished:** 12/14/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
155 2642.2							Poorly-Graded SAND (SP), dense to very dense, slightly moist, salt & pepper, fine to medium grained, angular to subangular.	155.0 2642.2						
								157.0 2640.2						
160 2637.2			111		29 - 50/0.4ft		Sandy SILT (ML), very stiff, slightly moist, tan to brown, low plasticity.	159.0 2638.2						
							Poorly-Graded SAND (SP), dense to very dense, slightly moist, salt & pepper, fine to medium grained, angular to subangular.							
165 2632.2														
170 2627.2			88		50 - 50/0.3ft									
175 2622.2							Silty SAND (SM), very stiff, dry, gray, fine grained, angular to subangular.	175.0 2622.2						
							Poorly-Graded SAND (SP), dense to very dense, slightly moist, salt & pepper, fine to medium grained, angular to subangular.	177.0 2620.2						
180 2617.2														
							Silty SAND (SM), very stiff, dry, gray to gray, fine grained, angular to subangular.	183.0 2614.2						
185 2612.2														
190 2607.2							Poorly-Graded SAND with silt (SP-SM), medium dense to very dense, slightly moist, tan to salt & pepper, fine to medium grained, subangular to angular.	190.0 2607.2						
195 2602.2														
200 2597.2							Boring Depth: 200.0 ft, *Elevation: 2597.2 ft*	200.0 2597.2						

Water Level Observations		Remarks:
▽ **During Drilling:** Not Recorded	▽ **After Drilling:** Not Recorded	
▼ **After Drilling:** Not Encountered		

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Figure No. 5

LOG OF BORING

Boring B2021-5

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.499133 **Coordinates** E: -116.713491
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2661.6 ft
Date Started: 12/14/21	**Date Finished:** 12/19/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
							TOPSOIL, moist, brown.	0.7 / 2660.9						
							Sandy SILT (ML), stiff, slightly moist, tan, fine grained, angular to subangular.							
5 / 2656.6			100		6 - 8 - 5				4					
10 / 2651.6			100		12 - 21 - 43		Poorly-Graded SAND (SP), medium dense to very dense, moist, tan to red, fine to medium grained, angular to subangular.	10.0 / 2651.6						
15 / 2646.6			100		5 - 7 - 16				3					
20 / 2641.6			100		10 - 21 - 26									
25 / 2636.6														
							Silty CLAY (CL-ML), medium stiff, slightly moist, white to gray, high plasticity.	27.0 / 2634.6						
							Poorly-Graded SAND (SP), medium dense to very dense, slightly moist, salt & pepper to red, fine to medium grained, angular to subangular.	29.0 / 2632.6						
30 / 2631.6			100		10 - 27 - 40									
35 / 2626.6			100		10 - 22 - 35				4					
							SILT (ML), hard, slightly moist, tan to gray, low plasticity.	37.0 / 2624.6						
40 / 2621.6			150		27 - 33 - 45/0.0ft									
							Poorly-Graded SAND (SP), medium dense to very dense, slightly moist, salt & pepper to red, fine to medium grained, angular to subangular.	42.0 / 2619.6						
45 / 2616.6			100		23 - 39 - 42			44.0 / 2617.6						
							SILT (ML), hard, slightly moist, tan to gray, low plasticity.	45.0 / 2616.6						
50 / 2611.6							Silty SAND (SM), medium dense to very dense, slightly moist, gray to brown, fine	50.0		54	24			Friction Angle= 14.95

Water Level Observations		Remarks:
▽ During Drilling: Not Recorded	▽ After Drilling: Not Encountered	
▼ After Drilling: Not Recorded		

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Figure No. 5

LOG OF BORING

Boring B2021-5

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.499133 **Coordinates** E: -116.713491
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2661.6 ft
Date Started: 12/14/21	**Date Finished:** 12/19/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
			100		27 - 38 - 50		grained, angular to subangular.	2611.6						degrees Cohesion= 0.489 ksf Cc= 0.06
							Silty CLAY (CL-ML), hard, slightly moist, tan, high plasticity.	51.0 2610.6						
55 2606.6							Poorly-Graded SAND (SP), medium dense to very dense, slightly moist, gray to tan, fine to medium grained, angular to subangular.	54.0 2607.6 55.0 2606.6						
60 2601.6			100		34 - 50/0.1ft		Silty SAND (SM), medium stiff, slightly moist, tan, fine grained.	60.0 2601.6	4					
65 2596.6							Poorly-Graded SAND (SP), medium dense to very dense, slightly moist, gray to tan, fine to medium grained, angular to subangular.							
							Poorly-Graded SAND with silt (SP-SM), very dense, moist, gray, fine grained, Varying amounts of silt. Thin viens of silty clay.	65.5 2596.1						
70 2591.6			100		10 - 30 - 20		SILT with sand (ML), hard, slightly moist, white to gray, non plastic, Broken pieces of consolidated clay.	71.5 2590.1	29	NV	NP	77	112	Friction Angle= 19.09 degrees Cohesion= 0.037 ksf
75 2586.6							Silty SAND (SM), very stiff, slightly moist, tan, fine grained.	73.5 2588.1						
							CLAY with sand (CL), hard, slightly moist, white to gray, non plastic, Broken pieces of consolidated clay.							
80 2581.6			100		10 - 18 - 27				21	35	21	83	104	Friction Angle= 31.18 degrees Cohesion= 0.26 ksf
85 2576.6														
							Silty SAND (SM), very dense, slightly moist, tan to red, fine grained, angular to subangular.	86.0 2575.6						
90 2571.6			100		49 - 50/0.3ft					NV	NP	34		Friction Angle= 13.53 degrees Cohesion= 0.654 ksf
95 2566.6														
100 2561.6			115		21 - 46 - 50/0.3ft				11					

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Water Level Observations		Remarks:
▽ During Drilling: Not Recorded	▽ After Drilling: Not Encountered	
▼ After Drilling: Not Recorded		

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Figure No. 5

LOG OF BORING

Boring B2021-5

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.499133 **Coordinates** E: -116.713491
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2661.6 ft
Date Started: 12/14/21	**Date Finished:** 12/19/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
105 2556.6							Silty CLAY (CL-ML), very stiff, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	102.0 2559.6						
110 2551.6			100		30 - 50/0.1ft		Silty SAND (SM), very dense, slightly moist, tan to red, fine grained, angular to subangular.	110.0 2551.6 111.0 2550.6						
115 2546.6							Silty CLAY (CL-ML), very stiff, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	115.5 2546.1						
120 2541.6			100		9 - 17 - 36		Silty SAND (SM), medium dense to very dense, slightly moist, gray to brown, fine grained, angular to subangular. Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	116.5 2545.1						
125 2536.6							Sandy SILT (ML), hard, slightly moist, red to brown, fine grained, low plasticity, Very fine sand. Some consolidated clay mixed.	126.0 2535.6 127.0 2534.6						
130 2531.6			107		26 - 50 - 50/0.4ft		Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	129.5 2532.1 131.5 2530.1						
135 2526.6							Silty SAND (SM), very dense, slightly moist, tan, very fine grained, Very fine sand. Some consolidated clay mixed. Less clay with depth.	134.5 2527.1						
140 2521.6			111		42 - 50/0.4ft		Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	140.0 2521.6						
145 2516.6							Sandy SILT (ML), hard, slightly moist, tan, low plasticity, Some consolidated silt. Seams of varying clay content. Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	141.0 2520.6 143.0 2518.6 145.0 2516.6						
150 2511.6			107		8 - 17 - 50/0.4ft		Sandy SILT (ML), hard, slightly moist, tan, low plasticity, Some consolidated silt. Seams of varying clay content. Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Broken	147.0 2514.6						

Water Level Observations		Remarks:
▽ During Drilling: Not Recorded	▽ After Drilling: Not Encountered	
▼ After Drilling: Not Recorded		

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Figure No. 5

LOG OF BORING

Boring B2021-5

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.499133 **Coordinates** E: -116.713491
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2661.6 ft
Date Started: 12/14/21	**Date Finished:** 12/19/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
							pieces of consolidated clay.							
155 2506.6							Sandy SILT (ML), hard, slightly moist, tan, low plasticity, Some consolidated silt. Seams of varying clay content.	156.0 2505.6						
							Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	157.0 2504.6						
160 2501.6			83		46 - 50/0.1ft		Sandy SILT (ML), hard, slightly moist, tan, low plasticity, Some consolidated silt. Seams of varying clay content.	160.0 2501.6						
							Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay. Higher silt content than previous.	163.5 2498.1 164.5 2497.1 167.0 2494.6						
170 2491.6			100		9 - 17 - 50		CLAY (CL), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.	170.0 2491.6						
							Sandy SILT (ML), hard, slightly moist, tan, low plasticity, Some consolidated silt..							
175 2486.6							CLAY (CL), hard, slightly moist, gray to blue, high plasticity, Broken pieces of consolidated clay.							
							Silty SAND (SM), slightly moist, tan, fine grained, angular to subangular.							
180 2481.6							Silty CLAY (CL-ML), hard, slightly moist, gray to blue, high plasticity, Varying levels of silt content.	180.0 2481.6						
							Silty SAND (SM), slightly moist, tan, fine grained, angular to subangular.							
185 2476.6														
190 2471.6														
195 2466.6														
200 2461.6							CLAY (CL), hard, slightly moist to moist, gray to blue, high plasticity, consolidated clay.	200.0 2461.6						

Water Level Observations		Remarks:
▽ During Drilling: Not Recorded	▽ After Drilling: Not Encountered	
▼ After Drilling: Not Recorded		

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Figure No. 5

LOG OF BORING

Boring B2021-5

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.499133 **Coordinates** E: -116.713491
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2661.6 ft
Date Started: 12/14/21	**Date Finished:** 12/19/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
205 2456.6														
210 2451.6														
215 2446.6														
220 2441.6														
225 2436.6							Boring Depth: 225.0 ft, *Elevation: 2436.6 ft*	225.0 2436.6						

Water Level Observations		Remarks:
During Drilling: Not Recorded		
After Drilling: Not Encountered	After Drilling: Not Recorded	

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Figure No. 6

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Boring B2021-6

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.495196 **Coordinates** E: -116.715718
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2636.7 ft
Date Started: 11/22/21	**Date Finished:** 12/2/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
							TOPSOIL, very moist, brown.	0.6 *2636.1*						
							Silty SAND (SM), loose to medium dense, slightly moist, tan to red, fine grained, subangular.							
5 *2631.7*			67		4 - 5 - 5									
10 *2626.7*			73		7 - 7 - 7				6					
15 *2621.7*							Poorly-Graded SAND (SP), very dense, slightly moist, gray, fine to medium grained, subangular.	15.0 *2621.7*						
20 *2616.7*			100		11 - 31 - 42									
							Silty SAND (SM), loose to medium dense, slightly moist, gray, fine grained, subangular.	21.0 *2615.7*						
25 *2611.7*			100		12 - 22 - 42				18					
							Poorly-Graded SAND (SP), very dense, slightly moist, gray, fine to medium grained, subangular.	27.0 *2609.7*						
30 *2606.7*														
							Silty SAND (SM), loose to medium dense, slightly moist to moist, gray, fine grained, Pieces of siltstone increasing with depth.	33.0 *2603.7*						
35 *2601.7*														
40 *2596.7*			100		8 - 18 - 37				22					
45 *2591.7*			100		39 - 42 - 50									
							Sandy SILT (ML), hard, slightly moist, gray, fine grained.	48.0 *2588.7*						
50 *2586.7*														

Water Level Observations		Remarks:
After Drilling: Not Encountered	During Drilling: Not Recorded After Drilling: Not Recorded	

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Figure No. 6

LOG OF BORING

Boring B2021-6

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.495196 **Coordinates** E: -116.715718
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2636.7 ft
Date Started: 11/22/21	**Date Finished:** 12/2/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
55 / 2581.7			100		14 - 28 - 43									UCS= 7.246 ksf
60 / 2576.7			100		6 - 13 - 27				25					
65 / 2571.7														
70 / 2566.7			100		7 - 20 - 27									
75 / 2561.7														
80 / 2556.7			91		8 - 18 - 50/0.1ft		CLAY (CH), hard, slightly moist, very dark gray, high plasticity, Almost claystone very consolidated.	76.0 / 2560.7		67	19	91		
85 / 2551.7														
90 / 2546.7			100		9 - 14 - 40									
95 / 2541.7														
100 / 2536.7			100		11 - 23 - 26					56	22	90		UCS= 15.661 ksf

Water Level Observations		Remarks:
After Drilling: Not Encountered	During Drilling: Not Recorded After Drilling: Not Recorded	

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Figure No. 6

LOG OF BORING

Boring B2021-6

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.495196 **Coordinates** E: -116.715718
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2636.7 ft
Date Started: 11/22/21	**Date Finished:** 12/2/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
105 2531.7							Sandy SILT (ML), hard, slightly moist, gray, medium plasticity.	102.0 2534.7						
							Silty CLAY (CL-ML), hard, slightly moist, very dark gray, high plasticity, Almost claystone very consolidated.	102.8 2533.9						
							CLAY with sand (CL), hard, slightly moist, gray, medium plasticity.	106.0 2530.7		47	22	91	100	
110 2526.7			100		9 - 19 - 28		Silty CLAY (CL-ML), hard, slightly moist, very dark gray, high plasticity, Almost claystone very consolidated.	106.9 2529.8	21					
							Sandy SILT (ML), hard, slightly moist, gray, medium plasticity.	110.8 2525.9						
115 2521.7							Silty CLAY (CL-ML), hard, slightly moist, very dark gray to blue, high plasticity, Almost claystone very consolidated.	112.0 2524.7						
120 2516.7			100		10 - 18 - 33				22					
125 2511.7														
130 2506.7			115		28 - 47 - 50/0.3ft									
135 2501.7														
140 2496.7			100		6 - 16 - 31									
145 2491.7														
150 2486.7			107		11 - 19 - 50/0.4ft									

Water Level Observations		Remarks:
After Drilling: Not Encountered	During Drilling: Not Recorded After Drilling: Not Recorded	

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Figure No. 6

LOG OF BORING

Boring B2021-6

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.495196 **Coordinates** E: -116.715718
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2636.7 ft
Date Started: 11/22/21	**Date Finished:** 12/2/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
155 2481.7														
160 2476.7			115		29 - 50 - 50/0.3ft									
165 2471.7								165.0 2471.7						

Boring Depth: 165.0 ft, *Elevation: 2471.7 ft*

Water Level Observations		Remarks:
After Drilling: Not Encountered	During Drilling: Not Recorded	
	After Drilling: Not Recorded	

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Figure No. 7

LOG OF BORING

Boring B2021-7

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.49528 **Coordinates** E: -116.712592
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2659.5 ft
Date Started: 12/2/21	**Date Finished:** 12/7/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
							Slightly moist, dark brown.	0.6 2658.9						
							Silty SAND (SM), loose to dense, very moist, tan, fine grained, angular to subangular.							
5 2654.5			60		2 - 2 - 3				4					
10 2649.5			67		10 - 8 - 5									
15 2644.5			80		8 - 18 - 18									
							Poorly-Graded SAND (SP), dense, moist, tan, fine to medium grained, angular to subangular.	16.4 2643.1						
20 2639.5														
25 2634.5			100		13 - 40 - 50		Silty SAND (SM), loose to dense, very moist, tan, fine grained, angular to subangular.	25.0 2634.5						
30 2629.5			0		26 - 50/0.1ft		Poorly-Graded SAND (SP), dense, moist, gray, fine to medium grained, angular to subangular.	30.3 2629.2 31.3 2628.2						
35 2624.5			0		35 - 50/0.3ft		Silty SAND (SM), loose to dense, very moist, tan, fine grained, angular to subangular.	32.3 2627.2 33.8 2625.7						
							Poorly-Graded SAND (SP), dense, moist, gray, fine to medium grained, angular to subangular.	39.6 2619.9	23	NV	NP	23	112	UCS= 0.511 ksf
40 2619.5			107		16 - 28 - 50/0.4ft		Silty SAND (SM), loose to dense, very moist, tan, fine grained, angular to subangular.	41.4 2618.1						
45 2614.5			100		19 - 37 - 48		Poorly-Graded SAND (SP), dense, moist, gray, fine to medium grained, angular to subangular.	43.6 2615.9 46.1 2613.4						
							Silty CLAY (CL-ML), very stiff, moist, tan, high plasticity, Broken pieces of consolidated clay.							
50 2609.5							Silty SAND (SM), very dense, slightly	50.0						

Water Level Observations		Remarks:
▽ During Drilling: Not Encountered	▽ After Drilling: Not Recorded	
▼ After Drilling: Not Recorded		

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Figure No. 7

LOG OF BORING

Boring B2021-7

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.49528 **Coordinates** E: -116.712592
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2659.5 ft
Date Started: 12/2/21	**Date Finished:** 12/7/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
55 2604.5			100		29 - 49 - 37		moist, tan, fine grained, angular to subangular, Broken pieces of siltstone and sandstone.	2609.5 54.0 2605.5						
							Silty CLAY (CL-ML), hard, moist, tan, high plasticity, Broken pieces of consolidated clay.	55.6 2603.9						
60 2599.5			107		21 - 41 - 50/0.4ft		Silty SAND (SM), very dense, slightly moist, tan, fine grained, angular to subangular, Broken pieces of siltstone and sandstone.	58.5 2601.0	12	NV	NP	84	104	UCS= 1.817 ksf
65 2594.5							Silty CLAY (CL-ML), hard, moist, tan, high plasticity, Broken pieces of consolidated clay..							
							Silty SAND (SM), very dense, slightly moist, tan, fine grained, angular to subangular, Broken pieces of siltstone and sandstone.	66.0 2593.5						
70 2589.5			100		9 - 23 - 35		Sandy SILT (ML), hard, moist, tan, high plasticity, Broken pieces of consolidated clay..							
75 2584.5							CLAY (CL), hard, moist, tan, high plasticity.							
80 2579.5			0		78 - 70/0.2ft		Silty SAND (SM), very dense, slightly moist, tan, fine grained, angular to subangular, Broken pieces of siltstone and sandstone.	80.0 2579.5						
85 2574.5							Silty CLAY (CL-ML), hard, moist, tan, high plasticity, Broken pieces of consolidated clay..	85.0 2574.5						
90 2569.5			0		70/0.3ft									
95 2564.5														
							CLAY (CL), hard, moist, tan, high plasticity.	97.7 2561.8						
100 2559.5			100		28 - 28 - 28				20					

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Water Level Observations		Remarks:
▽ During Drilling: Not Encountered	▽ After Drilling: Not Recorded	
▼ After Drilling: Not Recorded		

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Figure No. 7

LOG OF BORING

Boring B2021-7

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.49528 **Coordinates** E: -116.712592
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2659.5 ft
Date Started: 12/2/21	**Date Finished:** 12/7/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
105 / 2554.5														
110 / 2549.5			100		6 - 12 - 22.									
115 / 2544.5														
120 / 2539.5			77		22 - 41 - 50/0.3ft					33	23			Friction Angle= 18.02 degrees Cohesion= 0.053 ksf Cc= 0.38
							SILT (ML), hard, dry, tan, low plasticity, Broken pieces.	121.5 / 2538.0						
							Silty CLAY (CL-ML), hard, moist, gray, high plasticity, Broken pieces of consolidated clay..	122.2 / 2537.3						
125 / 2534.5														
130 / 2529.5			100		12 - 33 - 48		Sandy SILT (ML), hard, dry, tan, low plasticity, Broken pieces.	128.5 / 2531.0						
							Silty CLAY (CL-ML), hard, moist, gray, high plasticity, Broken pieces of consolidated clay..	129.1 / 2530.4	19					
135 / 2524.5														
140 / 2519.5			100		9 - 18 - 50				24					
145 / 2514.5							CLAY (CL), hard, moist, gray to blue, high plasticity.	145.0 / 2514.5						
150 / 2509.5			100		9 - 18 - 31									

Water Level Observations		Remarks:
During Drilling: Not Encountered		
After Drilling: Not Recorded	After Drilling: Not Recorded	

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Figure No. 7

LOG OF BORING

Boring B2021-7

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.49528 **Coordinates** E: -116.712592
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2659.5 ft
Date Started: 12/2/21	**Date Finished:** 12/7/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

Depth (ft) Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
155 2504.5														
160 2499.5			107		21 - 48 - 50/0.4ft									
165 2494.5														
170 2489.5			100		14 - 18 - 28									
175 2484.5														
180 2479.5														
185 2474.5														
190 2469.5														
195 2464.5														
200 2459.5							Boring Depth: 200.0 ft, *Elevation: 2459.5 ft*	200.0 2459.5						

Water Level Observations		Remarks:
During Drilling: Not Encountered		
After Drilling: Not Recorded	After Drilling: Not Recorded	

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Figure No. 8

LOG OF BORING

Boring B2021-8

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID		**Rig:** TS150 Crawler **Hammer:** Auto	**Boring Location** N: 43.48988 **Coordinates** E: -116.703147
Project Number: 114-571040-2022		**Boring Diameter:** 6 in	**System:** Decimal Degrees **Datum:** NAD83 **Top of Boring Elevation:** 2956.6 ft
Date Started: 11/15/21	**Date Finished:** 11/15/21	**Drilling Fluid:** None	**Abandonment Method:** Grout
Driller: Holt Services **Logger:** Matt Adams		**Location:** Refer to site map.	

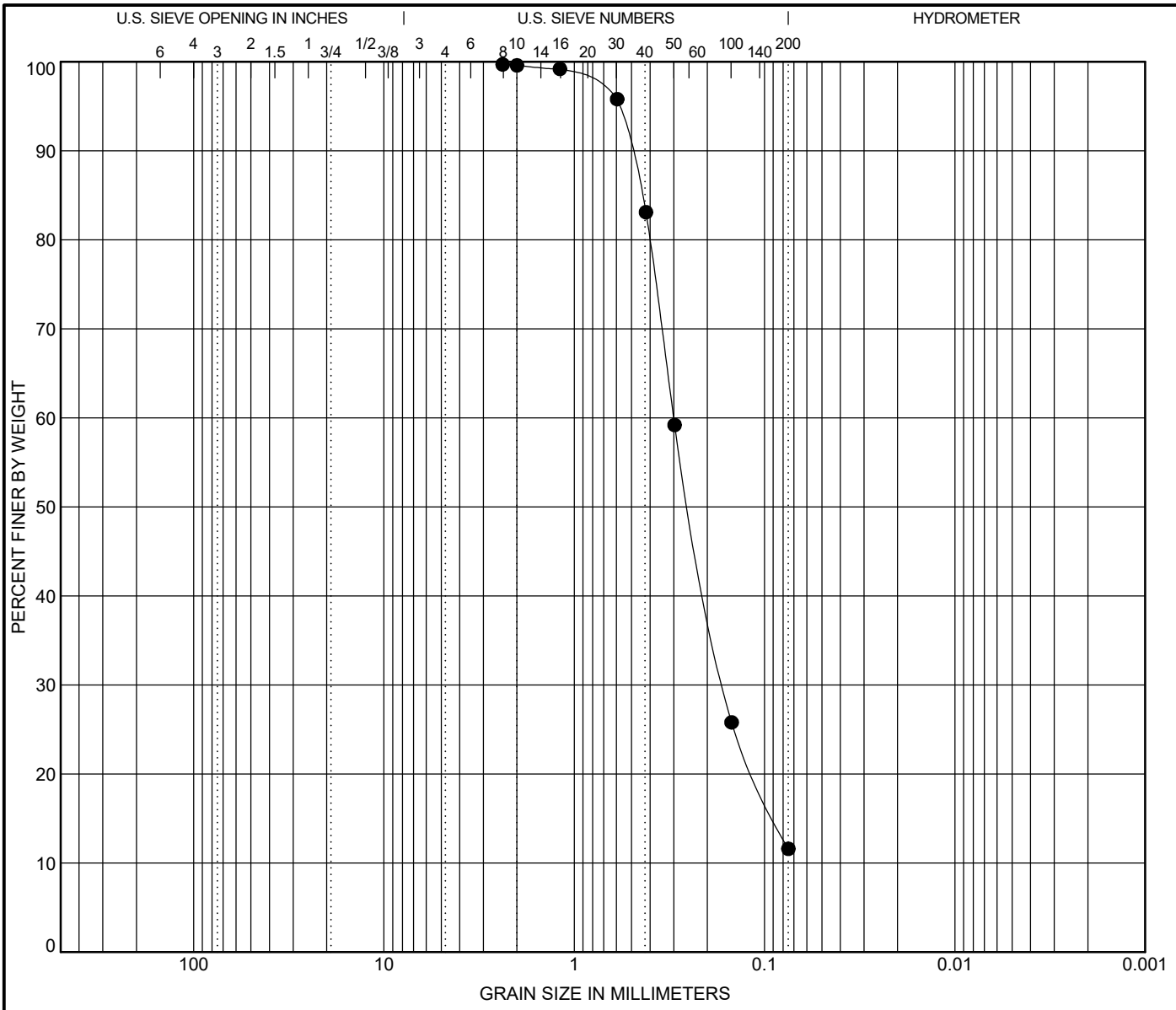
Depth (ft) / Elev. (ft)	Operation	Sample Type	Recovery (%)	RQD (%)	Blow Count	Lithology	Material Description	Depth (ft) / Elev. (ft)	MC (%)	LL	PL	-200 (%)	DD (pcf)	Remarks and Other Tests
			100		5-5-12		TOPSOIL, moist, brown.	0.6	11					
							SILT with sand (ML), very stiff, slightly moist to moist, tan.	2956.0		NV	NP	84	97	
			100		10-16-13									
5			100		8-8-10				11					
2951.6														
			100						12					
10														
2946.6			100		7-9-11		Silty SAND (SM), medium dense, slightly moist, tan to gray, fine grained, subangular, scattered gravel.	10.1 2946.5	6					
15														
2941.6			87		6-7-9				5					
20														
2936.6			87		9-13-15		Poorly-Graded SAND (SP), medium dense, slightly moist, tan to yellow, fine to medium grained, subangular to angular.	20.0 2936.6	5					
								21.5 2935.1						

Boring Depth: 21.5 ft, *Elevation: 2935.1 ft*

Water Level Observations		Remarks:
During Drilling: Not Encountered	**After Drilling:** Not Recorded	
After Drilling: Not Recorded		

APPENDIX C: Laboratory Testing

Figures 9 through 56



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 8	99.7
No. 10	99.6
No. 16	99.2
No. 30	95.8
No. 40	83.1
No. 50	59.2
No. 100	25.8
No. 200	11.6

Specimen Identification
B2021-1 - (3 - 6 ft)

Classification	LL	PL	PI	Cc	Cu
POORLY GRADED SAND with SILT(SP-SM)	**NV**	**NV**	**NP**	**1.27**	**4.33**

% Gravel	% Sand	% Silt	% Clay
0	88	12	

D100	D60	D30	D10
2.38	0.3	0.163	

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

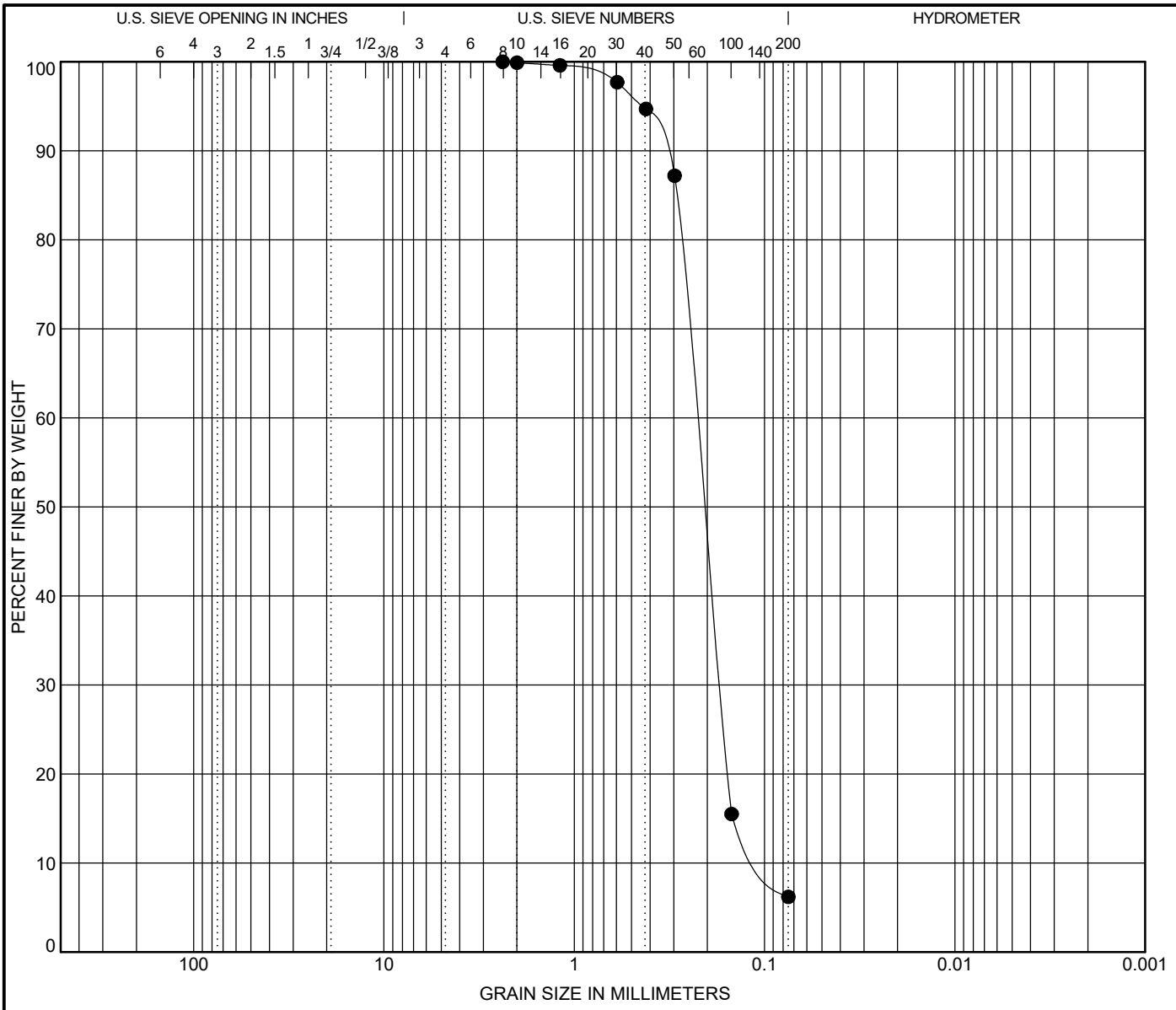
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 9

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 8	100
No. 10	99.9
No. 16	99.6
No. 30	97.7
No. 40	94.7
No. 50	87.2
No. 100	15.5
No. 200	6.2

Specimen Identification
B2021-1 - (25 - 27 ft)

Classification	LL	PL	PI	Cc	Cu
POORLY GRADED SAND with SILT(SP-SM)	**NV**	**NV**	**NP**	**1.29**	**2.30**

% Gravel	% Sand	% Silt	% Clay
0	94	6	

D100	D60	D30	D10
2.38	0.229	0.171	0.099

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

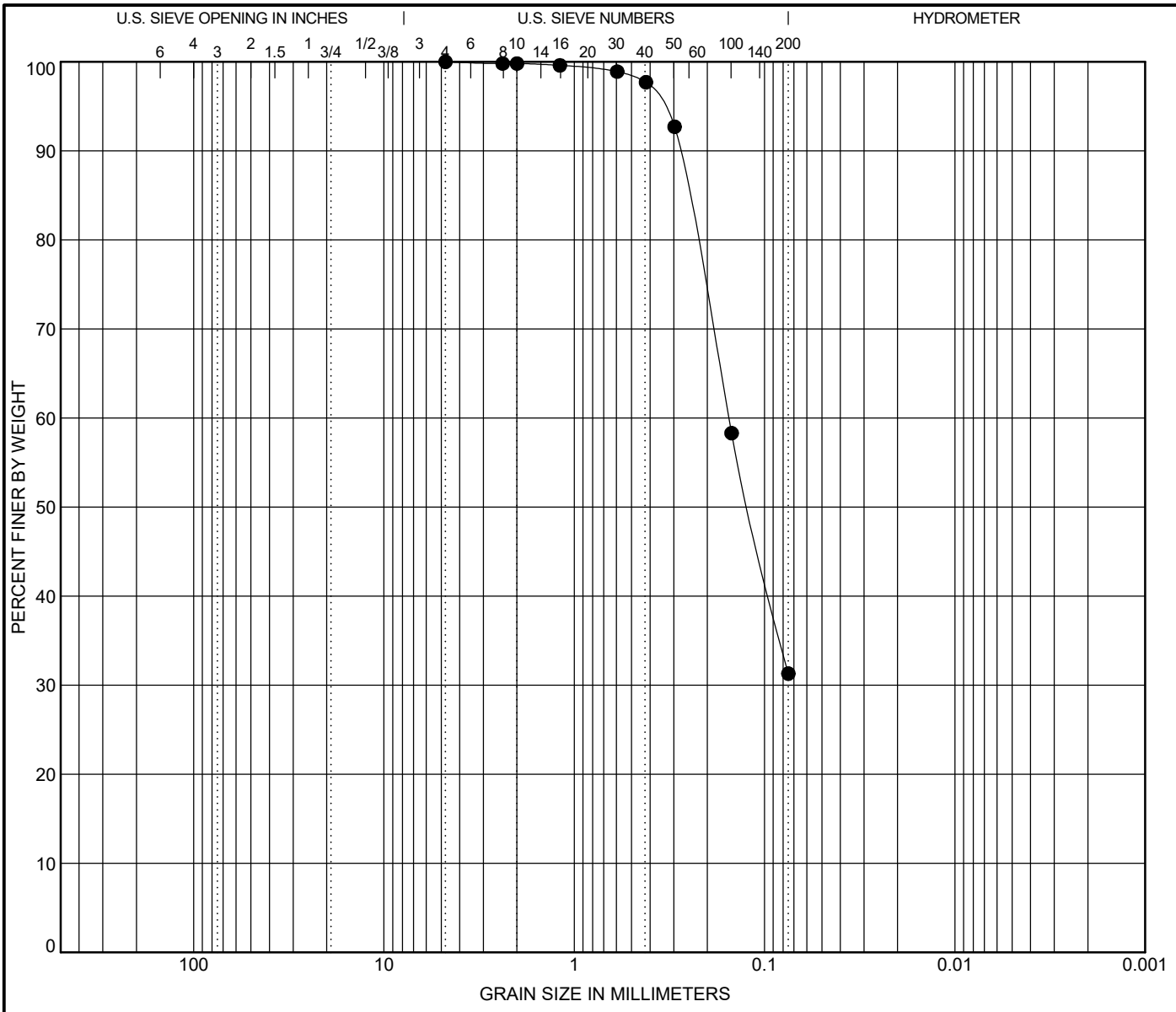
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 10

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.8
No. 10	99.8
No. 16	99.6
No. 30	98.9
No. 40	97.7
No. 50	92.7
No. 100	58.3
No. 200	31.3

Specimen Identification
B2021-3 - (25 - 27 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	69	31	

D100	D60	D30	D10
4.75	0.154		

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

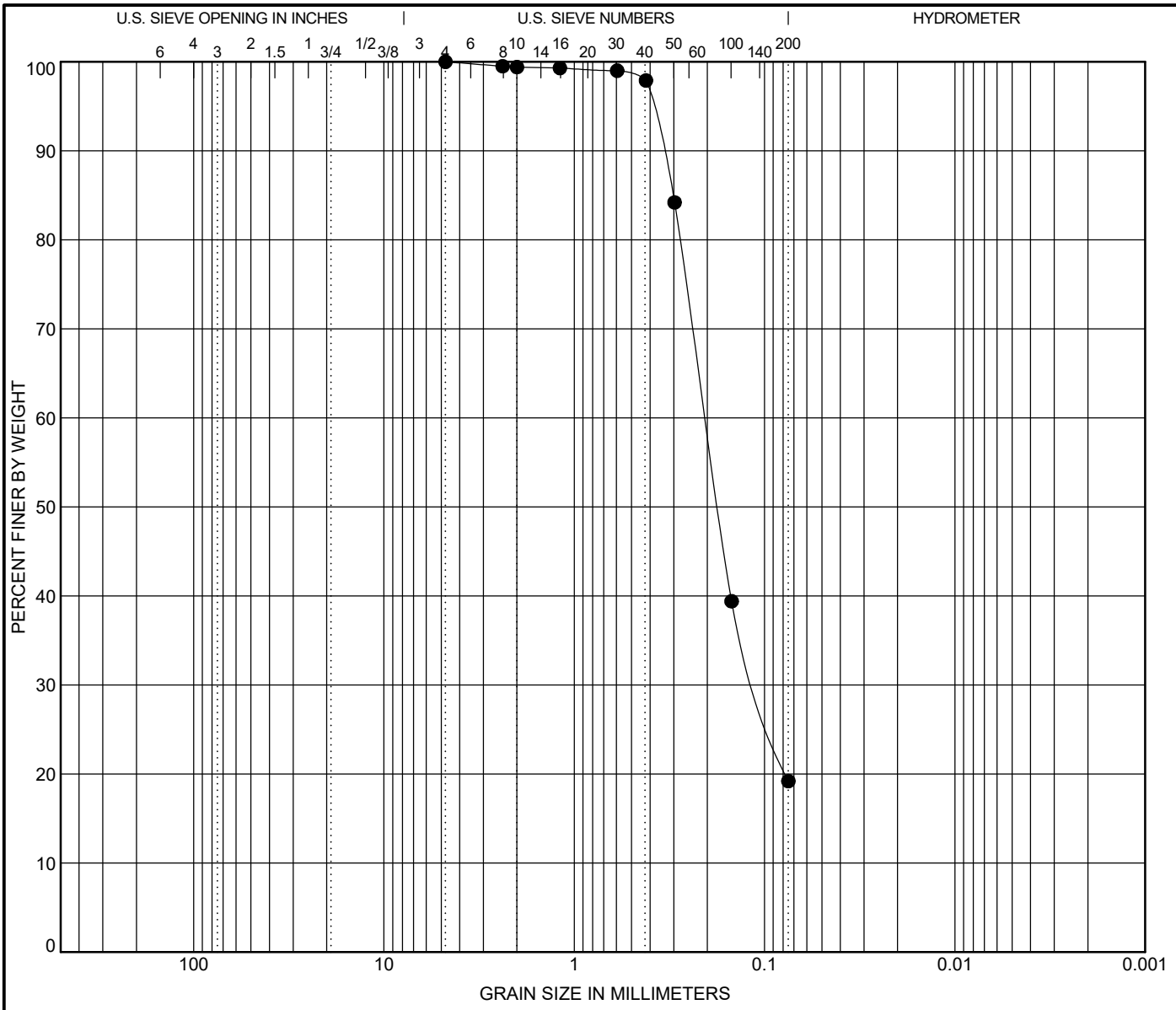
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 11

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.5
No. 10	99.4
No. 16	99.3
No. 30	99
No. 40	97.9
No. 50	84.2
No. 100	39.4
No. 200	19.2

Specimen Identification
B2021-3 - (60 - 62 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	81	19	

D100	D60	D30	D10
4.75	0.205	0.108	

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

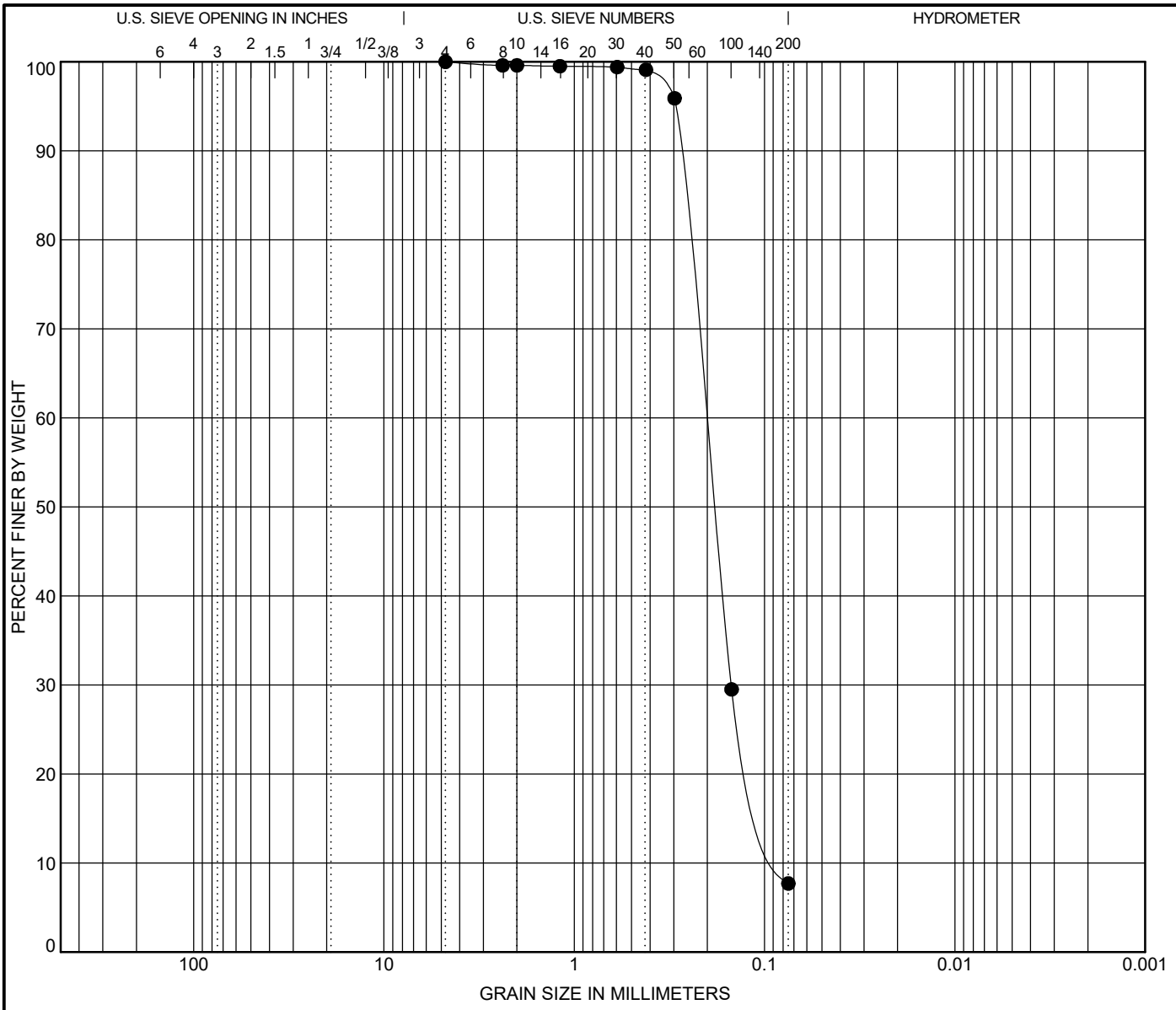
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 12

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.6
No. 10	99.6
No. 16	99.5
No. 30	99.4
No. 40	99.1
No. 50	95.9
No. 100	29.5
No. 200	7.7

Specimen Identification
B2021-3 - (61 - 65 ft)

Classification	LL	PL	PI	Cc	Cu
POORLY GRADED SAND with SILT(SP-SM)	**NV**	**NV**	**NP**	**1.36**	**2.54**

% Gravel	% Sand	% Silt	% Clay
0	92	8	

D100	D60	D30	D10
4.75	0.205	0.15	0.081

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

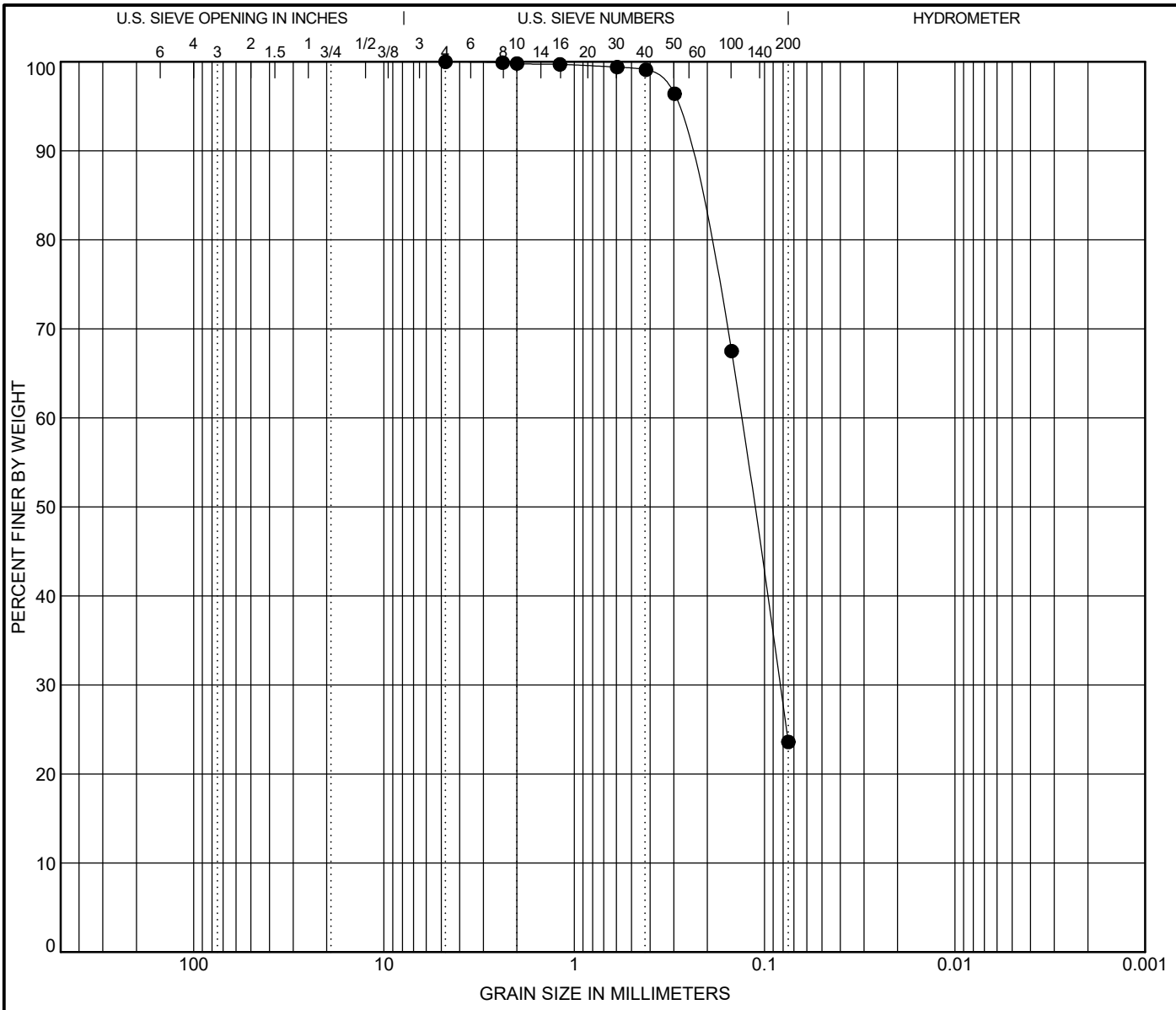
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 13

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.9
No. 10	99.8
No. 16	99.7
No. 30	99.4
No. 40	99.1
No. 50	96.4
No. 100	67.5
No. 200	23.6

Specimen Identification
B2021-3 - (80 - 82 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	76	24	

D100	D60	D30	D10
4.75	0.133	0.083	

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

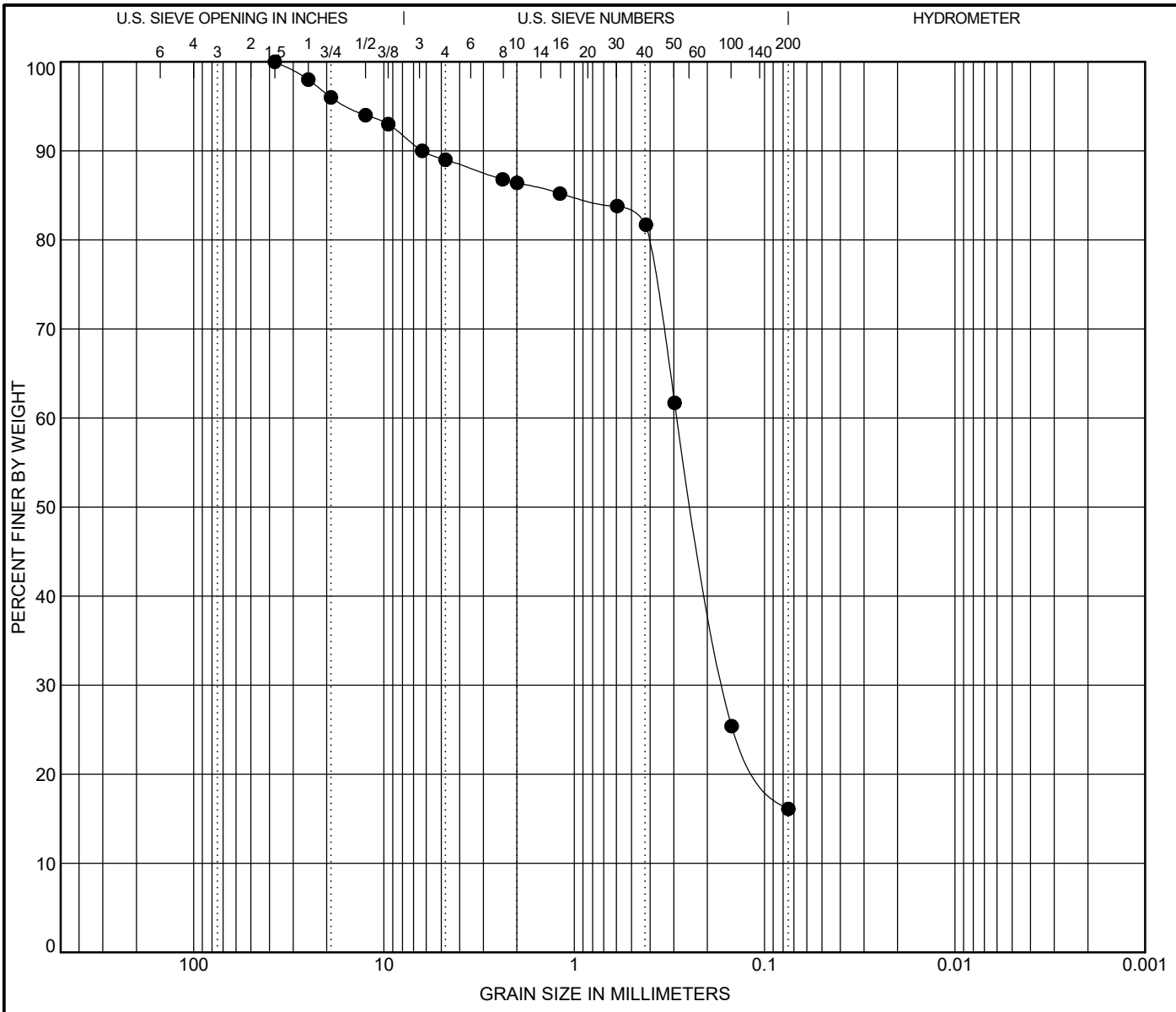
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 14

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
1.5 in	100
1 in	98
3/4 in	96
1/2 in	94
3/8 in	93
1/4 in	90
No. 4	89
No. 8	86.8
No. 10	86.4
No. 16	85.2
No. 30	83.8
No. 40	81.7
No. 50	61.7
No. 100	25.4
No. 200	16.1

Specimen Identification
B2021-3 - (116 - 120 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
11	73	16	

D100	D60	D30	D10
37.5	0.288	0.163	

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

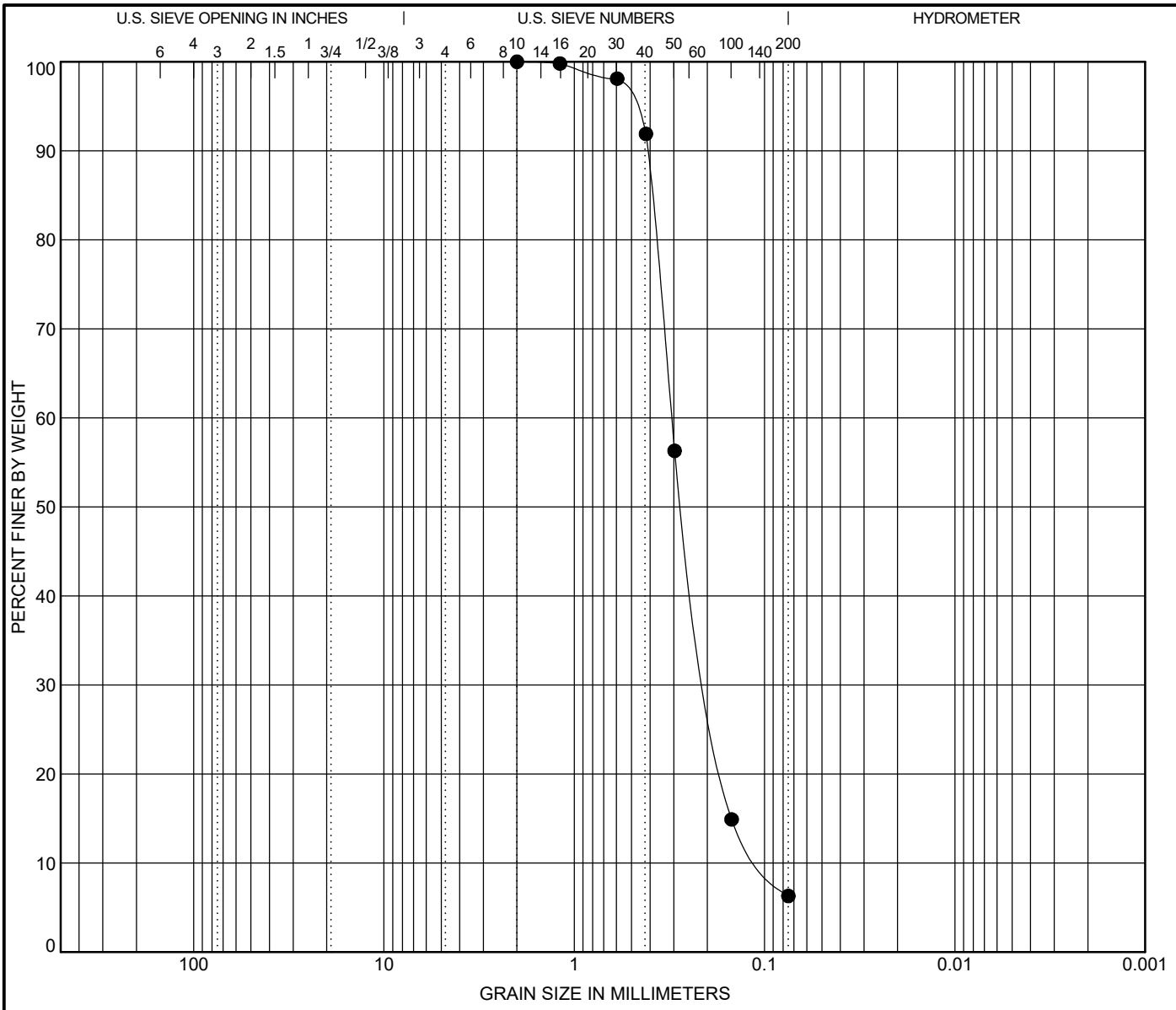
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 15

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 10	100
No. 16	99.8
No. 30	98.1
No. 40	91.9
No. 50	56.3
No. 100	14.9
No. 200	6.3

Specimen Identification
B2021-4 - (50 - 51.5 ft)

Classification	LL	PL	PI	Cc	Cu
POORLY GRADED SAND with SILT(SP-SM)	**NV**	**NV**	**NP**	**1.18**	**3.06**

% Gravel	% Sand	% Silt	% Clay
0	94	6	

D100	D60	D30	D10
2	0.308	0.192	0.101

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

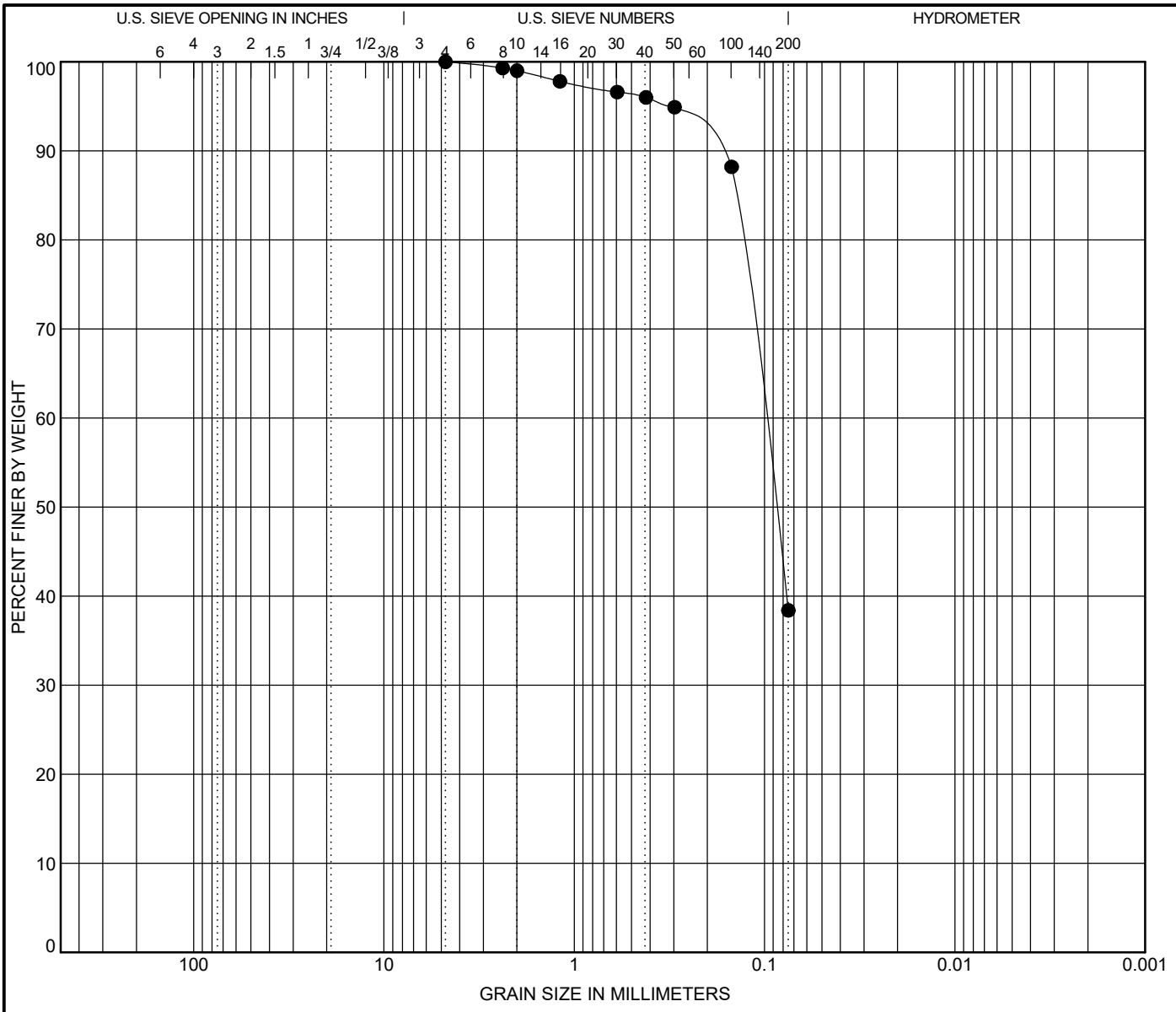
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 16

BORING LOGS.GPJ ` 6-20-22 ` ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.3
No. 10	99
No. 16	97.8
No. 30	96.6
No. 40	96
No. 50	94.9
No. 100	88.2
No. 200	38.4

Specimen Identification
B2021-4 - (90 - 91.5 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	62	38	

D100	D60	D30	D10
4.75	0.101		

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

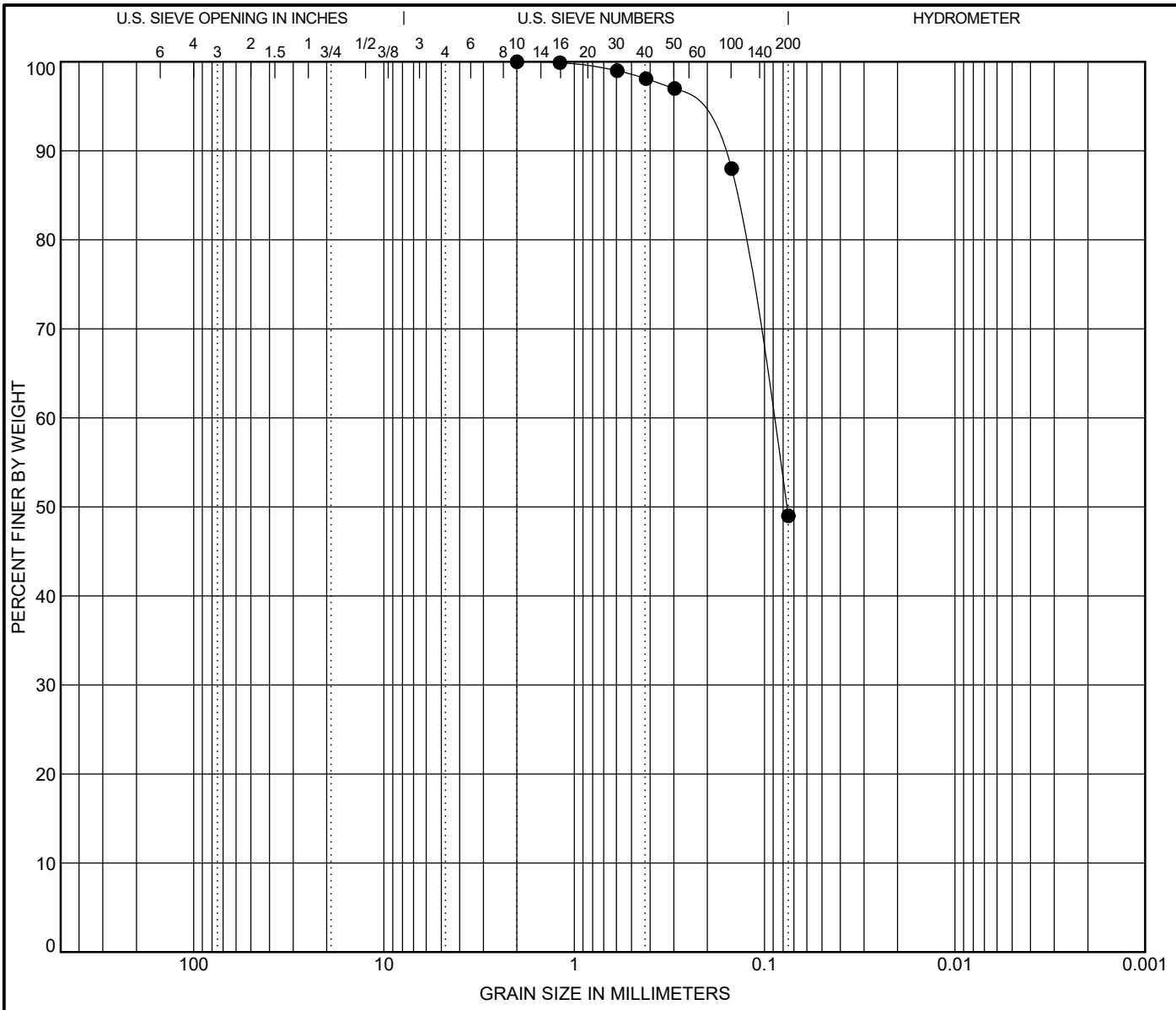
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 17

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 10	100
No. 16	99.9
No. 30	99
No. 40	98.1
No. 50	97
No. 100	88
No. 200	49

Specimen Identification
B2021-4 - (120 - 120.9 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	51	49	

D100	D60	D30	D10
2	0.091		

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

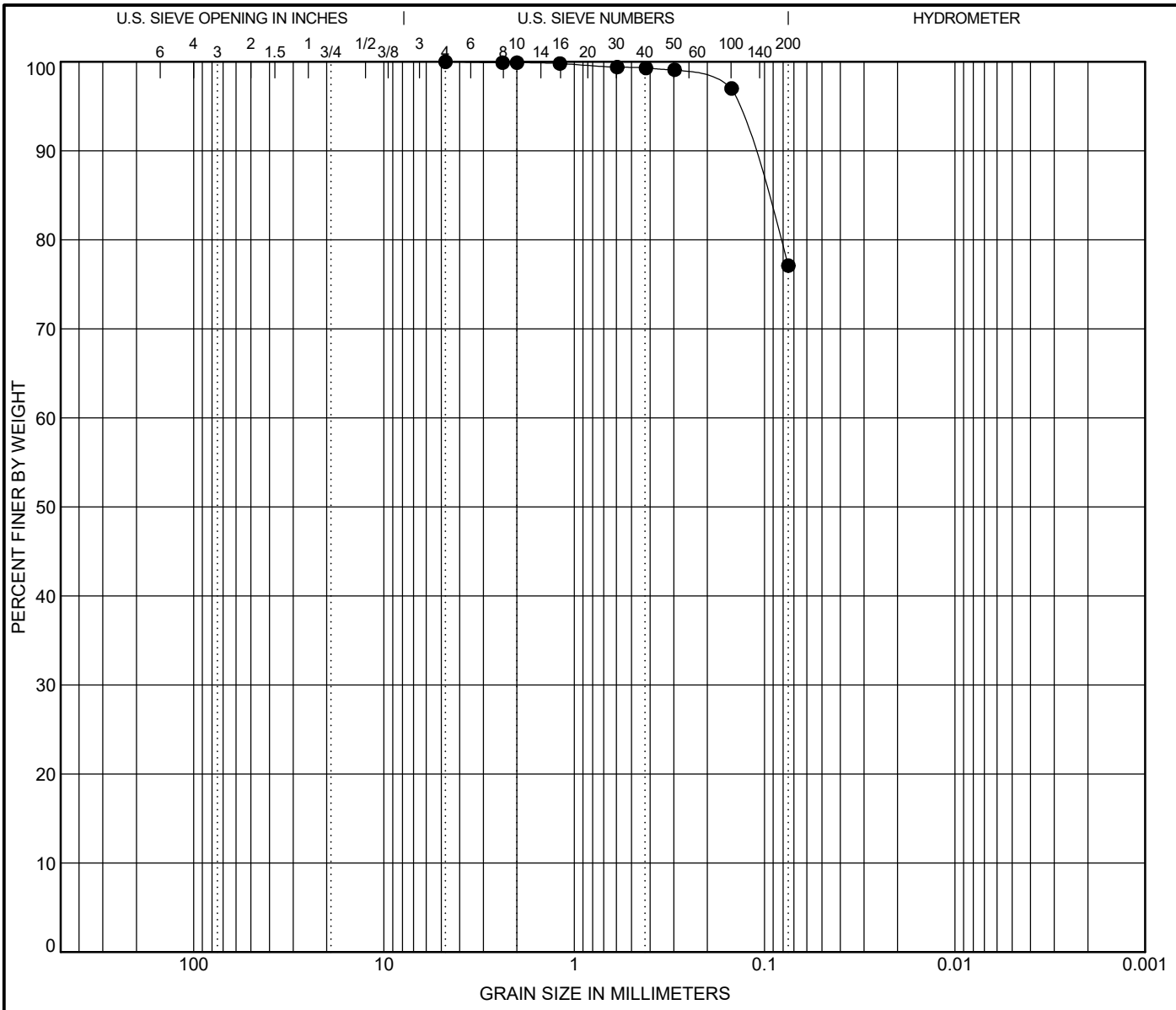
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 18

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.9
No. 10	99.9
No. 16	99.8
No. 30	99.4
No. 40	99.3
No. 50	99.1
No. 100	97
No. 200	77.1

Specimen Identification
B2021-5 - (69 - 70 ft)

Classification	LL	PL	PI	Cc	Cu
SILT with SAND(ML)	**27**	**20**	**7**		

% Gravel	% Sand	% Silt	% Clay
0	23	77	

D100	D60	D30	D10
4.75			

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

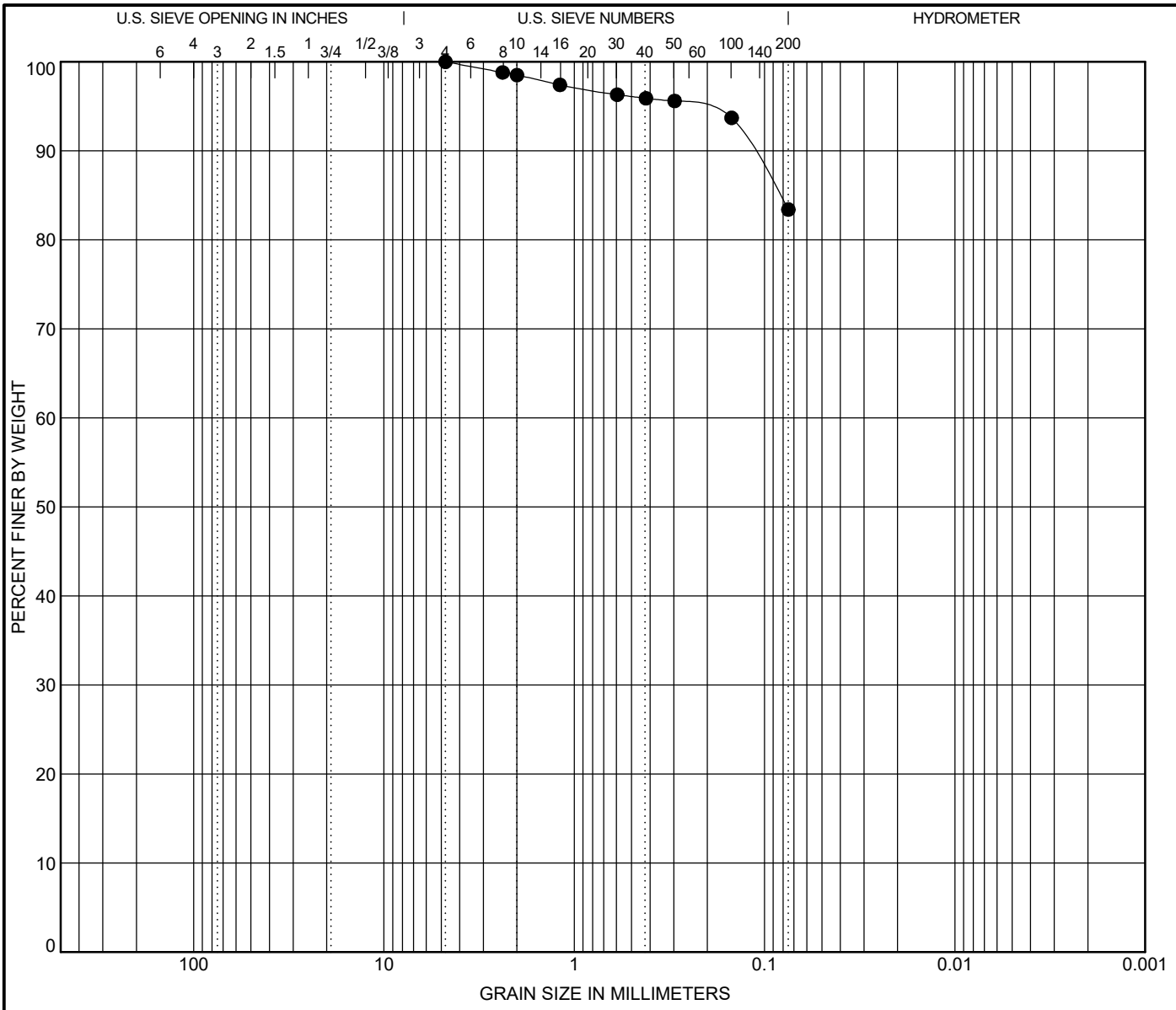
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 19

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	98.8
No. 10	98.5
No. 16	97.4
No. 30	96.3
No. 40	95.9
No. 50	95.6
No. 100	93.7
No. 200	83.4

Specimen Identification
B2021-5 - (80 - 81.5 ft)

Classification	LL	PL	PI	Cc	Cu
LEAN CLAY with SAND(CL)	**35**	**21**	**14**		

% Gravel	% Sand	% Silt	% Clay
0	17	83	

D100	D60	D30	D10
4.75			

GRAIN SIZE DISTRIBUTION

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

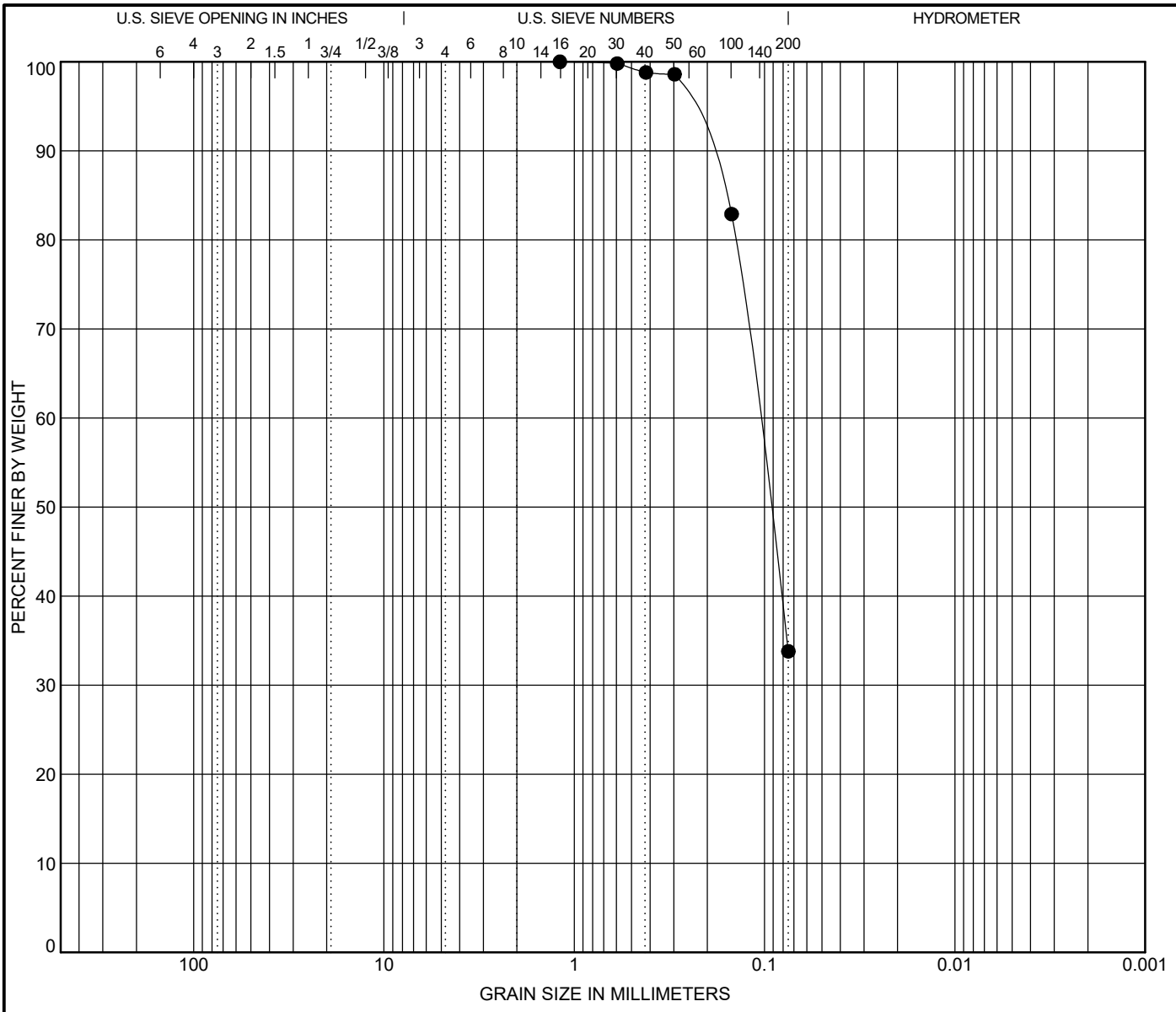
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 20

BORING LOGS.GPJ ` 6-20-22 ` ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 16	100
No. 30	99.8
No. 40	98.8
No. 50	98.6
No. 100	82.9
No. 200	33.8

Specimen Identification
B2021-5 - (90 - 91.5 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	66	34	

D100	D60	D30	D10
1.19	0.108		

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

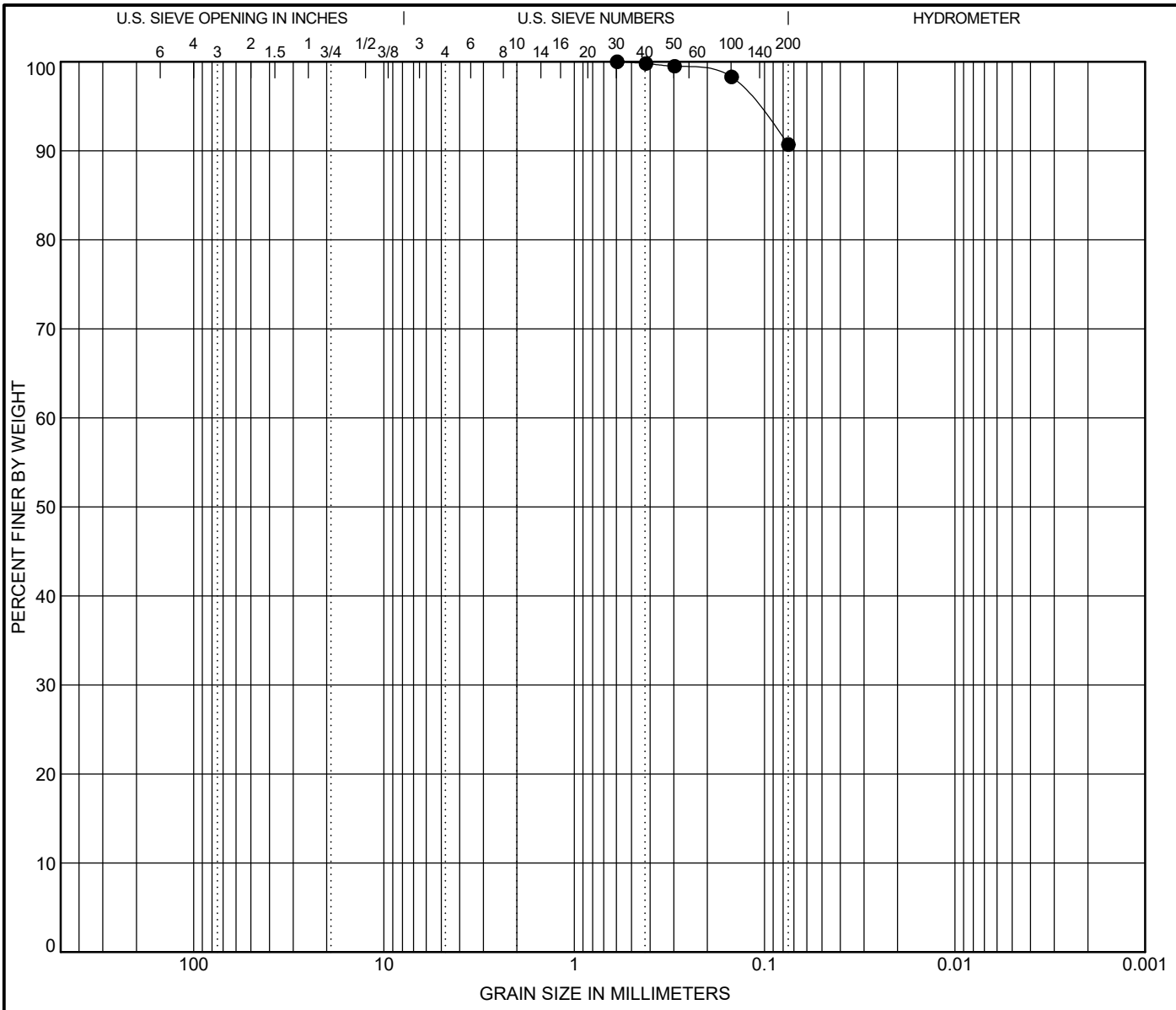
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 21

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 30	100
No. 40	99.8
No. 50	99.5
No. 100	98.3
No. 200	90.7

Specimen Identification
B2021-6 - (79 - 81 ft)

Classification	LL	PL	PI	Cc	Cu
FAT CLAY(CH)	**67**	**19**	**48**		

% Gravel	% Sand	% Silt	% Clay
0	9	91	

D100	D60	D30	D10
0.595			

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

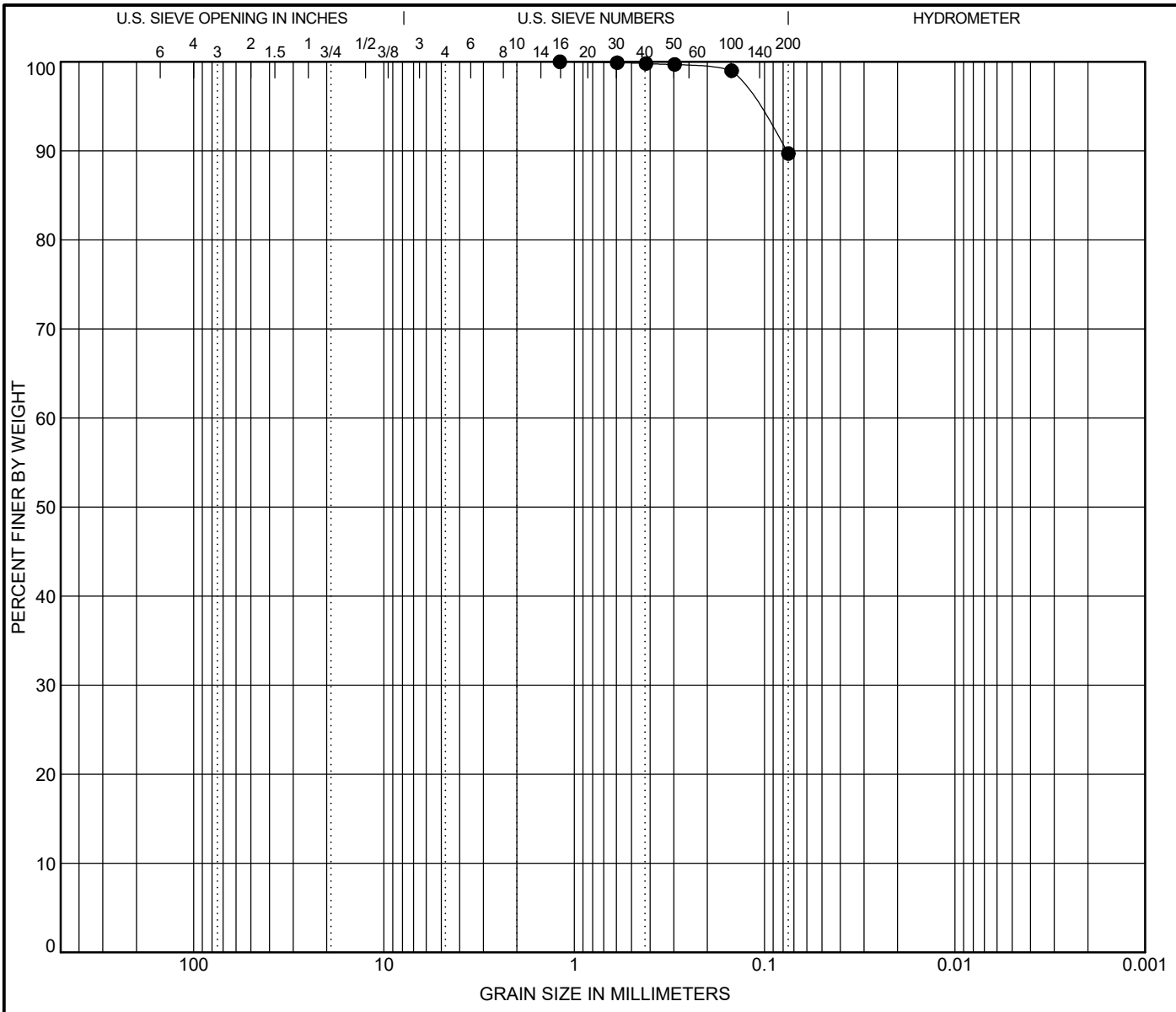
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 22

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 16	100
No. 30	99.9
No. 40	99.8
No. 50	99.7
No. 100	99
No. 200	89.7

Specimen Identification
B2021-6 - (99 - 102 ft)

Classification	LL	PL	PI	Cc	Cu
FAT CLAY(CH)	**56**	**22**	**34**		

% Gravel	% Sand	% Silt	% Clay
0	10	90	

D100	D60	D30	D10
1.19			

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

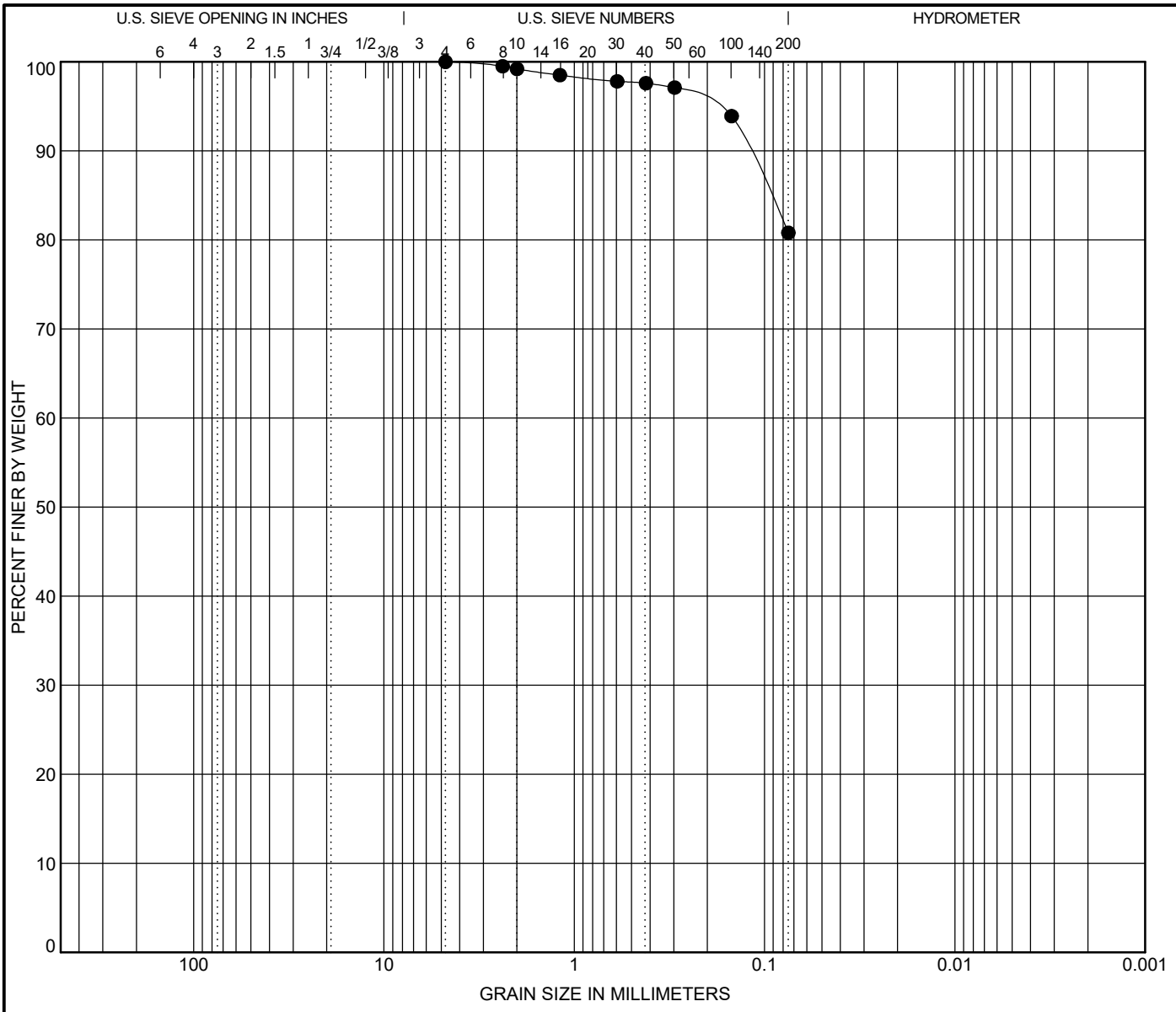
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 23

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.5
No. 10	99.2
No. 16	98.5
No. 30	97.8
No. 40	97.6
No. 50	97.1
No. 100	93.9
No. 200	80.8

Specimen Identification
B2021-6 - (106 - 107 ft)

Classification	LL	PL	PI	Cc	Cu
LEAN CLAY with SAND(CL)	**47**	**22**	**25**		

% Gravel	% Sand	% Silt	% Clay
0	19	81	

D100	D60	D30	D10
4.75			

GRAIN SIZE DISTRIBUTION

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

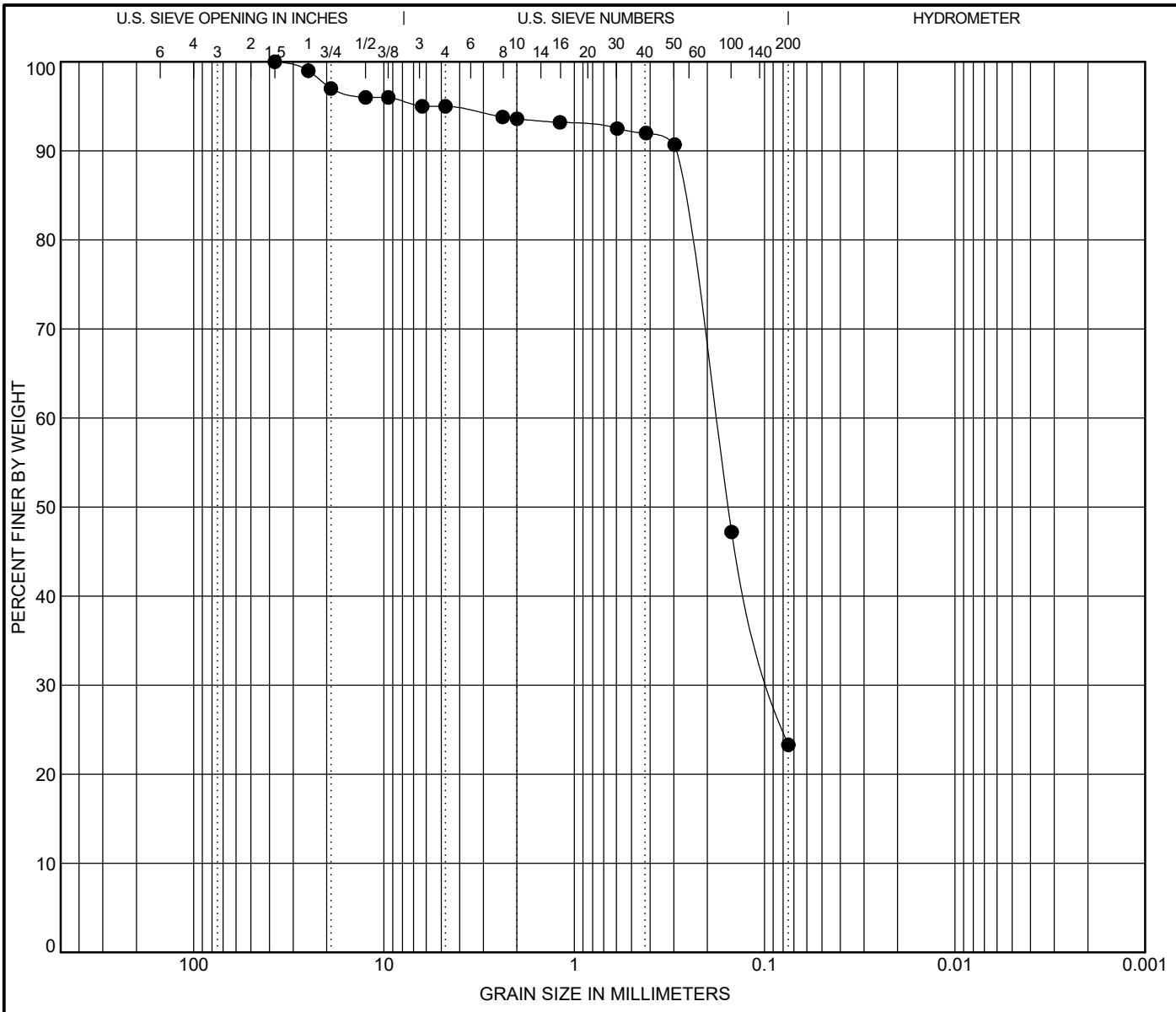
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 24

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
1.5 in	100
1 in	99
3/4 in	97
1/2 in	96
3/8 in	96
1/4 in	95
No. 4	95
No. 8	93.8
No. 10	93.6
No. 16	93.2
No. 30	92.5
No. 40	92
No. 50	90.7
No. 100	47.2
No. 200	23.3

Specimen Identification
B2021-7 - (39 - 41 ft)

Classification	LL	PL	PI	Cc	Cu
SILTY SAND(SM)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
5	72	23	

D100	D60	D30	D10
37.5	0.183	0.091	

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

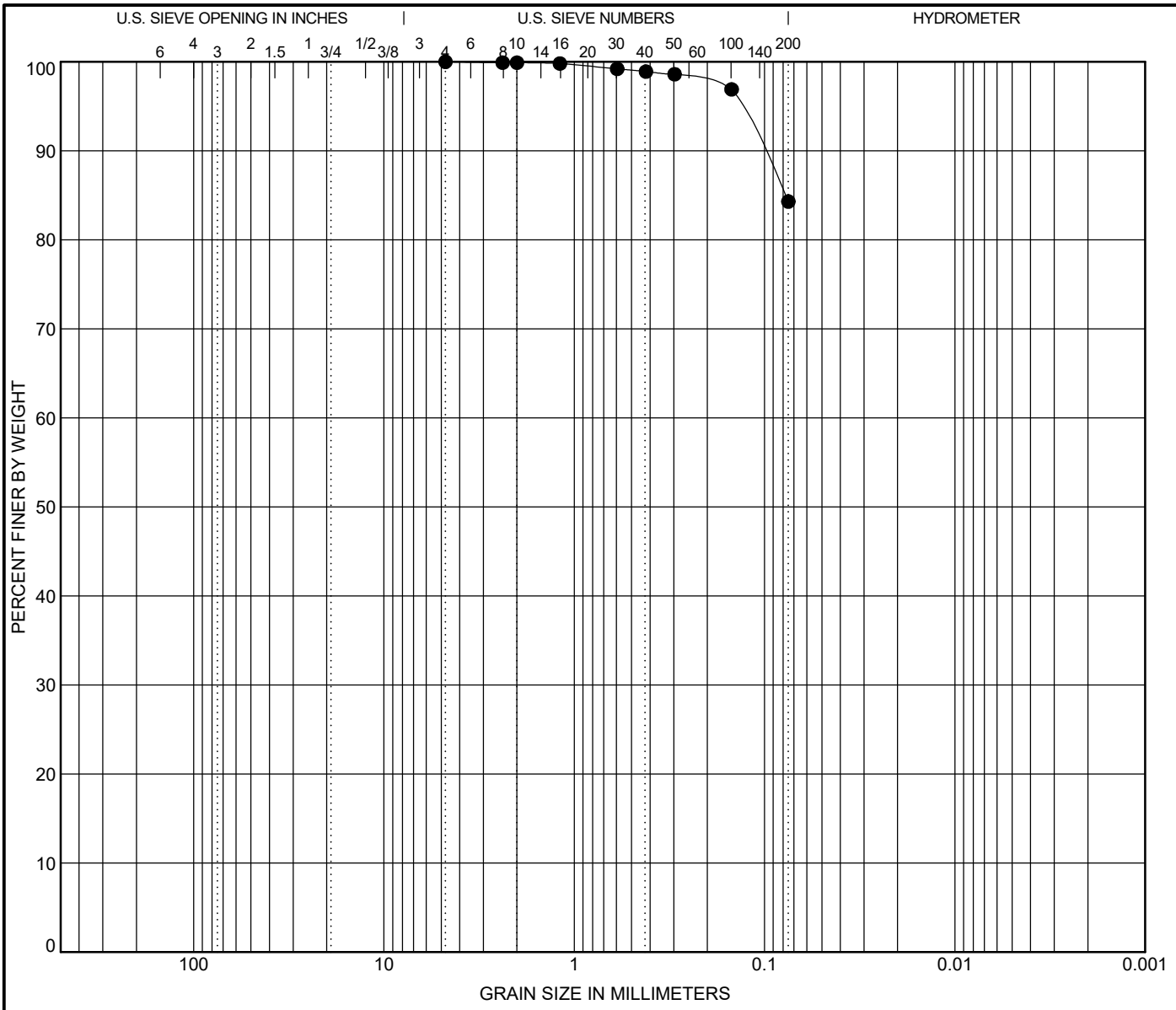
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 25

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 4	100
No. 8	99.9
No. 10	99.9
No. 16	99.8
No. 30	99.2
No. 40	98.9
No. 50	98.6
No. 100	96.9
No. 200	84.3

Specimen Identification
B2021-7 - (59 - 60 ft)

Classification	LL	PL	PI	Cc	Cu
SILT with SAND(ML)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	16	84	

D100	D60	D30	D10
4.75			

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

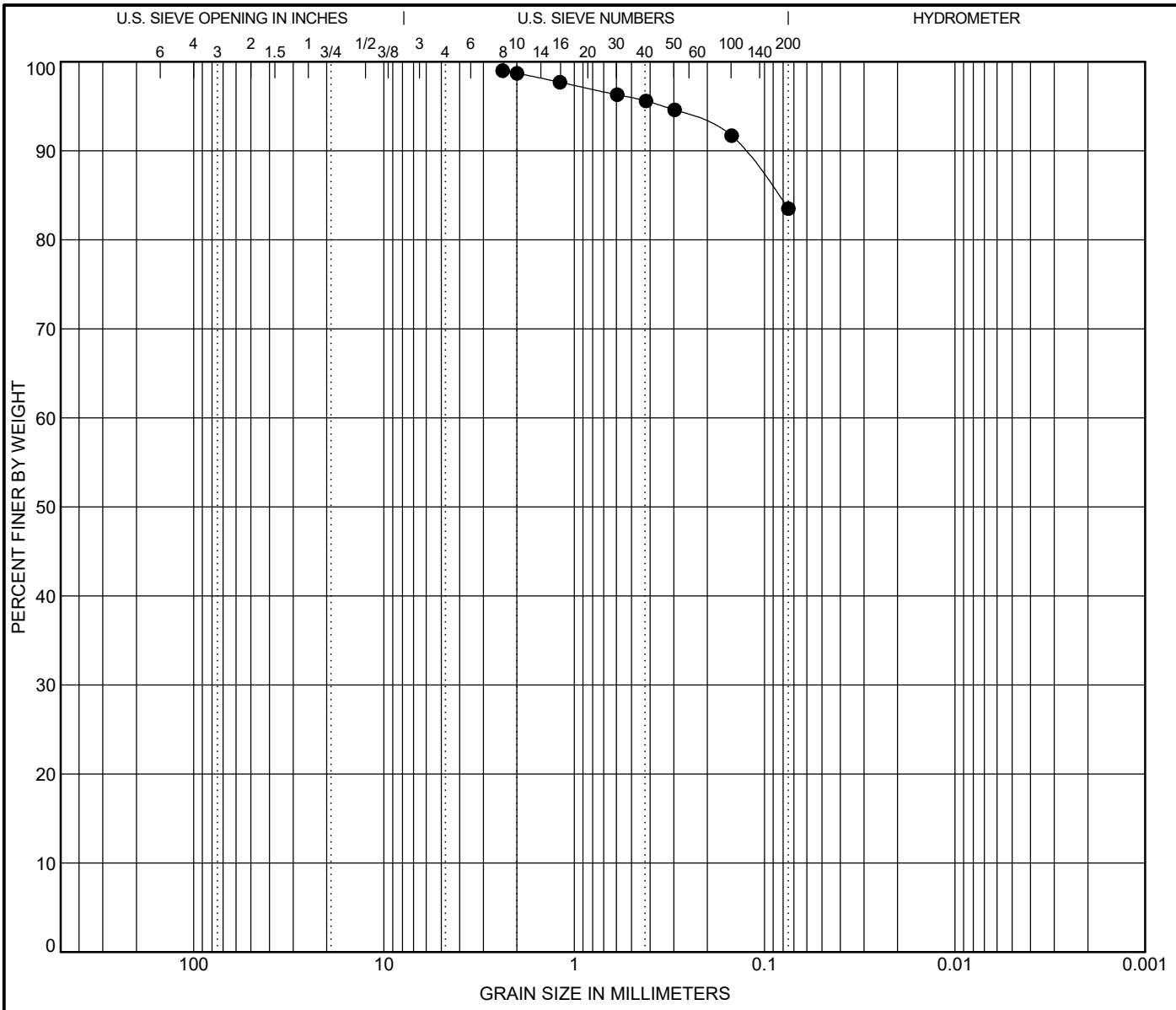
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 26

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

SIEVE SIZE	% PASSING
No. 8	99
No. 10	98.7
No. 16	97.7
No. 30	96.3
No. 40	95.6
No. 50	94.6
No. 100	91.7
No. 200	83.5

Specimen Identification
B2021-8 - (1 - 4 ft)

Classification	LL	PL	PI	Cc	Cu
SILT with SAND(ML)	**NV**	**NV**	**NP**		

% Gravel	% Sand	% Silt	% Clay
0	15	84	

D100	D60	D30	D10
2.38			

TETRA TECH

GRAIN SIZE DISTRIBUTION

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

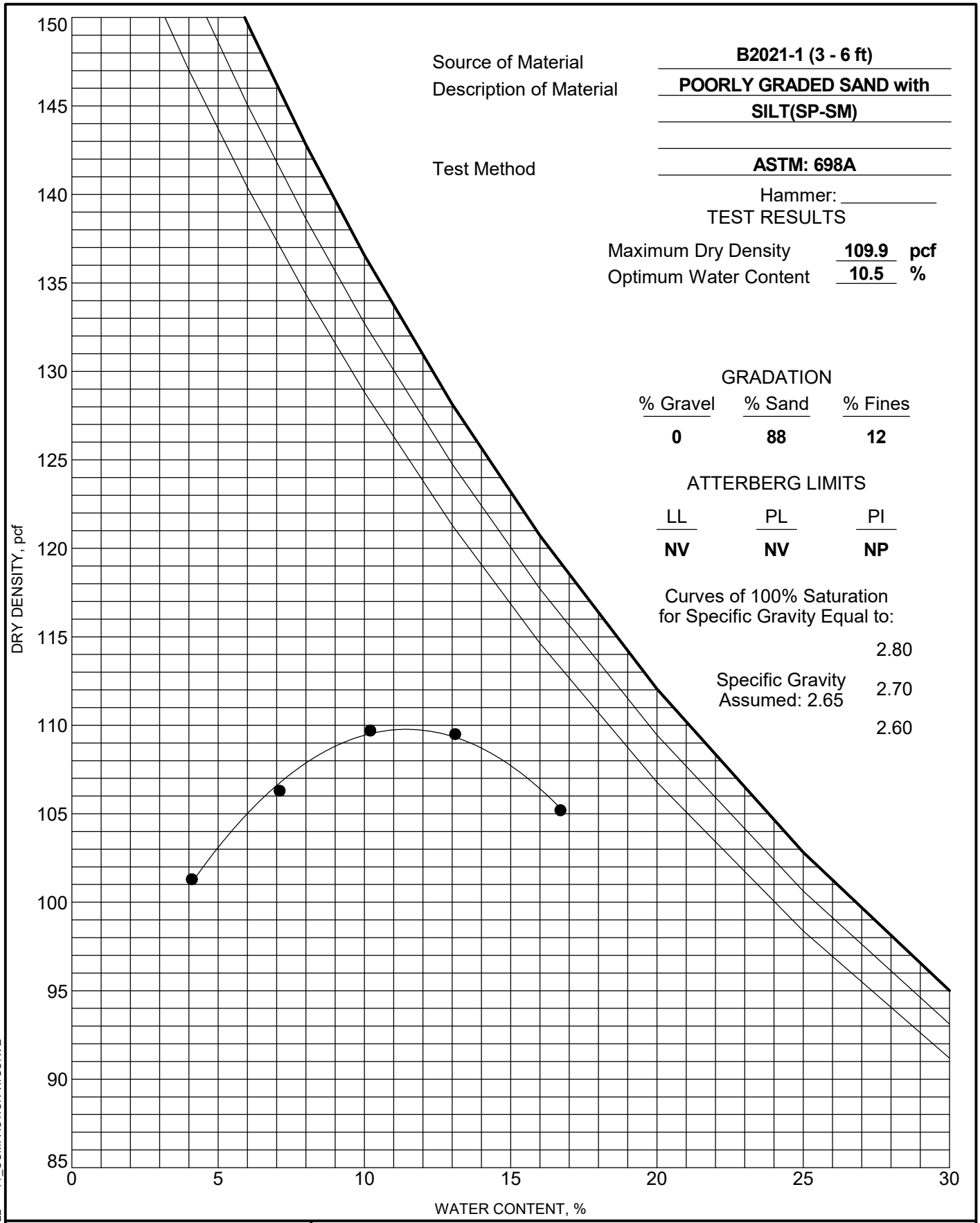
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 27

BORING LOGS.GPJ ` 6-9-22 ` TT_US GRAIN SIZE (SIEVE DATA)

Revised 1-23-08 (MAT)



Source of Material: **B2021-1 (3 - 6 ft)**

Description of Material: **POORLY GRADED SAND with SILT(SP-SM)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**109.9**	**pcf**
Optimum Water Content	**10.5**	**%**

GRADATION

% Gravel	% Sand	% Fines
0	**88**	**12**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

TETRA TECH

MOISTURE-DENSITY RELATIONSHIP

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

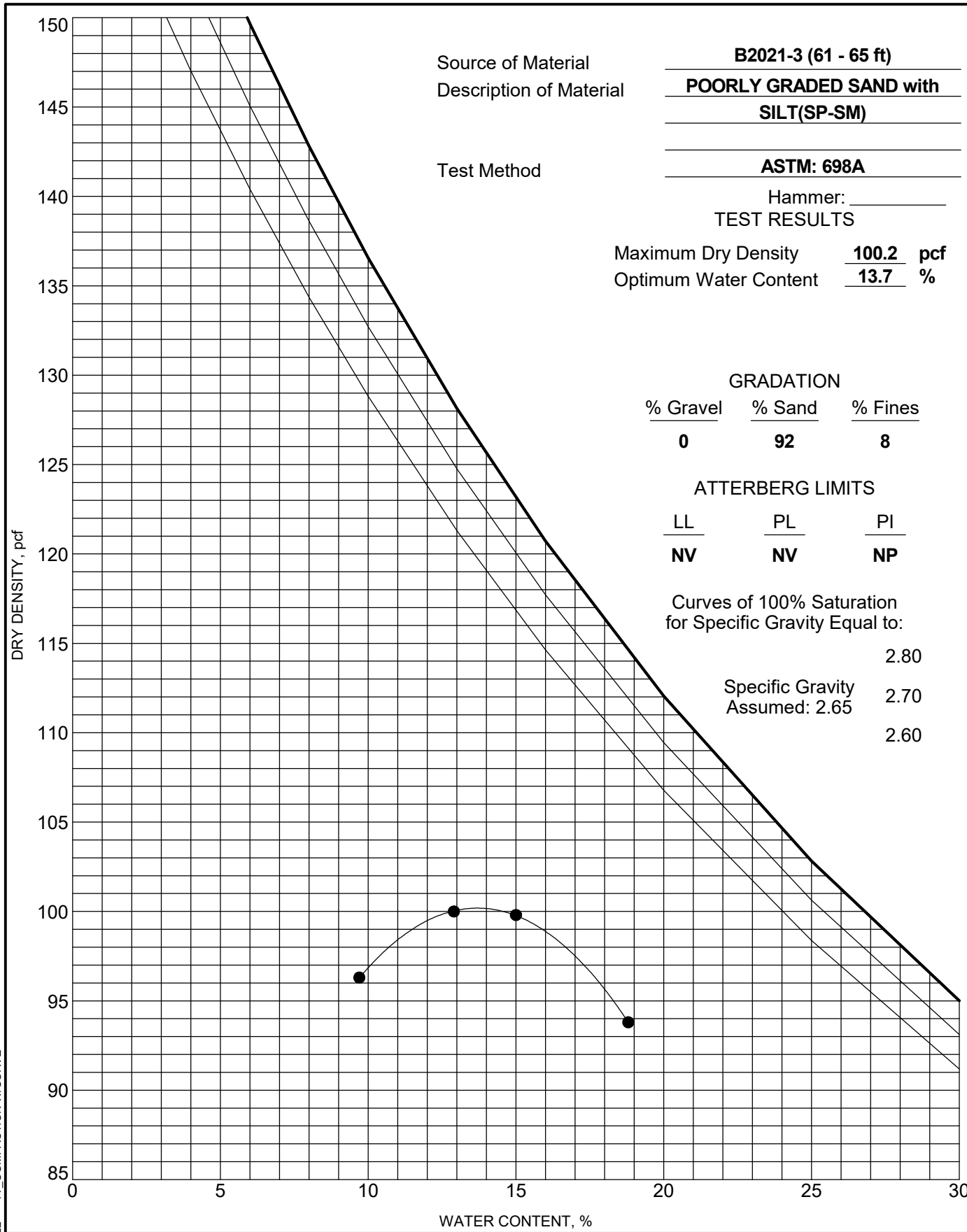
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 28

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-3 (61 - 65 ft)**

Description of Material: **POORLY GRADED SAND with SILT(SP-SM)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**100.2**	**pcf**
Optimum Water Content	**13.7**	**%**

GRADATION

% Gravel	% Sand	% Fines
0	**92**	**8**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

MOISTURE-DENSITY RELATIONSHIP

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

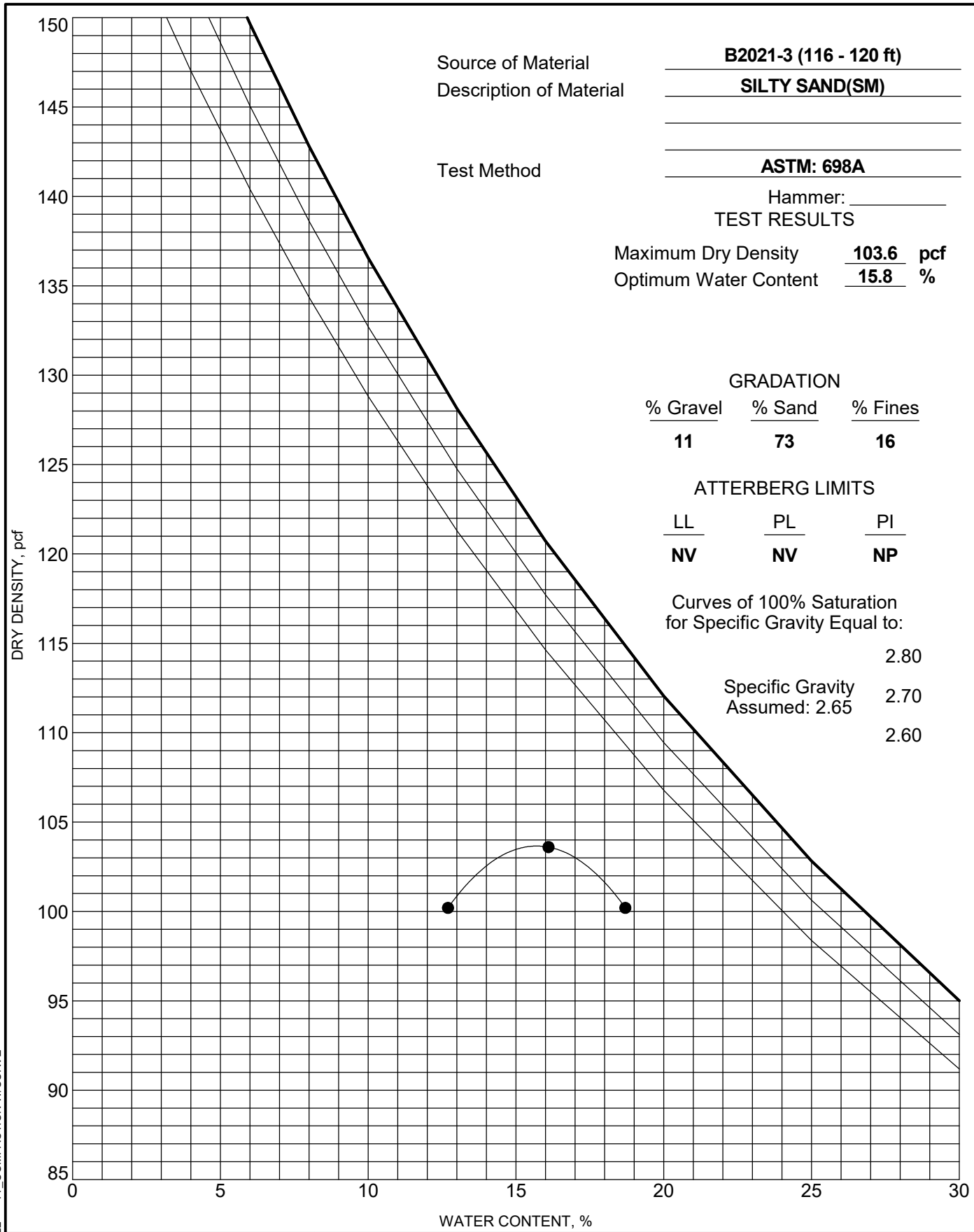
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 29

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-3 (116 - 120 ft)**

Description of Material: **SILTY SAND(SM)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**103.6**	**pcf**
Optimum Water Content	**15.8**	**%**

GRADATION

% Gravel	% Sand	% Fines
11	**73**	**16**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

MOISTURE-DENSITY RELATIONSHIP

TETRA TECH

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

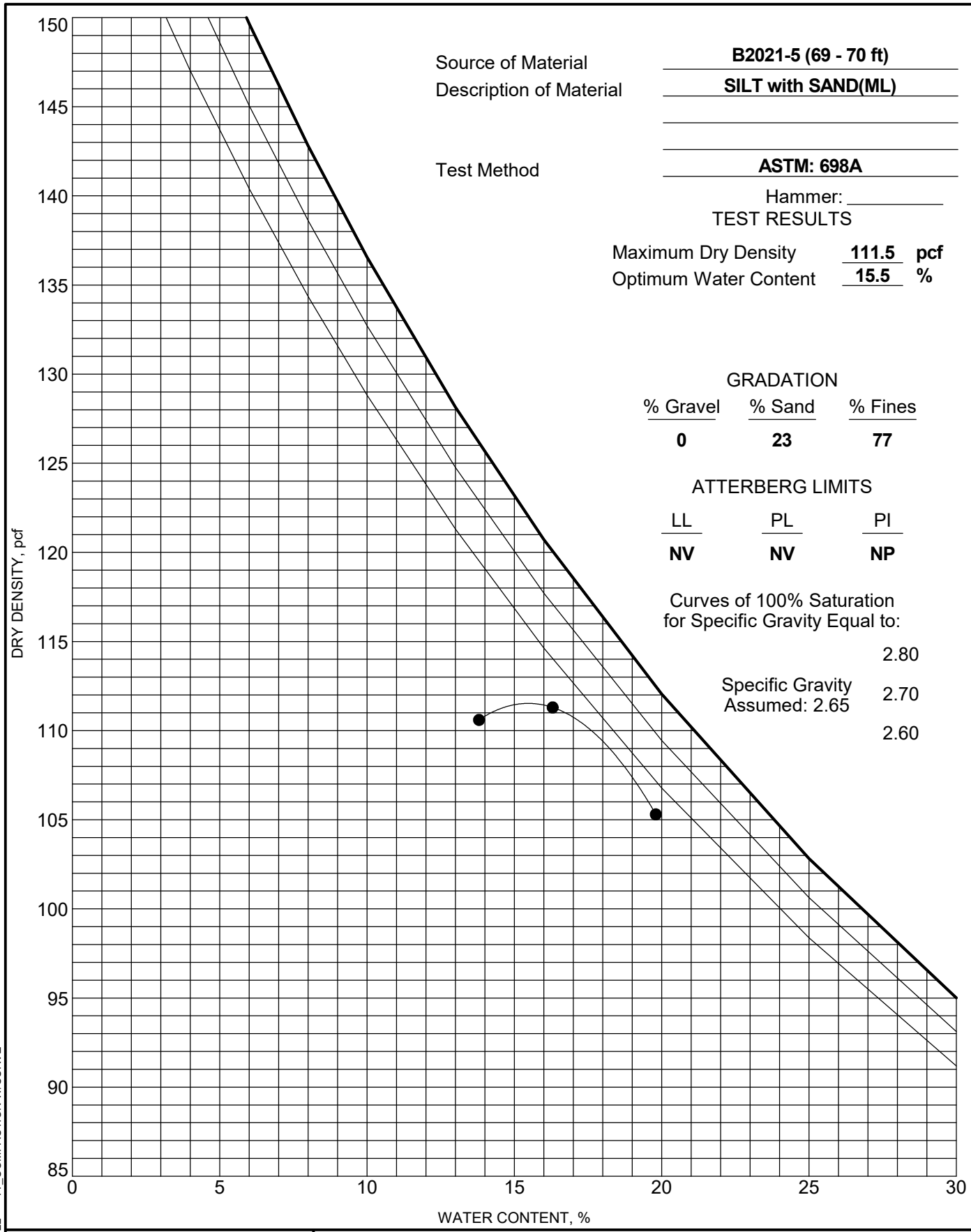
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 30

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-5 (69 - 70 ft)**

Description of Material: **SILT with SAND(ML)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**111.5**	**pcf**
Optimum Water Content	**15.5**	**%**

GRADATION

% Gravel	% Sand	% Fines
0	**23**	**77**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

TETRA TECH

MOISTURE-DENSITY RELATIONSHIP

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

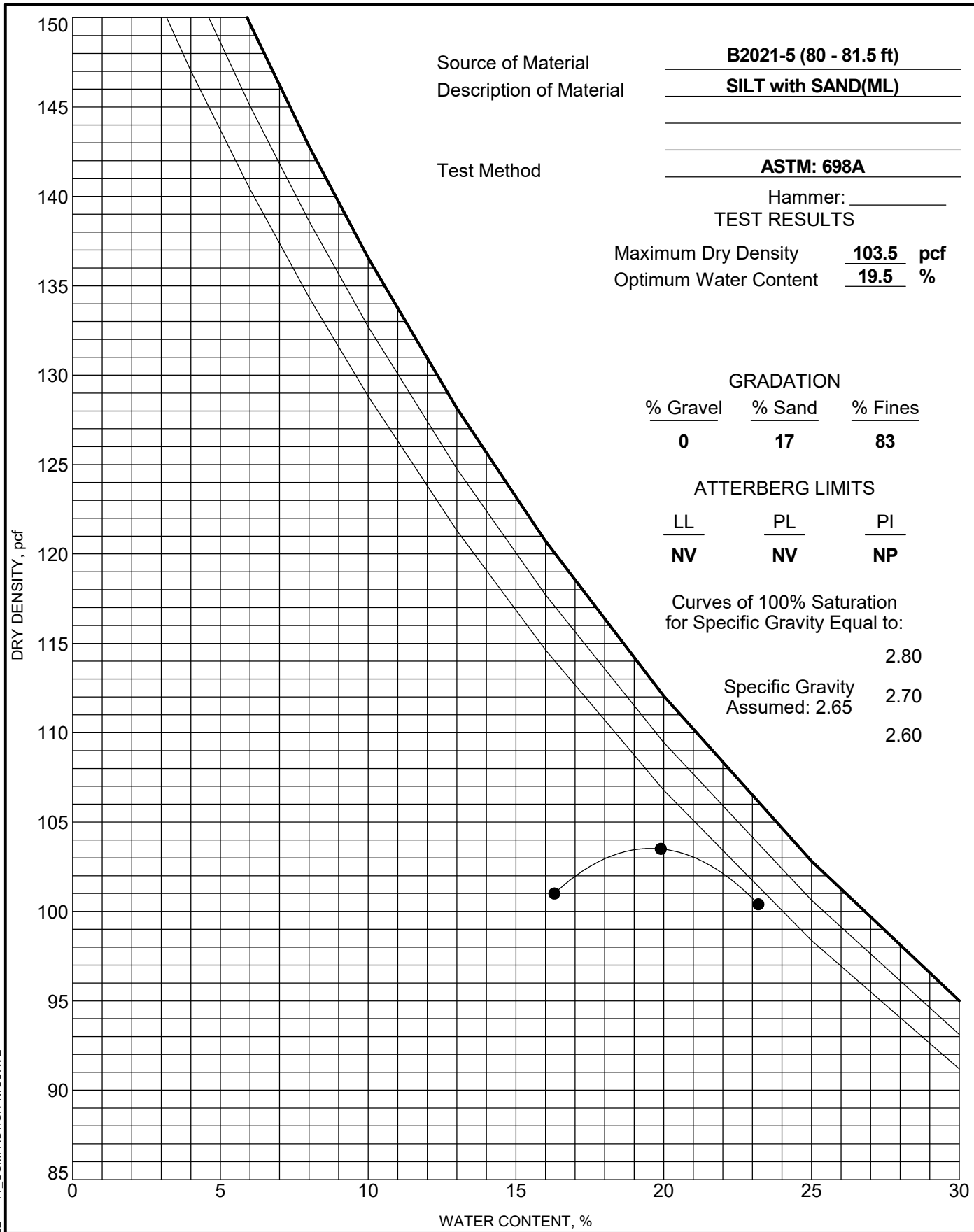
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 31

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-5 (80 - 81.5 ft)**

Description of Material: **SILT with SAND(ML)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**103.5**	**pcf**
Optimum Water Content	**19.5**	**%**

GRADATION

% Gravel	% Sand	% Fines
0	**17**	**83**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

TETRA TECH

MOISTURE-DENSITY RELATIONSHIP

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

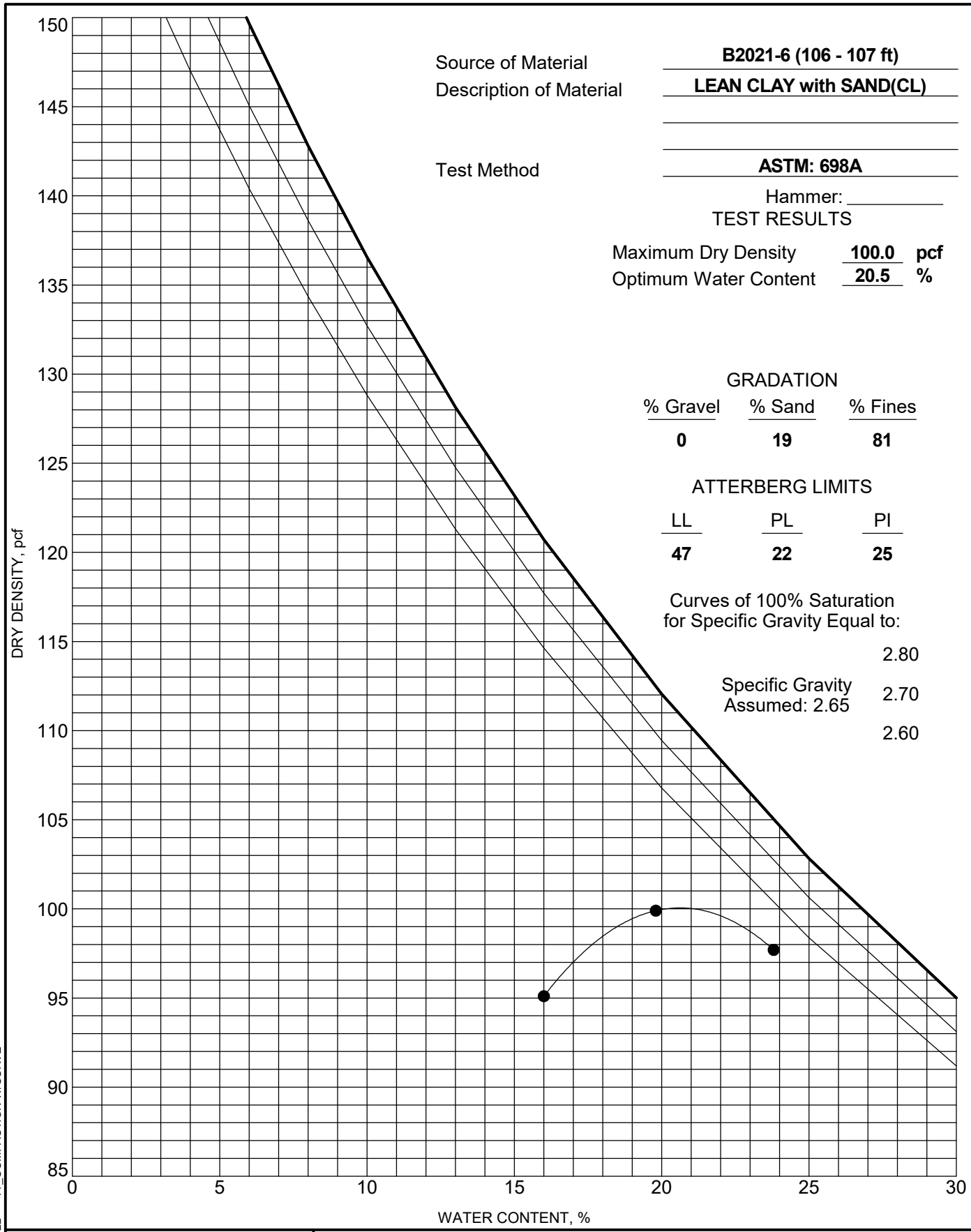
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 32

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-6 (106 - 107 ft)**

Description of Material: **LEAN CLAY with SAND(CL)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**100.0**	**pcf**
Optimum Water Content	**20.5**	**%**

GRADATION

% Gravel	% Sand	% Fines
0	**19**	**81**

ATTERBERG LIMITS

LL	PL	PI
47	**22**	**25**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

TETRA TECH

MOISTURE-DENSITY RELATIONSHIP

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

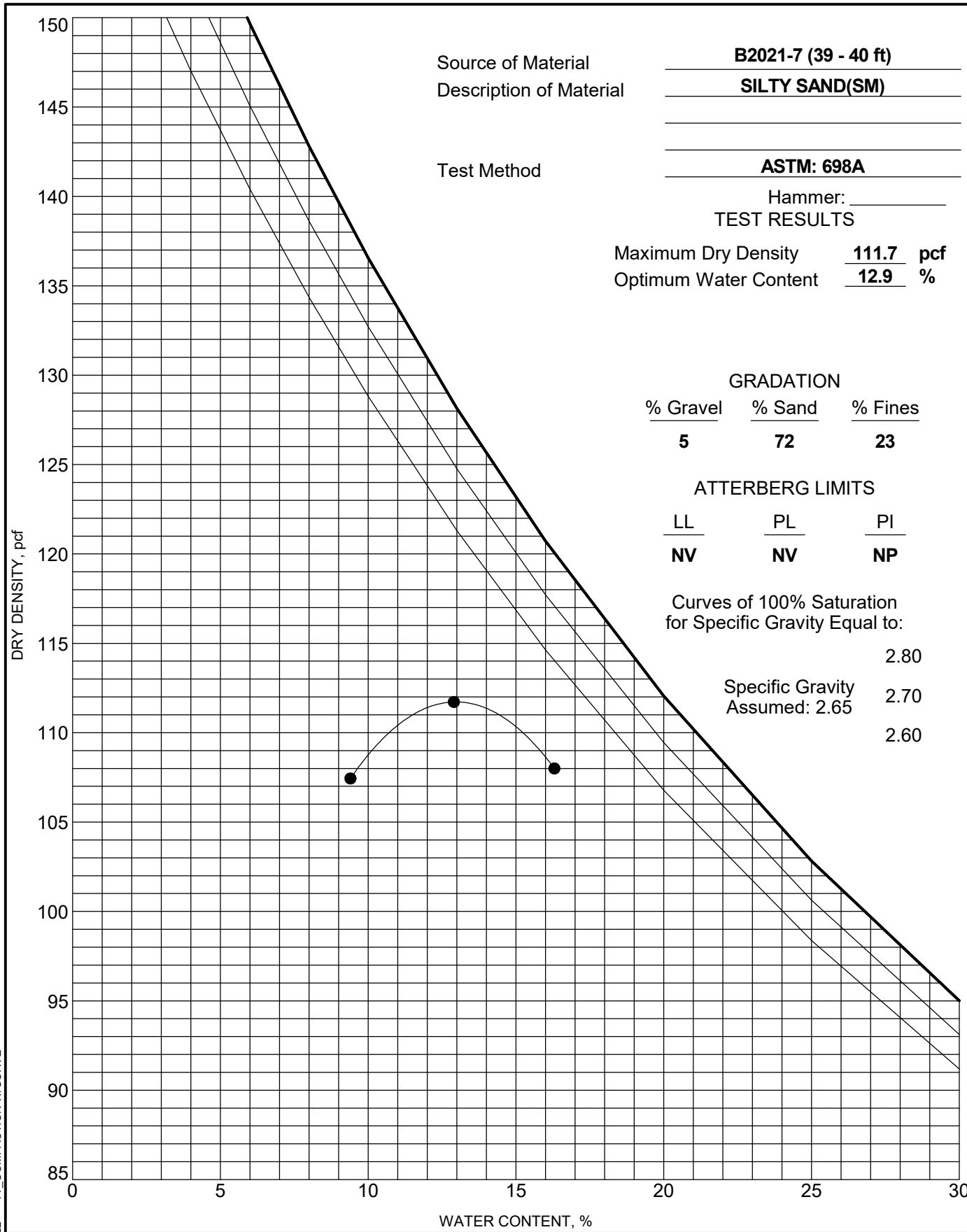
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 33

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-7 (39 - 40 ft)**

Description of Material: **SILTY SAND(SM)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**111.7**	**pcf**
Optimum Water Content	**12.9**	**%**

GRADATION

% Gravel	% Sand	% Fines
5	**72**	**23**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

TETRA TECH

MOISTURE-DENSITY RELATIONSHIP

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

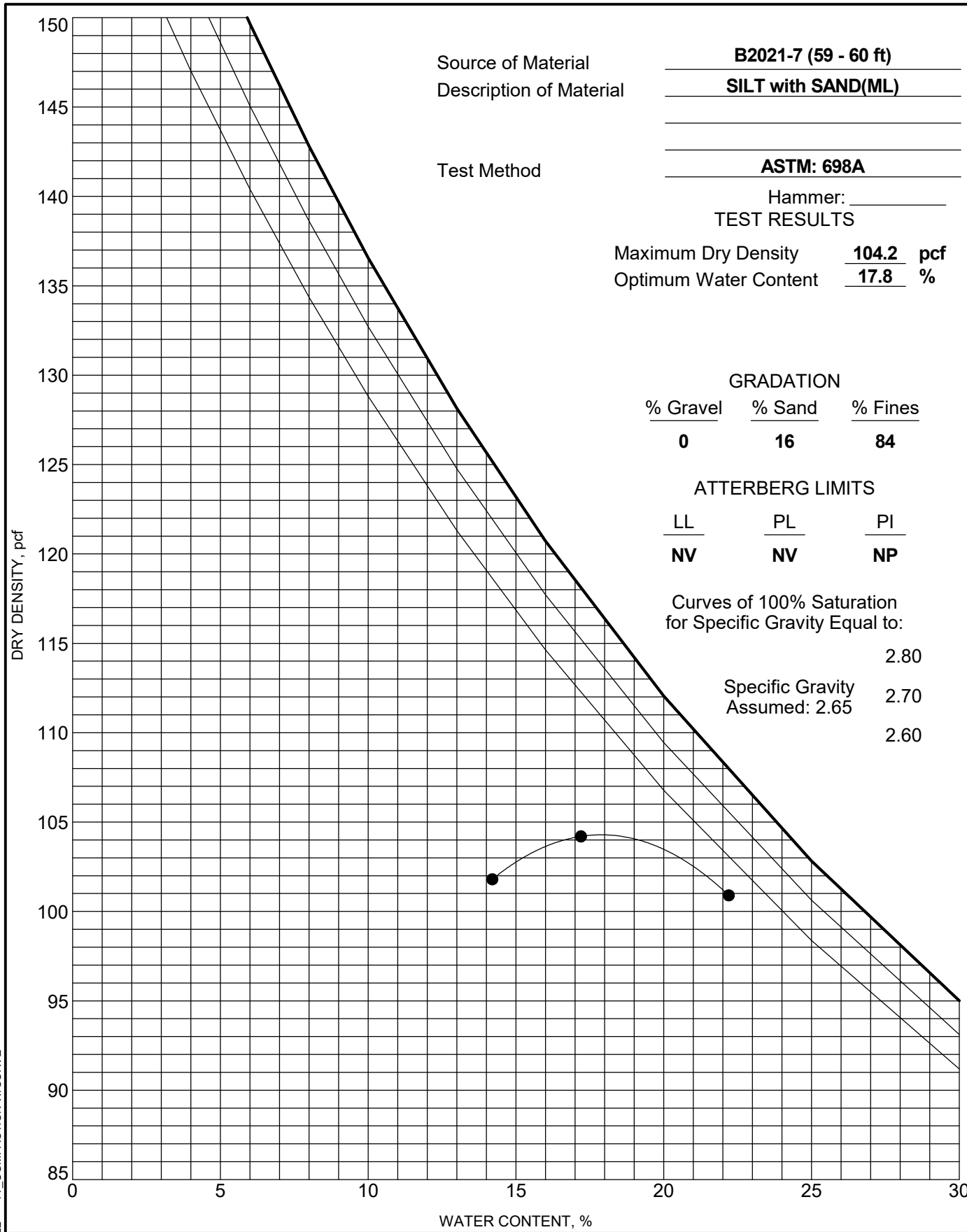
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 34

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-7 (59 - 60 ft)**

Description of Material: **SILT with SAND(ML)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**104.2**	**pcf**
Optimum Water Content	**17.8**	**%**

GRADATION

% Gravel	% Sand	% Fines
0	**16**	**84**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

TETRA TECH

MOISTURE-DENSITY RELATIONSHIP

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

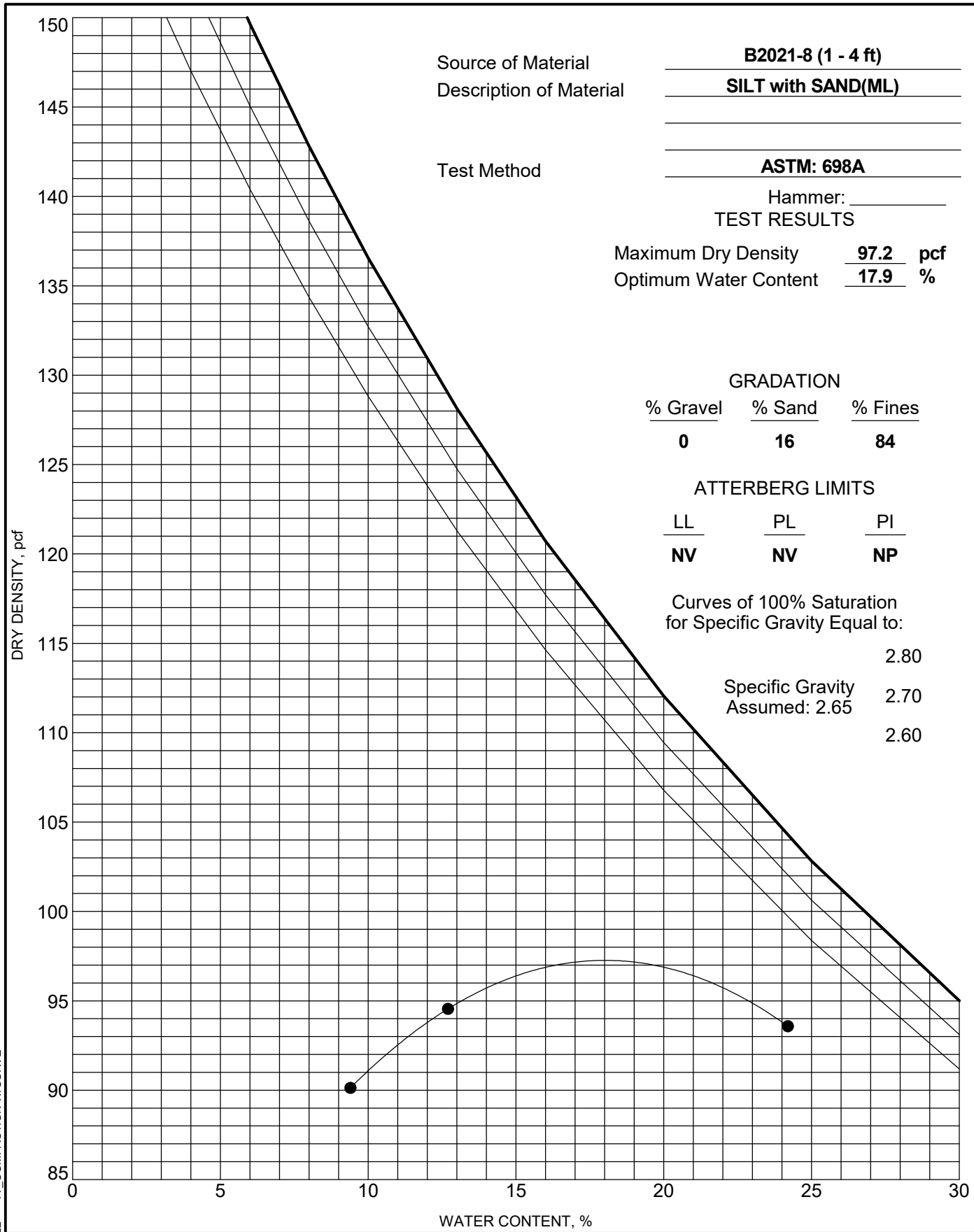
Location: Refer to site map.

Number: 114-571040-2022

Figure No. 35

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)



Source of Material: **B2021-8 (1 - 4 ft)**

Description of Material: **SILT with SAND(ML)**

Test Method: **ASTM: 698A**

Hammer: _____

TEST RESULTS

Maximum Dry Density	**97.2**	**pcf**
Optimum Water Content	**17.9**	**%**

GRADATION

% Gravel	% Sand	% Fines
0	**16**	**84**

ATTERBERG LIMITS

LL	PL	PI
NV	**NV**	**NP**

Curves of 100% Saturation for Specific Gravity Equal to:

Specific Gravity Assumed: 2.65

2.80

2.70

2.60

TETRA TECH

MOISTURE-DENSITY RELATIONSHIP

Project: Pickles Butte Sanitary Landfill - Canyon County, ID

Location: Refer to site map.

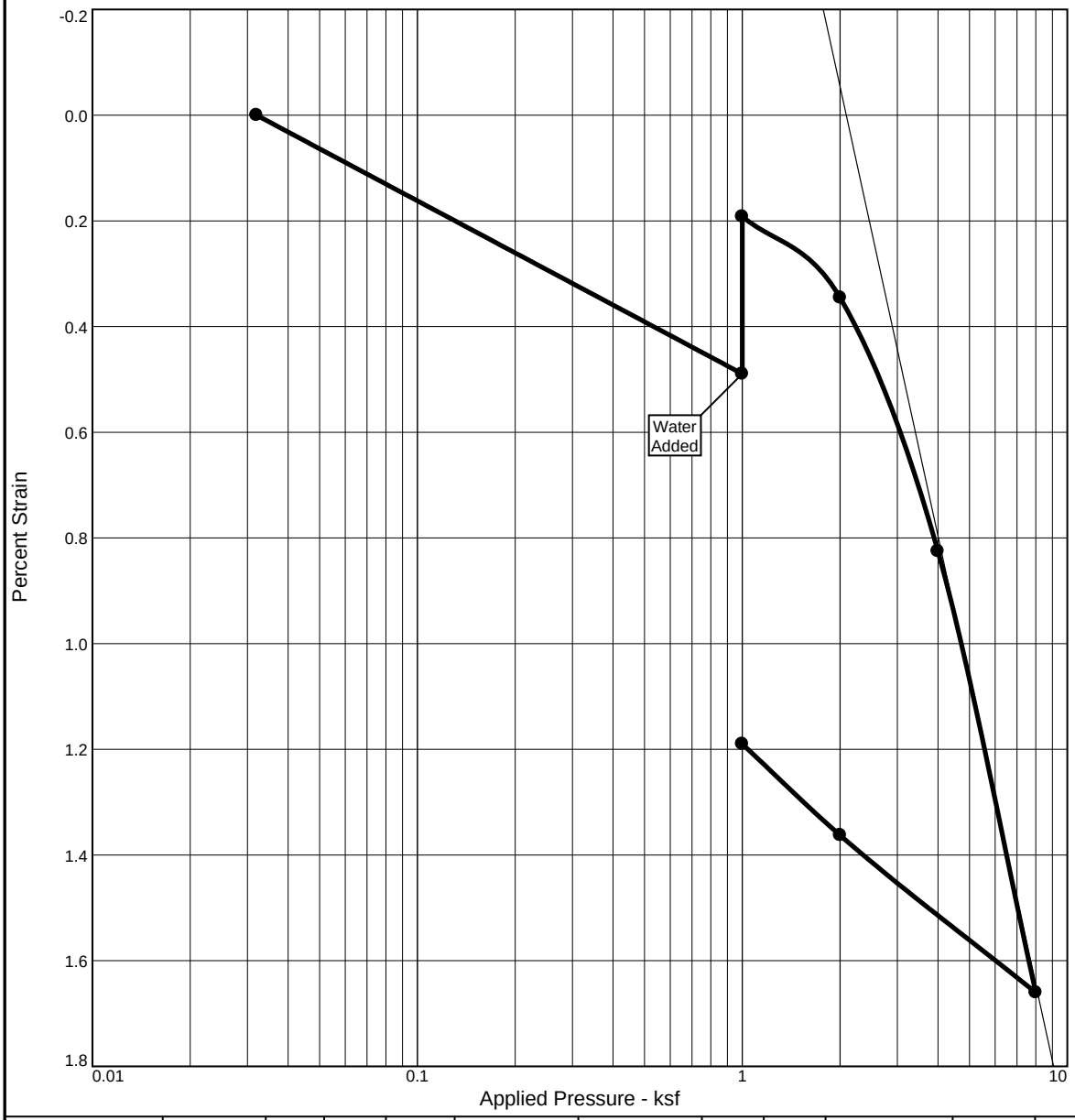
Number: 114-571040-2022

Figure No. 36

BORING LOGS.GPJ ` 6-9-22 ` TT_COMPACTION W/CURVE

Revised 1-23-08 (MAT)

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
24.8 %	3.5 %	120.1	NV	NP	2.65		3.0	0.04	0.01	2.6	0.3	0.375

MATERIAL DESCRIPTION	USCS	AASHTO
Silty Sand	SM	

Project No. 1145710402022

Project: Pickles Butte

Source of Sample: B2021-3 **Depth:** 25-27 ft

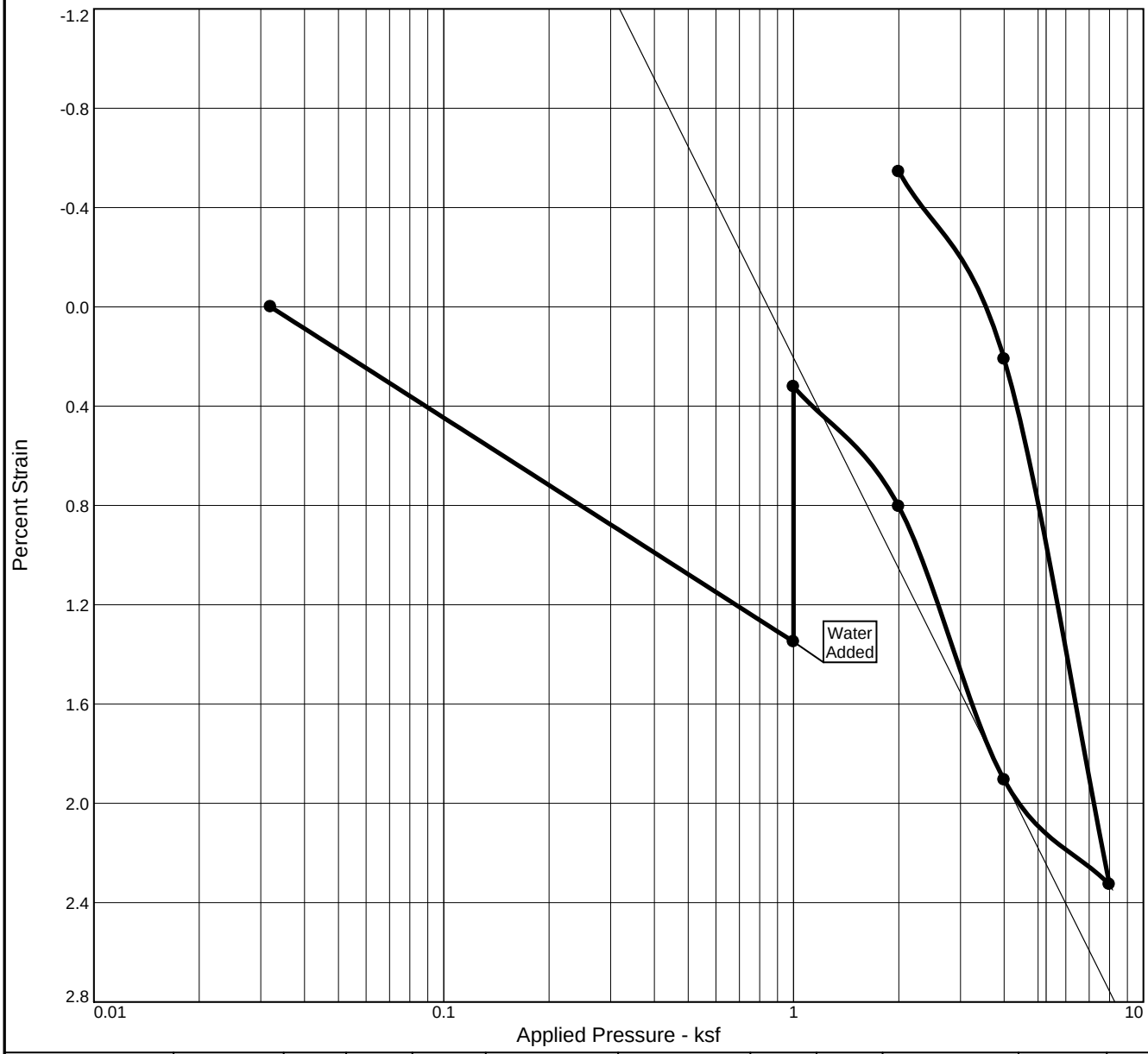
Remarks:

Tetra Tech

Missoula, MT

Figure 37

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
63.8 %	23.7 %	90.1	54	30	2.65		4.8	0.06	0.09	2.8	1.0	0.984

MATERIAL DESCRIPTION	USCS	AASHTO
Silty Clay	CL-ML	

Project No. 1145710402022

Project: Pickles Butte

Source of Sample: B2021-5 **Depth:** 50-51.5 ft

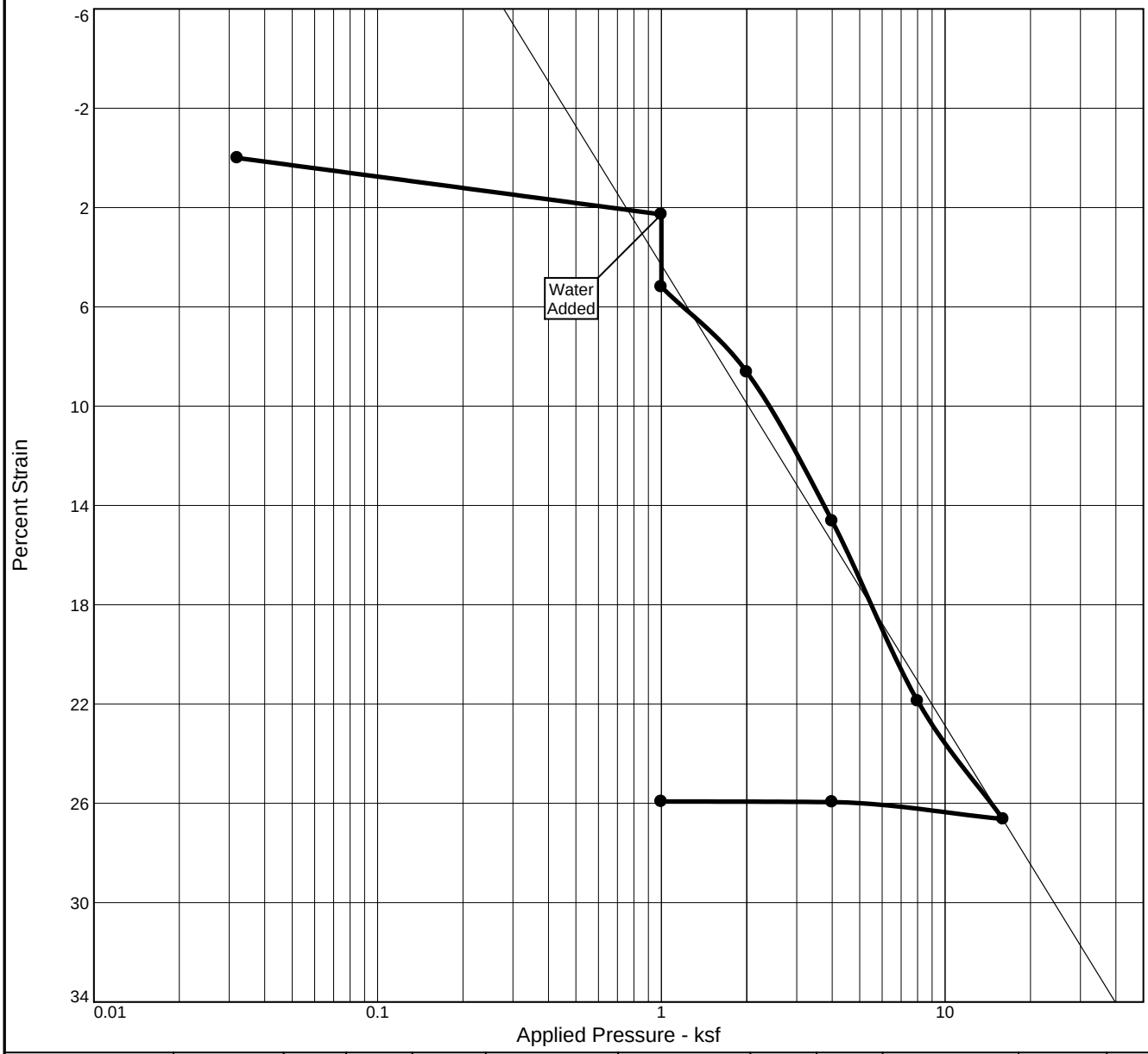
Tetra Tech

Missoula, MT

Remarks:

Figure 38

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
Sat.	Moist.											
52.0 %	20.4 %	83.5	33	10	2.65		1.5	0.38	0.01	0	2.9	1.038

MATERIAL DESCRIPTION	USCS	AASHTO
Silty Clay	CL-ML	

Project No. 1145710402022
Project: Pickles Butte

Source of Sample: B2021-7 **Depth:** 120-121.3 ft

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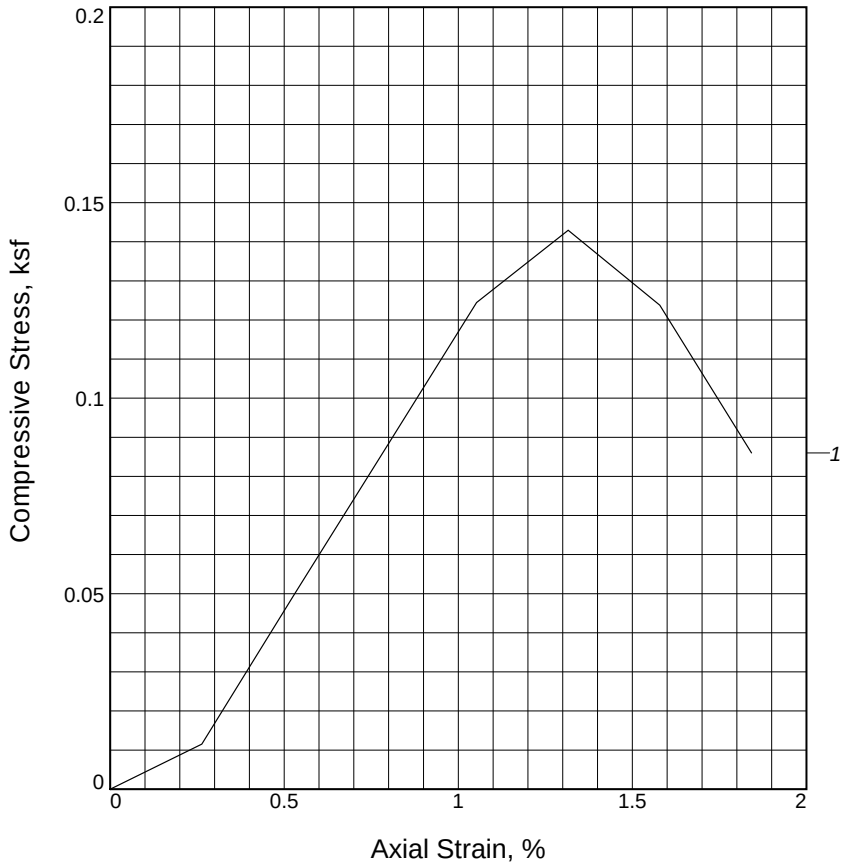
Missoula, MT

Remarks:

Figure 39

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	0.143			
Undrained shear strength, ksf	0.071			
Failure strain, %	1.3			
Strain rate, in./min.	0.030			
Water content, %	8.3			
Wet density, pcf	103.1			
Dry density, pcf	95.2			
Saturation, %	29.7			
Void ratio	0.7369			
Specimen diameter, in.	2.790			
Specimen height, in.	5.700			
Height/diameter ratio	2.04			

Description: bulk

LL = NV	**PL =** NV	**PI =** NV	**Assumed GS=** 2.65	**Type:** SP

Project No.: 1145710402022

Date Sampled:

Remarks:

Project: Pickles Butte

Source of Sample: B2021-3

Depth: 61-65 ft

Figure 40

UNCONFINED COMPRESSION TEST
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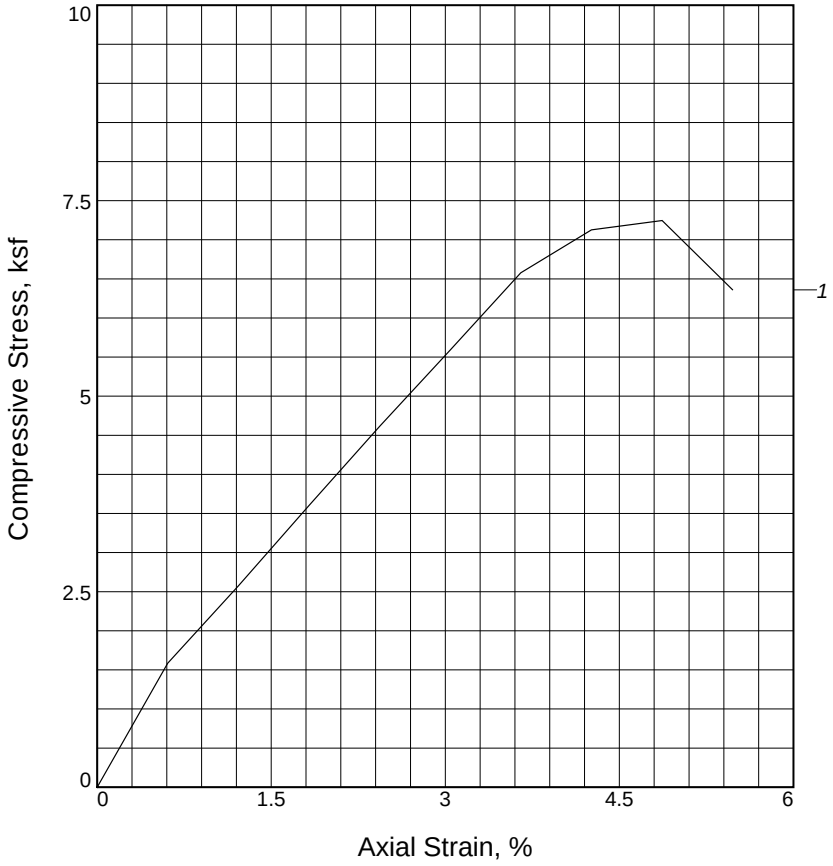
Missoula, MT

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	7.246			
Undrained shear strength, ksf	3.623			
Failure strain, %	4.9			
Strain rate, in./min.	0.060			
Water content, %	24.0			
Wet density, pcf	119.4			
Dry density, pcf	96.3			
Saturation, %	88.5			
Void ratio	0.7184			
Specimen diameter, in.	2.450			
Specimen height, in.	4.930			
Height/diameter ratio	2.01			

Description: Special

LL = N/A	**PL =** N/A	**PI =** N/A	**Assumed GS=** 2.65	**Type:** ML

Project No.: 1145710402022

Date Sampled:

Remarks:

Project: Pickles Butte

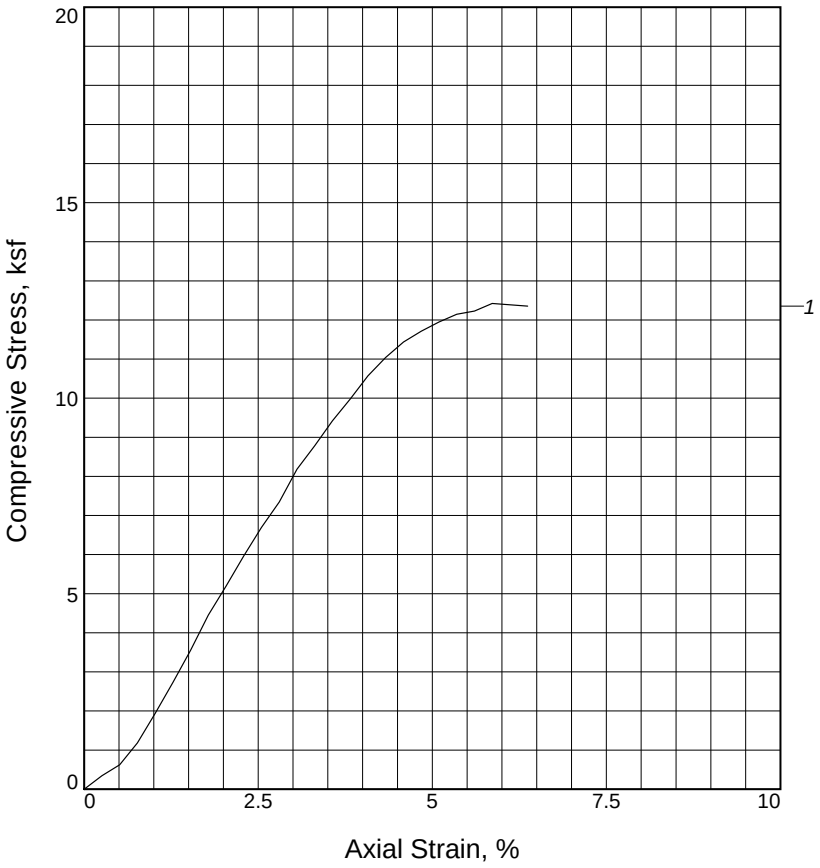
Source of Sample: B2021-6

Depth: 57-58 ft

UNCONFINED COMPRESSION TEST
Tetra Tech
Missoula, MT

Figure 41

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	12.421			
Undrained shear strength, ksf	6.211			
Failure strain, %	5.9			
Strain rate, in./min.	0.020			
Water content, %	24.6			
Wet density, pcf	124.9			
Dry density, pcf	100.2			
Saturation, %	100.3			
Void ratio	0.6508			
Specimen diameter, in.	1.918			
Specimen height, in.	3.925			
Height/diameter ratio	2.05			

Description: Special

LL = 67	**PL =** 19	**PI =** 48	**Assumed GS=** 2.65	**Type:** CH

Project No.: 1145710402022

Date Sampled:

Remarks:

Project: Pickles Butte

Source of Sample: B2021-6

Depth: 79-81 ft

Figure 42

UNCONFINED COMPRESSION TEST
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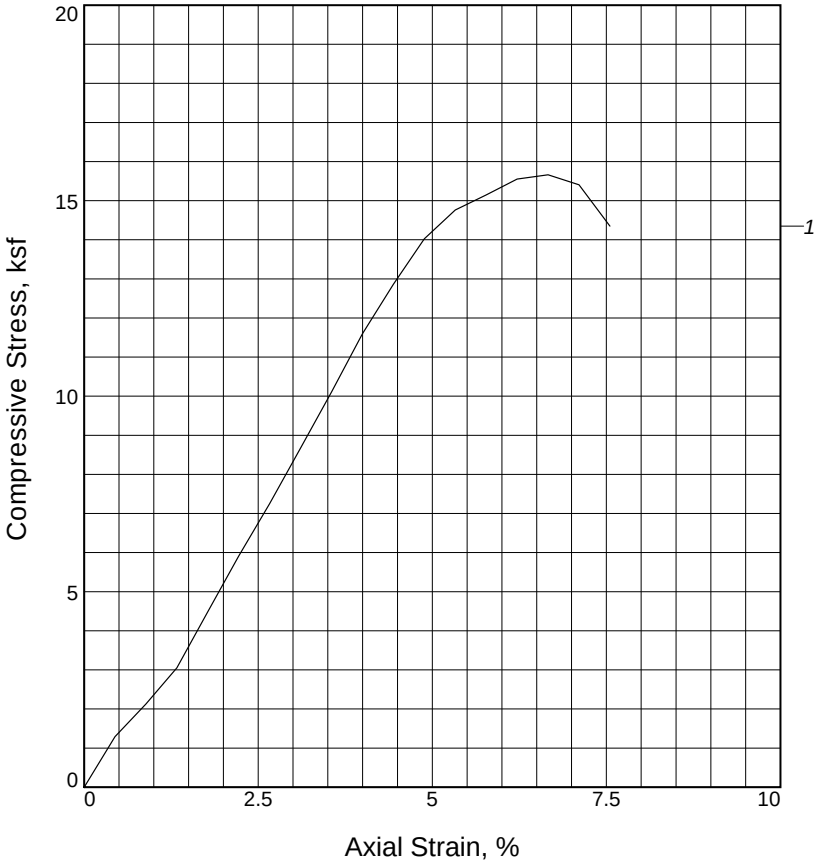
Missoula, MT

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	15.661			
Undrained shear strength, ksf	7.831			
Failure strain, %	6.7			
Strain rate, in./min.	0.050			
Water content, %	22.8			
Wet density, pcf	122.8			
Dry density, pcf	100.0			
Saturation, %	92.4			
Void ratio	0.6550			
Specimen diameter, in.	2.473			
Specimen height, in.	5.629			
Height/diameter ratio	2.28			

Description: Special

LL = 56	**PL =** 22	**PI =** 34	**Assumed GS=** 2.65	**Type:** CH

Project No.: 1145710402022

Date Sampled:

Remarks:

Project: Pickles Butte

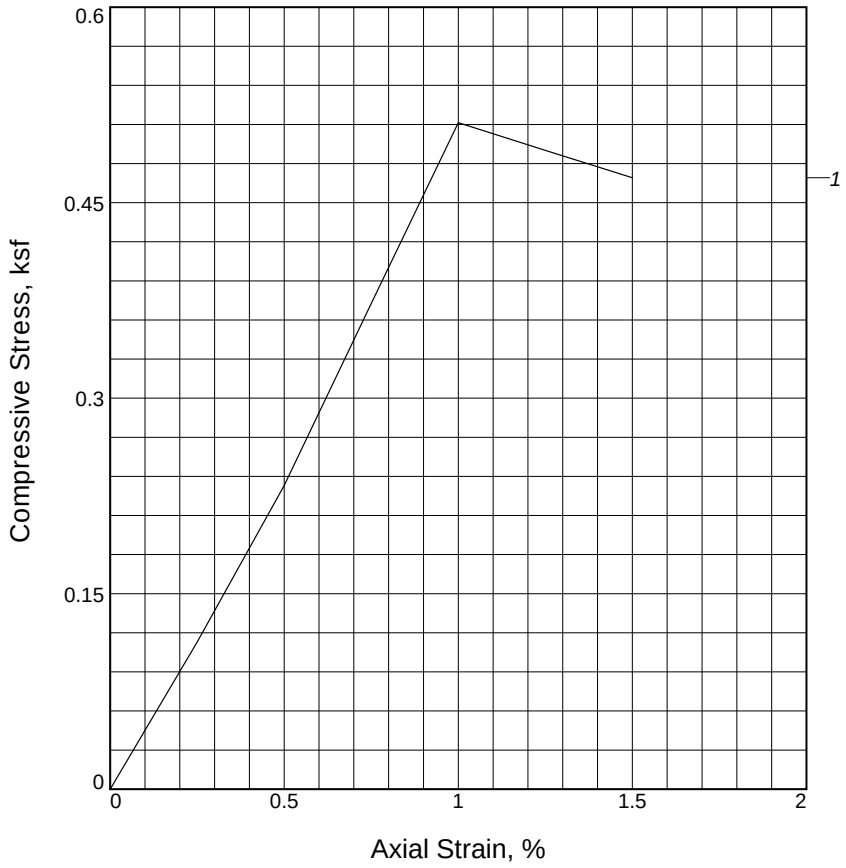
Source of Sample: B2021-6

Depth: 99-102 ft

Figure 43

UNCONFINED COMPRESSION TEST
Tetra Tech
Missoula, MT

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	0.511			
Undrained shear strength, ksf	0.256			
Failure strain, %	1.0			
Strain rate, in./min.	0.030			
Water content, %	4.5			
Wet density, pcf	109.9			
Dry density, pcf	105.2			
Saturation, %	20.8			
Void ratio	0.5722			
Specimen diameter, in.	2.710			
Specimen height, in.	6.000			
Height/diameter ratio	2.21			

Description: grab

LL = NV	**PL =** NV	**PI =** NV	**Assumed GS=** 2.65	**Type:** SP

Project No.: 1145710402022

Date Sampled:

Remarks:

Project: Pickles Butte

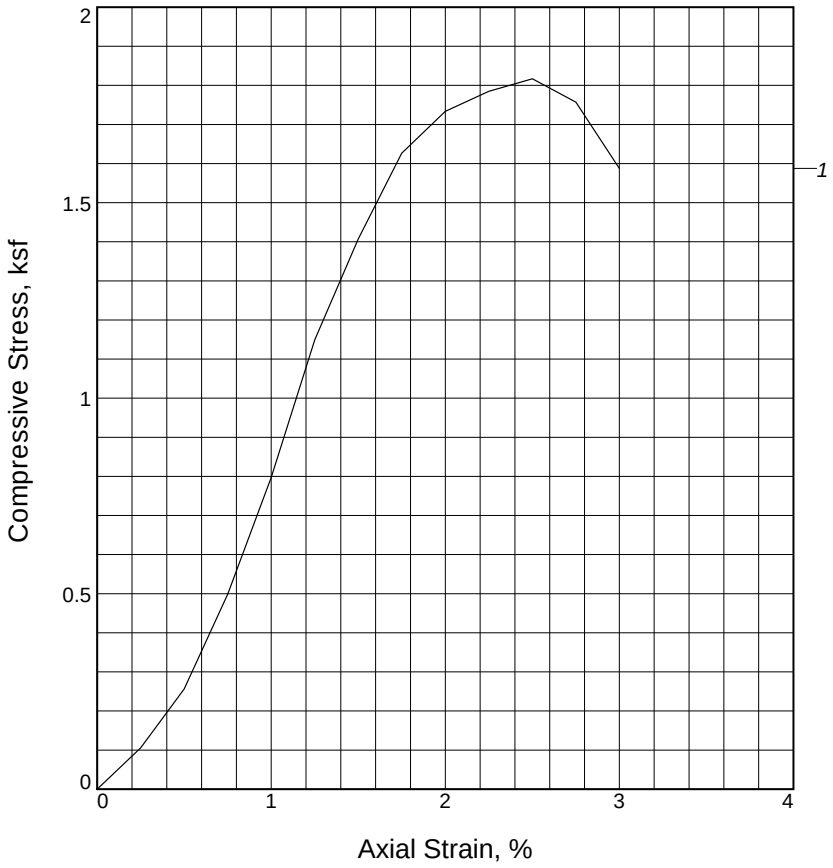
Source of Sample: B2021-7

Depth: 39-40 ft

Figure 44

UNCONFINED COMPRESSION TEST
Tetra Tech
Missoula, MT

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	1.817			
Undrained shear strength, ksf	0.908			
Failure strain, %	2.5			
Strain rate, in./min.	0.030			
Water content, %	19.9			
Wet density, pcf	112.4			
Dry density, pcf	93.8			
Saturation, %	68.9			
Void ratio	0.7646			
Specimen diameter, in.	2.800			
Specimen height, in.	6.000			
Height/diameter ratio	2.14			

Description: grab

LL = NV	**PL =** NV	**PI =** NV	**Assumed GS=** 2.65	**Type:** ML

Project No.: 1145710402022

Date Sampled:

Remarks:

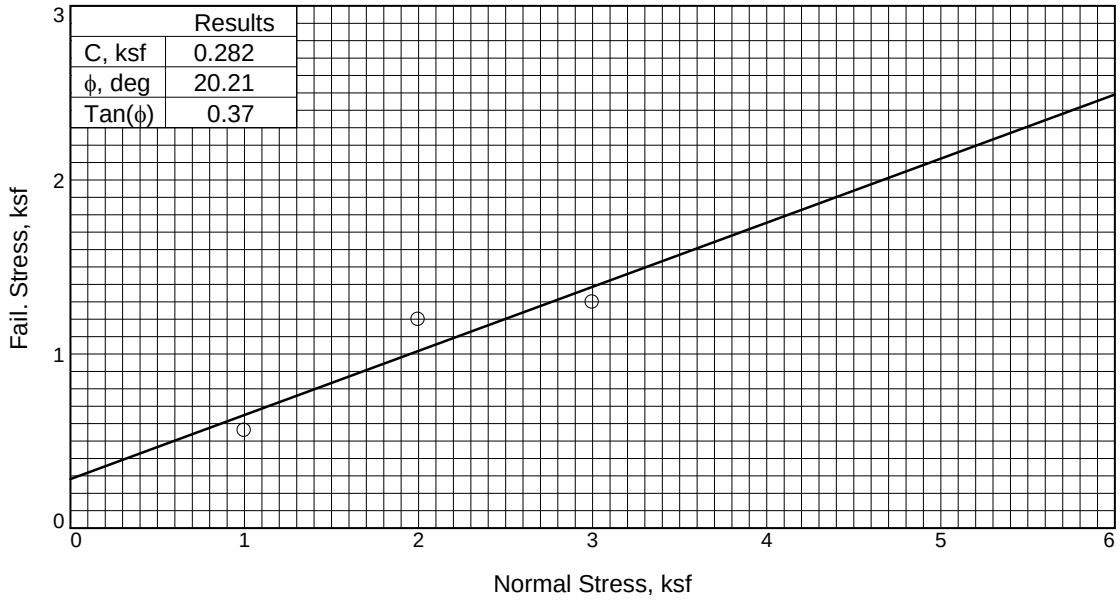
Project: Pickles Butte

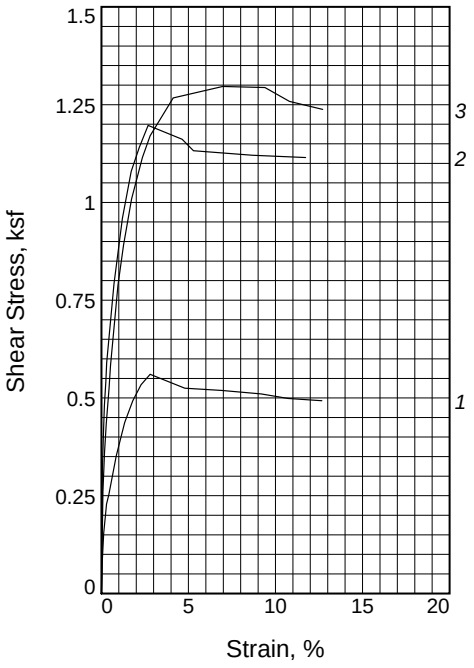
Source of Sample: B2021-7

Depth: 59-60 ft

Figure 45

UNCONFINED COMPRESSION TEST
Tetra Tech
Missoula, MT





Sample No.		1	2	3
Initial	Water Content, %	12.2	11.6	12.3
	Dry Density, pcf	104.5	106.4	101.5
	Saturation, %	55.7	55.5	51.6
	Void Ratio	0.5829	0.5554	0.6306
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.210	1.200	1.259
At Test	Water Content, %	16.4	17.4	18.2
	Dry Density, pcf	104.6	106.6	104.8
	Saturation, %	74.7	83.4	83.5
	Void Ratio	0.5816	0.5524	0.5787
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.209	1.198	1.219
Normal Stress, ksf		1.000	2.000	3.000
Fail. Stress, ksf		0.560	1.197	1.297
Strain, %		2.8	2.7	7.0
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: Shelby
Description: Silty Sand

Assumed Specific Gravity= 2.65
Remarks: Remolded

Project: Pickles Butte

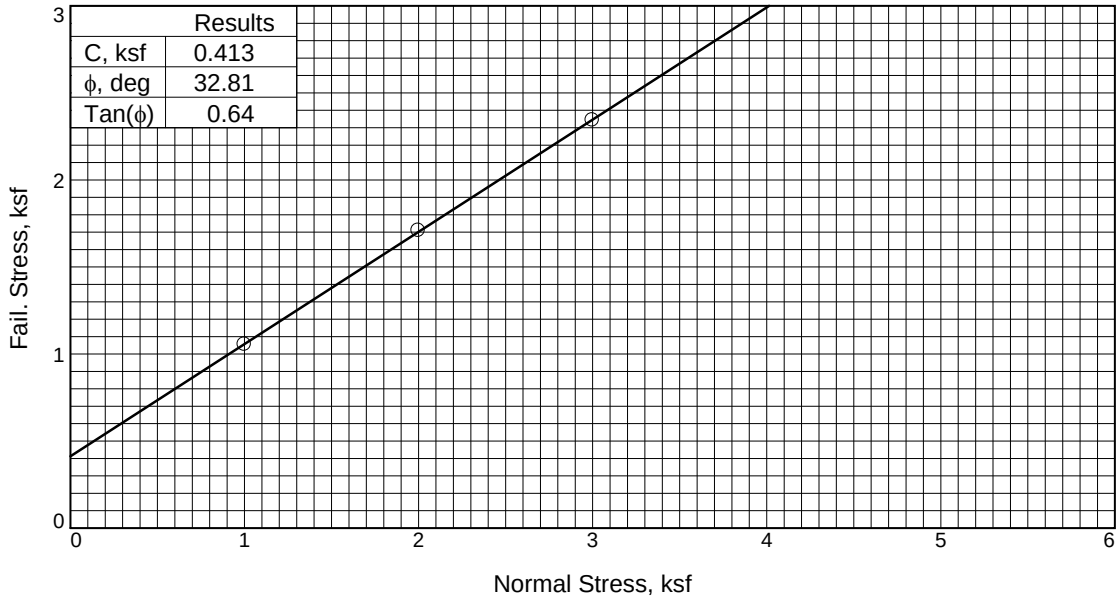
Source of Sample: B2021-3

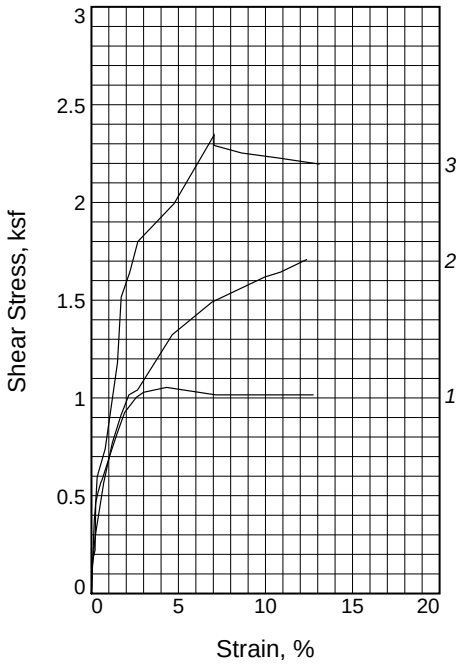
Proj. No.: 1145710402022 **Depth:** 60-62 ft

Date Sampled:

DIRECT SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 46





Sample No.		1	2	3
Initial	Water Content, %	13.7	12.8	13.0
	Dry Density, pcf	104.1	92.2	84.3
	Saturation, %	61.7	42.7	35.9
	Void Ratio	0.5892	0.7944	0.9626
	Diameter, in.	2.410	2.410	2.400
	Height, in.	0.934	1.068	1.240
At Test	Water Content, %	21.2	22.3	20.2
	Dry Density, pcf	105.2	96.7	84.8
	Saturation, %	98.1	83.1	56.4
	Void Ratio	0.5722	0.7104	0.9499
	Diameter, in.	2.410	2.410	2.400
	Height, in.	0.924	1.018	1.232
Normal Stress, ksf		1.000	2.000	3.000
Fail. Stress, ksf		1.054	1.708	2.343
Strain, %		4.3	12.4	7.0
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: Shelby
Description: Silty Sand

Assumed Specific Gravity= 2.65
Remarks: Remolded

Project: Pickles Butte

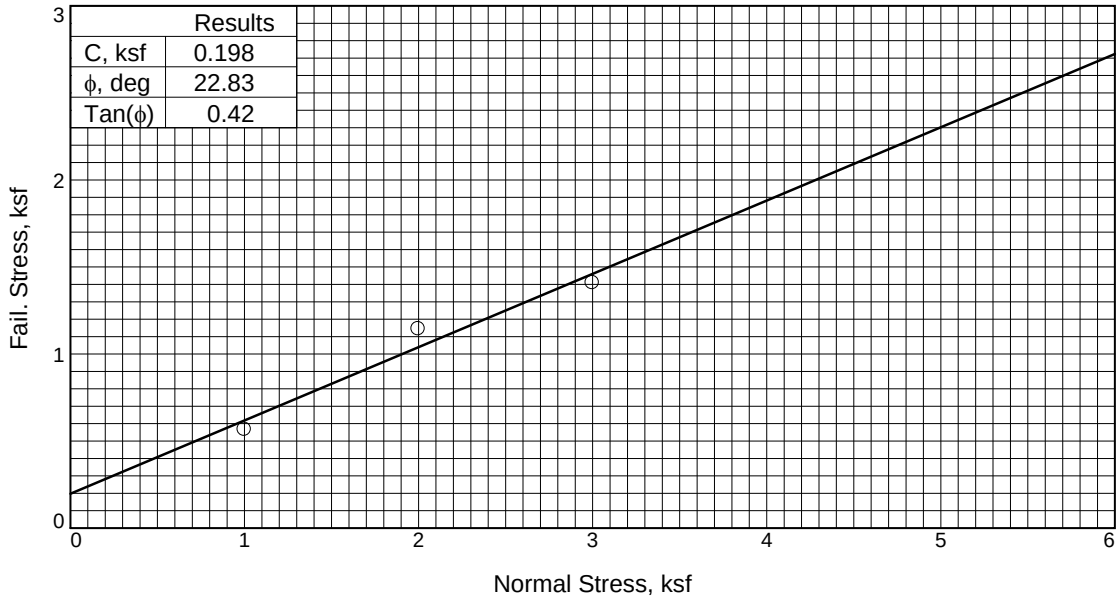
Source of Sample: B2021-3

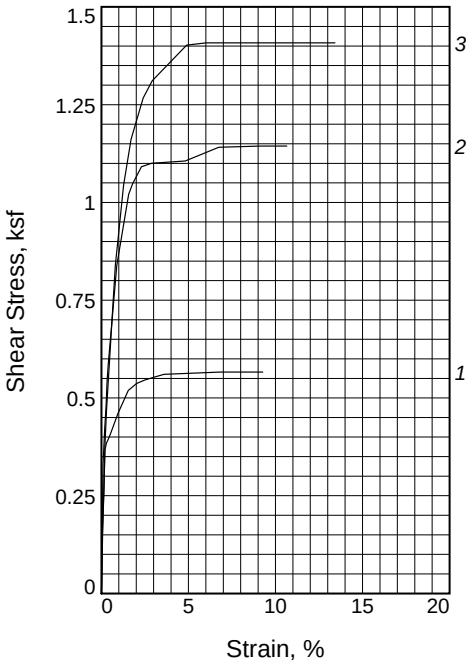
Proj. No.: 1145710402022 **Depth:** 80-82 ft

Date Sampled:

DIRECT SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 47





Sample No.		1	2	3
Initial	Water Content, %	15.0	15.0	15.0
	Dry Density, pcf	97.7	89.6	96.1
	Saturation, %	57.4	47.0	55.1
	Void Ratio	0.6932	0.8458	0.7217
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.210	1.310	1.210
At Test	Water Content, %	29.0	29.5	28.0
	Dry Density, pcf	97.8	89.9	96.3
	Saturation, %	111.2	93.0	103.2
	Void Ratio	0.6910	0.8400	0.7180
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.208	1.306	1.207
Normal Stress, ksf		1.000	2.000	3.000
Fail. Stress, ksf		0.566	1.144	1.408
Strain, %		6.8	9.2	6.0
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: MC
Description: Silty Sand

LL= NV **PI=** NP
Assumed Specific Gravity= 2.65
Remarks:

Project: Pickles Butte

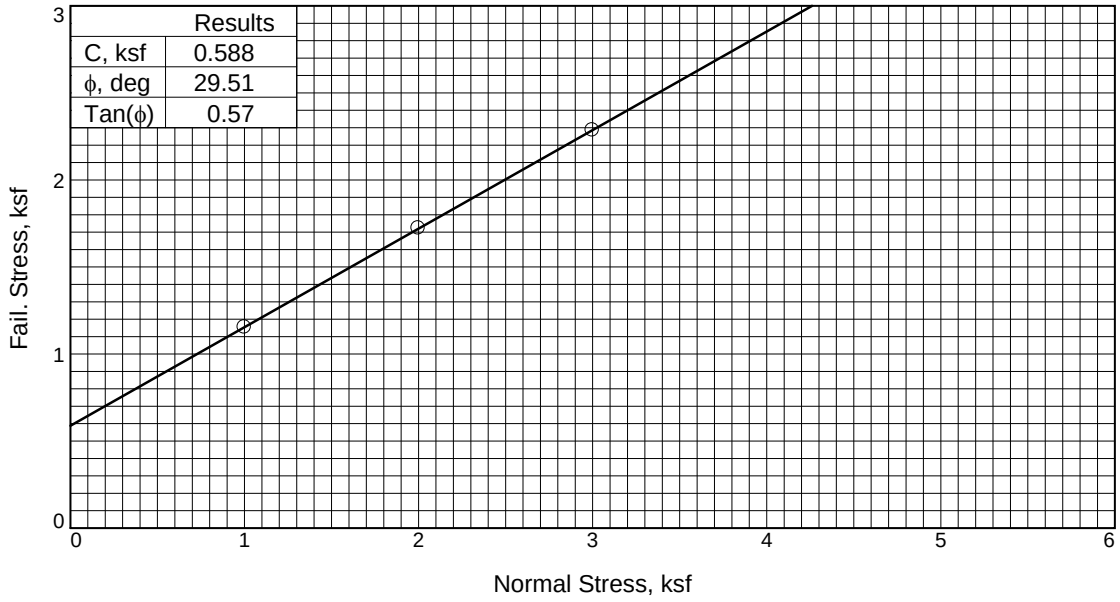
Source of Sample: B2021-4

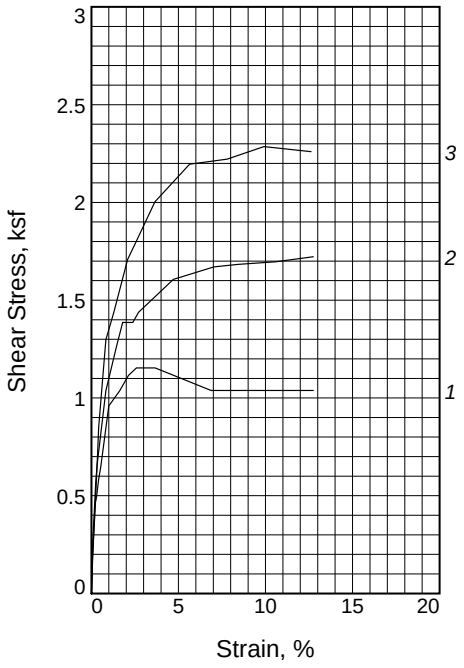
Proj. No.: 1145710402022 **Depth:** 90-91.5 ft

Date Sampled:

DIRECT SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 48





Sample No.		1	2	3
Initial	Water Content, %	6.9	6.2	6.2
	Dry Density, pcf	89.6	94.1	95.0
	Saturation, %	21.8	21.8	22.3
	Void Ratio	0.8457	0.7582	0.7415
	Diameter, in.	2.400	2.400	2.410
	Height, in.	1.150	1.138	1.122
At Test	Water Content, %	28.7	27.7	25.8
	Dry Density, pcf	90.0	96.2	100.9
	Saturation, %	90.8	101.9	107.0
	Void Ratio	0.8377	0.7195	0.6390
	Diameter, in.	2.400	2.400	2.410
	Height, in.	1.145	1.113	1.056
Normal Stress, ksf		1.000	2.000	3.000
Fail. Stress, ksf		1.153	1.723	2.285
Strain, %		2.6	12.8	9.9
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: MC
Description: Silty Sand

Assumed Specific Gravity= 2.65
Remarks: Remolded

Project: Pickles Butte

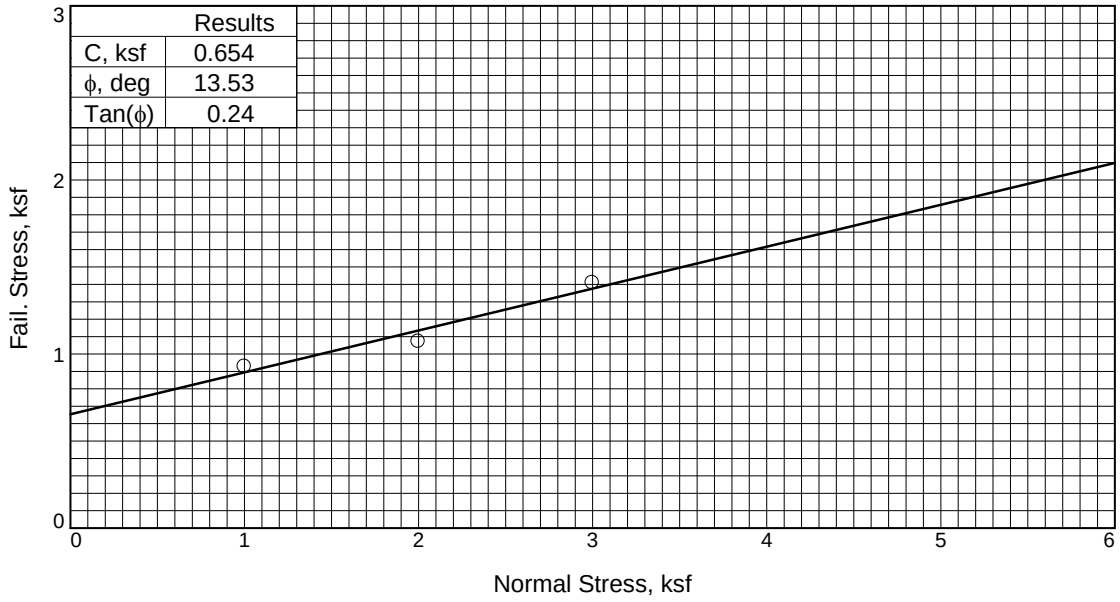
Source of Sample: B2021-4

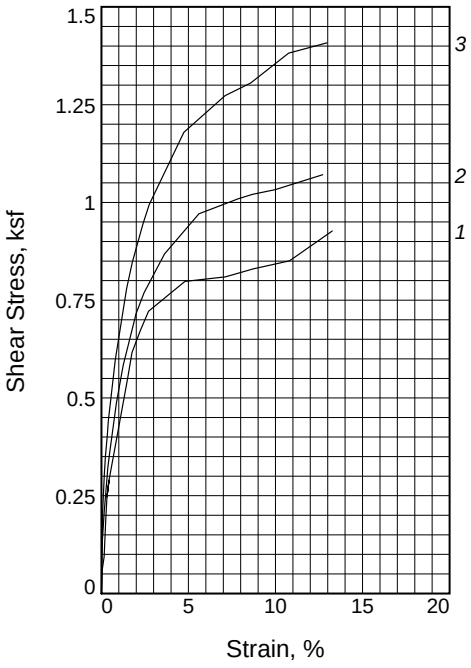
Proj. No.: 1145710402022 **Depth:** 120-120.9 ft

Date Sampled:

DIRECT SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 49





Sample No.		1	2	3
Initial	Water Content, %	11.3	11.3	11.2
	Dry Density, pcf	99.2	98.3	98.8
	Saturation, %	44.6	43.7	43.8
	Void Ratio	0.6682	0.6829	0.6750
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.200	1.190	1.206
At Test	Water Content, %	27.5	25.7	27.1
	Dry Density, pcf	101.9	102.9	102.0
	Saturation, %	117.0	112.1	115.6
	Void Ratio	0.6233	0.6075	0.6217
	Diameter, in.	2.500	2.500	2.500
	Height, in.	1.168	1.137	1.168
Normal Stress, ksf		1.000	2.000	3.000
Fail. Stress, ksf		0.927	1.071	1.408
Strain, %		13.3	12.7	13.0
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: MC
Description: Lean Clay With Sand

Assumed Specific Gravity= 2.65
Remarks: Remolded

Project: Pickles Butte

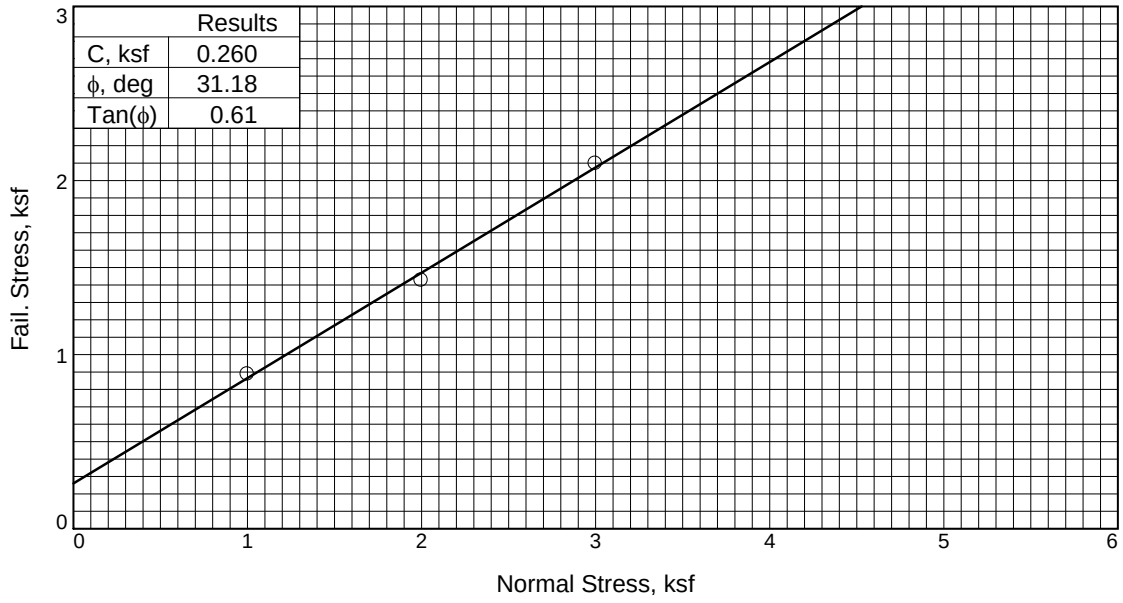
Source of Sample: B2021-5

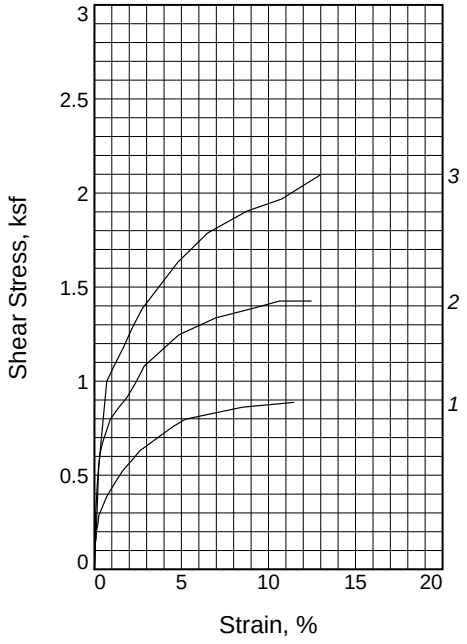
Proj. No.: 1145710402022 **Depth:** 80.0-81.5 ft

Date Sampled:

DIRECT SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 50





Sample No.		1	2	3
Initial	Water Content, %	18.0	18.2	18.3
	Dry Density, pcf	80.6	84.6	78.3
	Saturation, %	45.3	50.4	43.7
	Void Ratio	1.0522	0.9546	1.1118
	Diameter, in.	2.410	2.410	2.400
	Height, in.	1.240	1.190	1.250
At Test	Water Content, %	25.0	24.1	24.1
	Dry Density, pcf	82.7	87.5	82.3
	Saturation, %	66.2	71.7	63.1
	Void Ratio	1.0009	0.8905	1.0104
	Diameter, in.	2.410	2.410	2.400
	Height, in.	1.209	1.151	1.190
Normal Stress, ksf		1.000	2.000	3.000
Fail. Stress, ksf		0.887	1.426	2.098
Strain, %		11.5	10.6	13.0
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.001	0.001	0.001

Sample Type: MC
Description: Silty Sand

Assumed Specific Gravity= 2.65
Remarks: Remolded

Project: Pickles Butte

Source of Sample: B2021-5

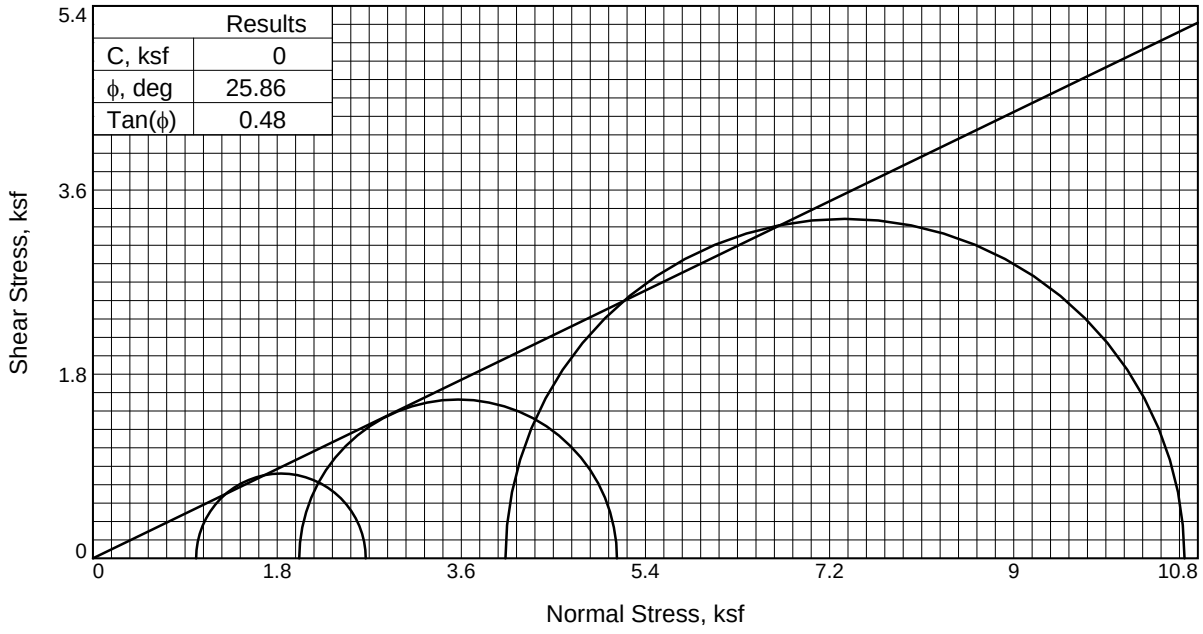
Proj. No.: 1145710402022 **Depth:** 90-91.5 ft

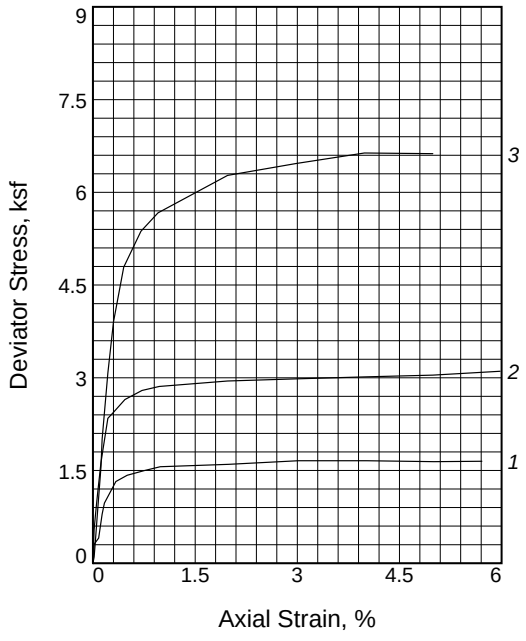
Date Sampled:

DIRECT SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 51

Tested By: DB **Checked By:** LP





Sample No.		1	2	3
Initial	Water Content, %	5.0	5.0	5.0
	Dry Density, pcf	100.9	100.9	100.9
	Saturation, %	20.7	20.7	20.7
	Void Ratio	0.6394	0.6394	0.6394
	Diameter, in.	2.803	2.803	2.803
	Height, in.	6.001	6.001	6.001
At Test	Water Content, %	22.7	21.8	20.9
	Dry Density, pcf	101.4	102.9	104.6
	Saturation, %	95.4	95.2	95.0
	Void Ratio	0.6312	0.6074	0.5820
	Diameter, in.	2.803	2.869	2.945
	Height, in.	5.972	5.616	5.247
Strain rate, in./min.		0.001	0.001	0.001
Back Pressure, psi		85.000	85.000	85.000
Cell Pressure, psi		92.000	99.000	113.000
Fail. Stress, ksf		1.66	3.11	6.64
Ult. Stress, ksf				
σ_1 Failure, ksf		2.67	5.12	10.67
σ_3 Failure, ksf		1.01	2.02	4.03

Type of Test:
Consolidated Undrained

Description: Silty Sand

Assumed Specific Gravity=
2.65 **Remarks:**

Project: Pickles Butte

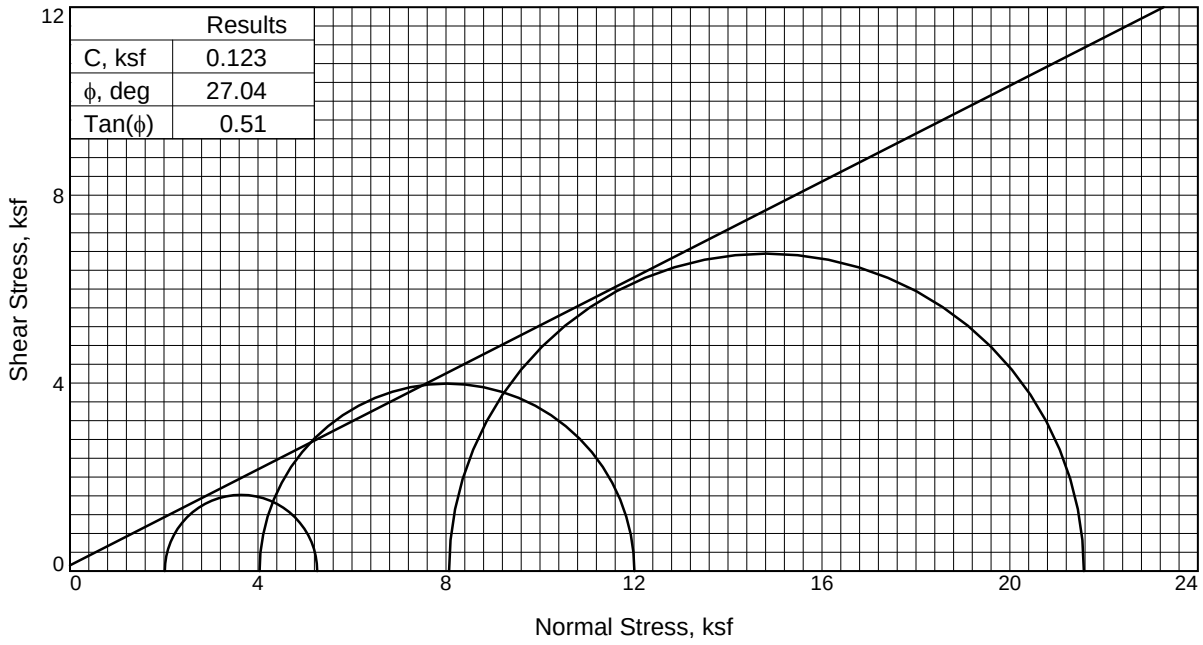
Source of Sample: B2021-3

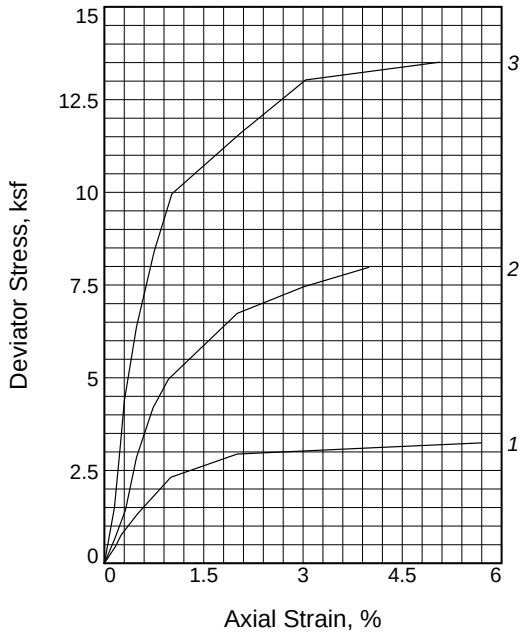
Proj. No.: 1145710402022 **Depth:** 25-27 ft

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 52





Sample No.		1	2	3
Initial	Water Content, %	5.0	5.0	5.0
	Dry Density, pcf	100.4	100.4	100.4
	Saturation, %	20.5	20.5	20.5
	Void Ratio	0.6481	0.6481	0.6481
	Diameter, in.	2.801	2.801	2.801
	Height, in.	6.001	6.001	6.001
At Test	Water Content, %	23.2	22.3	20.9
	Dry Density, pcf	100.7	102.2	104.5
	Saturation, %	95.5	95.3	95.0
	Void Ratio	0.6431	0.6195	0.5836
	Diameter, in.	2.800	2.865	2.895
	Height, in.	5.986	5.638	5.397
Strain rate, in./min.		0.001	0.001	0.001
Back Pressure, psi		103.000	103.000	103.000
Cell Pressure, psi		117.000	131.000	159.000
Fail. Stress, ksf		3.24	7.98	13.51
Ult. Stress, ksf				
σ_1 Failure, ksf		5.26	12.01	21.57
σ_3 Failure, ksf		2.02	4.03	8.06

Type of Test:
Consolidated Undrained

Description: Poorly Graded Sand with Silt

Assumed Specific Gravity= 2.65

Remarks:

Project: Pickles Butte

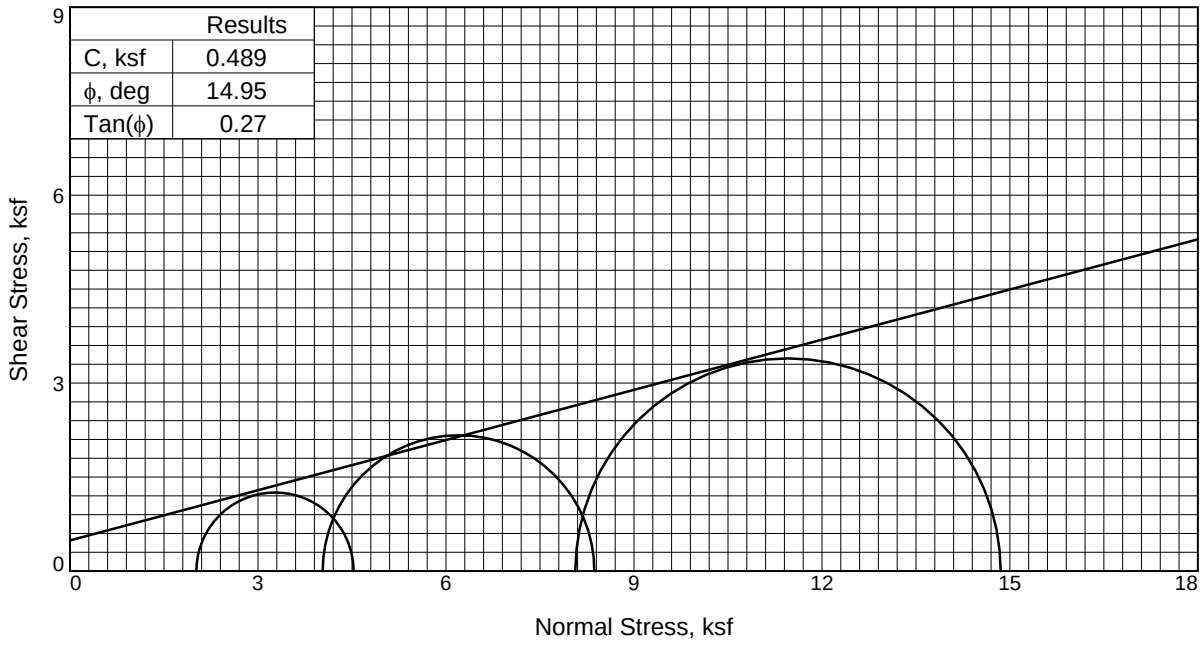
Source of Sample: B2021-4

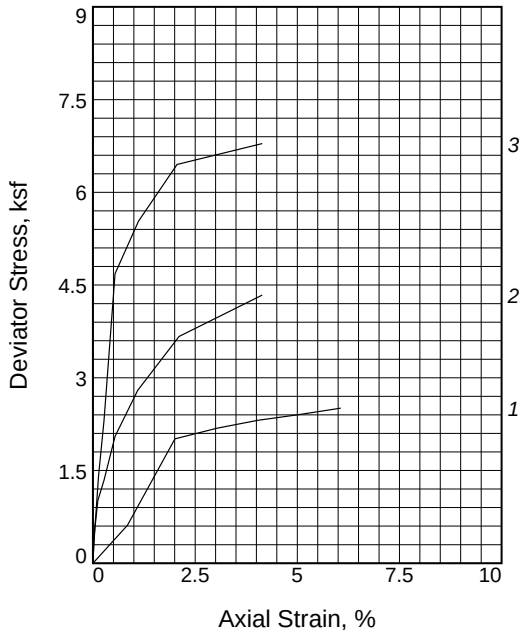
Proj. No.: 1145710402022 **Depth:** 50-51.5 ft

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 53





Sample No.		1	2	3
Initial	Water Content, %	23.0	23.0	23.0
	Dry Density, pcf	90.1	90.1	90.1
	Saturation, %	73.0	73.0	73.0
	Void Ratio	0.8354	0.8354	0.8354
	Diameter, in.	2.800	2.800	2.800
	Height, in.	6.030	6.030	6.030
At Test	Water Content, %	27.4	23.7	21.3
	Dry Density, pcf	95.2	100.9	104.9
	Saturation, %	98.4	98.2	98.0
	Void Ratio	0.7372	0.6404	0.5770
	Diameter, in.	2.747	2.776	2.793
	Height, in.	5.930	5.481	5.206
Strain rate, in./min.		0.001	0.001	0.001
Back Pressure, psi		63.000	63.000	63.000
Cell Pressure, psi		77.000	91.000	119.000
Fail. Stress, ksf		2.51	4.34	6.79
Ult. Stress, ksf				
σ_1 Failure, ksf		4.52	8.37	14.85
σ_3 Failure, ksf		2.02	4.03	8.06

Type of Test:
Consolidated Undrained

Description: Silty Clay

Assumed Specific Gravity= 2.65

Remarks:

Project: Pickles Butte

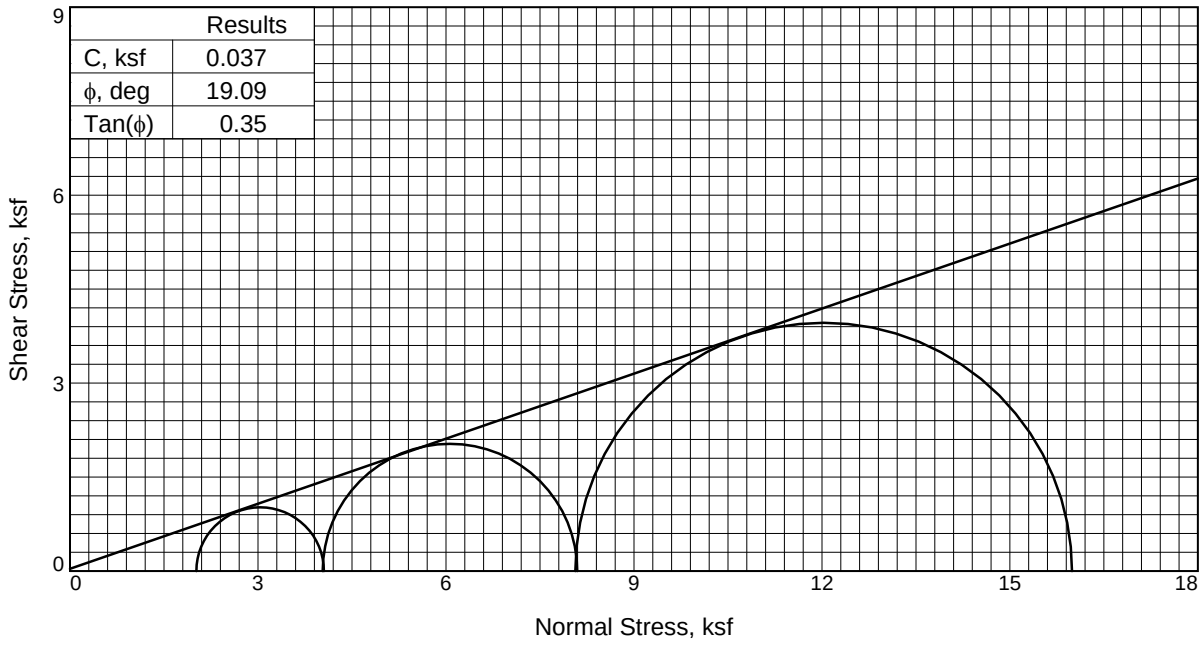
Source of Sample: B2021-5

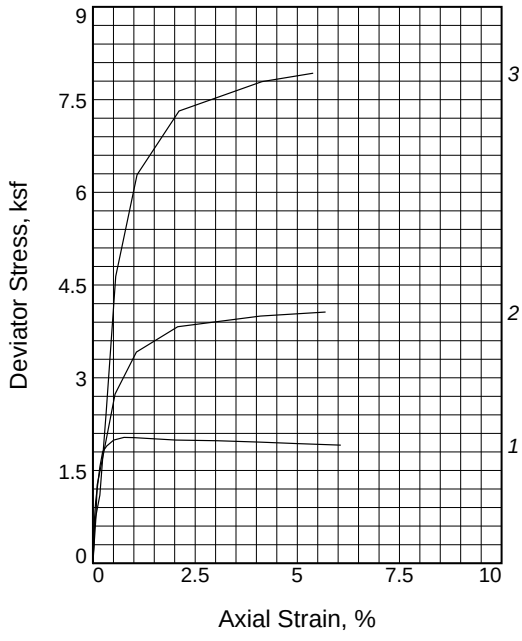
Proj. No.: 1145710402022 **Depth:** 50-51.5 ft

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 54





Sample No.		1	2	3
Initial	Water Content, %	16.2	16.2	16.2
	Dry Density, pcf	101.9	101.9	101.9
	Saturation, %	69.1	69.1	69.1
	Void Ratio	0.6231	0.6231	0.6231
	Diameter, in.	2.790	2.790	2.790
	Height, in.	6.000	6.000	6.000
At Test	Water Content, %	22.2	21.2	19.2
	Dry Density, pcf	102.4	104.1	107.8
	Saturation, %	95.7	95.5	95.0
	Void Ratio	0.6160	0.5892	0.5344
	Diameter, in.	2.800	2.873	2.924
	Height, in.	5.930	5.541	5.164
Strain rate, in./min.		0.001	0.001	0.001
Back Pressure, psi		53.000	53.000	53.000
Cell Pressure, psi		67.000	81.000	109.000
Fail. Stress, ksf		2.03	4.06	7.93
Ult. Stress, ksf				
σ_1 Failure, ksf		4.05	8.09	15.99
σ_3 Failure, ksf		2.02	4.03	8.06

Type of Test:
Consolidated Undrained

Description: Silt

Assumed Specific Gravity= 2.65

Remarks:

Project: Pickles Butte

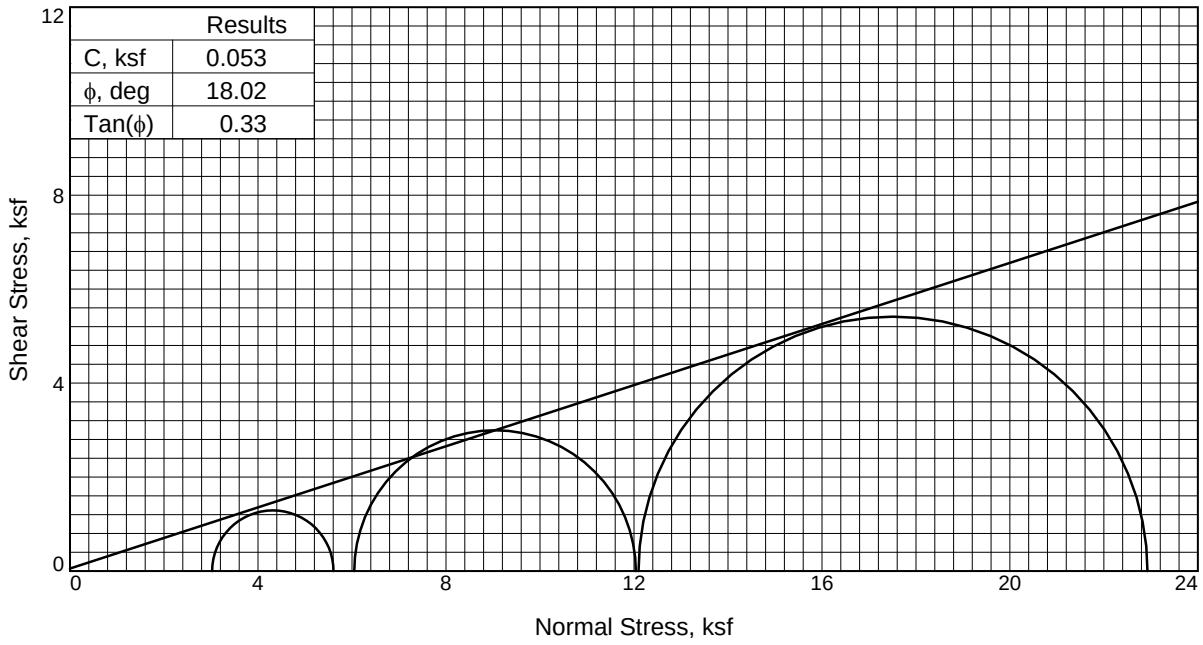
Source of Sample: B2021-5

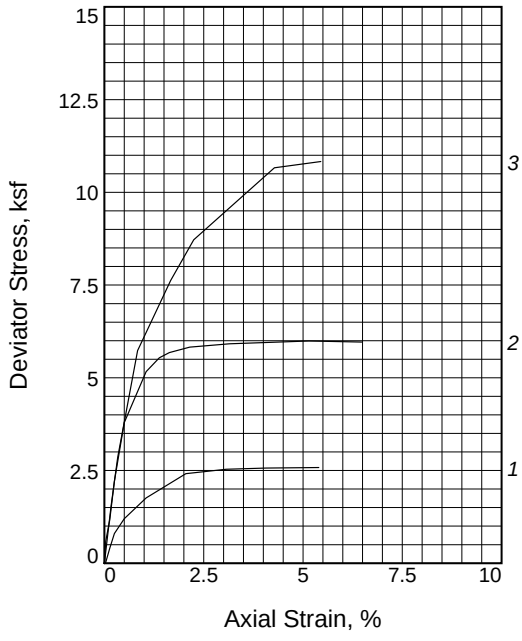
Proj. No.: 1145710402022 **Depth:** 69-70 ft

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 55





Sample No.		1	2	3
Initial	Water Content, %	18.1	18.1	18.1
	Dry Density, pcf	85.7	85.7	85.7
	Saturation, %	51.4	51.4	51.4
	Void Ratio	0.9314	0.9314	0.9314
	Diameter, in.	2.801	2.801	2.801
	Height, in.	6.020	6.020	6.020
At Test	Water Content, %	24.5	24.5	24.5
	Dry Density, pcf	98.3	98.3	98.3
	Saturation, %	95.0	95.0	95.0
	Void Ratio	0.6826	0.6826	0.6826
	Diameter, in.	2.618	2.694	2.795
	Height, in.	6.004	5.670	5.268
Strain rate, in./min.		0.001	0.001	0.001
Back Pressure, psi		65.000	65.000	65.000
Cell Pressure, psi		86.000	107.000	149.000
Fail. Stress, ksf		2.58	5.99	10.83
Ult. Stress, ksf				
σ_1 Failure, ksf		5.61	12.04	22.93
σ_3 Failure, ksf		3.02	6.05	12.10

Type of Test:
Consolidated Undrained

Description: Clay

Assumed Specific Gravity= 2.65

Remarks:

Project: Pickles Butte

Source of Sample: B2021-7

Proj. No.: 1145710402022 **Depth:** 120-121.3 ft

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
Tetra Tech
Missoula, MT

Figure 56

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	0 - 1.5																				
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	2 - 3.5										9										
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	-		NV	NP		99.6	83.1	11.6	110	109.9		10.5									
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	4 - 5.5																				
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	6 - 7.5										8										
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	8 - 9.5																				
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	10 - 11.5										6										
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	15 - 16.5										5										
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	20 - 21.5																				
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	25 - 27		NV	NP		99.9	94.7	6.2	113								0.03				
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	27 - 28.5																				
B2021-1	11/15/2021	43.502927	-116.624204	2740.3976	30 - 31.5																				
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	0 - 1.5										7										
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	2 - 3.5																				
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	4 - 5.5										3										
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	6 - 7.5																				
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	8 - 9.5										3										
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	10 - 11.5																				
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	15 - 16.5										5										
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	20 - 21										3										
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	25 - 26.5																				
B2021-2	11/16/2021	43.501658	-116.713829	2739.0394	30 - 31.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	5 - 6.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	10 - 11.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	15 - 16.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	20 - 21.5										3										
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	25 - 27		NV	NP		99.8	97.7	31.3					25.86	0			0.04				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	26 - 30																				

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	27 - 28.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	30 - 31.5										3										
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	35 - 36.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	40 - 41.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	45 - 46.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	50 - 51.5										3										
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	60 - 62		NV	NP		99.4	97.9	19.2					20.21	0.282							
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	61 - 65		NV	NP		99.6	99.1	7.7	100	100.2		13.7			0.143						
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	70 - 71.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	80 - 82		NV	NP		99.8	99.1	23.6					32.81	0.413							
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	82 - 83.5										2										
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	90 - 91.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	100 - 100.2																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	101 - 107																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	110 - 110.7																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	112 - 115																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	116 - 120		NV	NP		86.4	81.7	16.1	104	103.6		15.75									
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	121 - 121.8										4										
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	135 - 138																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	139 - 142																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	140 - 141.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	147 - 151																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	150 - 151.5																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	159 - 161																				
B2021-3	11/22/2021	43.500874	-116.716768	2737.6687	160 - 161.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	5 - 6.5										6										
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	9 - 10																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	10 - 11.5																				

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	15 - 16.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	20 - 21.5										5										
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	25 - 26.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	30 - 31.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	35 - 36.5										8										
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	40 - 41.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	44 - 45																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	45 - 46.5										16										
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	50 - 51.5		NV	NP		100	91.9	6.3					27.04	0.123							
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	51 - 52																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	60 - 61.5										2										
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	69 - 70																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	70 - 71.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	79 - 80																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	80 - 81.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	89 - 90																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	90 - 91.5		NV	NP		99	96	38.4					22.83	0.198							
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	98 - 99																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	99 - 100.5										22										
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	109 - 110																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	110 - 111.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	119 - 120																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	120 - 120.9		NV	NP		100	98.1	49					29.51	0.588							
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	129 - 130																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	130 - 131.5																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	139 - 140																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	140 - 141.5										2										
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	149 - 150																				

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	150 - 150.9																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	157 - 159																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	160 - 160.9																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	169 - 170																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	170 - 170.8																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	175 - 177																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	179 - 180																				
B2021-4	12/14/2021	43.665364	-116.688388	2797.1687	189 - 190																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	5 - 6.5										4										
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	9 - 10																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	10 - 11.5																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	15 - 16.5										3										
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	19 - 20																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	20 - 21.5																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	27 - 28																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	30 - 31.5																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	35 - 36.5										4										
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	39 - 40																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	40 - 41																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	45 - 46.5																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	49 - 50																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	50 - 51.5		54	30									14.95	0.489			0.06				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	59 - 60																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	60 - 60.6										4										
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	69 - 70		NV	NP		99.9	99.3	77.1	112	111.5		15.5	19.09	0.037							
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	70 - 71.5										29										
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	79 - 80																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	80 - 81.5		35	14	0.000	98.5	95.9	83.4	104	103.5	21	19.5	31.18	0.26							

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	89 - 90																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	90 - 90.8		NV	NP			98.8	33.8					13.53	0.654							
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	99 - 100										11										
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	100 - 101.3																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	109 - 110																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	110 - 110.6																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	119 - 120																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	120 - 121.5																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	126 - 127																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	130 - 131.4																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	139 - 140																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	140 - 140.9																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	149 - 150																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	150 - 151.4																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	159 - 160																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	160 - 160.6																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	169 - 170																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	170 - 171.5																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	174 - 175																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	179 - 180																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	189 - 190																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	199 - 200																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	204 - 205																				
B2021-5	12/19/2021	43.499133	-116.713491	2661.6331	209 - 210																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	5 - 6.5																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	9 - 11																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	10 - 11.5										6										
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	20 - 21.5																				

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	25 - 26.5										18										
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	39 - 41																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	40 - 41.5										22										
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	45 - 46.5																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	50 - 51.5																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	57 - 58														7.246						
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	59 - 61																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	60 - 61.5										25										
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	68 - 69																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	69 - 71																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	70 - 71.5																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	75 - 76																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	79 - 81		67	48			99.8	90.7													
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	80 - 81.1																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	84 - 85																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	89 - 91																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	90 - 91.5																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	99 - 102		56	34			99.8	89.7							15.661						
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	100 - 101.5																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	106 - 107		47	25		99.2	97.6	80.8	100	100		20.5									
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	110 - 111.5										21										
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	120 - 121.5										22										
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	129 - 130																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	130 - 131.3																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	140 - 141.5																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	149 - 150																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	150 - 151.4																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	159 - 160																				

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	160 - 161.3																				
B2021-6	12/2/2021	43.495196	-116.715718	2636.7423	164 - 165																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	5 - 6.5										4										
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	10 - 11.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	15 - 16.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	19 - 20																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	25 - 26.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	30 - 30.6																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	35 - 35.8																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	39 - 40		NV	NP		93.6	92	23.3	112	111.7		12.9			0.511						
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	40 - 41.4										23										
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	45 - 46.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	49 - 50																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	50 - 51.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	59 - 60		NV	NP		99.9	98.9	84.3	104	104.2		17.8			1.817						
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	60 - 61.4										12										
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	69 - 70																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	70 - 71.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	79 - 80																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	80 - 80.7																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	89 - 90																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	90 - 90.3																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	99 - 100																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	100 - 101.5										20										
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	110 - 111.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	120 - 121.3		33	10									18.02	0.053			0.38				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	125 - 126																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	129 - 130																				

TETRA TECH

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER 114-571040-2022 **PROJECT NAME** Pickles Butte Sanitary Landfill - Canyon County, ID

Boring Number	Date Drilled	Latitude	Longitude	Elevation (feet)	Depth (feet)	Soil Class (USCS)	LL (%)	PI (%)	Liquidity Index	10 Mesh (%)	40 Mesh (%)	200 Mesh (%)	In-Place Density (pcf)	Maximum Dry Density (pcf)	Percent Natural Moisture	Percent Optimum Moisture	Friction Angle (degrees)	Cohesion (ksf)	Unconfined Compressive Strength (ksf)	Splitting Tensile Strength (psi)	Cc	pH	Resistivity (ohm-cm)	Sulfate Content (%)	California Bearing Ratio
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	130 - 131.5										19										
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	139 - 140																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	140 - 141.5										24										
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	149 - 150																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	150 - 151.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	160 - 161.4																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	169 - 170																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	170 - 171.5																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	179 - 180																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	189 - 190																				
B2021-7	12/7/2021	43.495280	-116.712592	2659.5036	199 - 200																				
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	0 - 1.5										11										
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	1 - 4		NV	NP		98.7	95.6	83.5	97	97.2		17.9									
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	2 - 3.5																				
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	4 - 5.5										11										
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	8 - 10										12										
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	10 - 11.5										6										
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	11 - 15																				
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	15 - 16.5										5										
B2021-8	11/15/2021	43.489880	-116.703147	2956.6206	20 - 21.5										5										

APPENDIX D: Static Slope Stability Analyses

Slope Stability Cross Sections - Figures 1D thorough 5D
Slope Stability Stability Analyses Printouts Figures 6D through 43D

LEGEND

- PROPOSED CUT MAJOR CONTOUR
- PROPOSED CUT MINOR CONTOUR
- PROPOSED BORROW MAJOR CONTOUR
- PROPOSED BORROW MINOR CONTOUR
- PROPOSED FILL MAJOR CONTOUR
- PROPOSED FILL MINOR CONTOUR
- ●B2021-# 2021 GEOTECHNICAL BORING

NOTES:

1. EXCAVATION SURFACES ARE FROM PREVIOUS PRELIMINARY DESIGN.
2. CONTOURS SHOWN DO NOT REFLECT GEOTECHNICAL REPORT RECOMMENDATIONS.
3. SLOPE LABELS DO REFLECT GEOTECHNICAL REPORT RECOMMENDATIONS.

PH-8-3 18.9 ACRES
PH-7-3 15.9 ACRES
PH-6-3 17.9 ACRES
PH-8-2 21.3 ACRES
PH-7-2 17.3 ACRES
PH-6-2 20.0 ACRES
PH-8-1 20.6 ACRES
PH-7-1 20.1 ACRES
PH-6-1 16.1 ACRES
PH-5-3 17.1 ACRES
PH-5-1 24.2 ACRES
PH-5-2 22.0 ACRES
PH-3-2 25.5 ACRES
PH-3-1 7.5 ACRES
PH-2-1 11.3 ACRES
PH-1-2 41.2 ACRES
PH-1-1 33.2 ACRES

Stuart Well
B2021-1
B2021-2
B2021-3
B2021-4
B2021-5
B2021-6
B2021-7
PB-1 (ABND)
PB-2 (ABND)
PB-3 (ABND)
PB-4
PB-5
PB-6
PB-7
PB-9
PB-10
PB-11
PB-12
PB-13
PB-16
GT(98)-1
GT(98)-2
GT(98)-3
GT(98)-4
GT(98)-5
Water Supply Well

B F-2D · G F-5D · C F-3D · F F-4D · D F-3D · E F-4D · A F-2D

0 125 250 500

Bar Measures 1 inch

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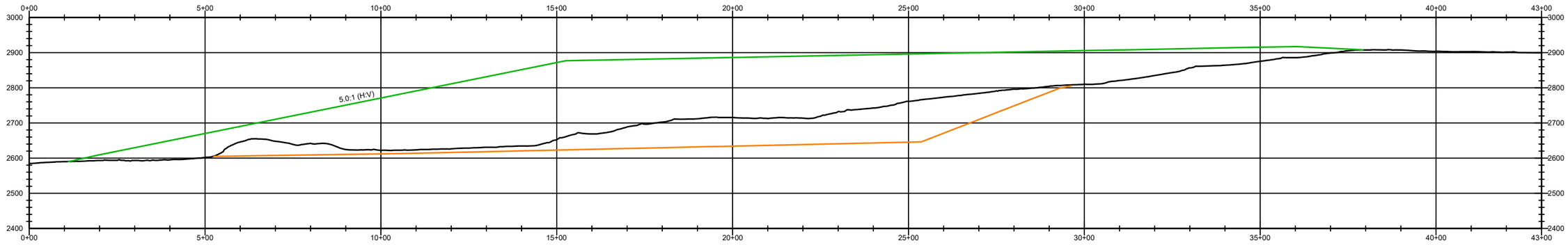
PICKLES BUTTE LANDFILL, CANYON COUNTY, IDAHO

2022 EXPANSION
GEOTECHNICAL INVESTIGATION

SITE PLAN

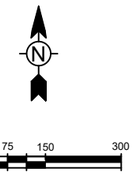
Project No.: 114-571040-2022
Date: 7/29/2022
Designed By: SG

Figure
1D



A F-1D SECTION A
SCALE: 1" = 300'

B F-1D SECTION B
SCALE: 1" = 300'



LEGEND
- EXISTING GROUND
- PROPOSED CUT
- PROPOSED BORROW
- PROPOSED FILL

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PICKLES BUTTE LANDFILL, CANYON COUNTY, IDAHO

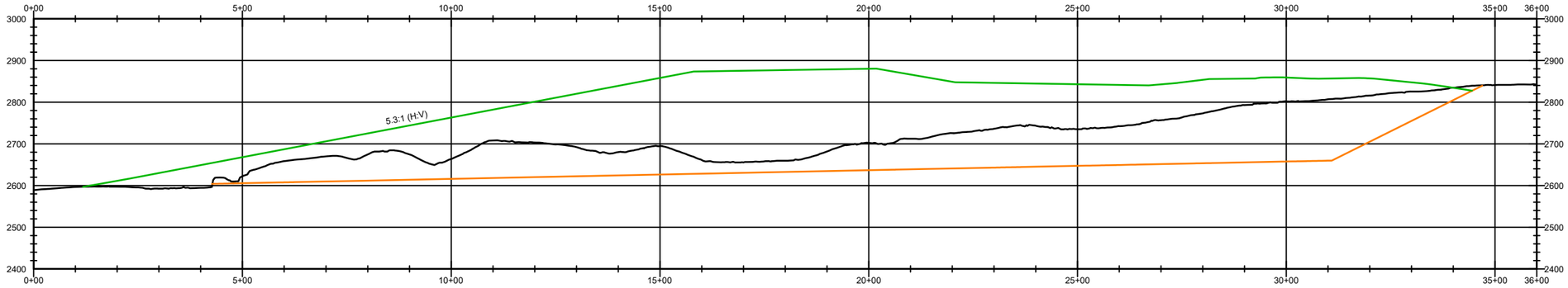
2022 EXPANSION
GEOTECHNICAL INVESTIGATION

PROFILES A & B

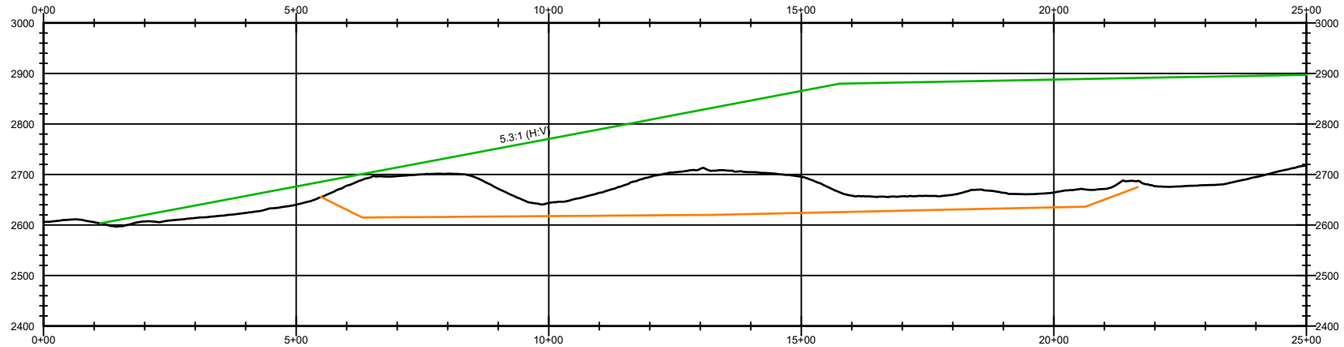
Project No.:	114-571040-2022
Date:	7/29/2022
Designed By:	SG

Figure
2D

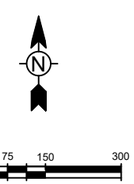
Bar Measures 1 inch



C F-1D SECTION C
SCALE: 1" = 300'



D F-1D SECTION D
SCALE: 1" = 300'



LEGEND
- EXISTING GROUND
- PROPOSED CUT
- PROPOSED BORROW
- PROPOSED FILL

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PICKLES BUTTE LANDFILL, CANYON COUNTY, IDAHO

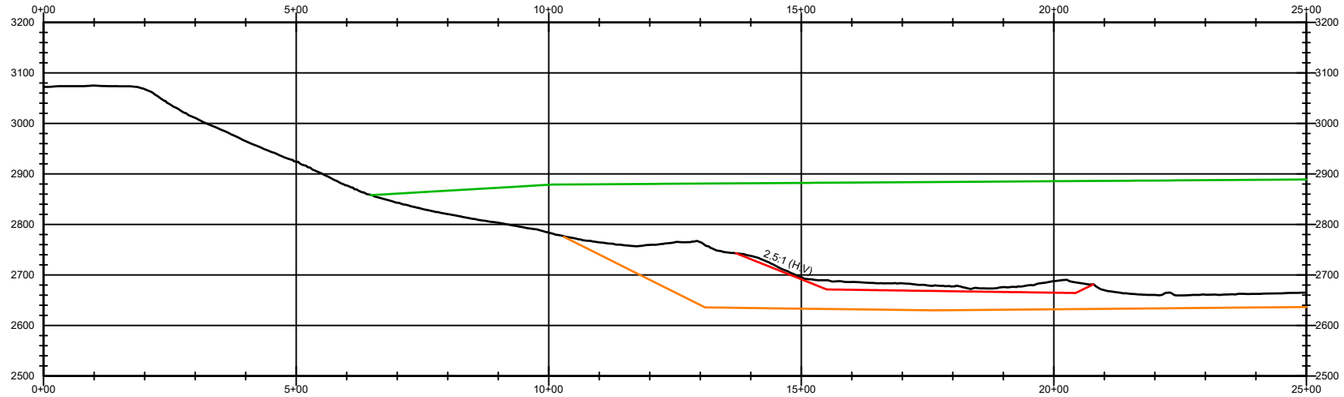
2022 EXPANSION
GEOTECHNICAL INVESTIGATION

PROFILES C & D

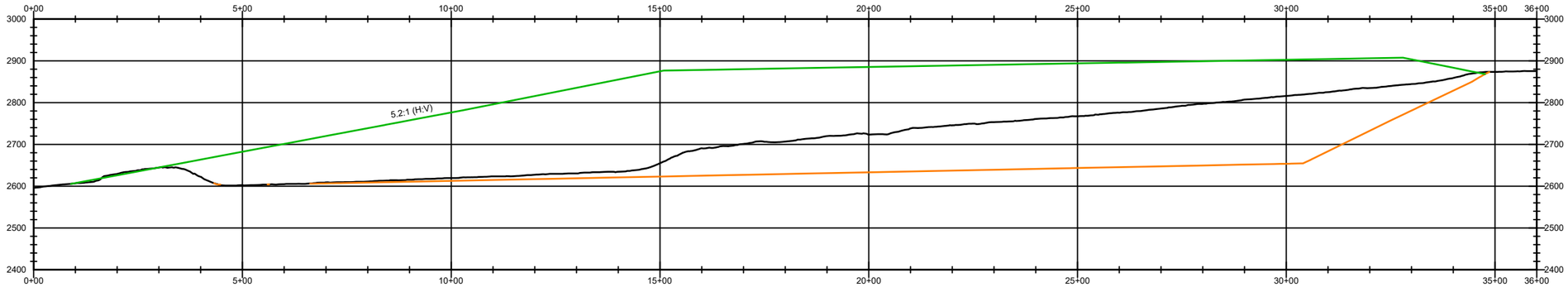
Project No.:	114-571040-2022
Date:	7/29/2022
Designed By:	SG

Figure
3D

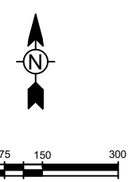
Bar Measures 1 inch



E F-1D SECTION E
SCALE: 1" = 300'



F F-1D SECTION F
SCALE: 1" = 300'



LEGEND
- EXISTING GROUND
- PROPOSED CUT
- PROPOSED BORROW
- PROPOSED FILL

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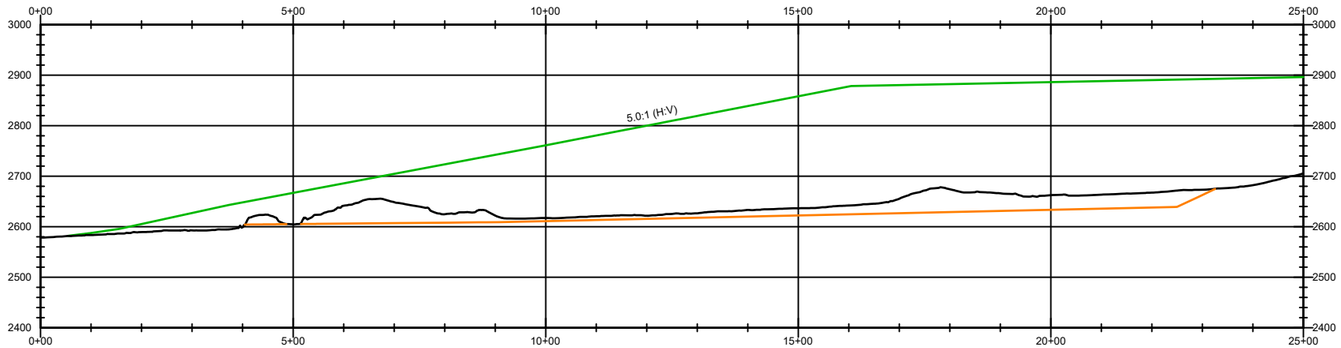
PICKLES BUTTE LANDFILL, CANYON COUNTY, IDAHO

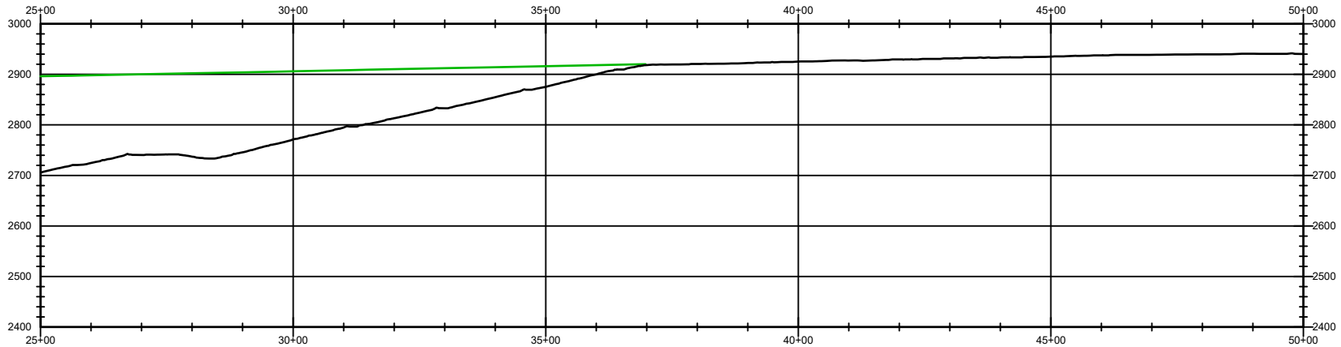
2022 EXPANSION
GEOTECHNICAL INVESTIGATION

PROFILES E & F

Project No.: 114-571040-2022
Date: 7/29/2022
Designed By: SG
Figure
4D

Bar Measures 1 inch





G F-1D SECTION G
SCALE: 1" = 300'

N

0 75 150 300

LEGEND
- EXISTING GROUND
- PROPOSED CUT
- PROPOSED BORROW
- PROPOSED FILL

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PICKLES BUTTE LANDFILL, CANYON COUNTY, IDAHO

2022 EXPANSION
GEOTECHNICAL INVESTIGATION

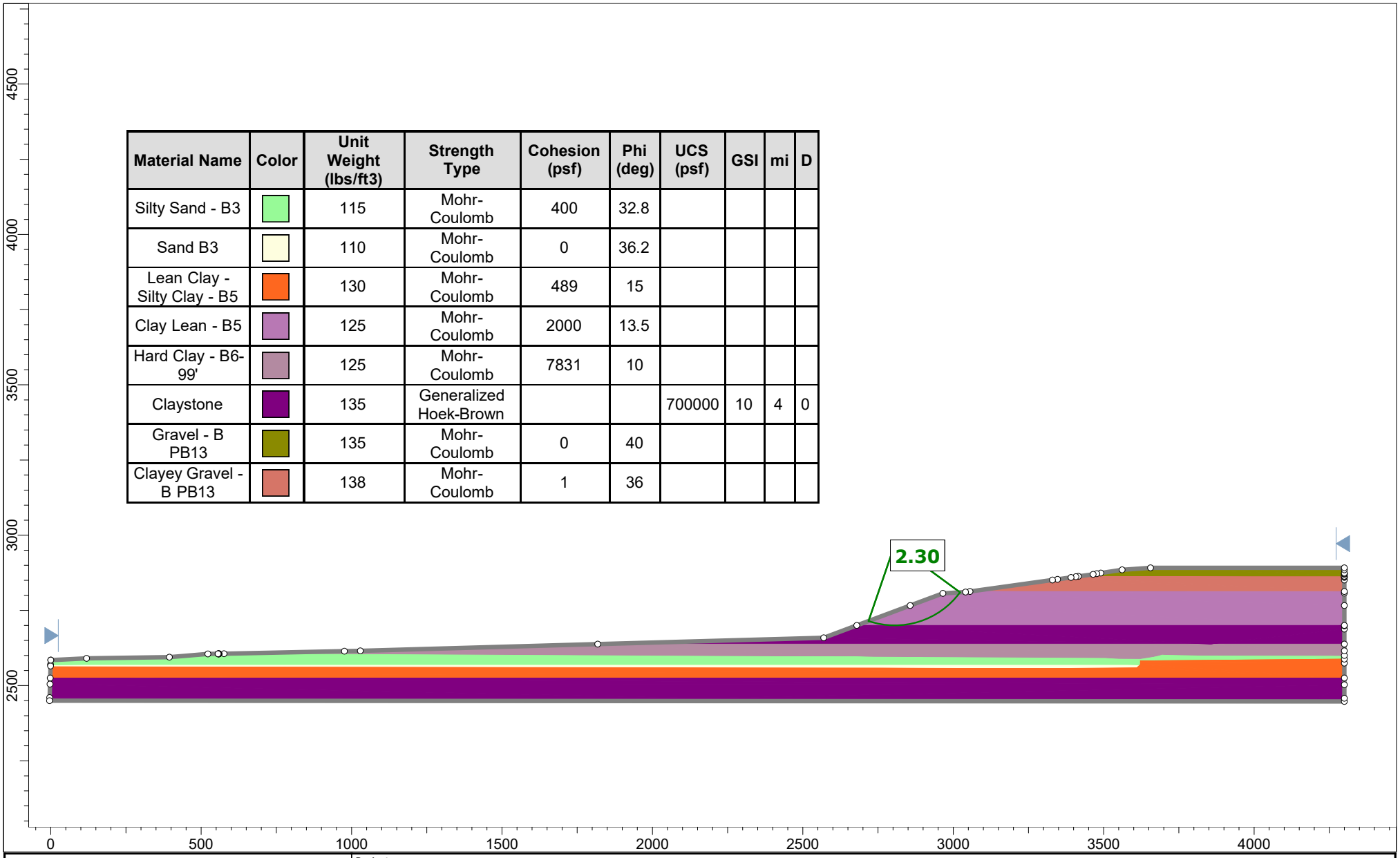
PROFILE G

Project No.:	114-571040-2022
Date:	7/29/2022
Designed By:	SG

Figure
5D

Bar Measures 1 inch

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
Silty Sand - B3		115	Mohr-Coulomb	400	32.8				
Sand B3		110	Mohr-Coulomb	0	36.2				
Lean Clay - Silty Clay - B5		130	Mohr-Coulomb	489	15				
Clay Lean - B5		125	Mohr-Coulomb	2000	13.5				
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10				
Claystone		135	Generalized Hoek-Brown			700000	10	4	0
Gravel - B PB13		135	Mohr-Coulomb	0	40				
Clayey Gravel - B PB13		138	Mohr-Coulomb	1	36				



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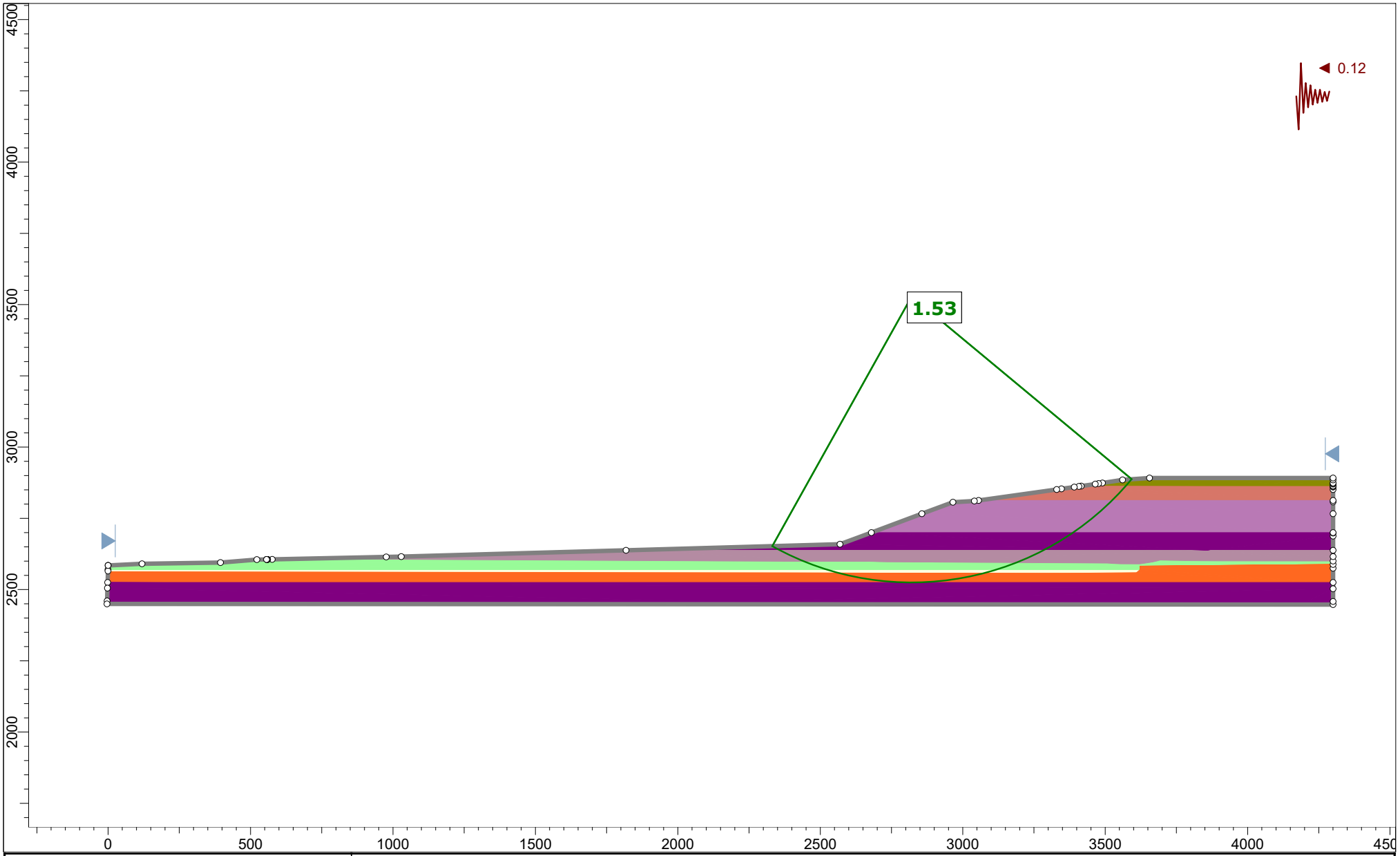
SLIDEINTERPRET 9.023

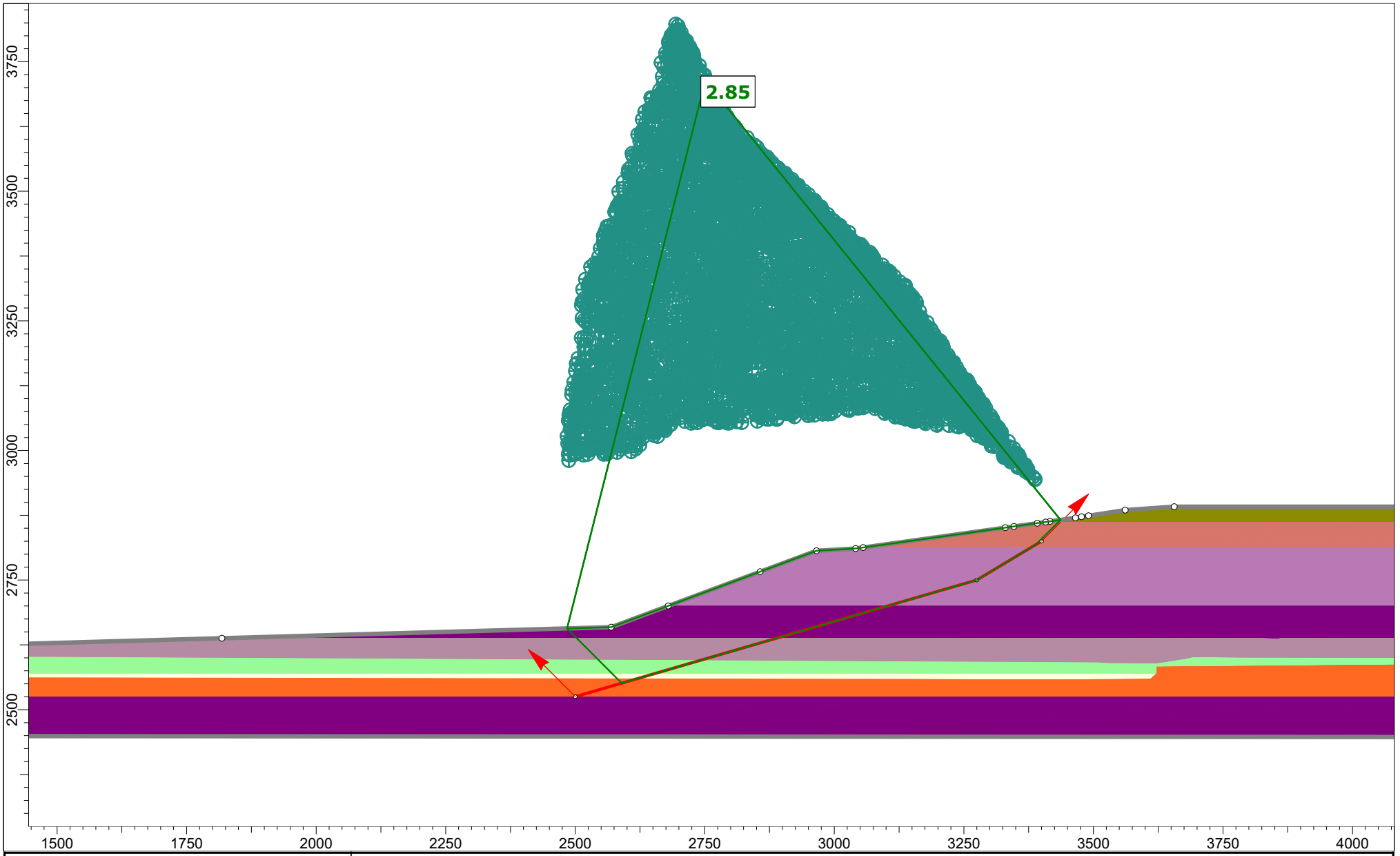
Project	Pickles Butte		
Group	SECTION A	Scenario	Proposed Excavation 3H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/27/2022	File Name	Static Loading

Figure 6D



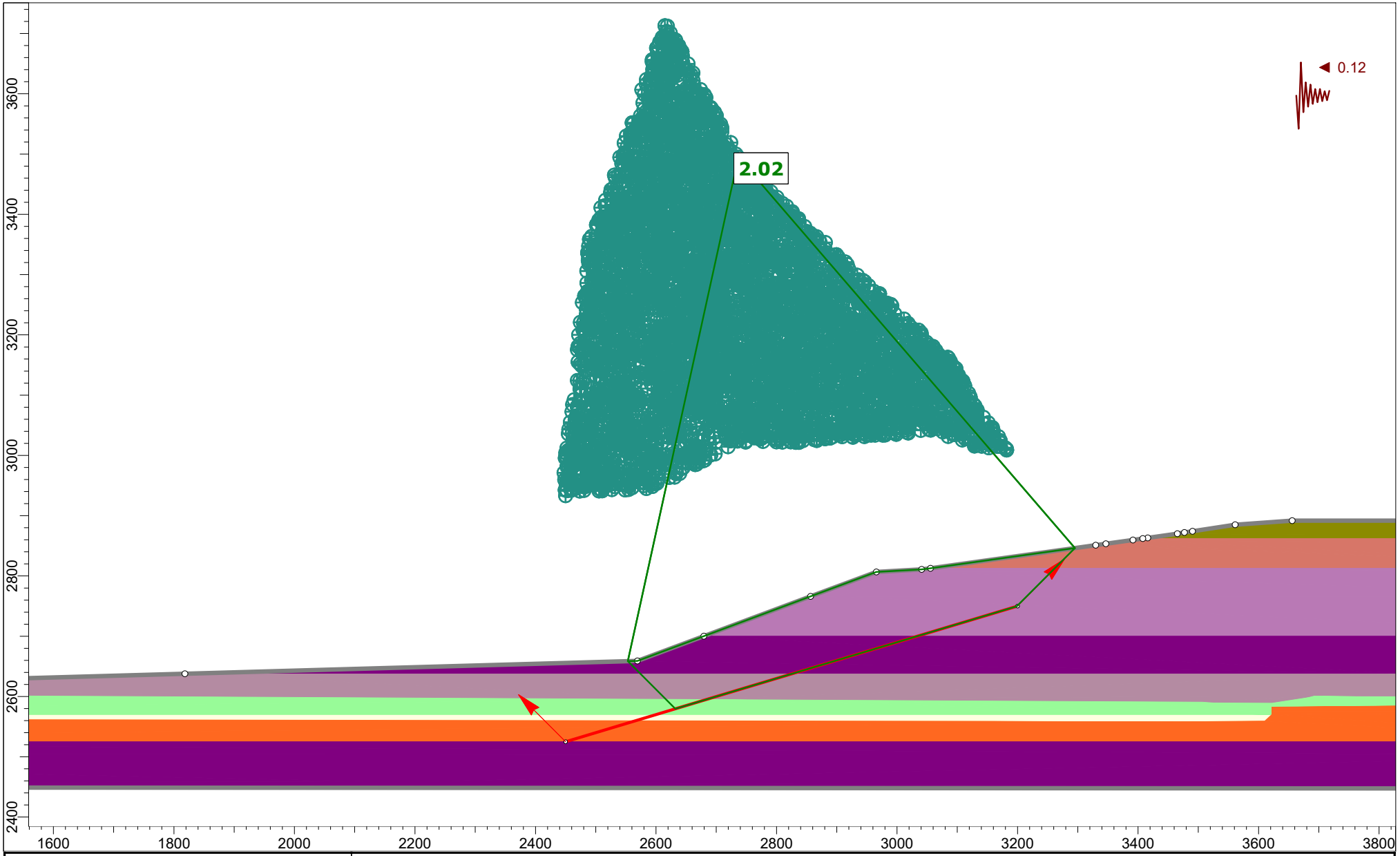
rocscience	Project	Pickles Butte	Figure 7D
	Group	SECTION A	Scenario: Proposed Excavation 3H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/27/2022	File Name: Seismic Loading

SLIDEINTERPRET 9.023



rocscience	Project	Pickles Butte	Figure 8D
	Group	SECTION A	Scenario: Proposed Excavation 3H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Static Loading - Block Failure

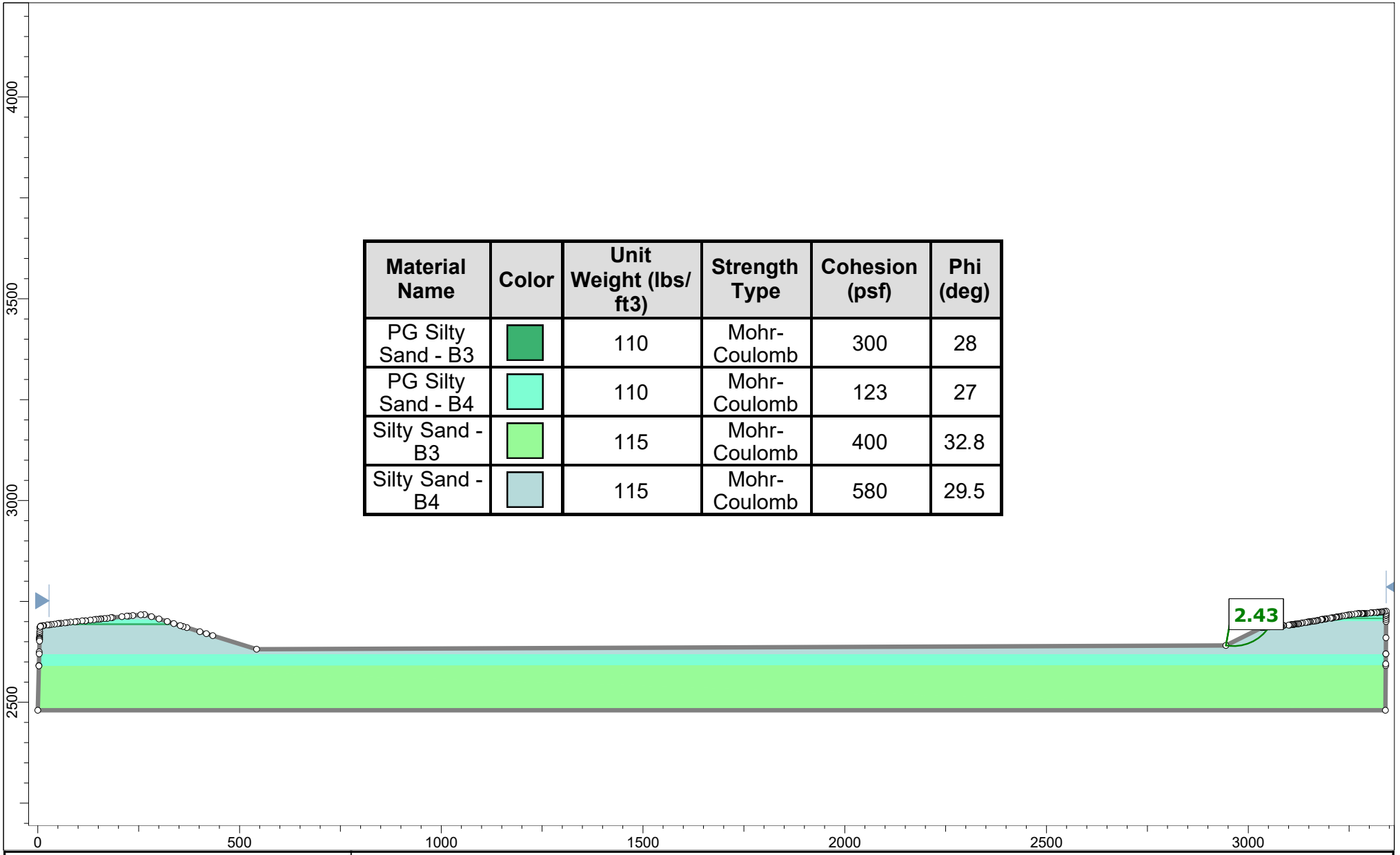
SLIDEINTERPRET 9.023



rocscience	Project	Pickles Butte	Figure 9D
	Group	SECTION A	Scenario: Proposed Excavation 3H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Seismic Loading - Block

SLIDEINTERPRET 9.023

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PG Silty Sand - B3		110	Mohr-Coulomb	300	28
PG Silty Sand - B4		110	Mohr-Coulomb	123	27
Silty Sand - B3		115	Mohr-Coulomb	400	32.8
Silty Sand - B4		115	Mohr-Coulomb	580	29.5



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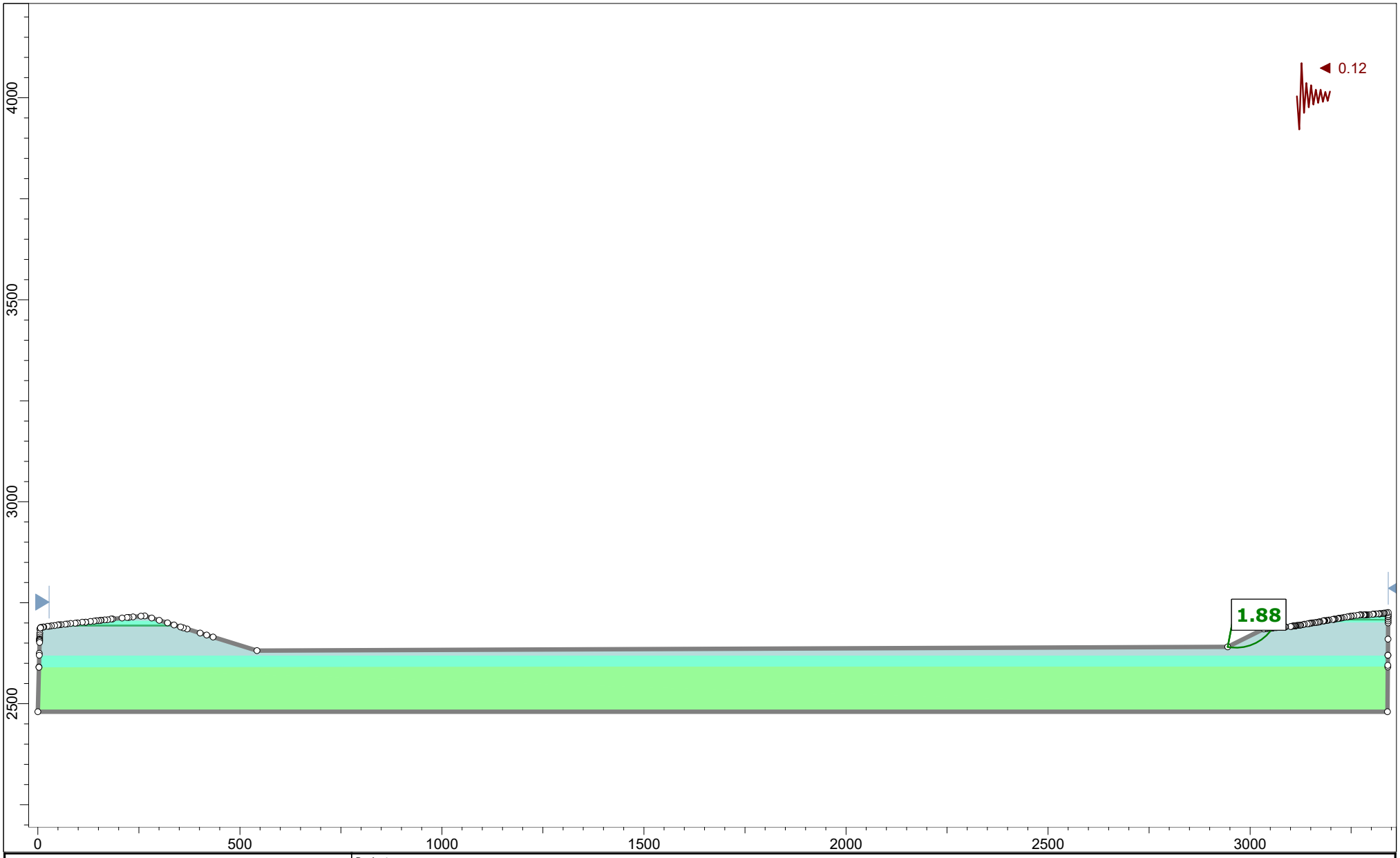
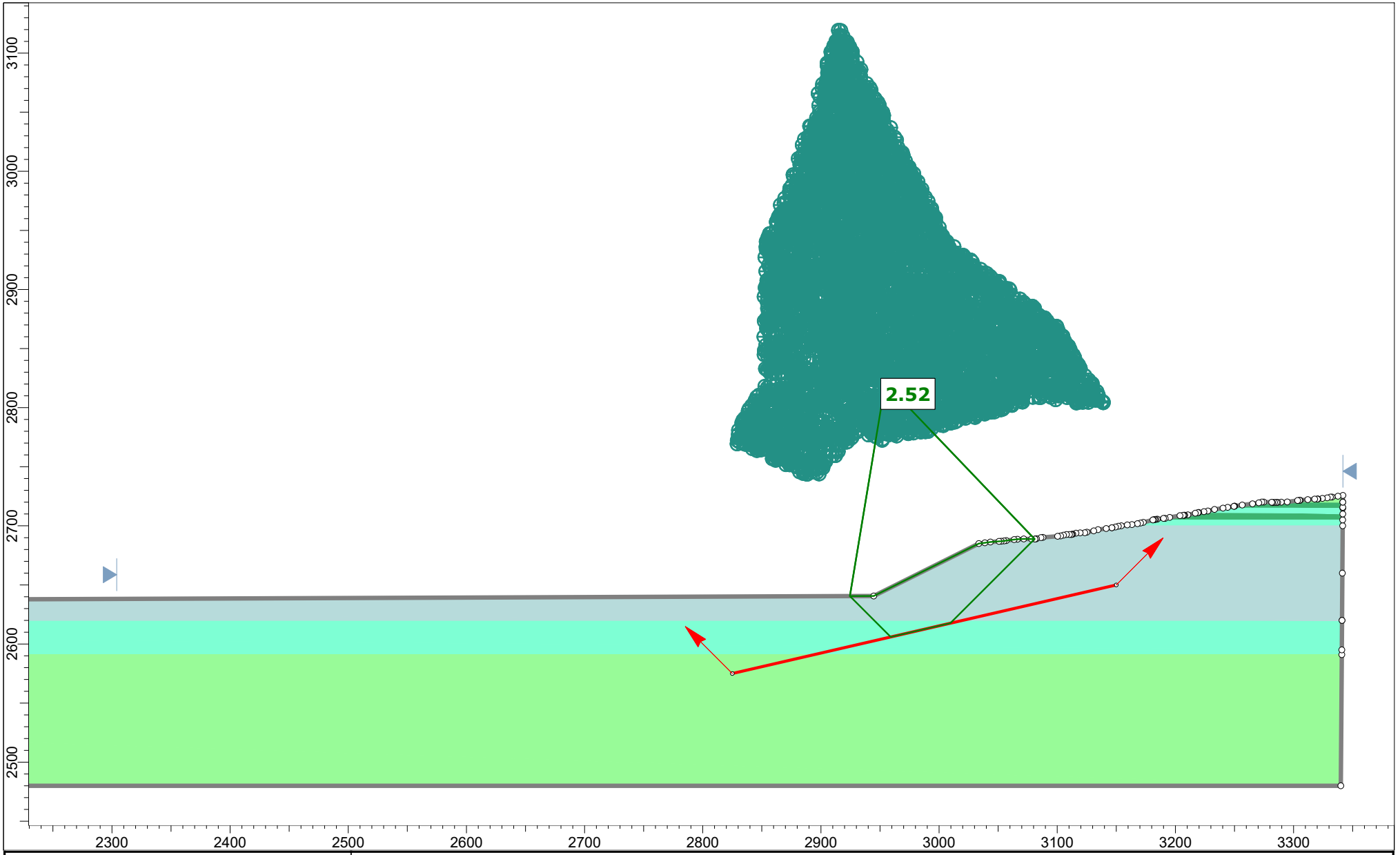
SLIDEINTERPRET 9.023

Project	Pickles Butte		Figure 10D
Group	SECTION B	Scenario	Proposed Excavation 2.27H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/27/2022	File Name	Static Loading

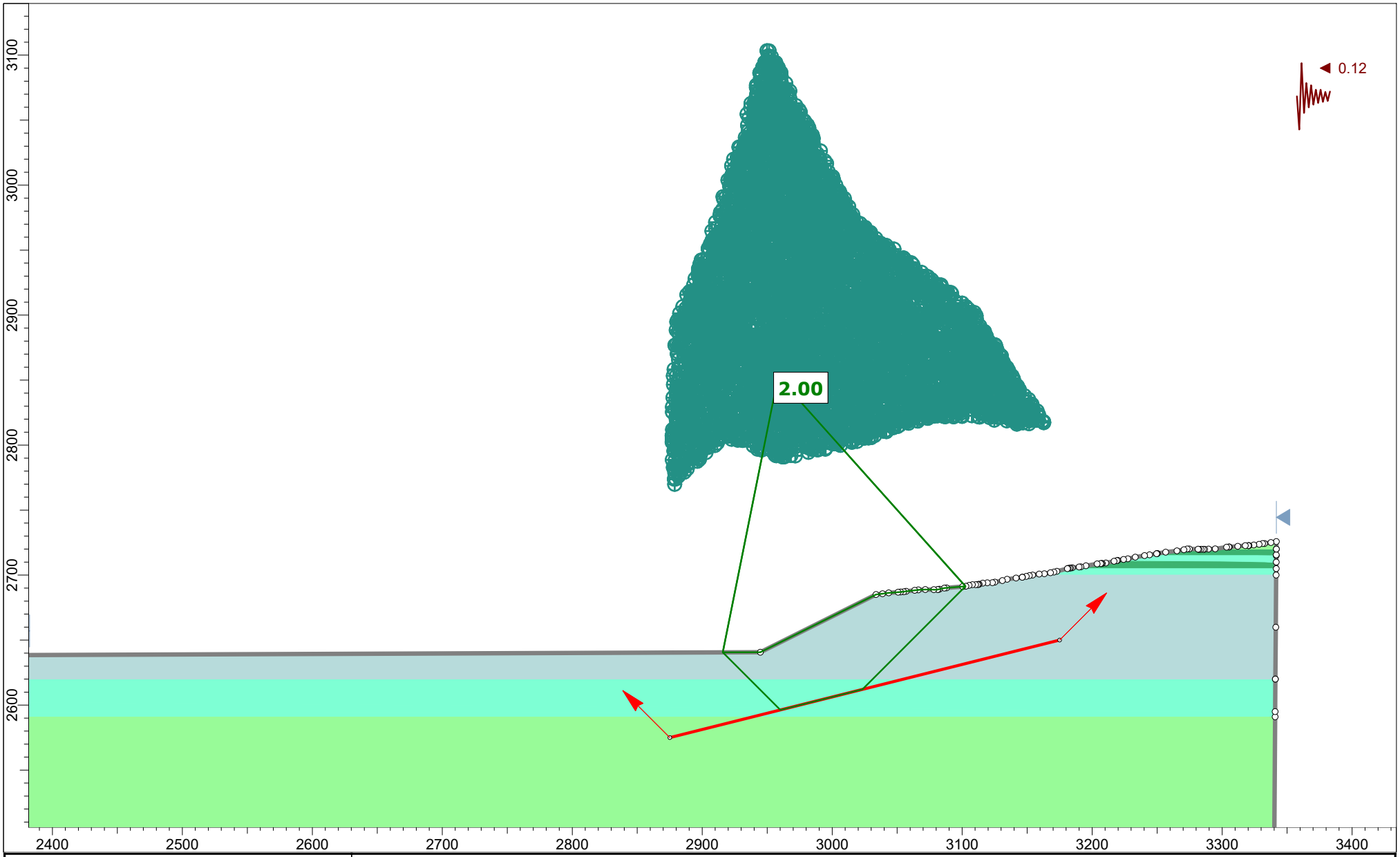


rocscience	Project	Pickles Butte	Figure 11D
	Group	SECTION B	Scenario: Proposed Excavation 2.27H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/27/2022	File Name: Seismic Loading

SLIDEINTERPRET 9.023

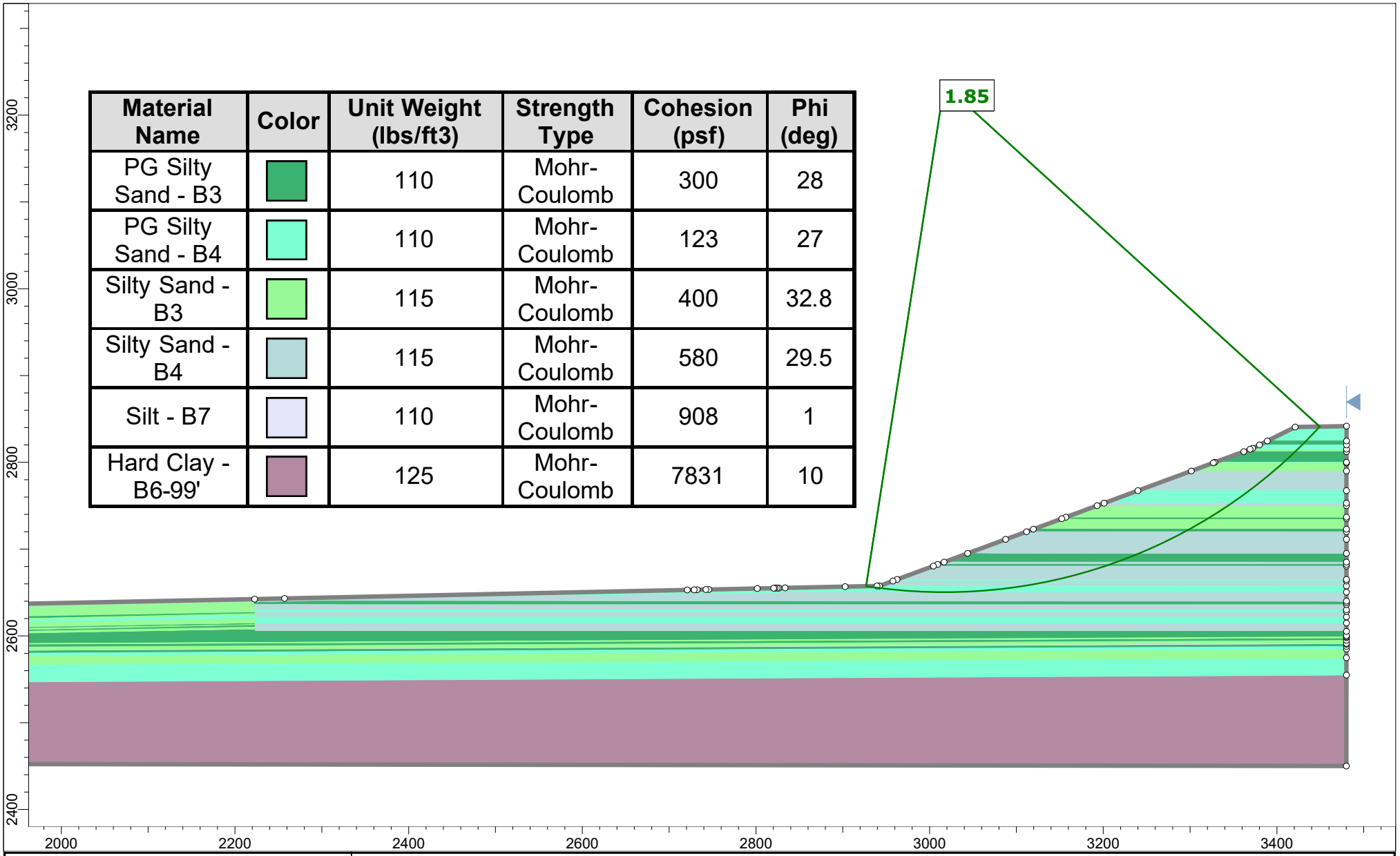


rocscience	Project	Pickles Butte	Figure 12D
	Group	SECTION B	Scenario: Proposed Excavation 2.27H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Static Loading - Block Failure



rocscience	Project	Pickles Butte	Figure 13D
	Group	SECTION B	Scenario: Proposed Excavation 2.27H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Seismic Loading - Block

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PG Silty Sand - B3		110	Mohr-Coulomb	300	28
PG Silty Sand - B4		110	Mohr-Coulomb	123	27
Silty Sand - B3		115	Mohr-Coulomb	400	32.8
Silty Sand - B4		115	Mohr-Coulomb	580	29.5
Silt - B7		110	Mohr-Coulomb	908	1
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10



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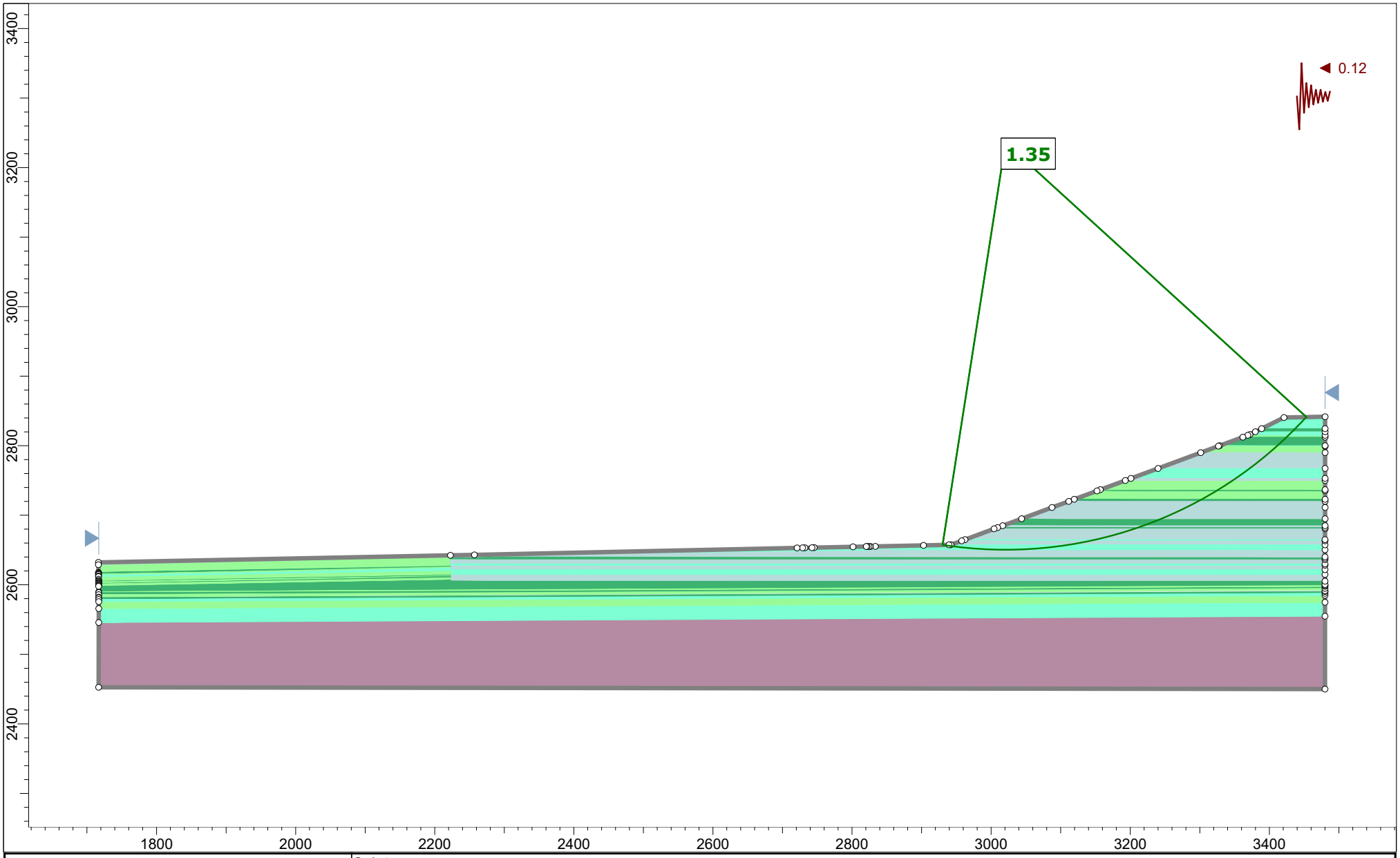
SLIDEINTERPRET 9.023

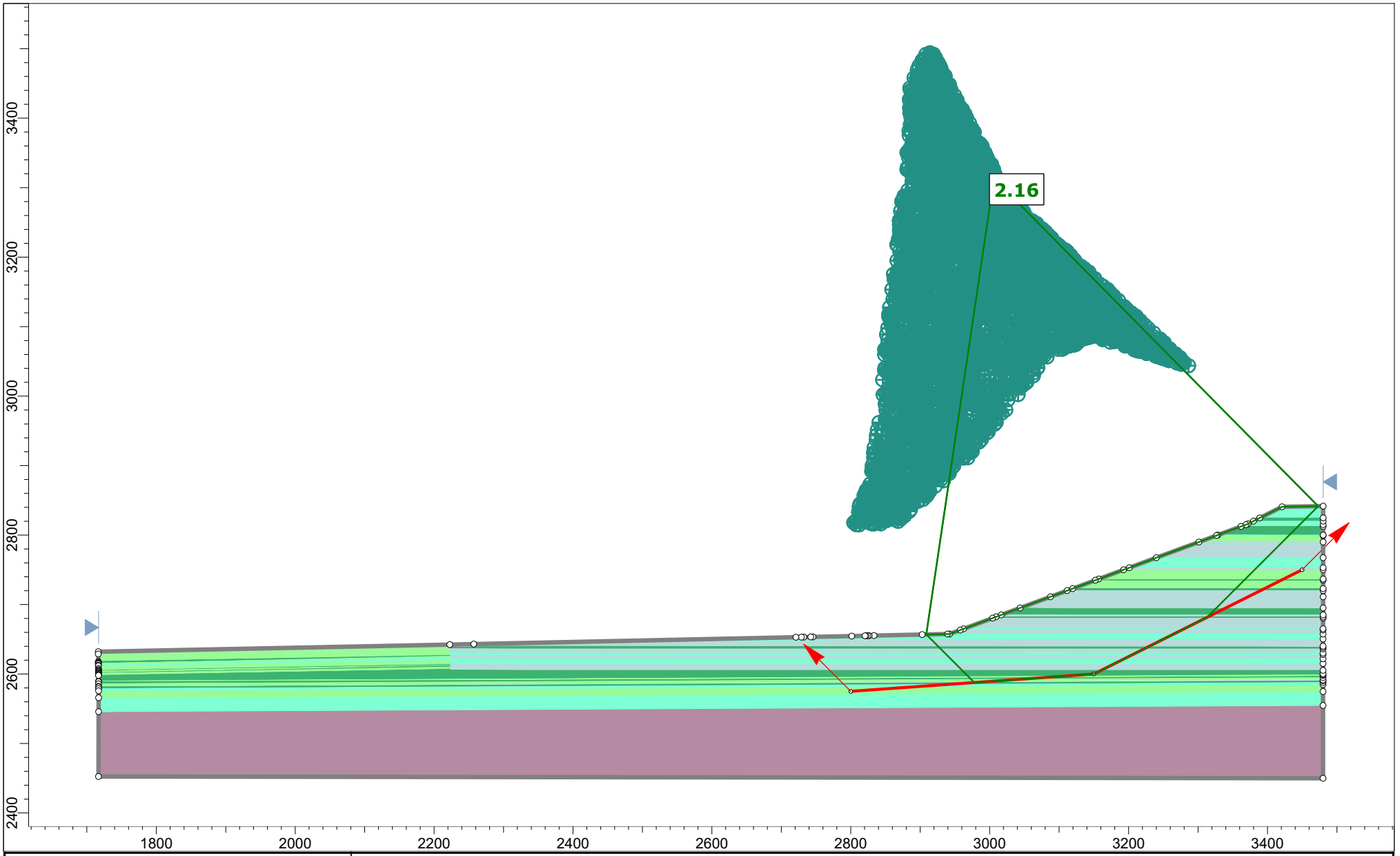
Project	Pickles Butte		
Group	SECTION C	Scenario	Proposed Excavation 2.85H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/27/2022	File Name	Static Loading

Figure 14D



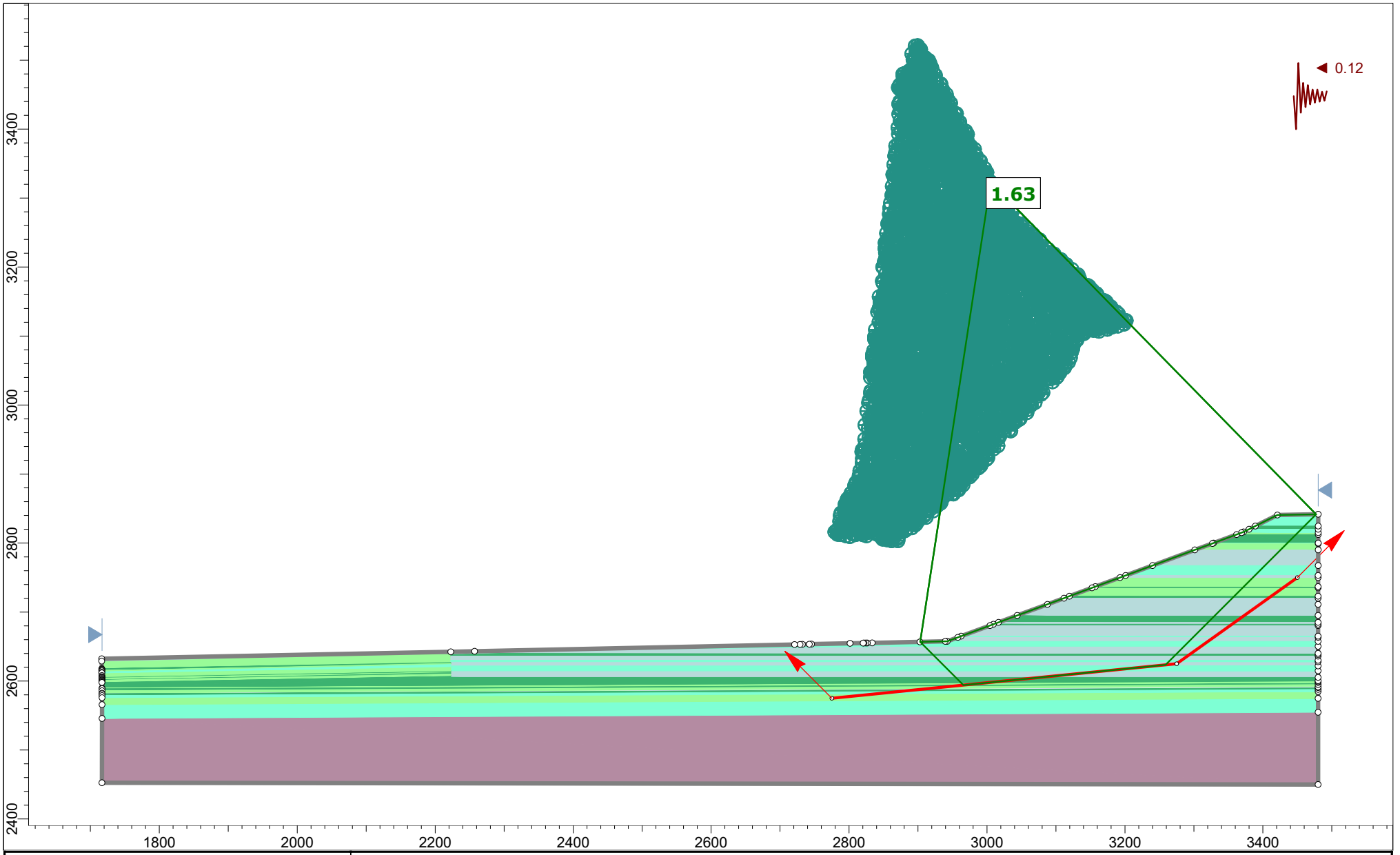
rocscience	Project	Pickles Butte	Figure 15D
	Group	SECTION C	Scenario: Proposed Excavation 2.85H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/27/2022	File Name: Seismic Loading

SLIDEINTERPRET 9.023



rocscience	Project	Pickles Butte	Figure 16D
	Group	SECTION C	Scenario: Proposed Excavation 2.85H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Static Loading - Block

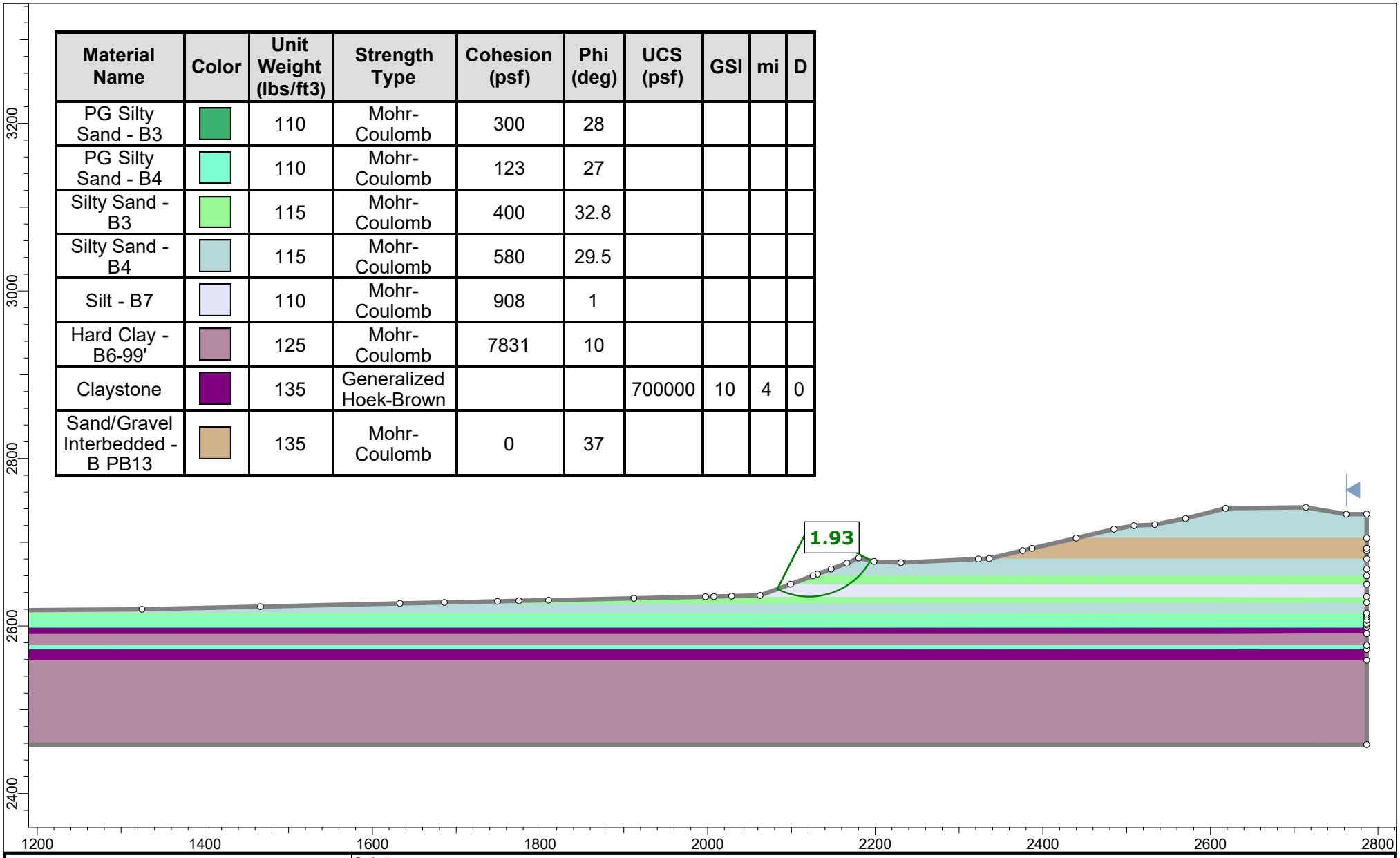
SLIDEINTERPRET 9.023



rocscience	Project	Pickles Butte	Figure 17D
	Group	SECTION C	Scenario: Proposed Excavation 2.85H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Seismic Loading - Block Failure

SLIDEINTERPRET 9.023

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
PG Silty Sand - B3		110	Mohr-Coulomb	300	28				
PG Silty Sand - B4		110	Mohr-Coulomb	123	27				
Silty Sand - B3		115	Mohr-Coulomb	400	32.8				
Silty Sand - B4		115	Mohr-Coulomb	580	29.5				
Silt - B7		110	Mohr-Coulomb	908	1				
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10				
Claystone		135	Generalized Hoek-Brown			700000	10	4	0
Sand/Gravel Interbedded - B PB13		135	Mohr-Coulomb	0	37				



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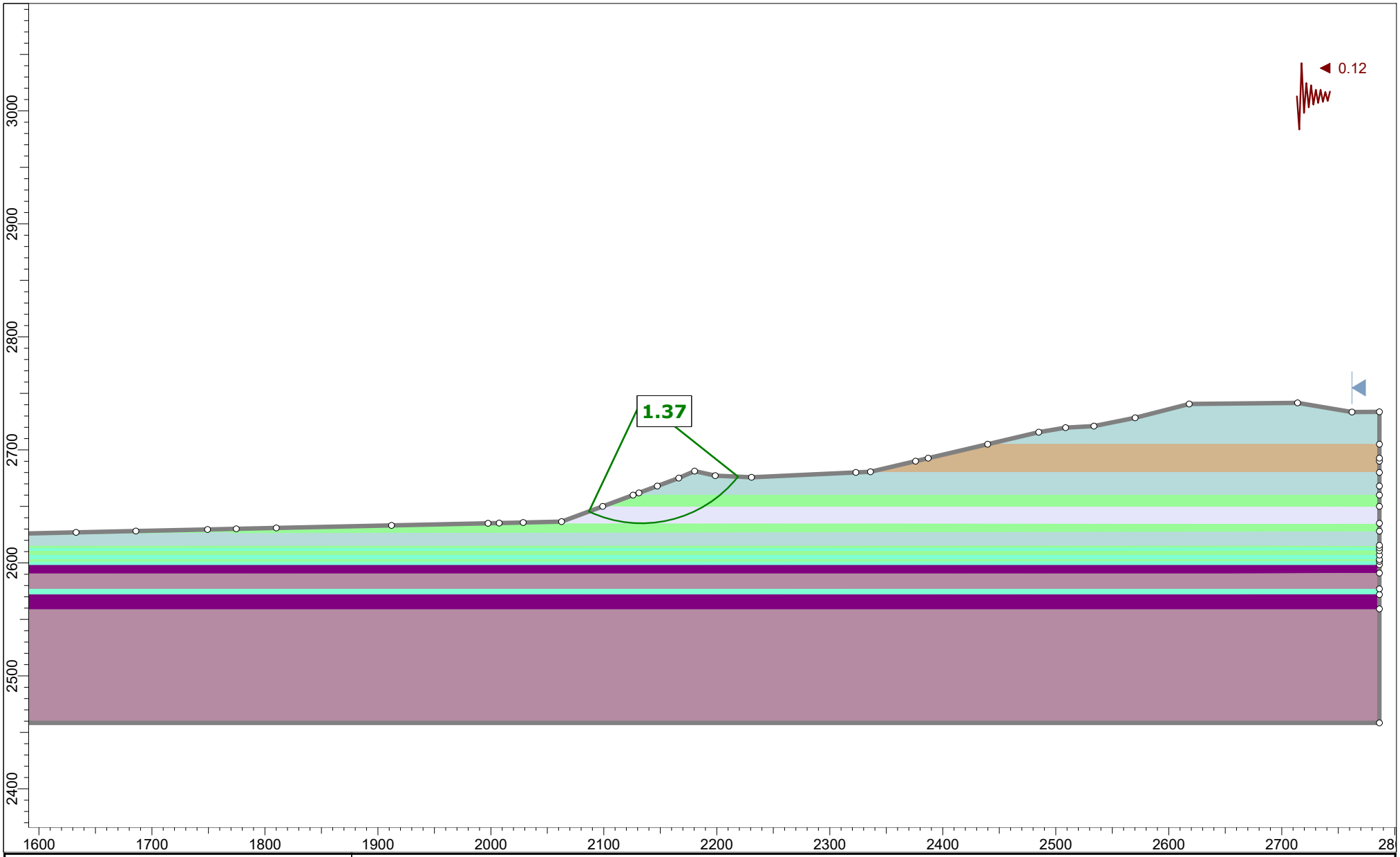
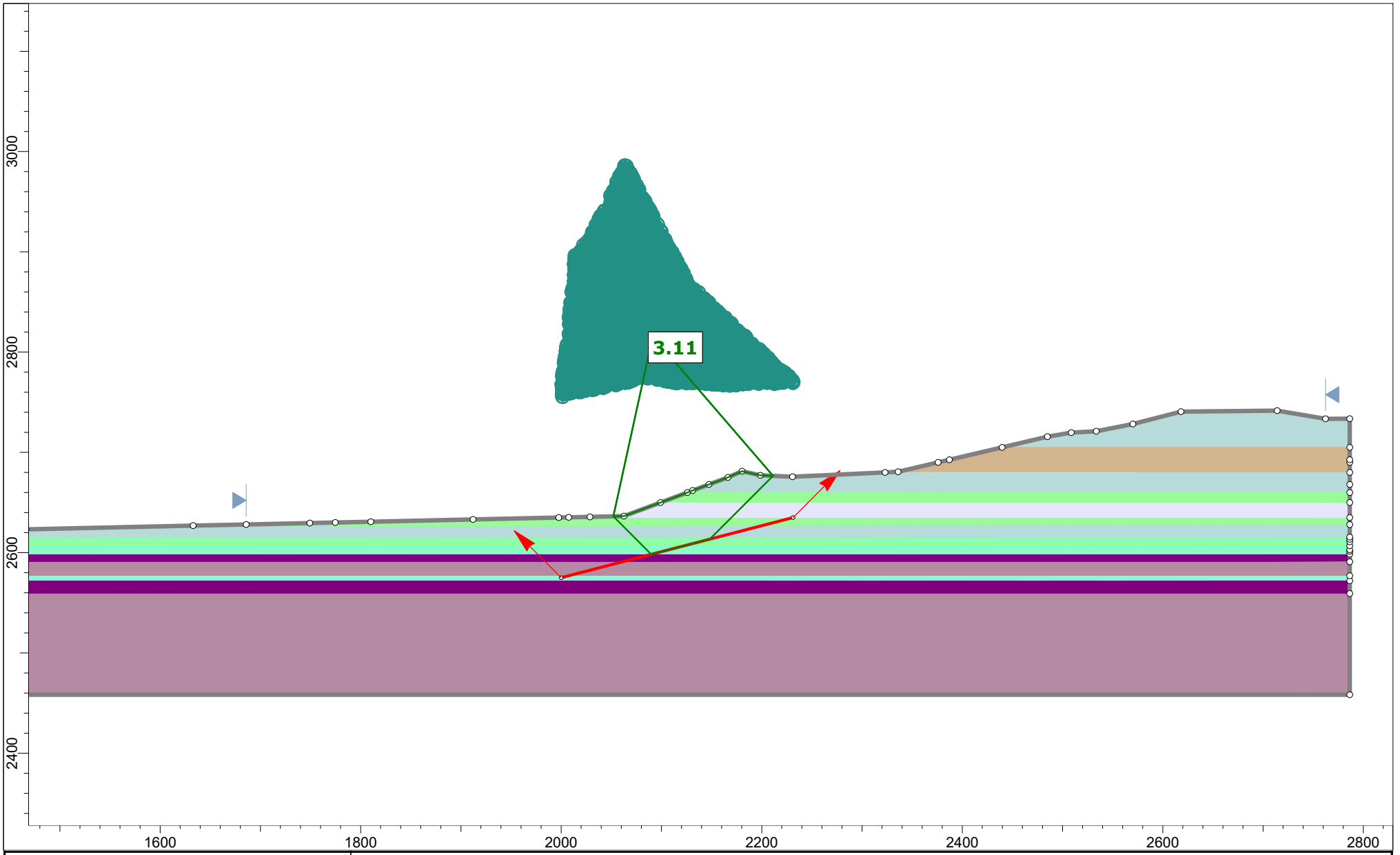
SLIDEINTERPRET 9.023

Project	Pickles Butte		
Group	SECTION D	Scenario	Proposed Excavation 2.87H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/27/2022	File Name	Static Loading

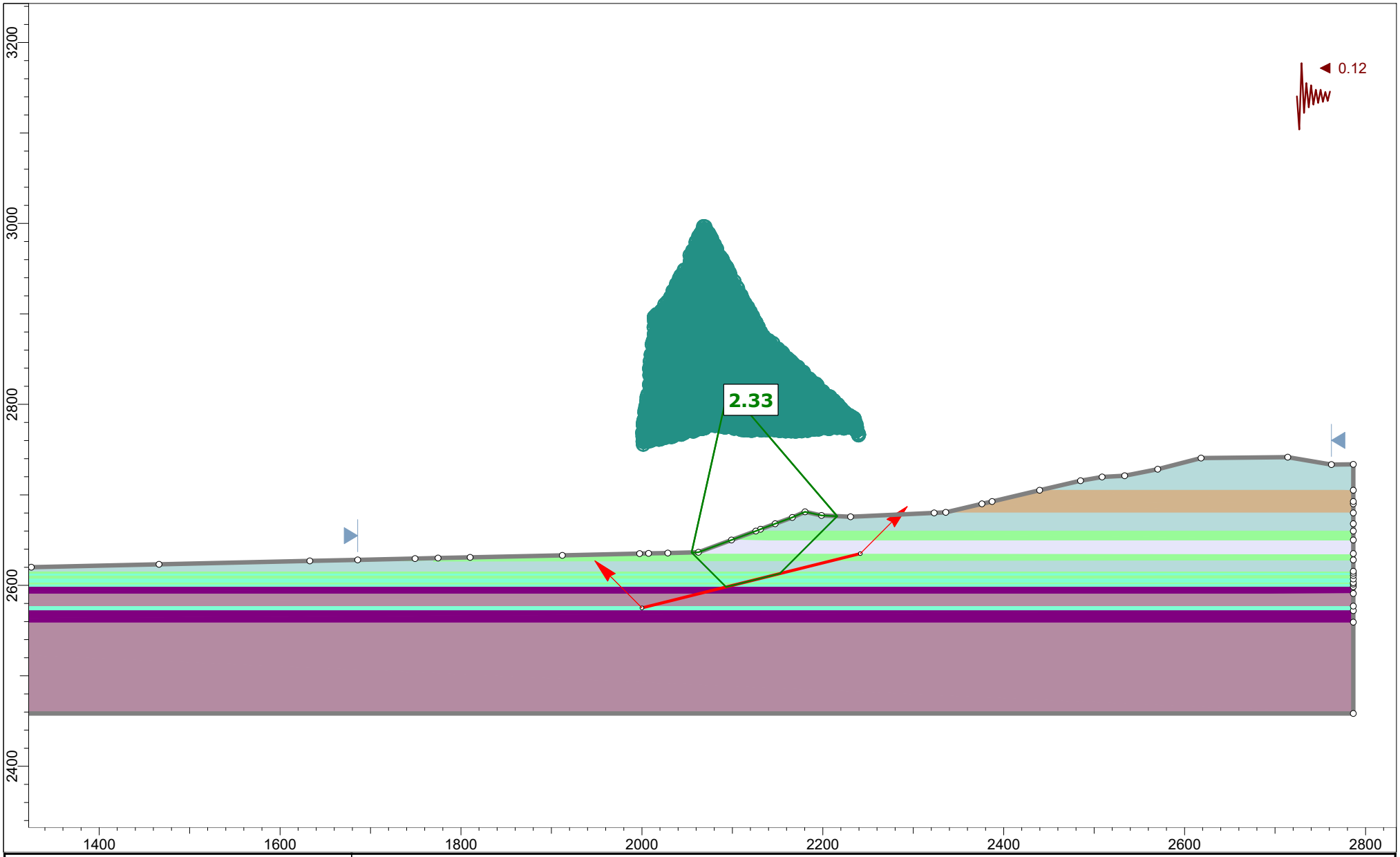
Figure 18D



rocscience	Project	Pickles Butte	Figure 19D
	Group	SECTION D	Scenario: Proposed Excavation 2.87H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/27/2022	File Name: Seismic Loading

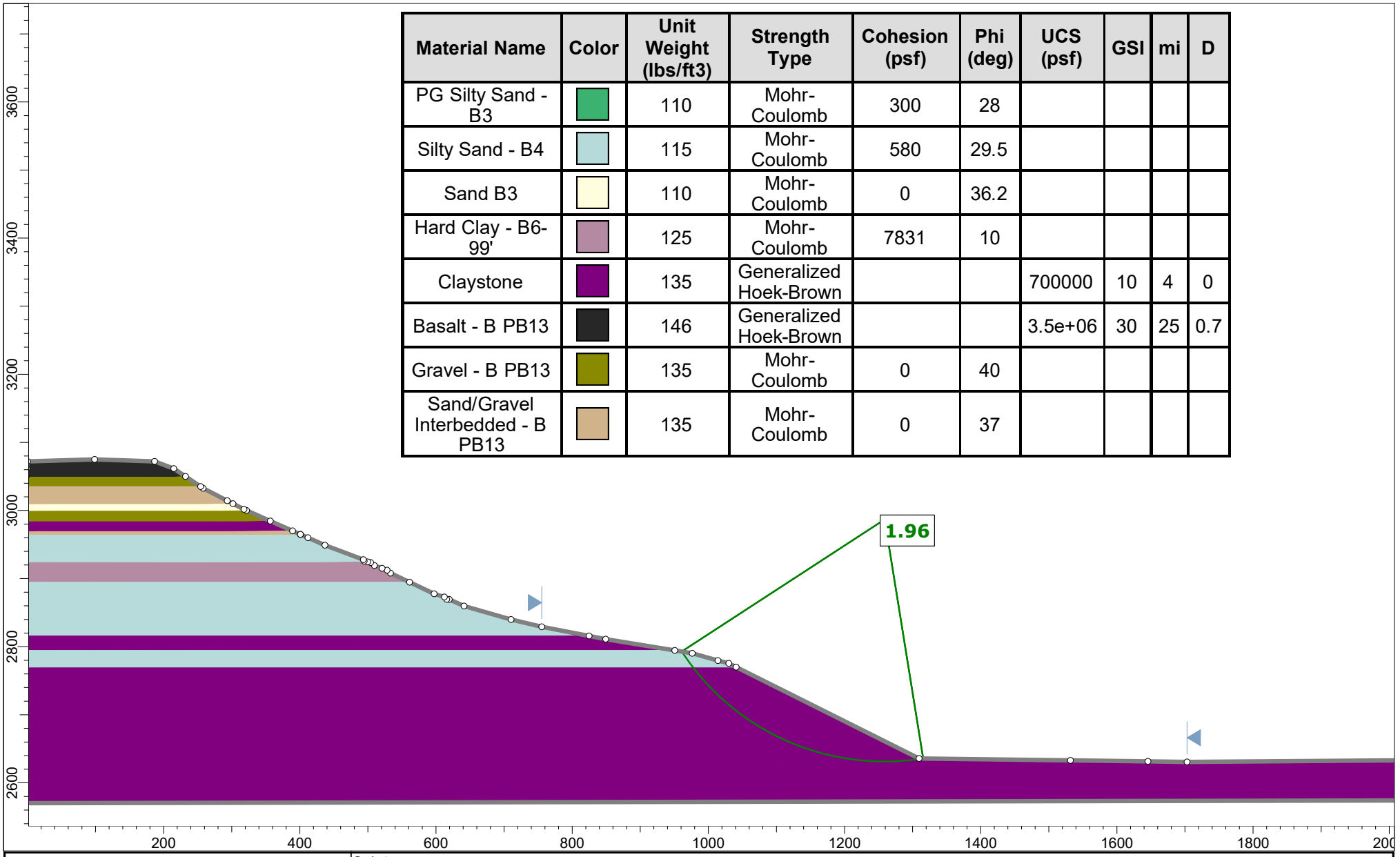


rocscience	Project	Pickles Butte	Figure 20D
	Group	SECTION D	Scenario: Proposed Excavation 2.87H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Static Loading - Block



rocscience	Project	Pickles Butte	Figure 21D
	Group	SECTION D	Scenario: Proposed Excavation 2.87H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Seismic Loading - Block Failure

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
PG Silty Sand - B3		110	Mohr-Coulomb	300	28				
Silty Sand - B4		115	Mohr-Coulomb	580	29.5				
Sand B3		110	Mohr-Coulomb	0	36.2				
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10				
Claystone		135	Generalized Hoek-Brown			700000	10	4	0
Basalt - B PB13		146	Generalized Hoek-Brown			3.5e+06	30	25	0.7
Gravel - B PB13		135	Mohr-Coulomb	0	40				
Sand/Gravel Interbedded - B PB13		135	Mohr-Coulomb	0	37				

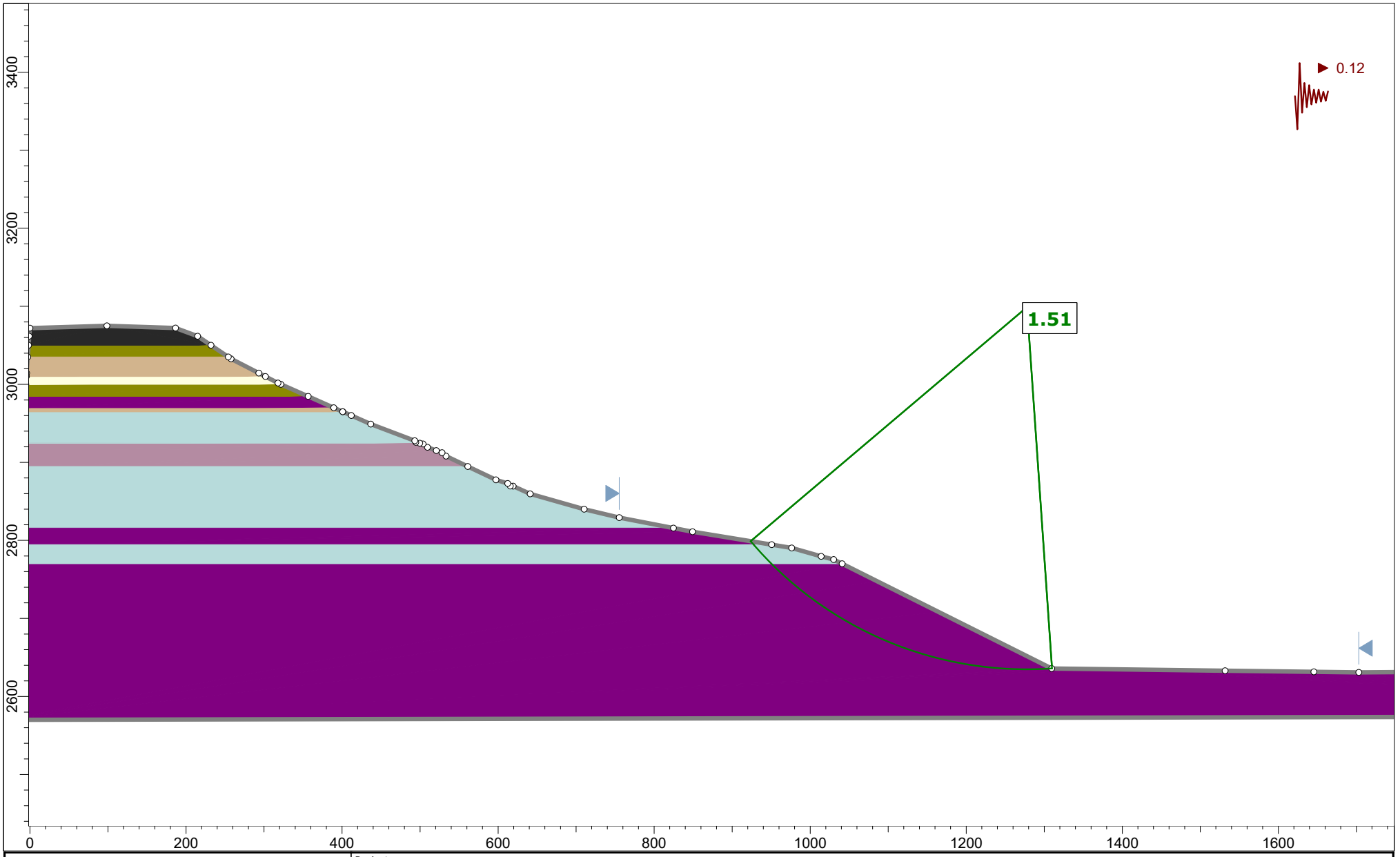


rocscience

SLIDEINTERPRET 9.023

Project	Pickles Butte		
Group	SECTION E	Scenario	Proposed Excavation 2.27H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/27/2022	File Name	Static Loading

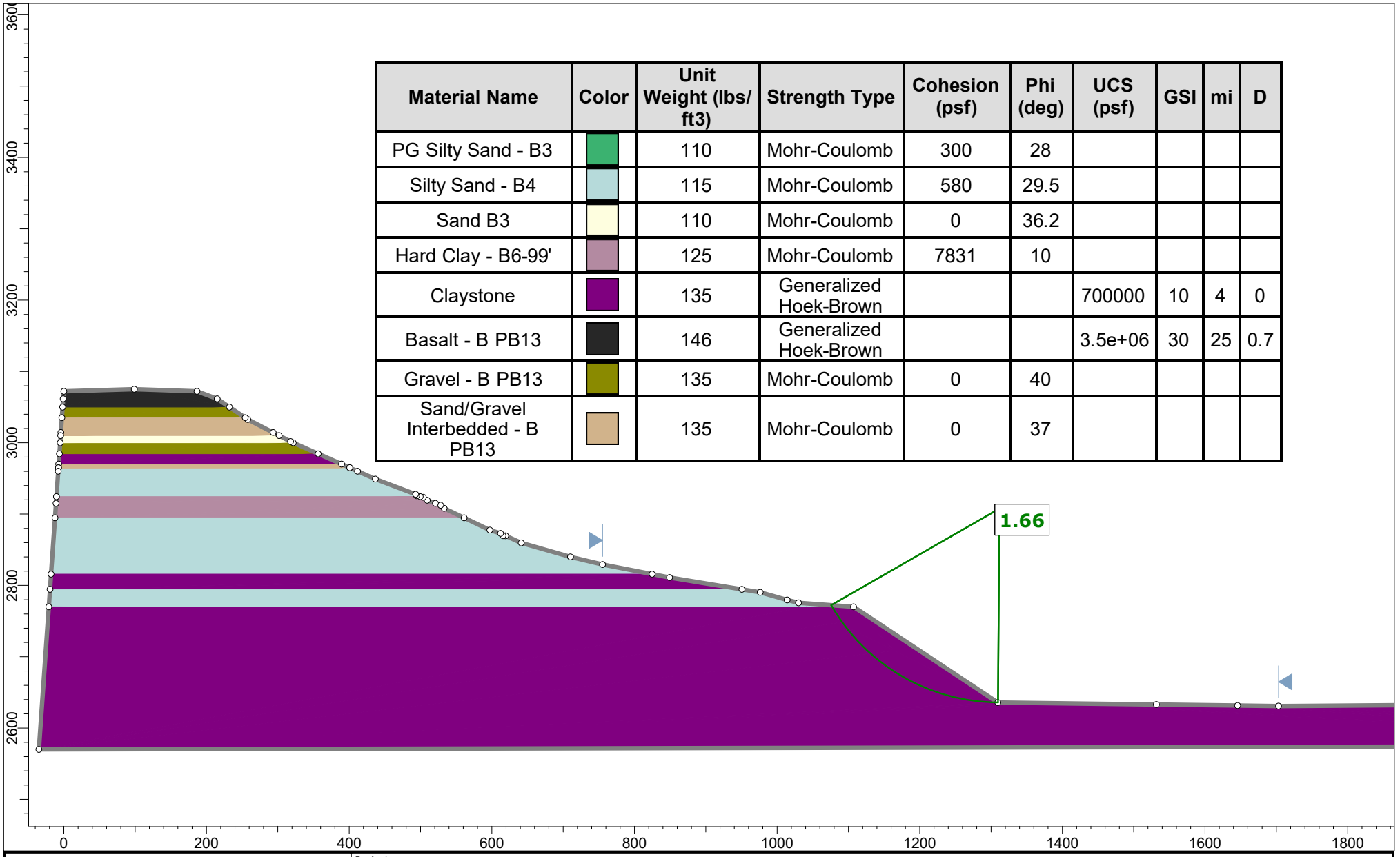
Figure 22D



rocscience	Project	Pickles Butte	Figure 23D
	Group	SECTION E	Scenario: Proposed Excavation 2.27H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/27/2022	File Name: Seismic Loading

SLIDEINTERPRET 9.023

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
PG Silty Sand - B3		110	Mohr-Coulomb	300	28				
Silty Sand - B4		115	Mohr-Coulomb	580	29.5				
Sand B3		110	Mohr-Coulomb	0	36.2				
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10				
Claystone		135	Generalized Hoek-Brown			700000	10	4	0
Basalt - B PB13		146	Generalized Hoek-Brown			3.5e+06	30	25	0.7
Gravel - B PB13		135	Mohr-Coulomb	0	40				
Sand/Gravel Interbedded - B PB13		135	Mohr-Coulomb	0	37				

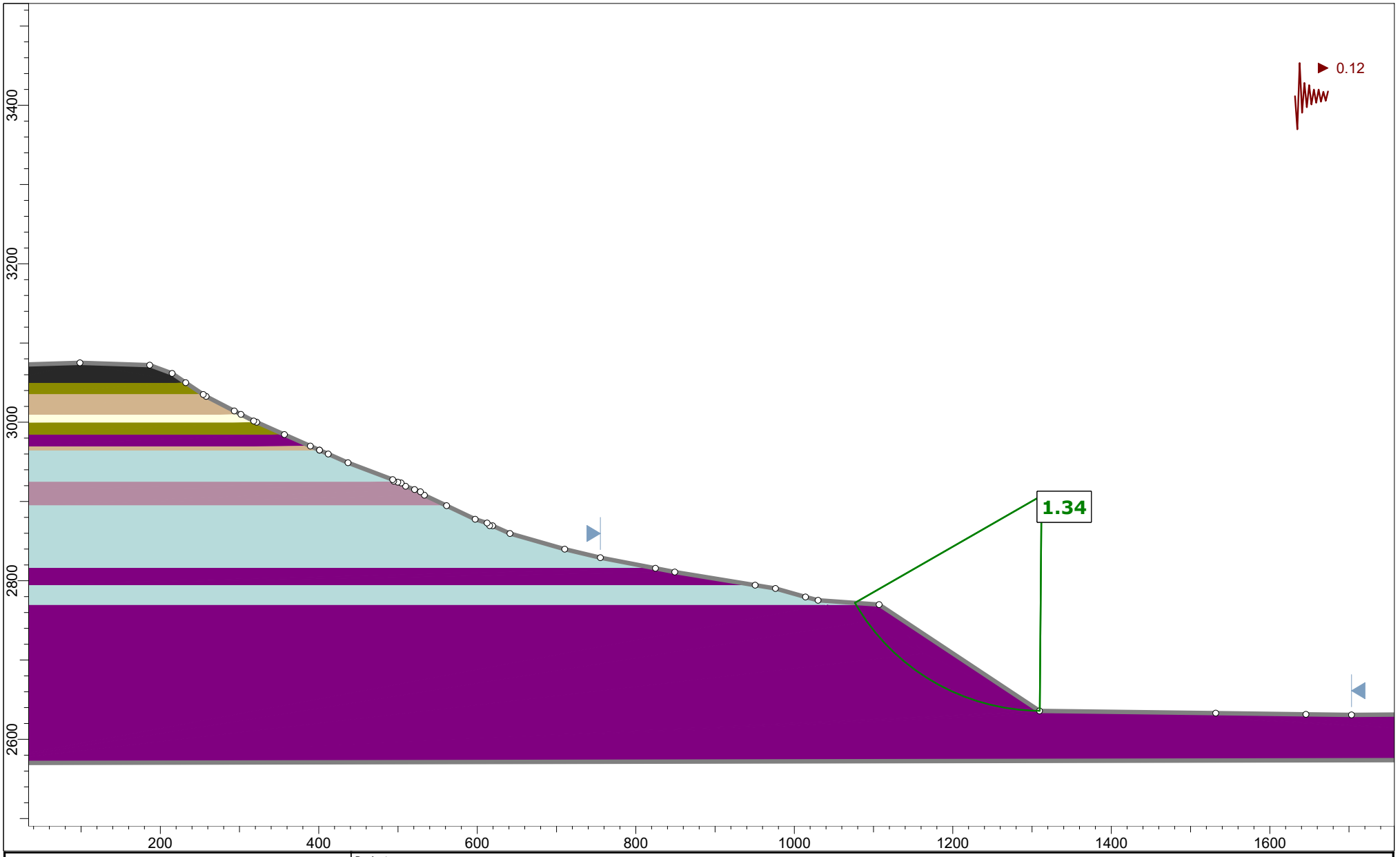


rocscience

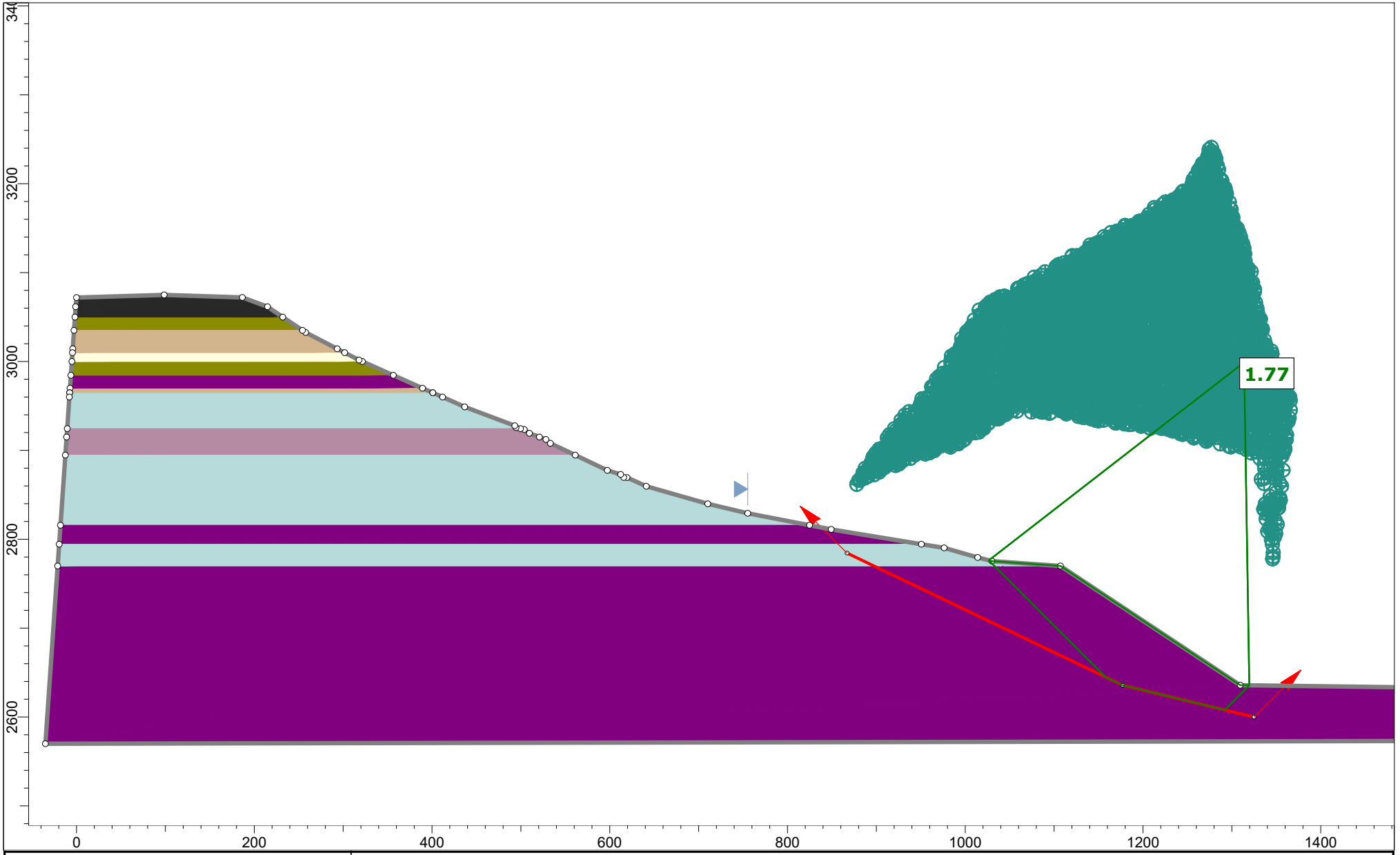
SLIDEINTERPRET 9.023

Project	Pickles Butte		
Group	SECTION E	Scenario	Proposed Excavation 1.87H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/27/2022	File Name	Static Loading

Figure 24D

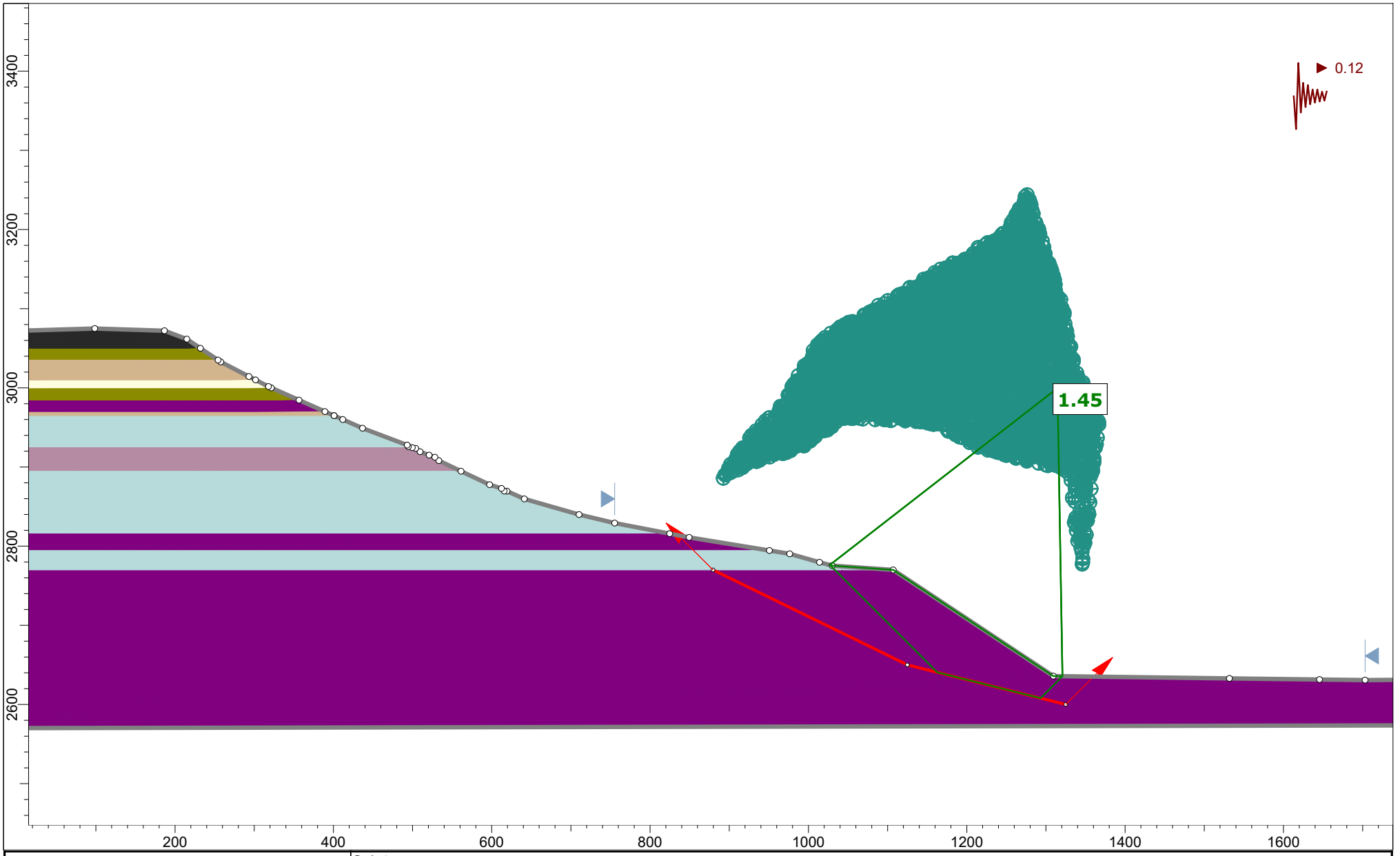


rocscience	Project	Pickles Butte	Figure 25D
	Group	SECTION E	Scenario: Proposed Excavation 1.87H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/27/2022	File Name: Seismic Loading



rocscience	Project	Pickles Butte	Figure 26D
	Group	SECTION E	Scenario: Proposed Excavation1.87H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Static Loading - Block

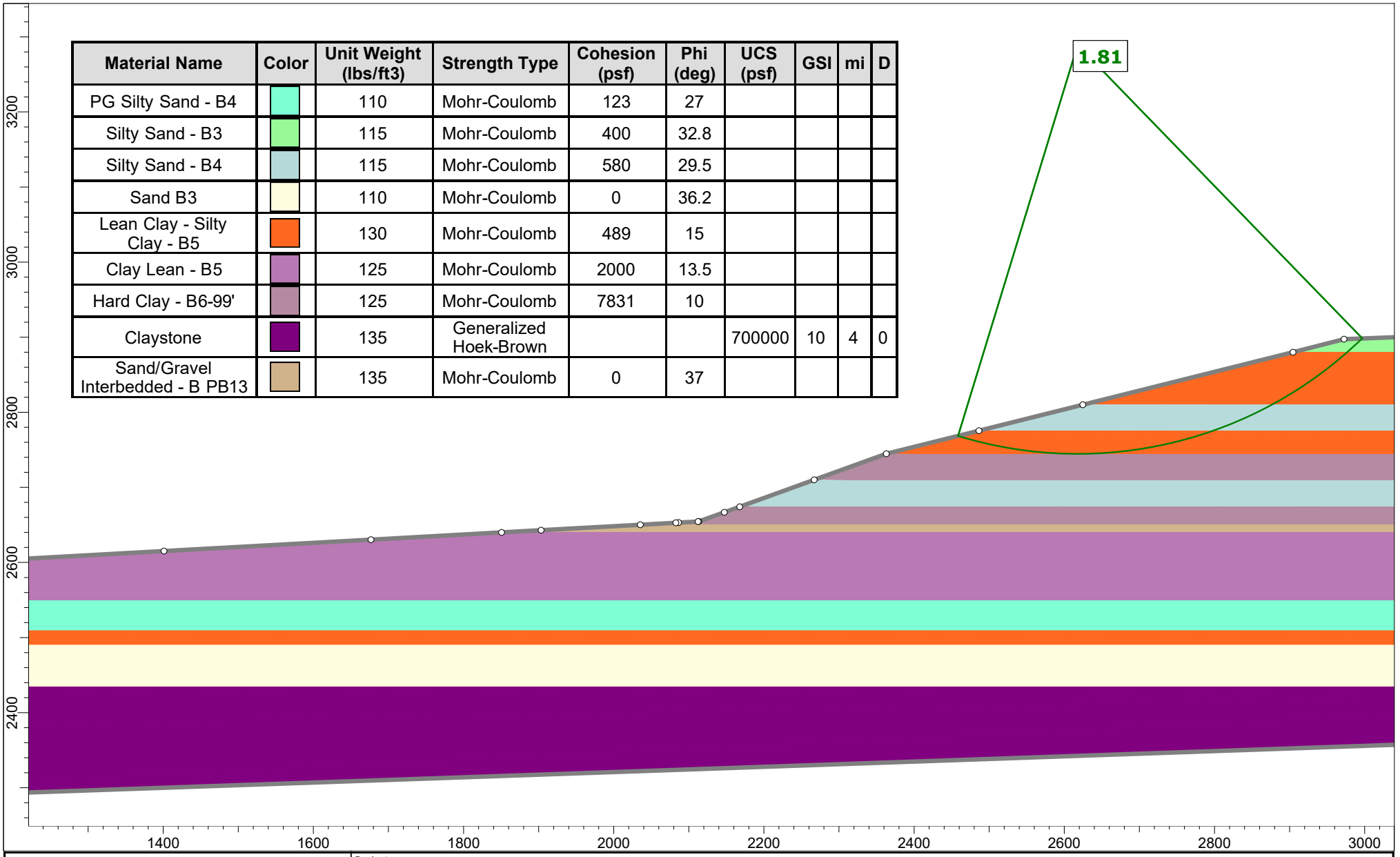
SLIDEINTERPRET 9.023



rocscience	Project	Pickles Butte	Figure 27D
	Group	SECTION E	Scenario: Proposed Excavation 1.87H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Seismic Loading - Block

SLIDEINTERPRET 9.023

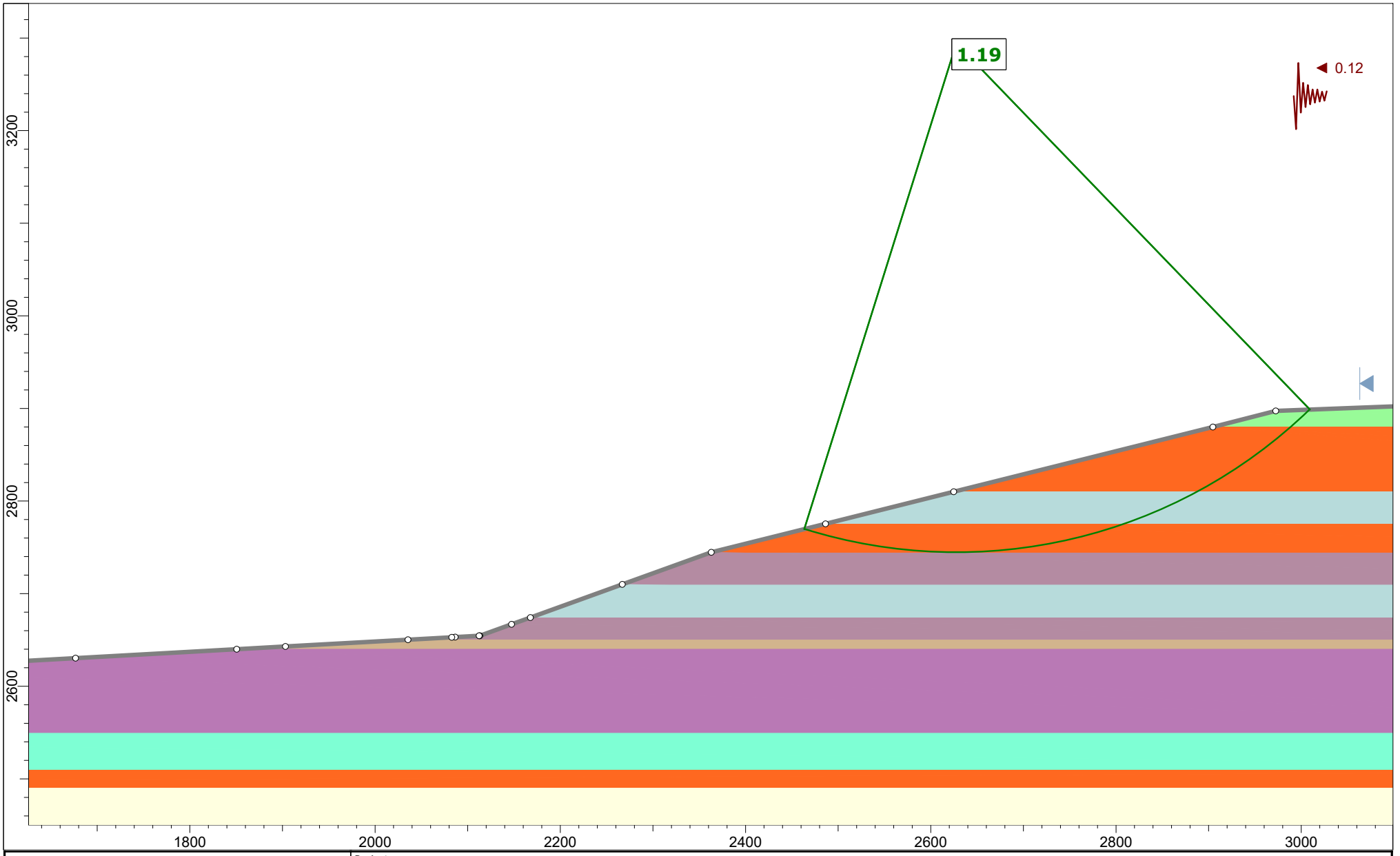
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
PG Silty Sand - B4		110	Mohr-Coulomb	123	27				
Silty Sand - B3		115	Mohr-Coulomb	400	32.8				
Silty Sand - B4		115	Mohr-Coulomb	580	29.5				
Sand B3		110	Mohr-Coulomb	0	36.2				
Lean Clay - Silty Clay - B5		130	Mohr-Coulomb	489	15				
Clay Lean - B5		125	Mohr-Coulomb	2000	13.5				
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10				
Claystone		135	Generalized Hoek-Brown			700000	10	4	0
Sand/Gravel Interbedded - B PB13		135	Mohr-Coulomb	0	37				



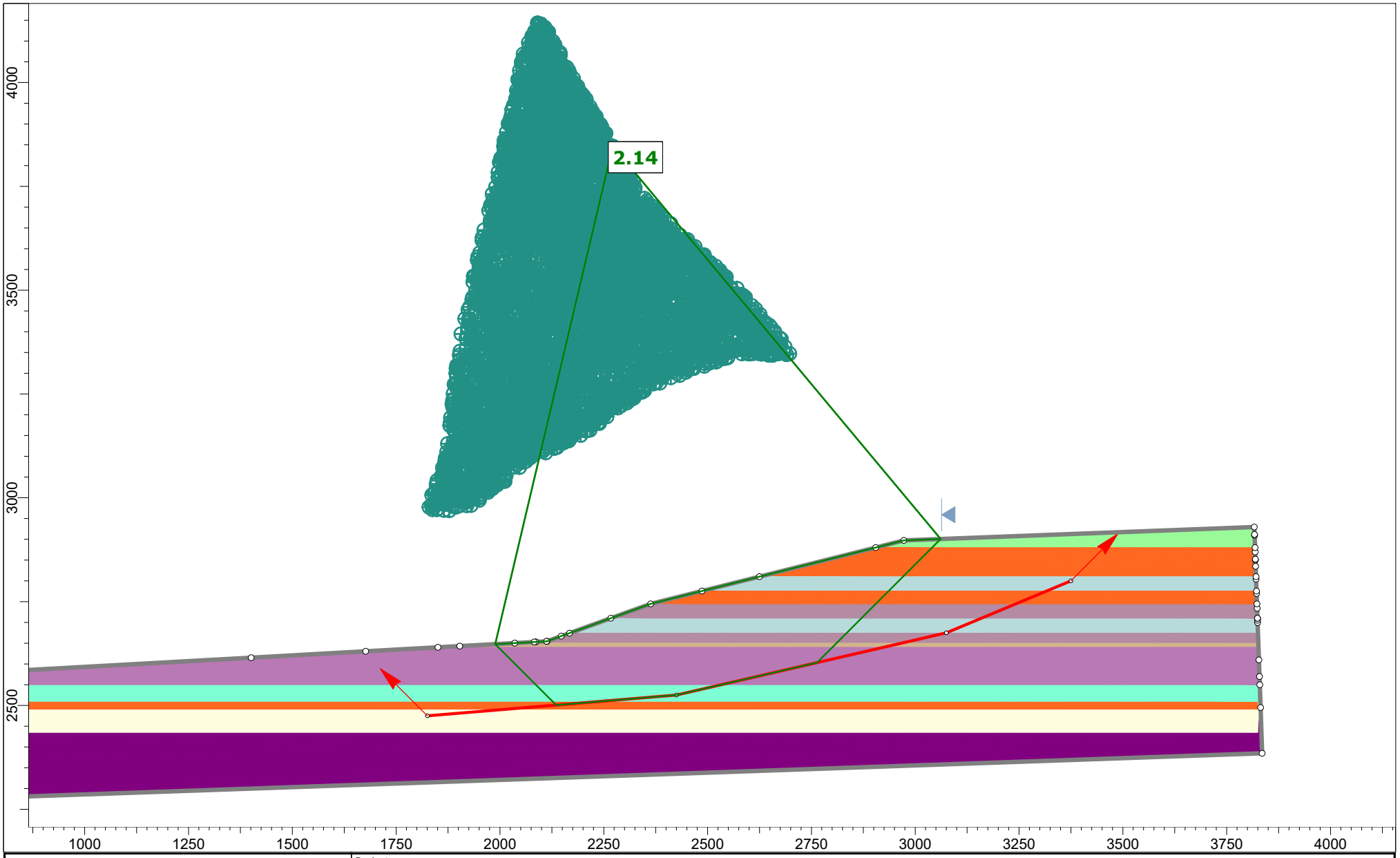
rocscience

SLIDEINTERPRET 9.023

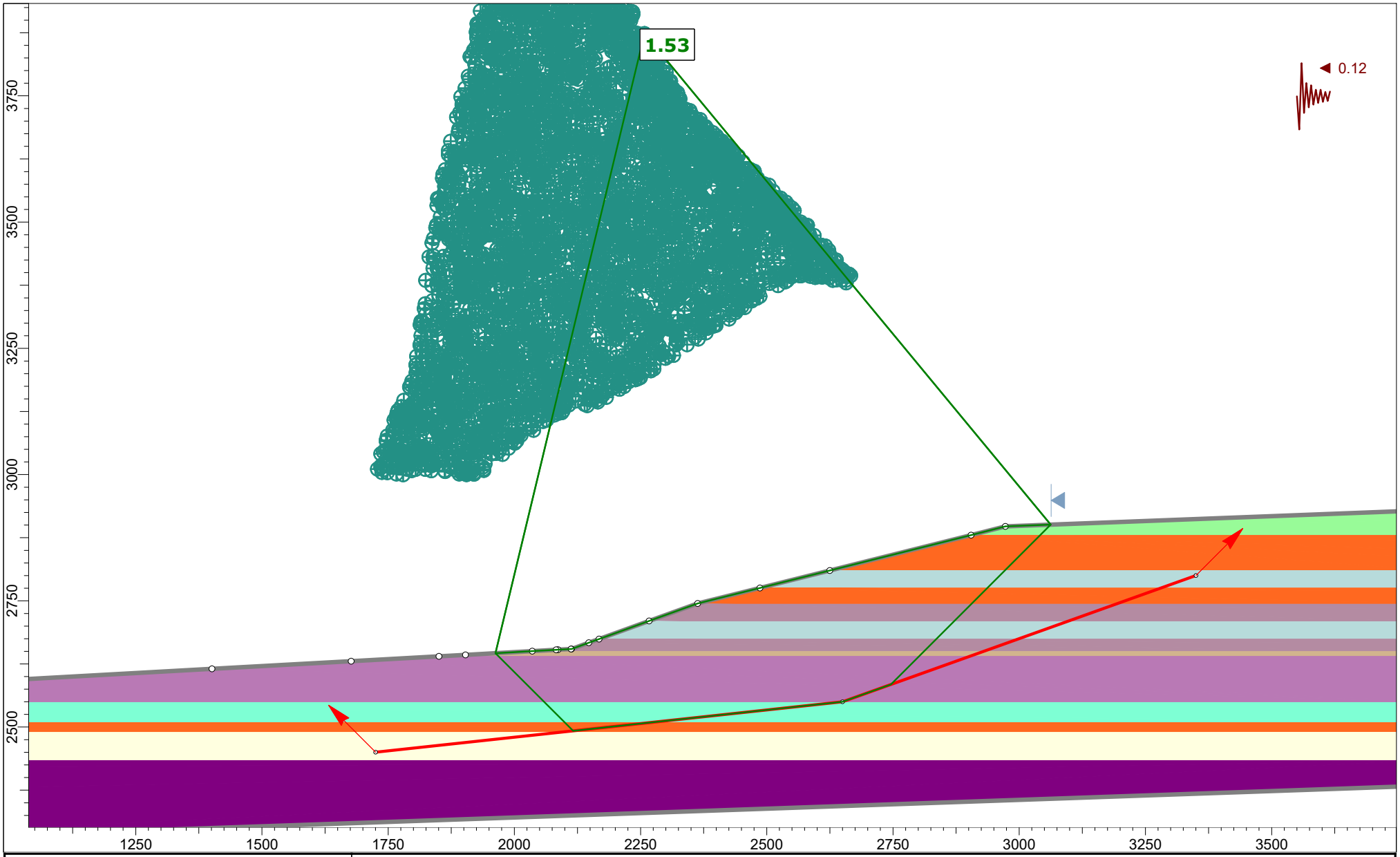
Project	Pickles Butte		Figure 28D
Group	SECTION F	Scenario	Proposed Excavation 3H:1V Lower, 4H:1V Upper
Drawn By	SG	Company	Tetra Tech
Date	7/28/2022	File Name	Static Loading



rocscience	Project	Pickles Butte	Figure 29D
	Group	SECTION F	Scenario: Proposed Excavation 3H:1V Lower, 4H:1V Upper
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Seismic Loading

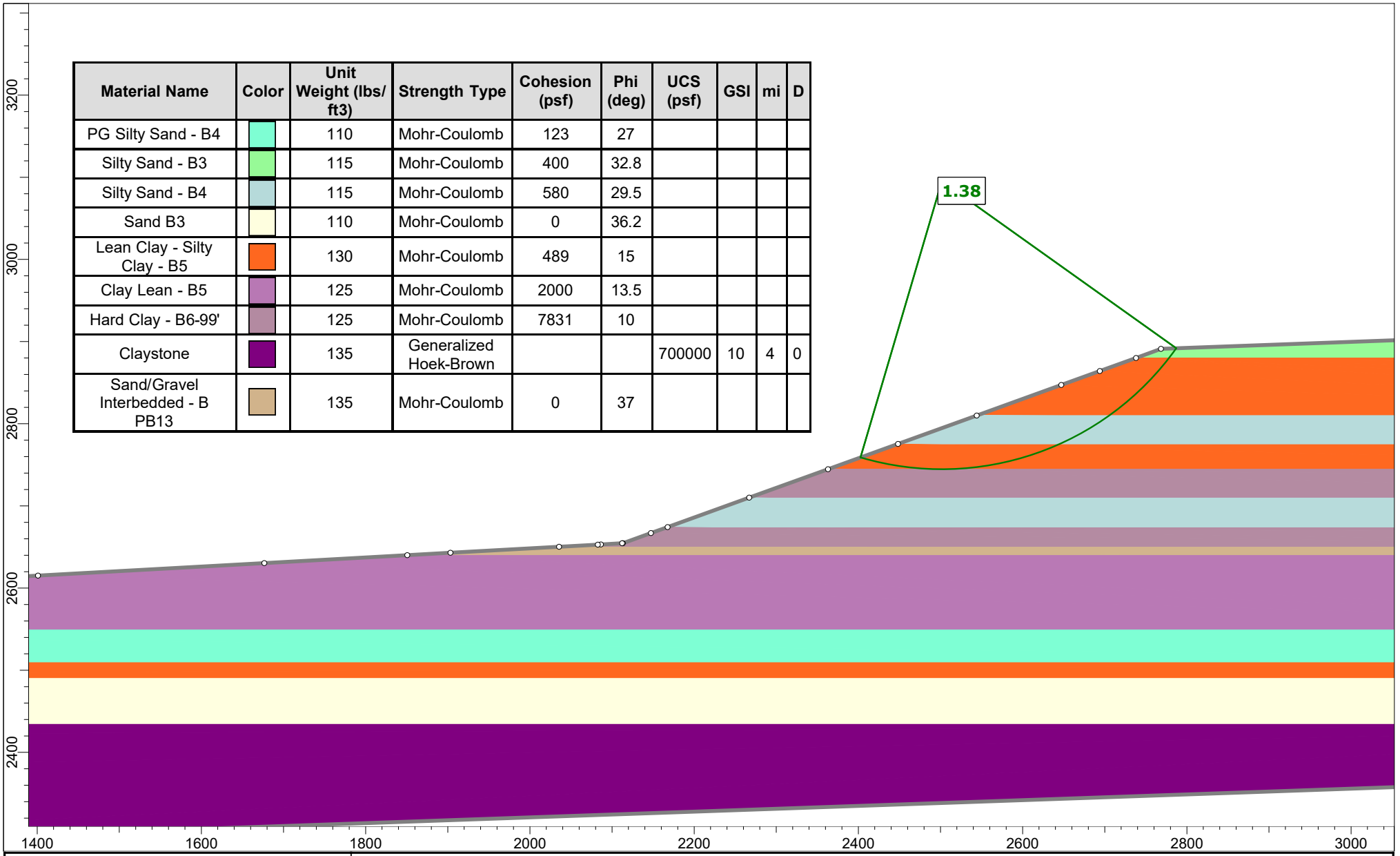


rocscience	Project	Pickles Butte	Figure 30D
	Group	SECTION F	Scenario: Proposed Excavation 3H:1V Lower, 4H:1V Upper
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Static Loading - Block Failure



rocscience	Project	Pickles Butte	Figure 31D
	Group	SECTION F	Scenario: Proposed Excavation 3H:1V Lower, 4H:1V Upper
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Static Loading - Block Failure

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
PG Silty Sand - B4		110	Mohr-Coulomb	123	27				
Silty Sand - B3		115	Mohr-Coulomb	400	32.8				
Silty Sand - B4		115	Mohr-Coulomb	580	29.5				
Sand B3		110	Mohr-Coulomb	0	36.2				
Lean Clay - Silty Clay - B5		130	Mohr-Coulomb	489	15				
Clay Lean - B5		125	Mohr-Coulomb	2000	13.5				
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10				
Claystone		135	Generalized Hoek-Brown			700000	10	4	0
Sand/Gravel Interbedded - B PB13		135	Mohr-Coulomb	0	37				

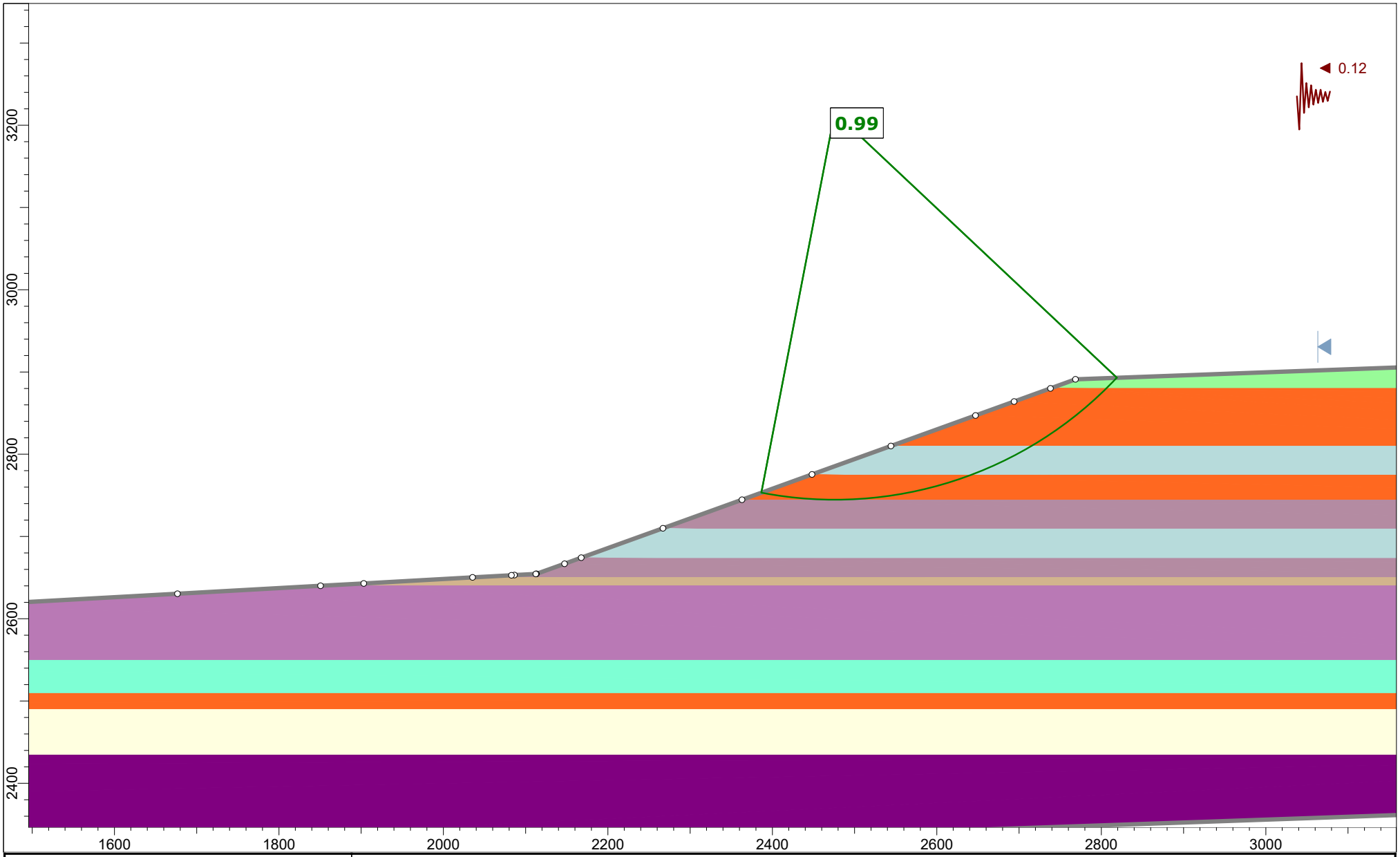


rocscience

SLIDEINTERPRET 9.023

Project	Pickles Butte		
Group	SECTION F	Scenario	Proposed Excavation 3H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/28/2022	File Name	Static Loading

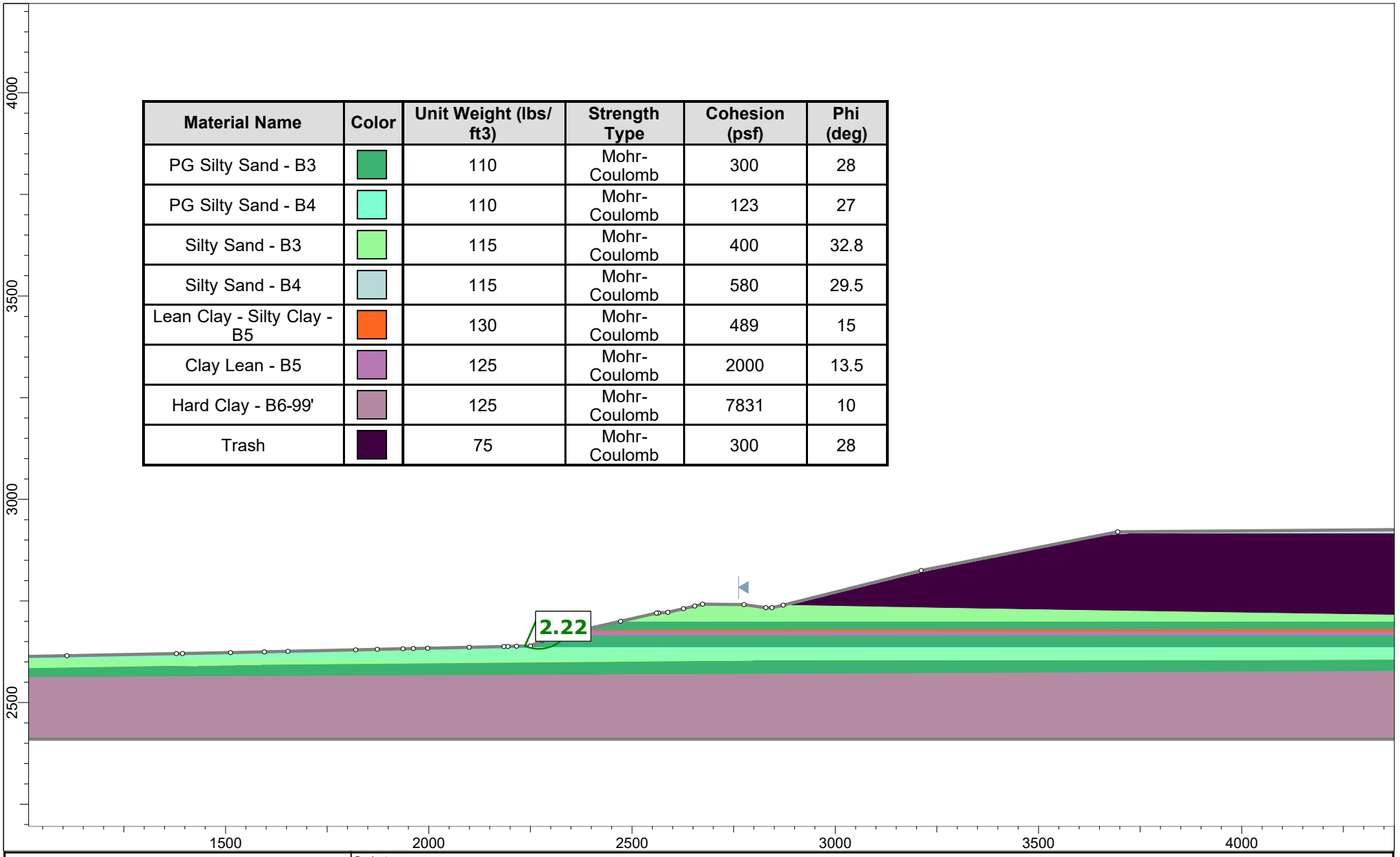
Figure 32D



rocscience	Project	Pickles Butte	Figure 33D
	Group	SECTION F	Scenario: Proposed Excavation 3H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Seismic Loading

SLIDEINTERPRET 9.023

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)
PG Silty Sand - B3		110	Mohr-Coulomb	300	28
PG Silty Sand - B4		110	Mohr-Coulomb	123	27
Silty Sand - B3		115	Mohr-Coulomb	400	32.8
Silty Sand - B4		115	Mohr-Coulomb	580	29.5
Lean Clay - Silty Clay - B5		130	Mohr-Coulomb	489	15
Clay Lean - B5		125	Mohr-Coulomb	2000	13.5
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10
Trash		75	Mohr-Coulomb	300	28

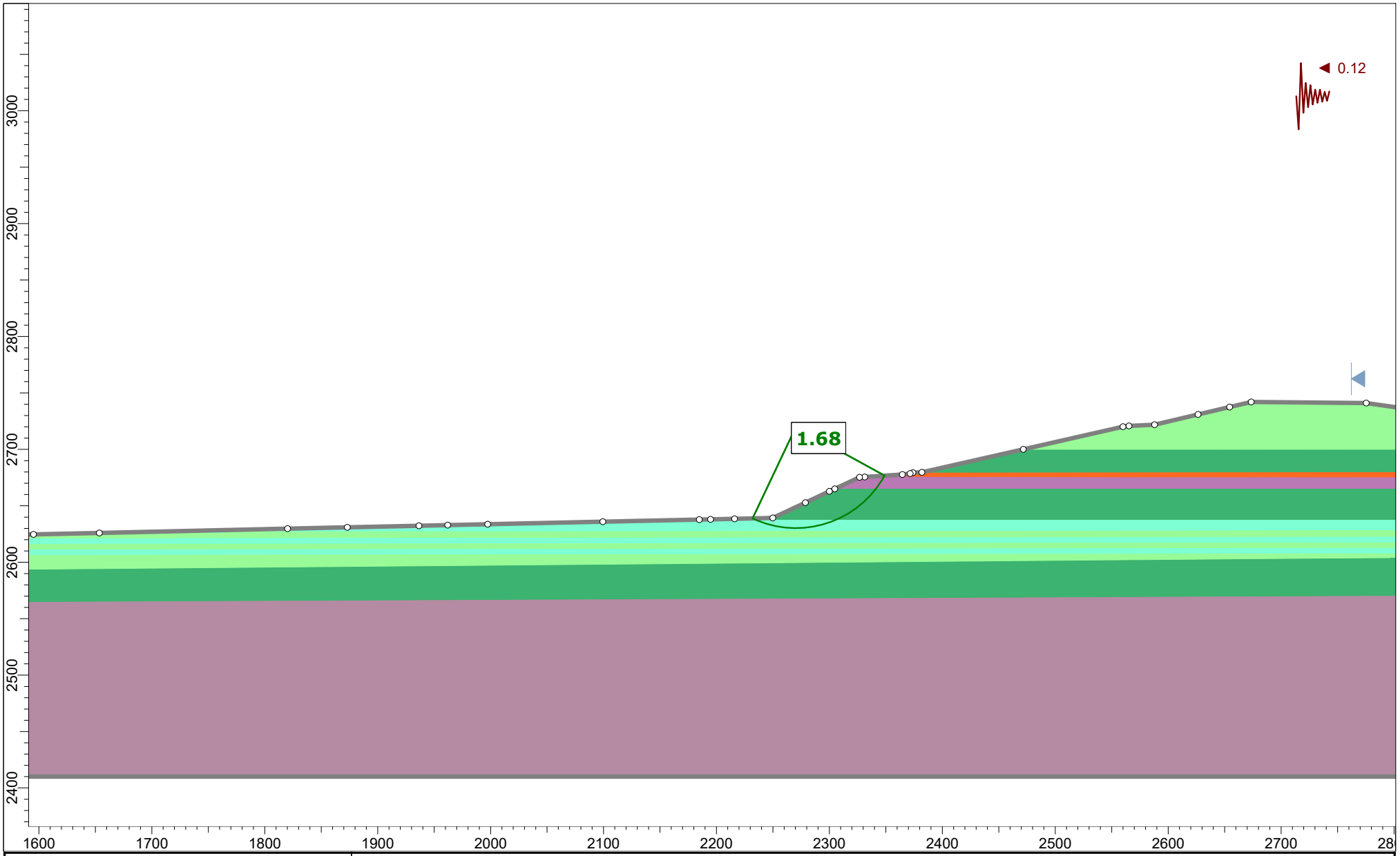


rocscience

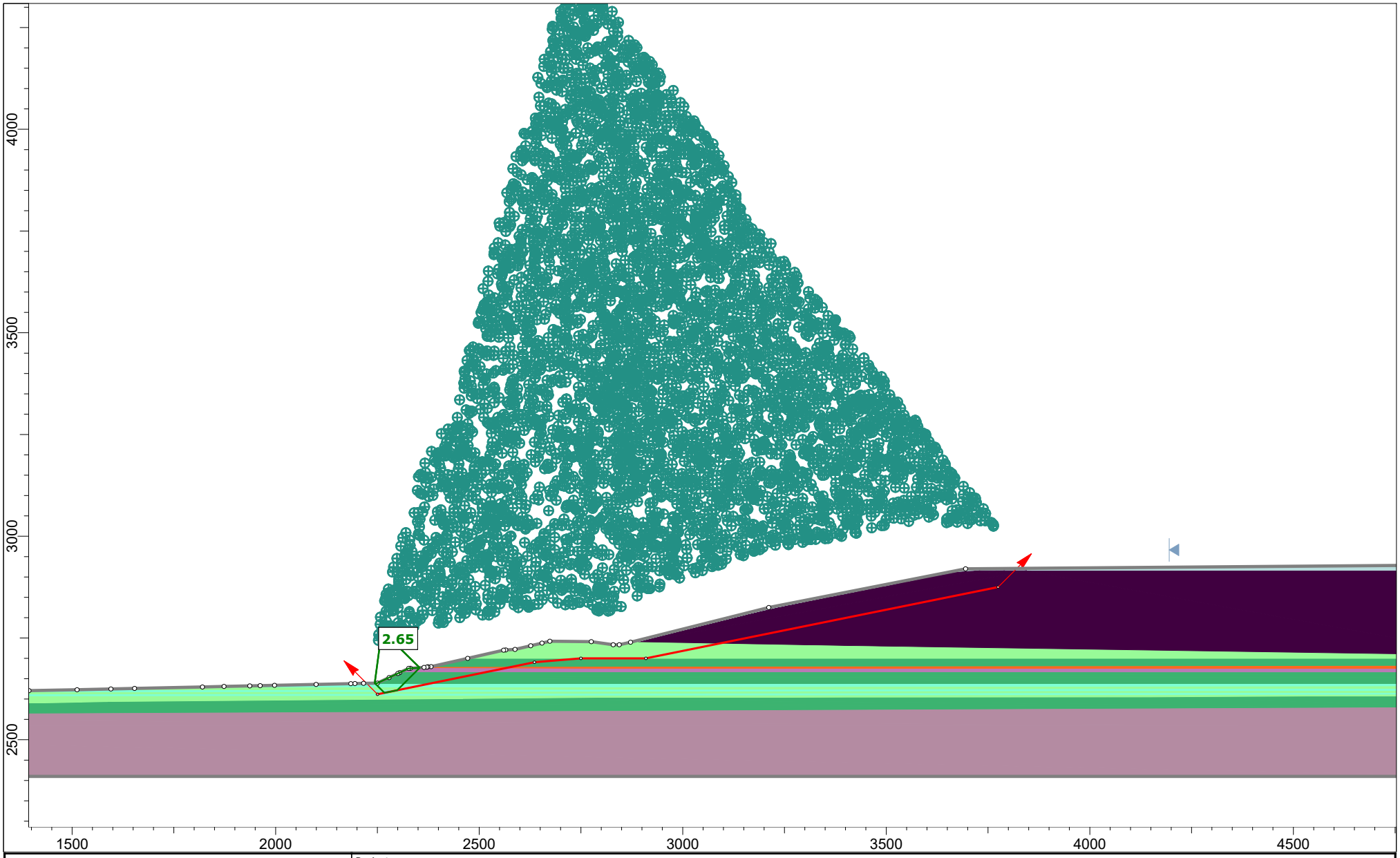
SLIDEINTERPRET 9.023

Project	Pickles Butte		
Group	SECTION G	Scenario	Proposed Excavation 2.6H:1V
Drawn By	SG	Company	Tetra Tech
Date	7/28/2022	File Name	Static Loading

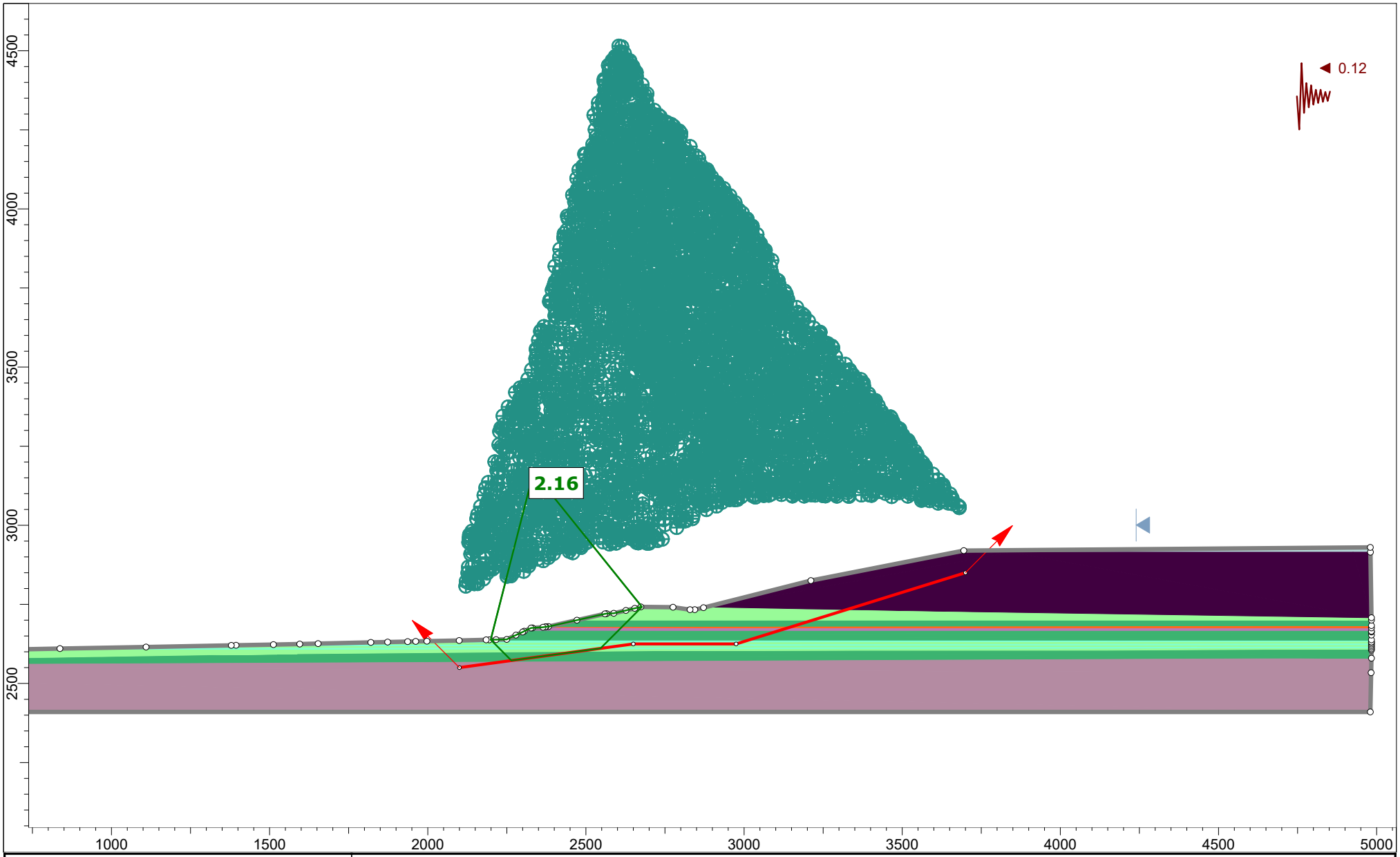
Figure 34D



rocscience	Project	Pickles Butte	Figure 35D
	Group	SECTION G	Scenario: Proposed Excavation 2.6H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Seismic Loading

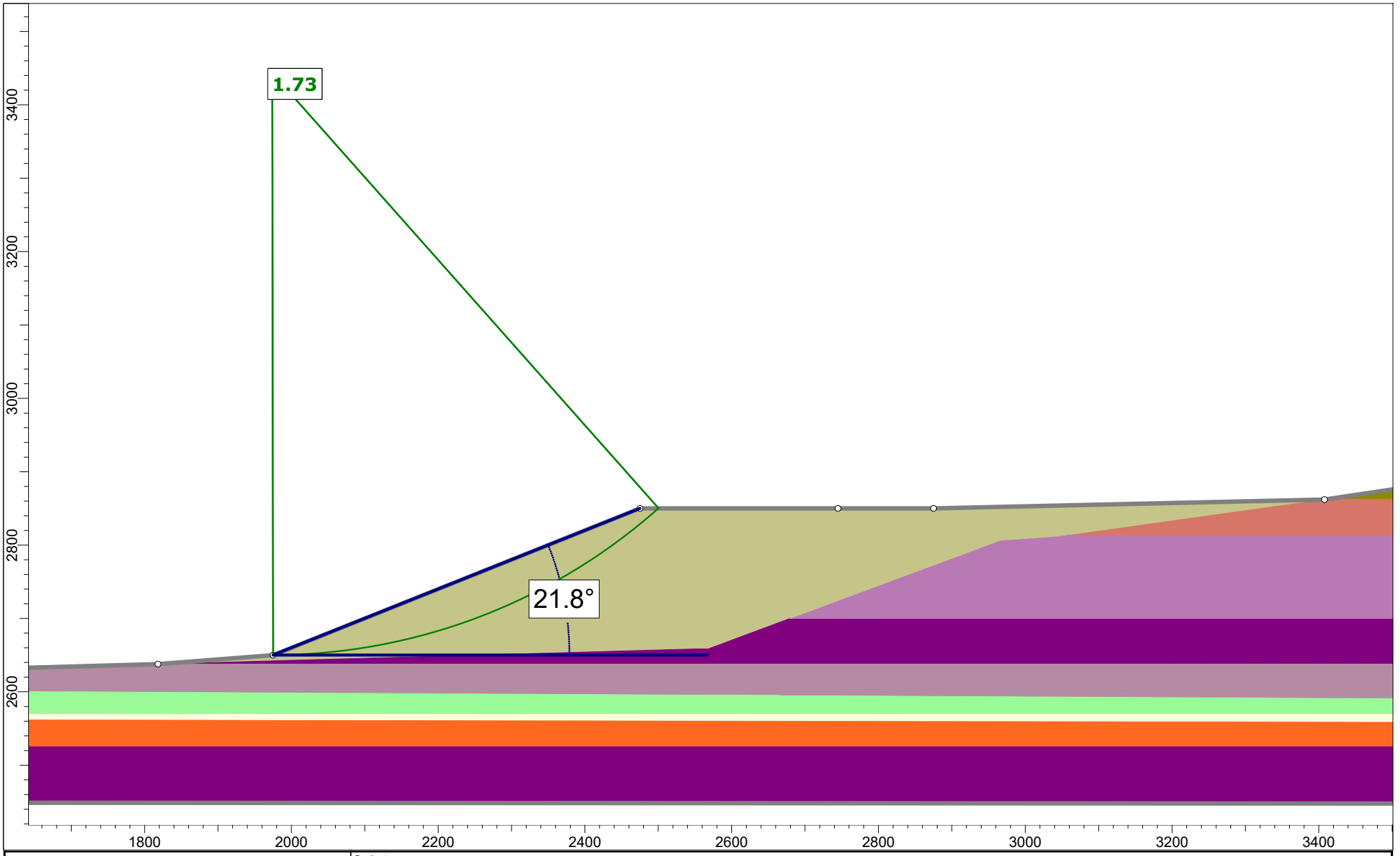


rocscience	Project	Pickles Butte	Figure 36D
	Group	SECTION G	Scenario: Proposed Excavation 2.6H:1V
	Drawn By	SG	Company: Tetra Tech
SLIDEINTERPRET 9.023	Date	7/28/2022	File Name: Static Loading - Block

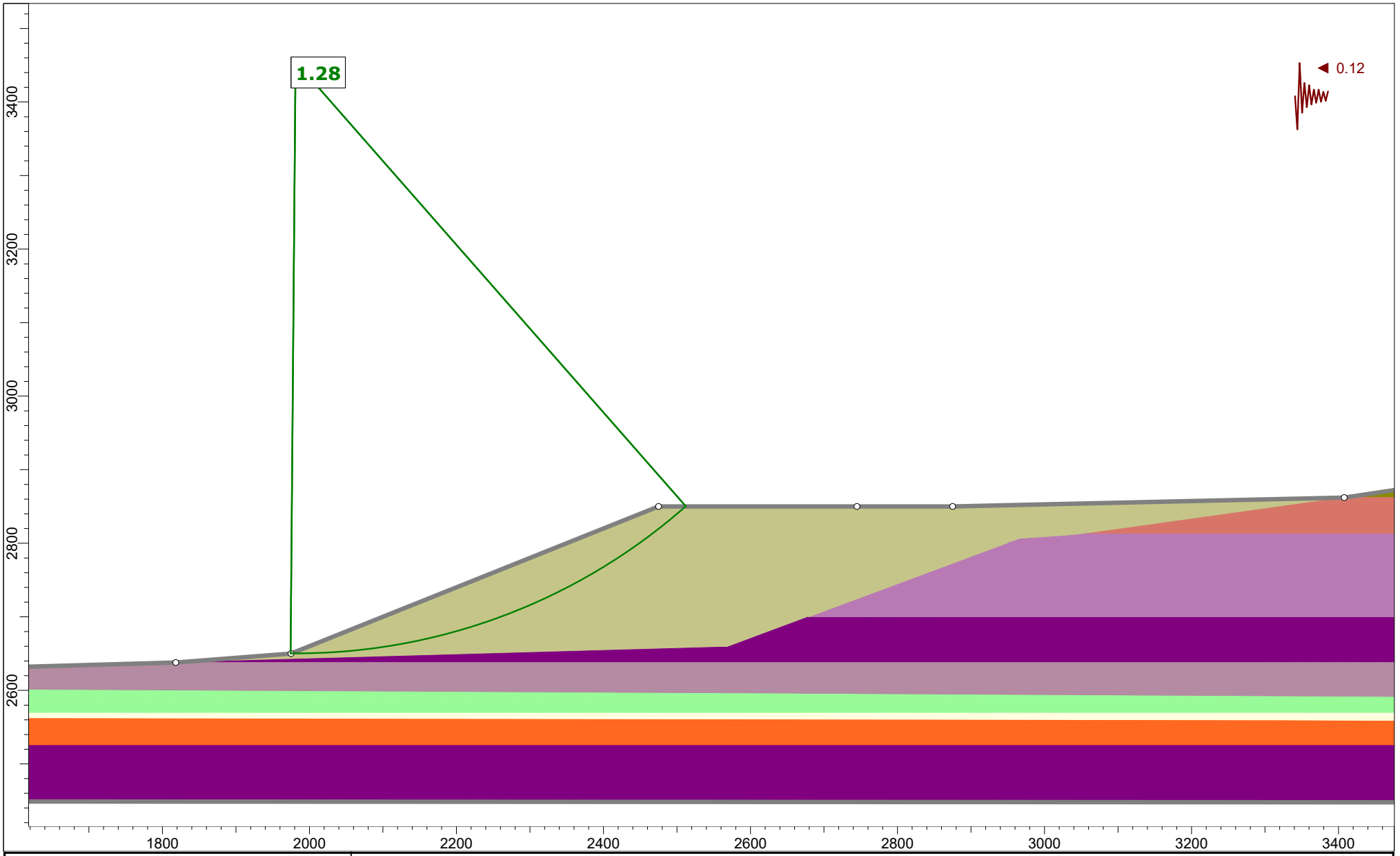


rocscience	Project	Pickles Butte	Figure 37D
	Group	SECTION G	Scenario: Proposed Excavation 2.6H:1V
	Drawn By	SG	Company: Tetra Tech
	Date	7/28/2022	File Name: Seismic Loading - Block

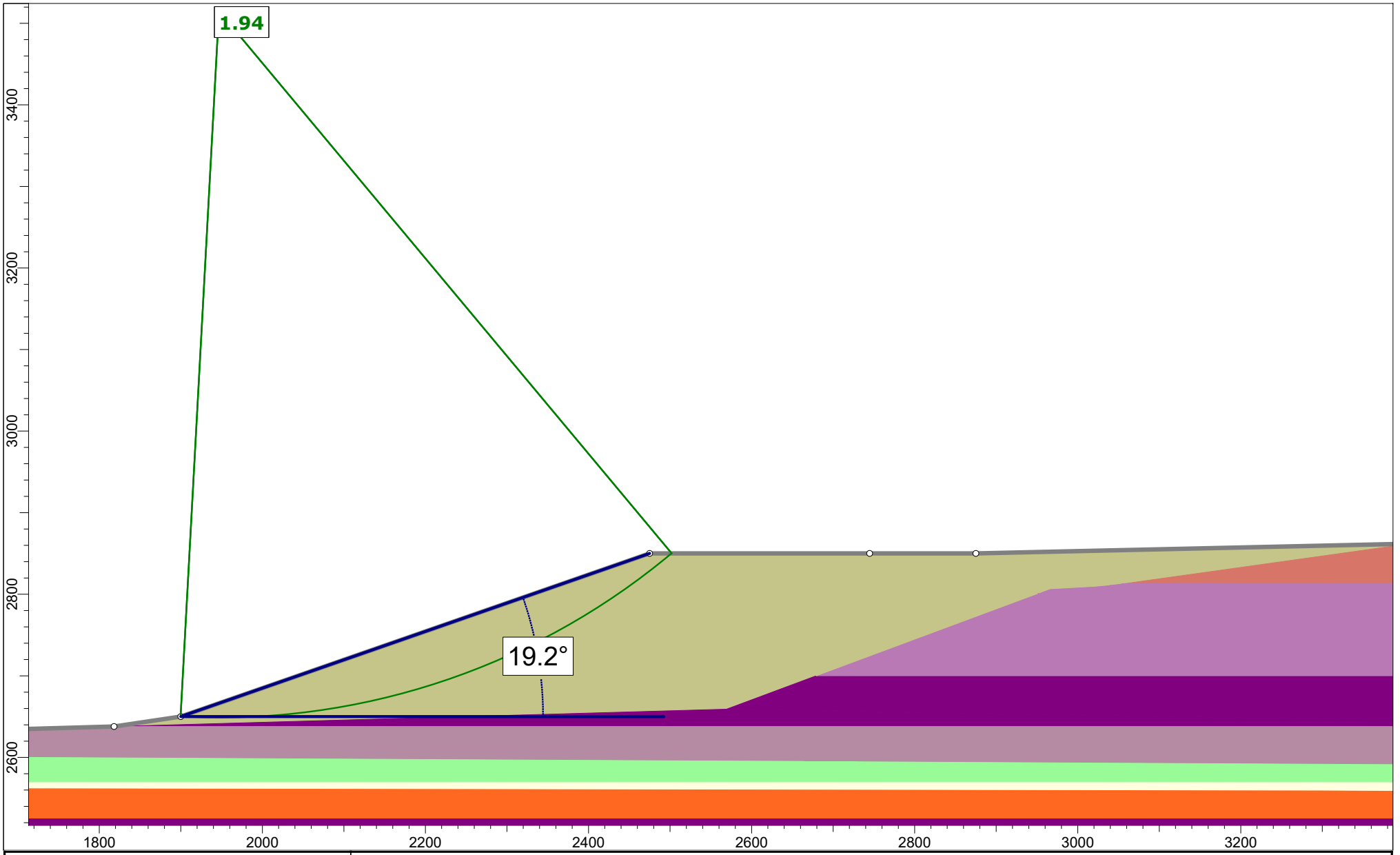
SLIDEINTERPRET 9.023



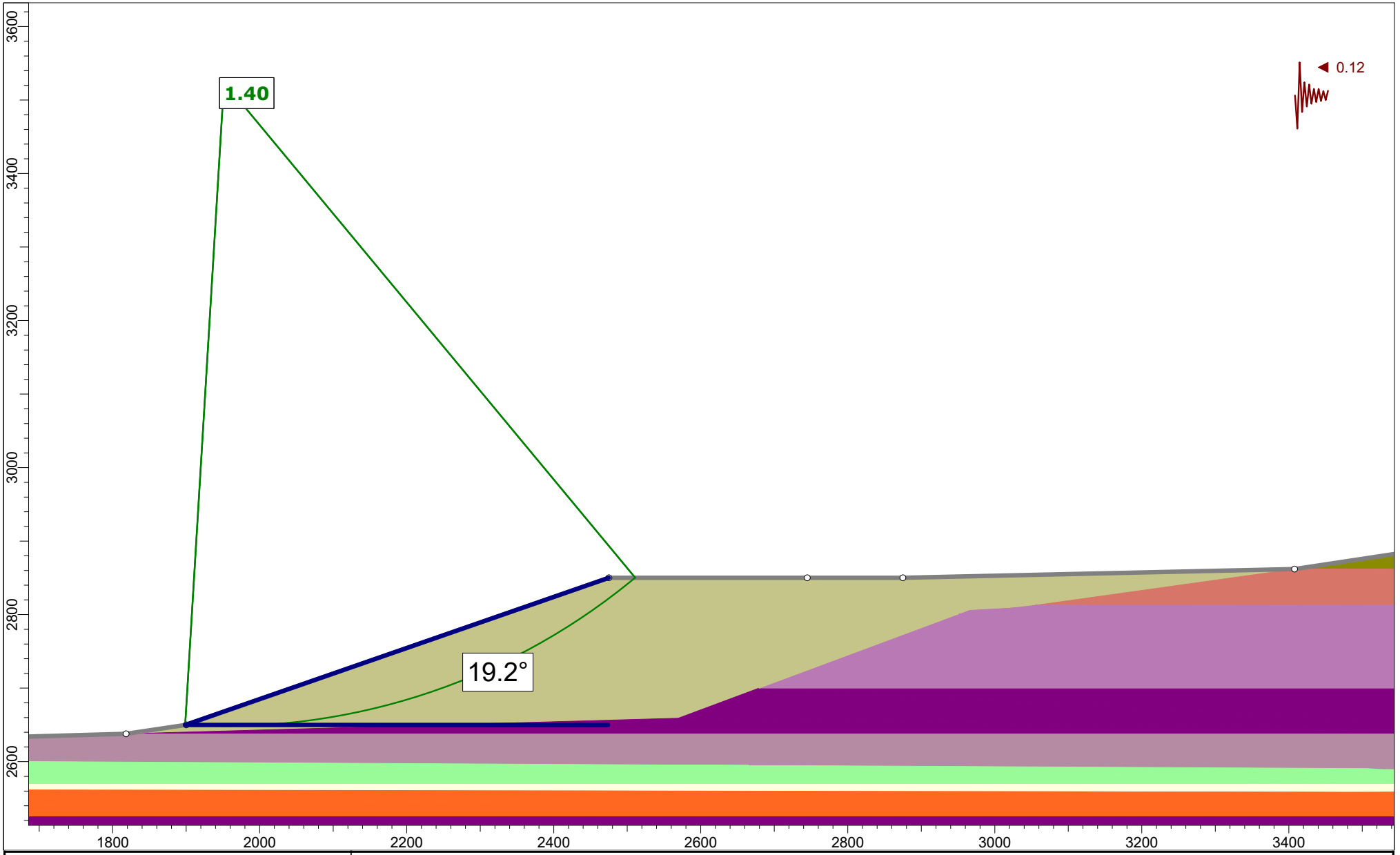
rocscience	Project: Pickles Butte		Figure 38D
	Group: SECTION E	Scenario: 2.75H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
SLIDEINTERPRET 9.023	Date: 8/4/2022	File Name: Trash Backfill - Static	



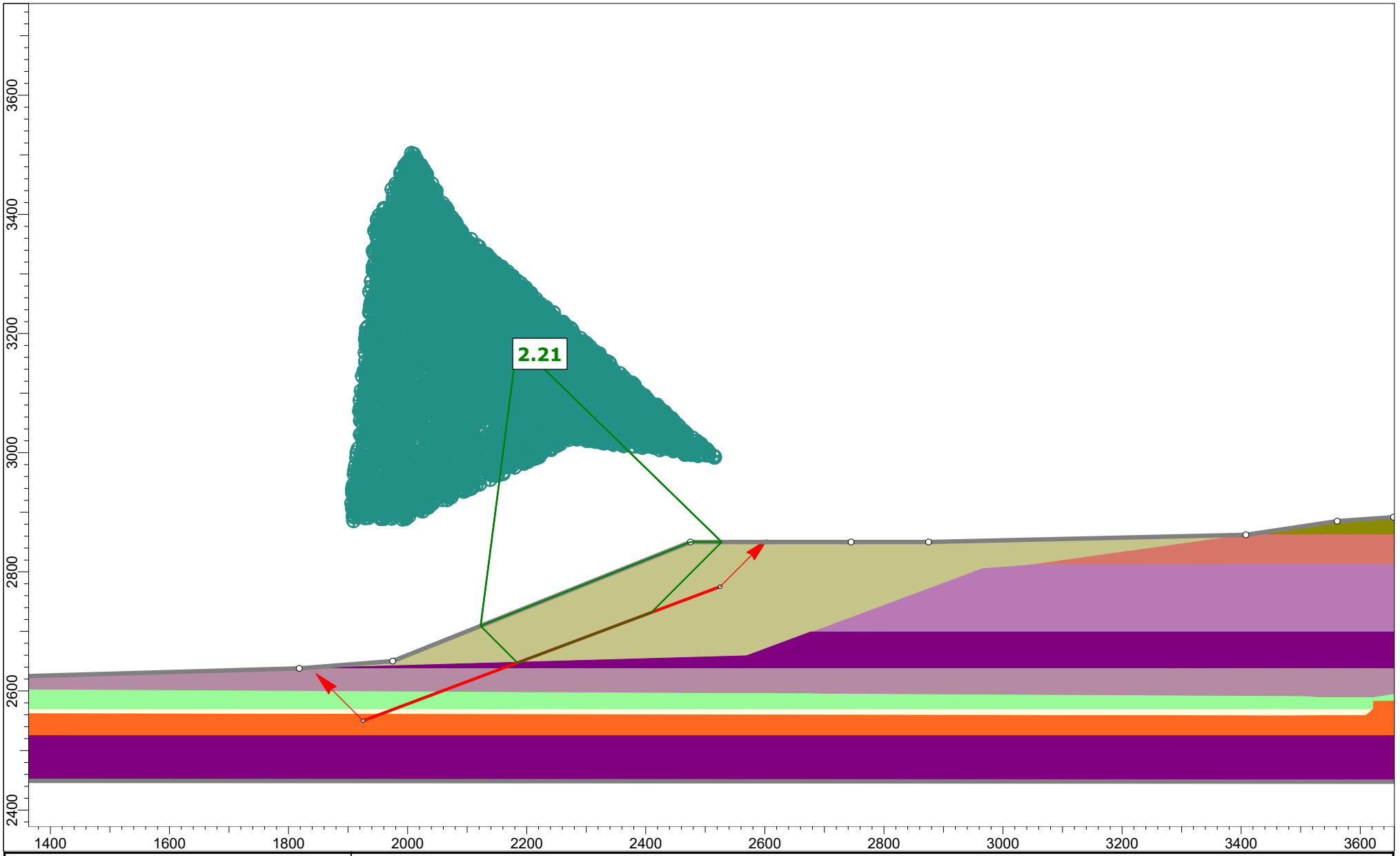
rocscience	Project: Pickles Butte		Figure 39D
	Group: SECTION E	Scenario: 2.75H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
SLIDEINTERPRET 9.023	Date: 8/4/2022	File Name: Trash Backfill - Seismic	



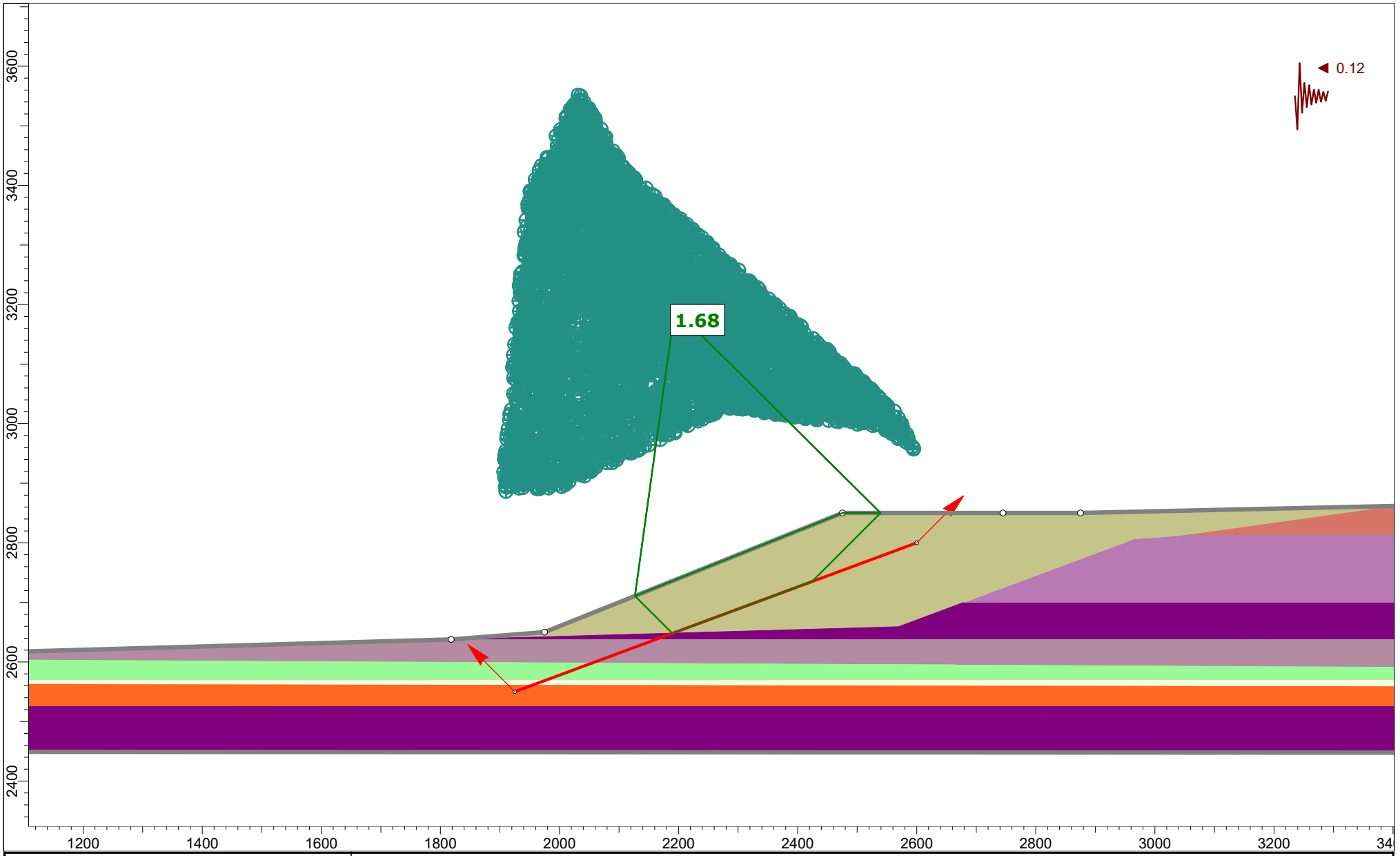
rocscience	Project: Pickles Butte		Figure 40D
	Group: SECTION E	Scenario: 3H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
SLIDEINTERPRET 9.023	Date: 8/4/2022	File Name: Trash Backfill	



rocscience	Project: Pickles Butte		Figure 41D
	Group: SECTION E	Scenario: 3H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
SLIDEINTERPRET 9.023	Date: 8/4/2022	File Name: Trash Backfill - Seismic	



rocscience	Project: Pickles Butte		Figure 42D
	Group: SECTION E	Scenario: 3H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
SLIDEINTERPRET 9.023	Date: 8/5/2022	File Name: Trash Backfill Block Sliding- Static	



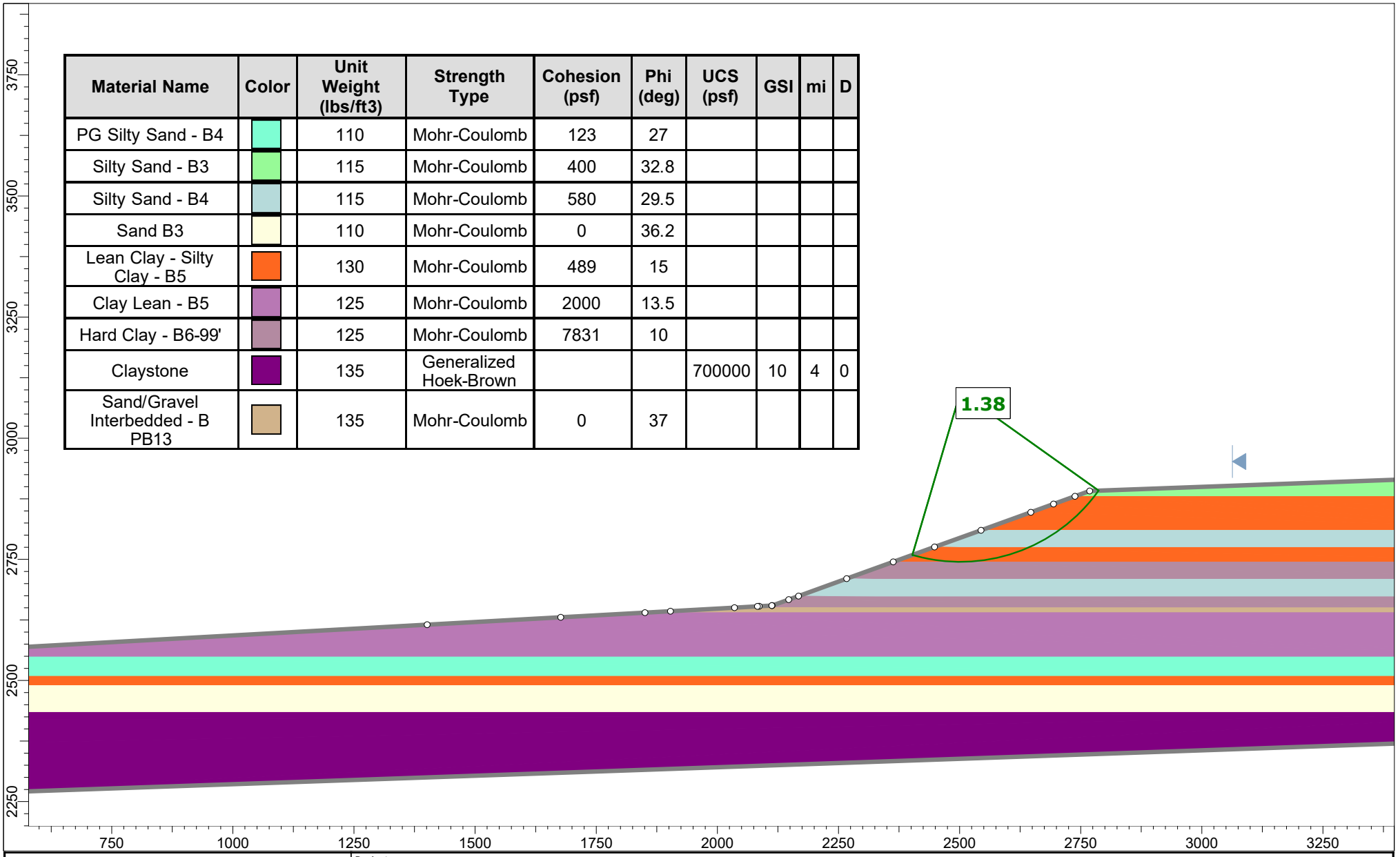
rocscience	Project: Pickles Butte		Figure 43D
	Group: SECTION E	Scenario: 3H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
SLIDEINTERPRET 9.023	Date: 8/5/2022	File Name: Trash Backfill Block Sliding- Seismic	

APPENDIX E: Deformation Analysis

Static and Pseudo-Static Slope Stability Stability Analyses with Associated Circular and Block Failure Factor of Safety, Newmark Displacement, and Critical Acceleration for Slope 3H:1V Figures 1E through 6E

Static and Pseudo-Static Slope Stability Stability Analyses with Associated Circular and Block Failure Factor of Safety, Newmark Displacement, and Critical Acceleration for Slope 4H:1V Figures 7E through 12E

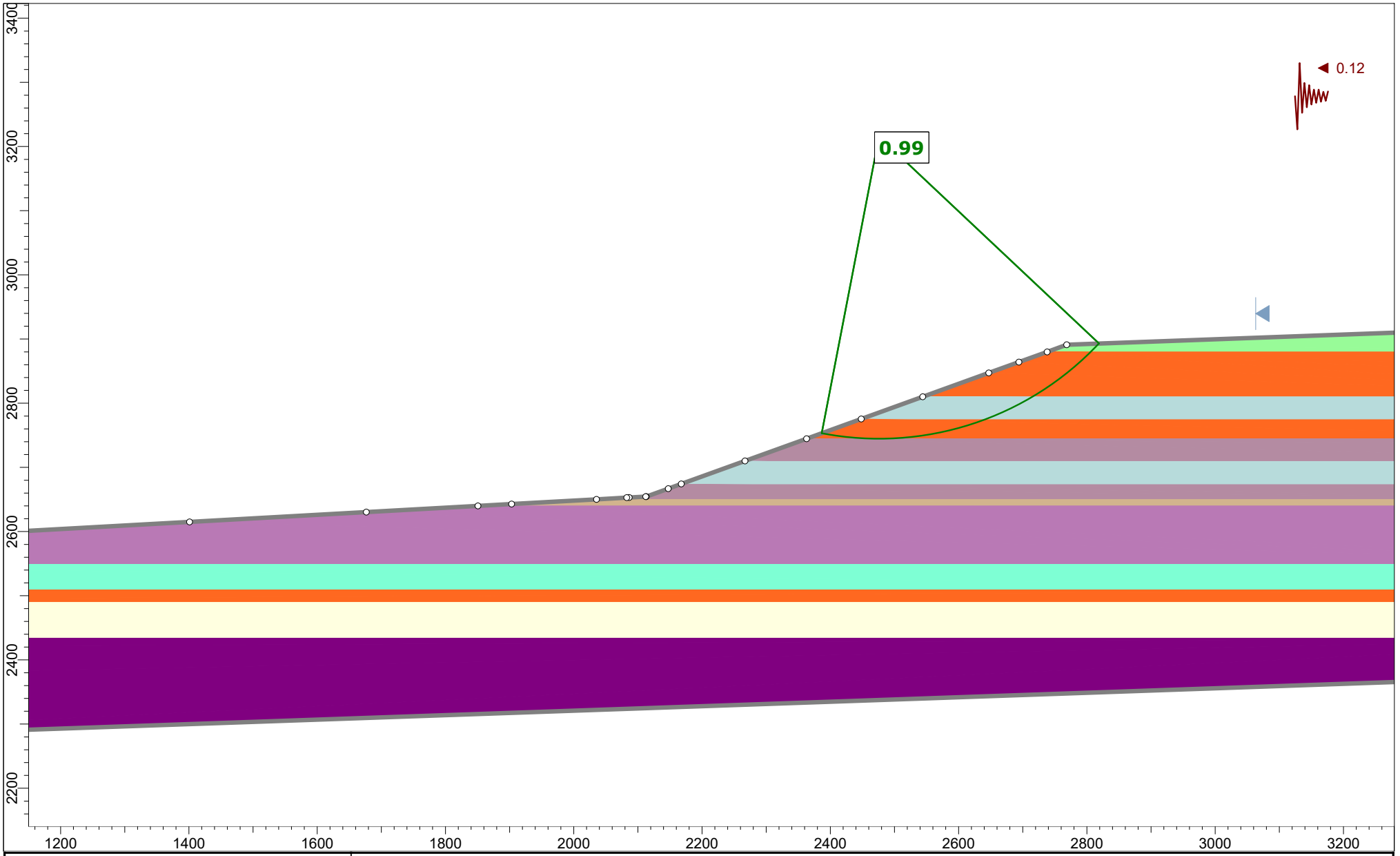
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	UCS (psf)	GSI	mi	D
PG Silty Sand - B4		110	Mohr-Coulomb	123	27				
Silty Sand - B3		115	Mohr-Coulomb	400	32.8				
Silty Sand - B4		115	Mohr-Coulomb	580	29.5				
Sand B3		110	Mohr-Coulomb	0	36.2				
Lean Clay - Silty Clay - B5		130	Mohr-Coulomb	489	15				
Clay Lean - B5		125	Mohr-Coulomb	2000	13.5				
Hard Clay - B6-99'		125	Mohr-Coulomb	7831	10				
Claystone		135	Generalized Hoek-Brown			700000	10	4	0
Sand/Gravel Interbedded - B PB13		135	Mohr-Coulomb	0	37				



rocscience

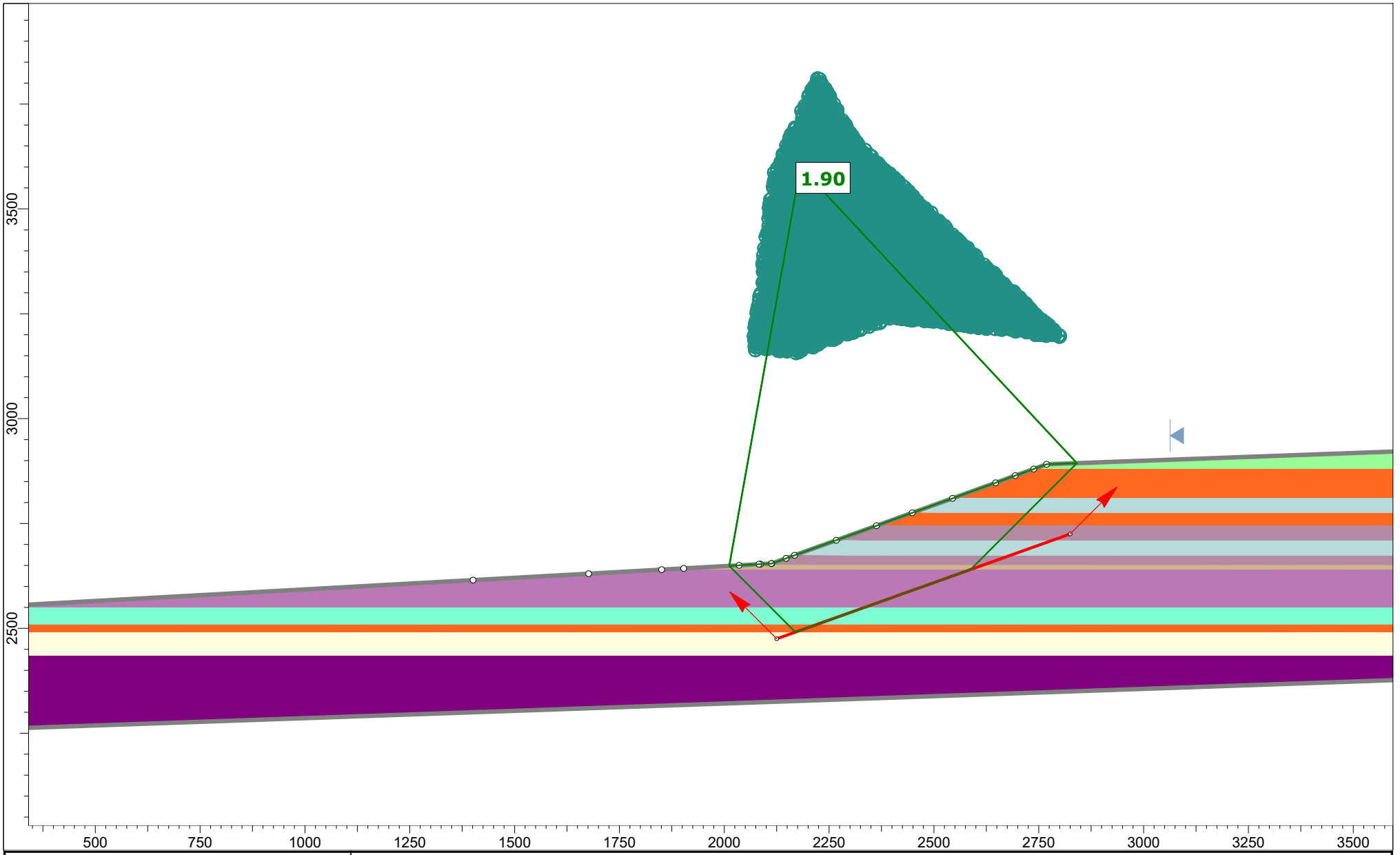
SLIDEINTERPRET 9.023

Project	Pickles Butte		Figure 1E
Group	SECTION F	Scenario	3H:1V Slope
Drawn By	SG	Company	Tetra Tech
Date	7/29/2022	File Name	Static Loading



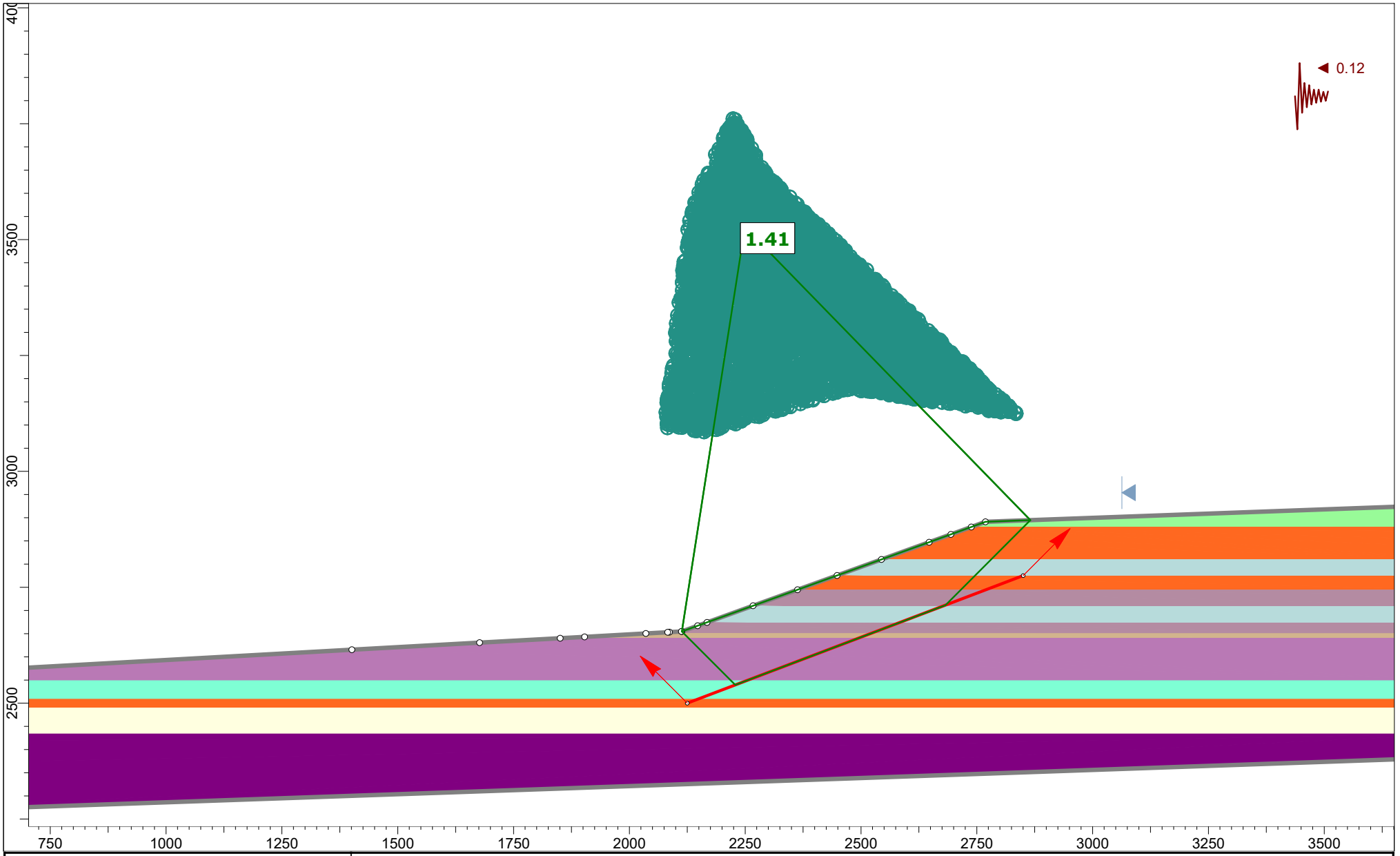
rocscience	Project	Pickles Butte	Figure 2E
	Group	SECTION F	Scenario 3H:1V Slope
	Drawn By	SG	Company Tetra Tech
	Date	7/29/2022	File Name Seismic Loading

SLIDEINTERPRET 9.023



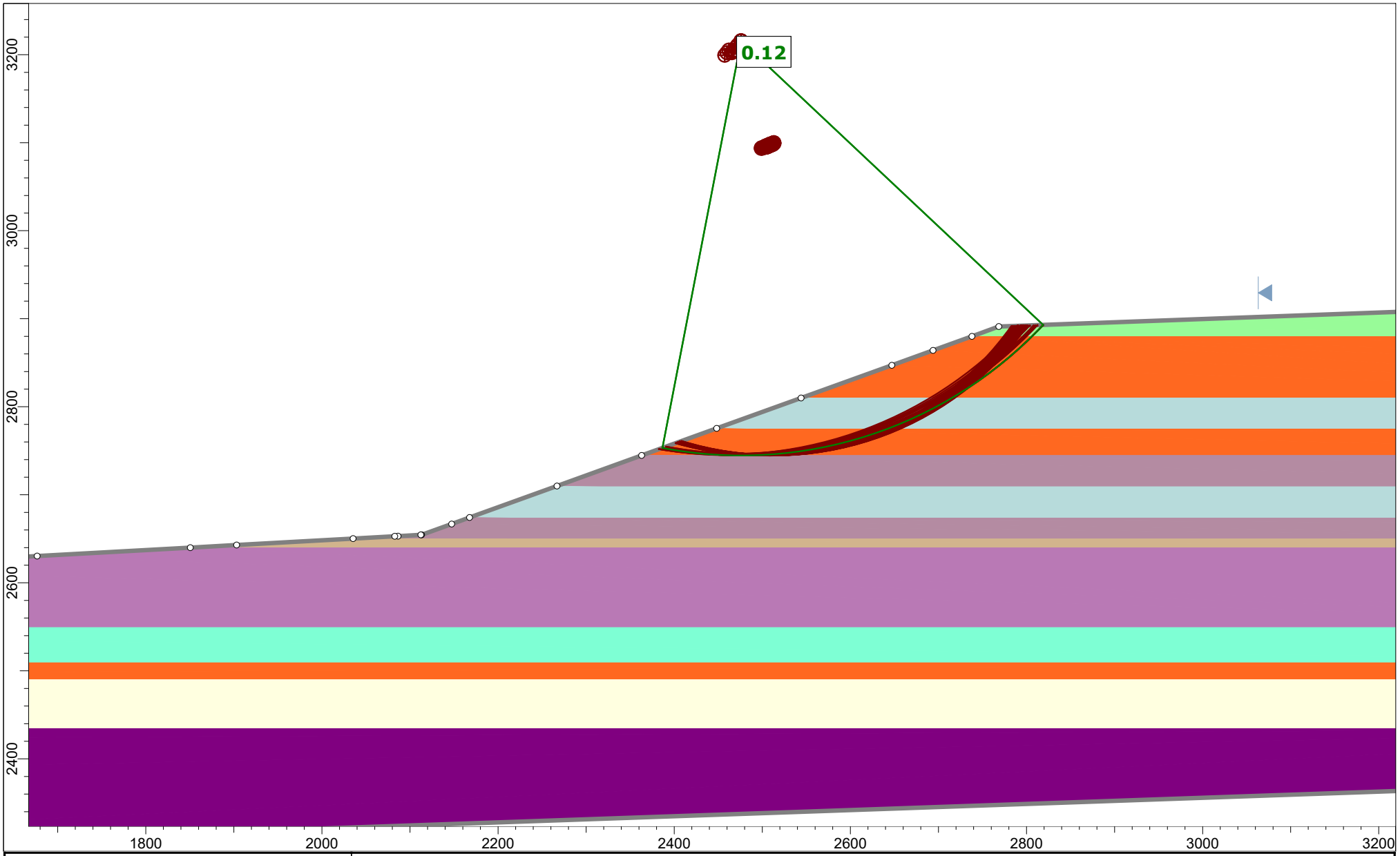
rocscience	Project: Pickles Butte		Figure 3E
	Group: SECTION F	Scenario:	3H:1V Slope
	Drawn By: SG	Company:	Tetra Tech
	Date: 7/29/2022	File Name:	Static Loading

SLIDEINTERPRET 9.023



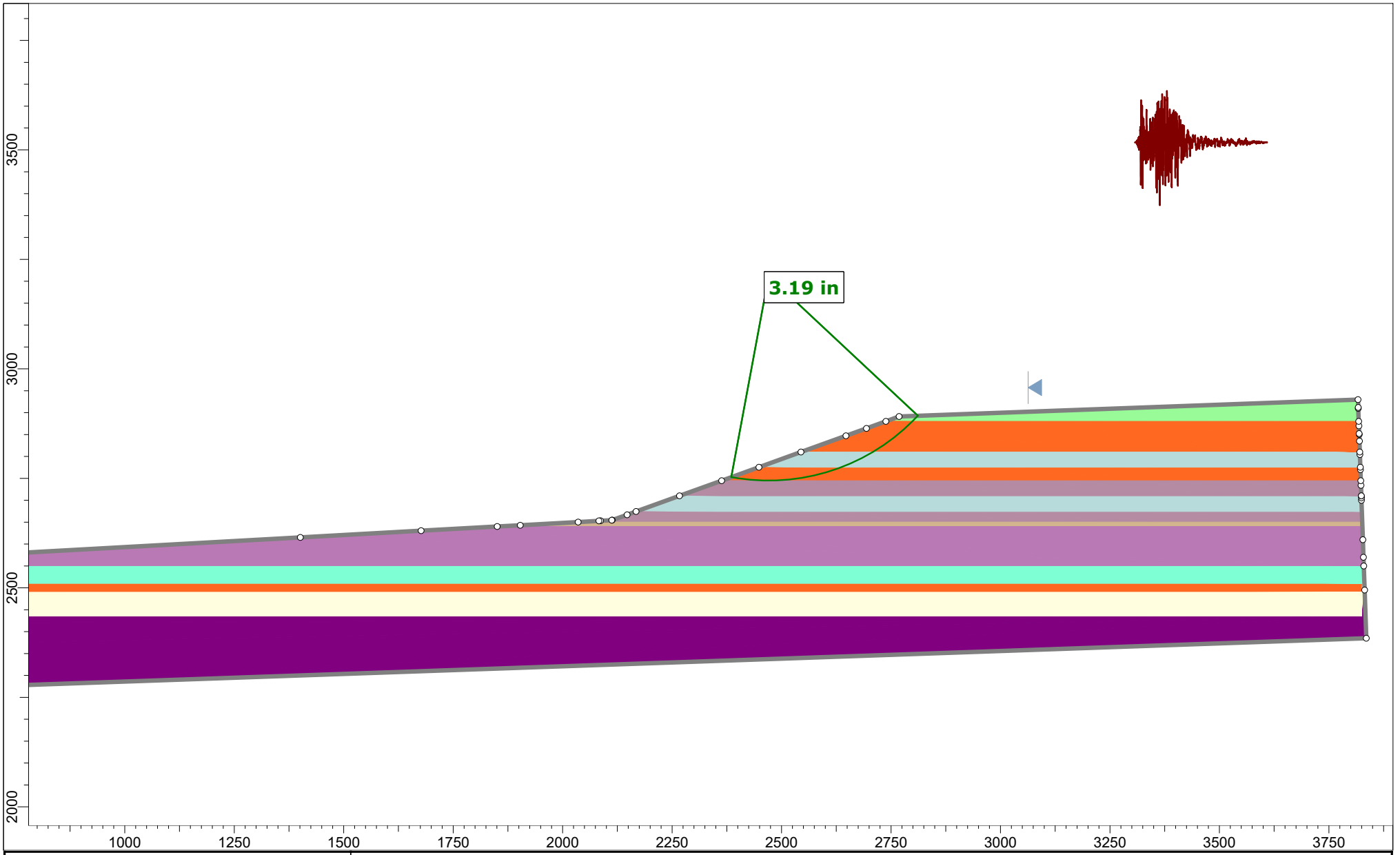
rocscience	Project: Pickles Butte		Figure 4E
	Group: SECTION F	Scenario:	3H:1V Slope
	Drawn By: SG	Company:	Tetra Tech
	Date: 7/29/2022	File Name:	Seismic Loading - Block Failure

SLIDEINTERPRET 9.023



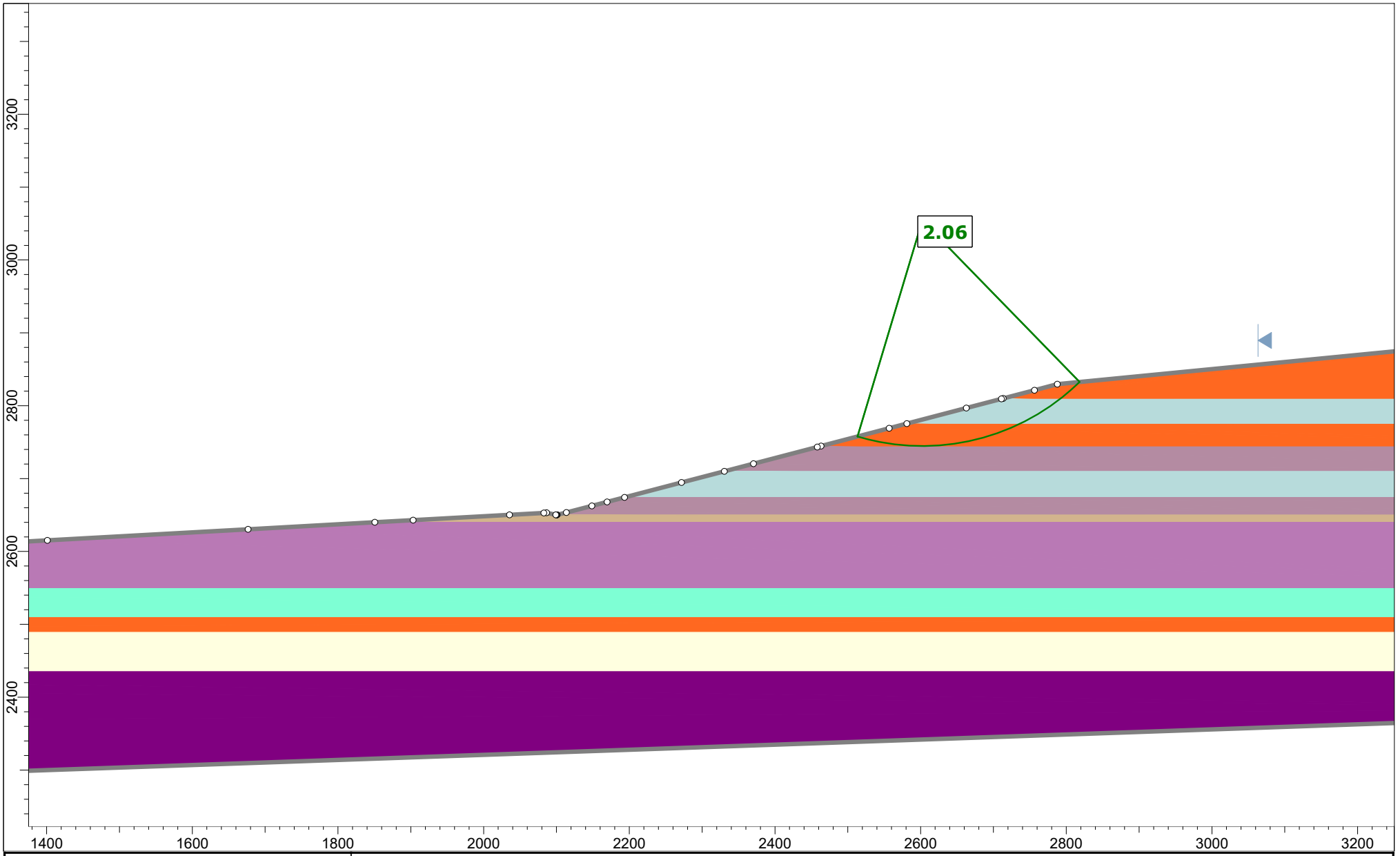
rocscience	Project	Pickles Butte	Figure 5E
	Group	SECTION F	Scenario: 3H:1V Slope
	Drawn By	SG	Company: Tetra Tech
	Date	7/29/2022	File Name: Critical Acceleration

SLIDEINTERPRET 9.023



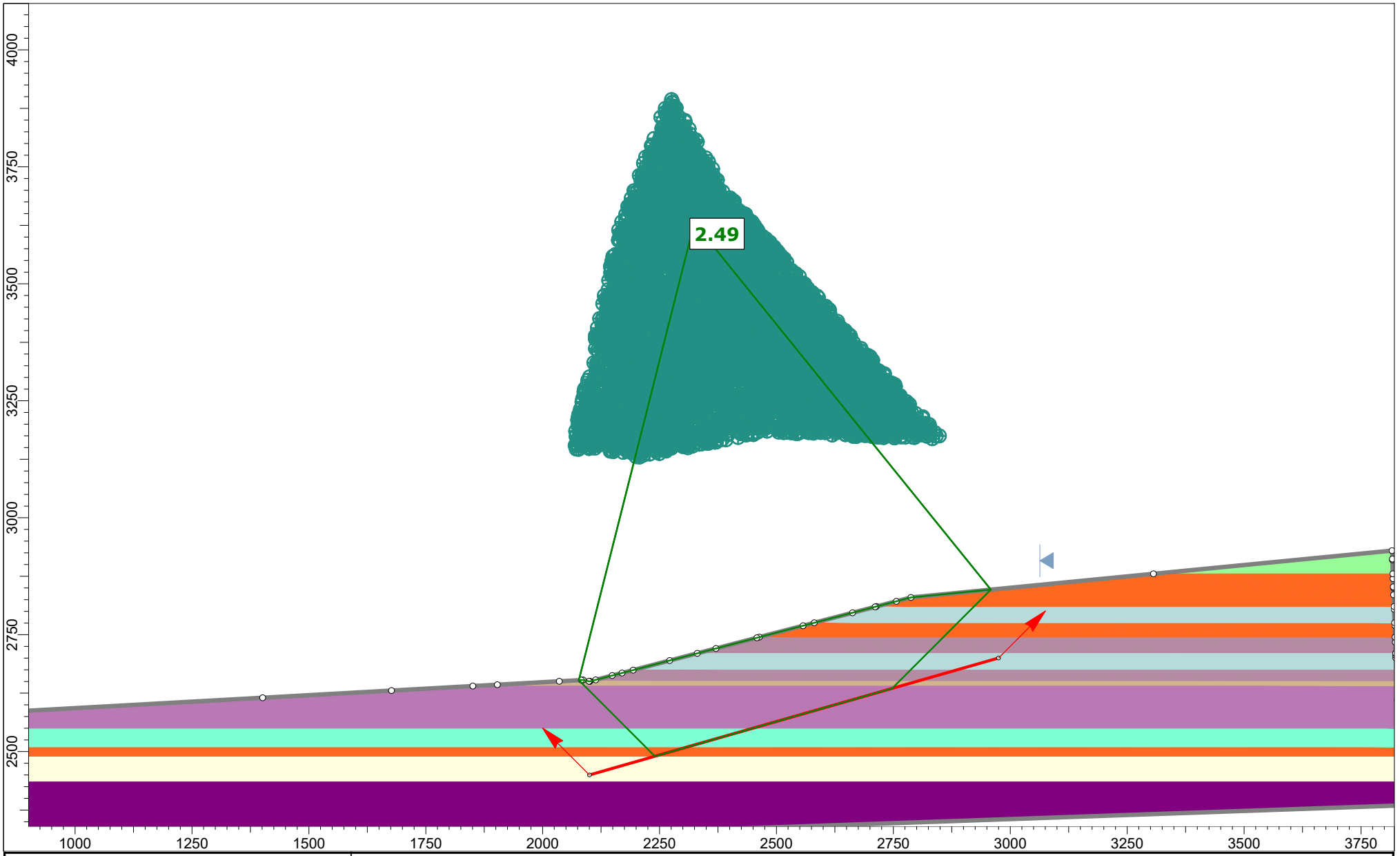
rocscience	Project	Pickles Butte	Figure 6E
	Group: SECTION F	Scenario: 3H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
	Date: 7/28/2022	File Name: Seismic Loading - Newmark Displacement	

SLIDEINTERPRET 9.023



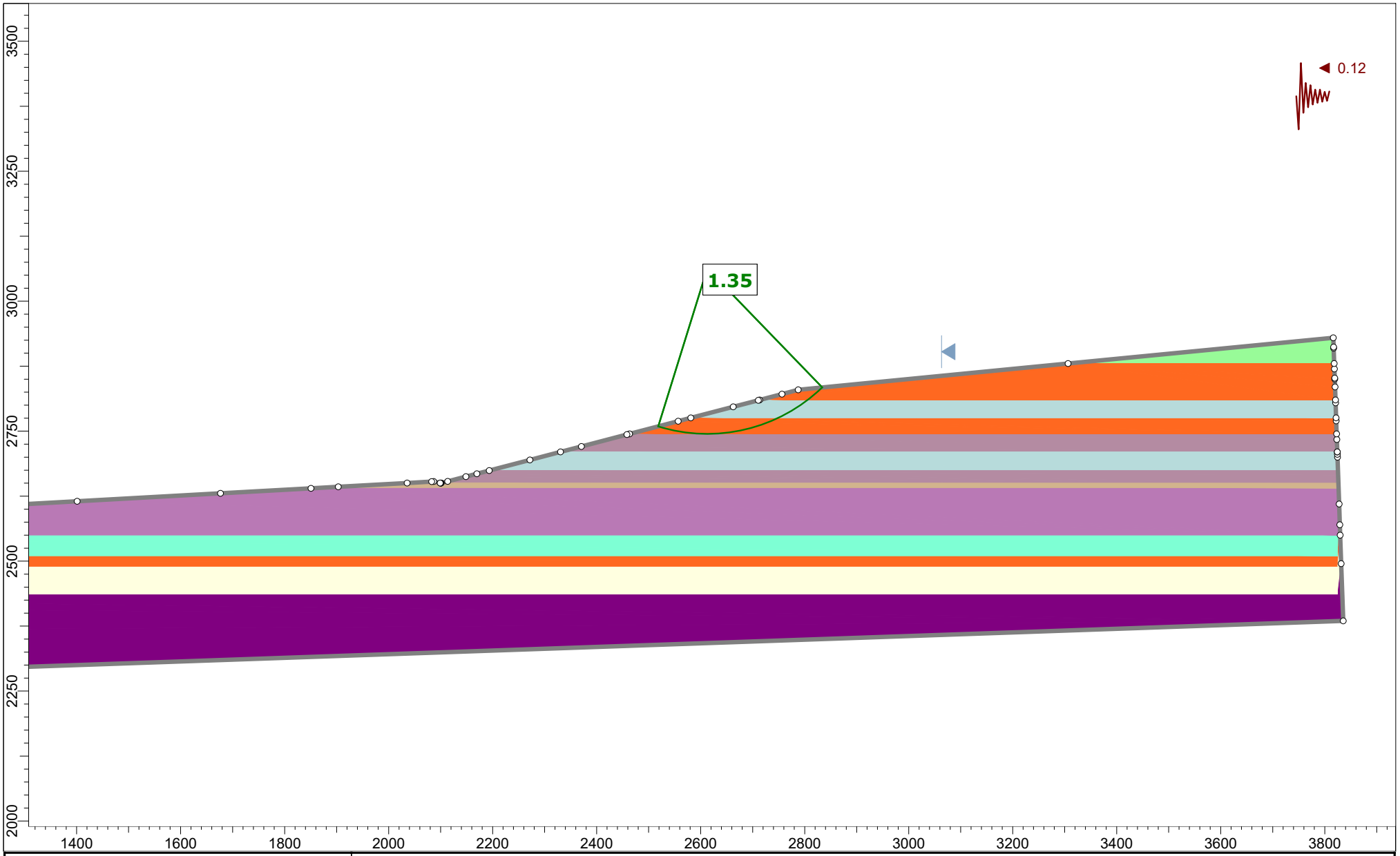
rocscience	Project	Pickles Butte	Figure 7E
	Group	SECTION F	Scenario: 4H:1V Slope
	Drawn By	SG	Company: Tetra Tech
	Date	7/29/2022	File Name: Static Loading

SLIDEINTERPRET 9.023



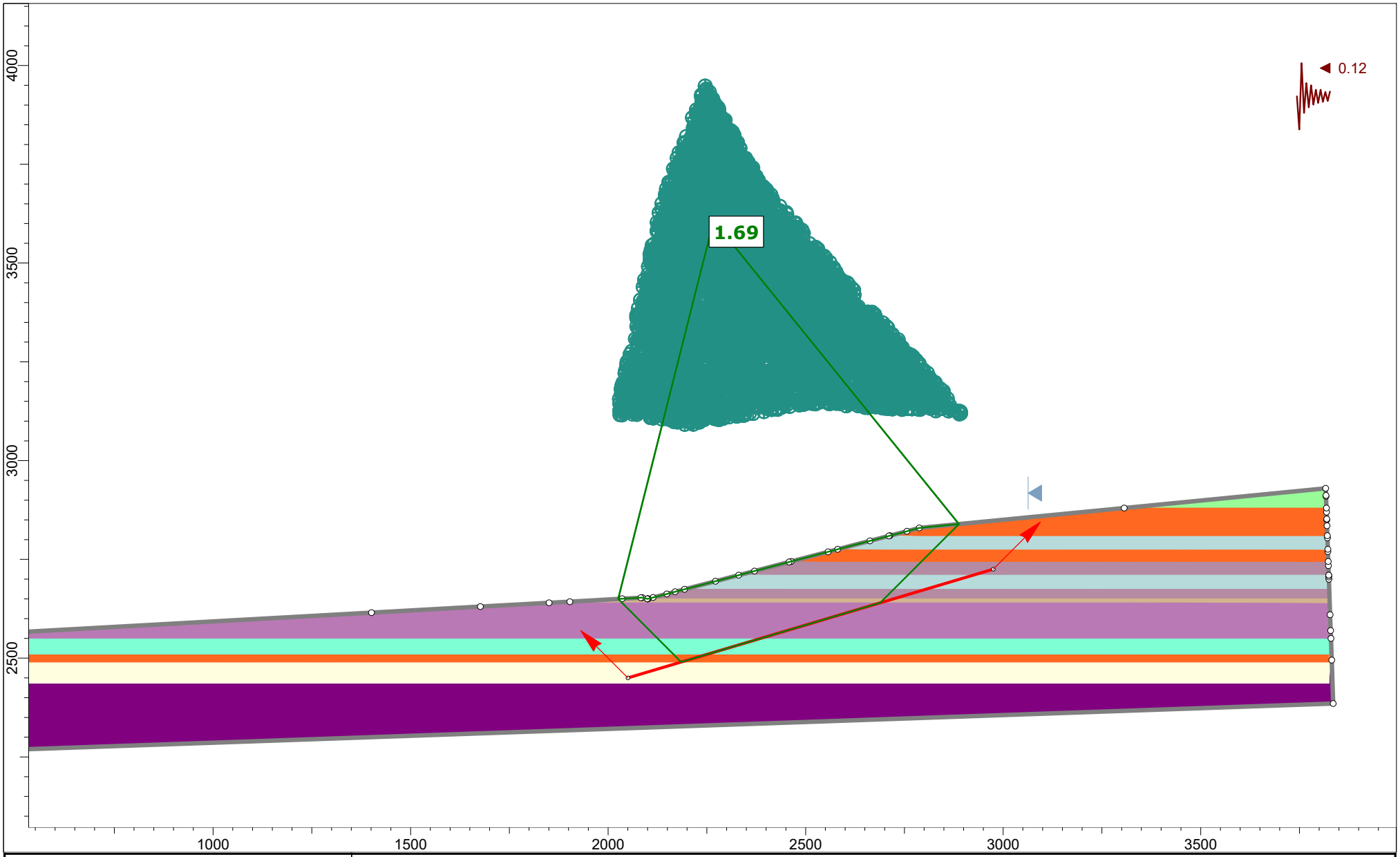
rocscience	Project: Pickles Butte		Figure 8E
	Group: SECTION F	Scenario: 4H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
	Date: 7/29/2022	File Name: Static Loading - Block Failure	

SLIDEINTERPRET 9.023



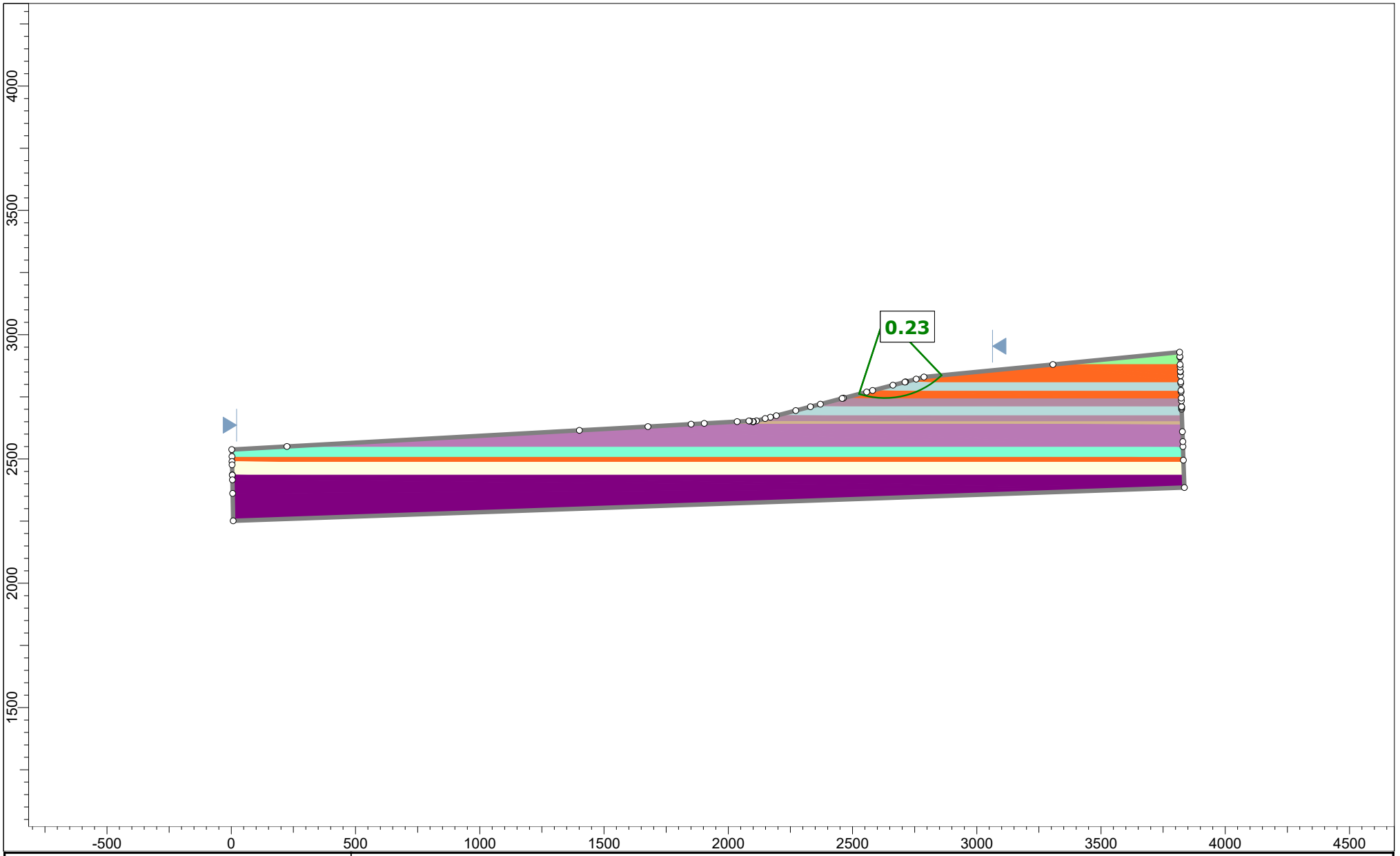
rocscience	Project: Pickles Butte		Figure 9E
	Group: SECTION F	Scenario: 4H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
	Date: 7/29/2022	File Name: Seismic Loading	

SLIDEINTERPRET 9.023



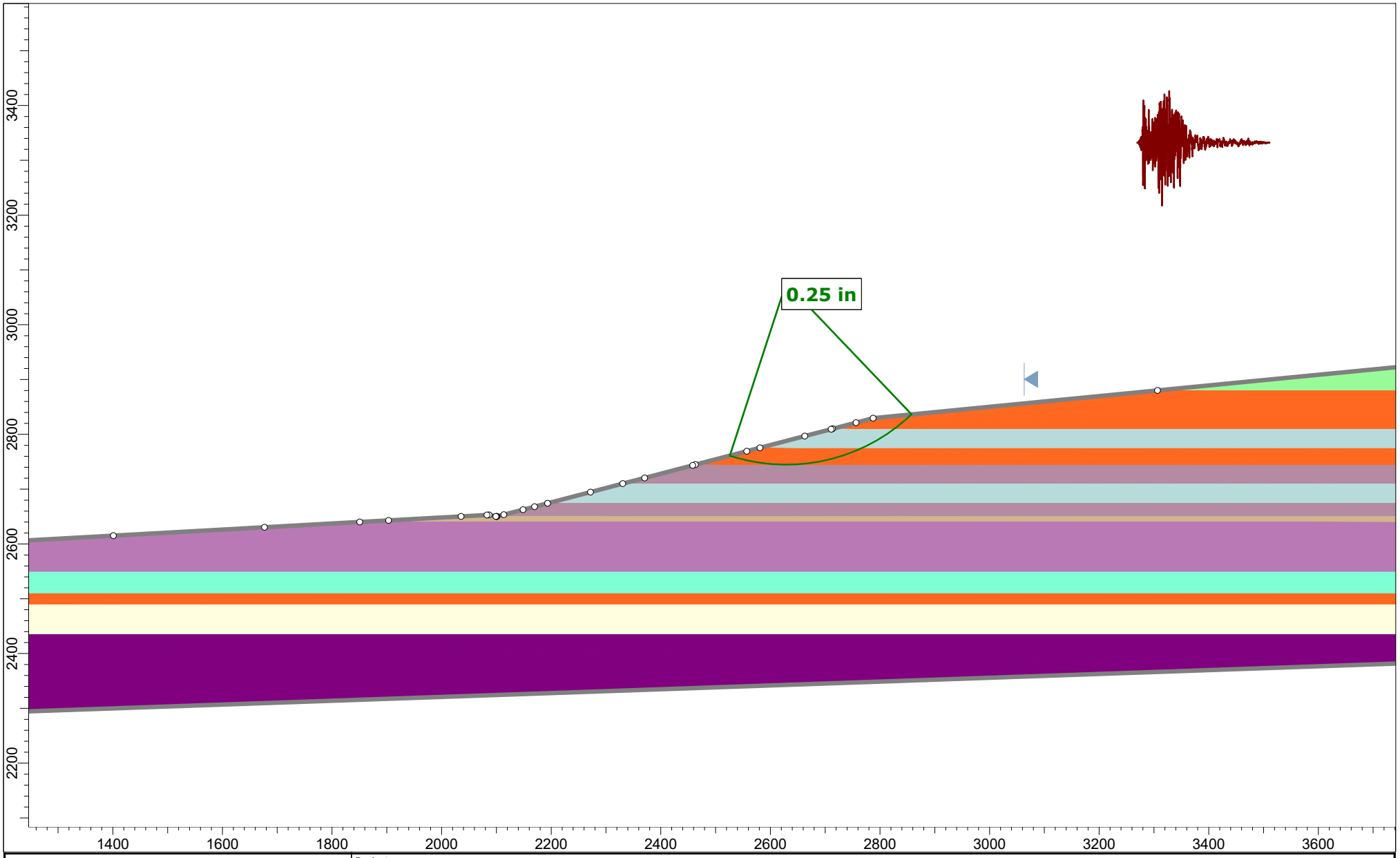
rocscience	Project: Pickles Butte		Figure 10E
	Group: SECTION F	Scenario: 4H:1V Slope	
	Drawn By: SG	Company: Tetra Tech	
	Date: 7/29/2022	File Name: Seismic Loading - Block Failure	

SLIDEINTERPRET 9.023



rocscience	Project	Pickles Butte	Figure 11E
	Group	SECTION F	Scenario 4H:1V Slope
	Drawn By	SG	Company Tetra Tech
	Date	7/29/2022	File Name Critical Acceleration

SLIDEINTERPRET 9.023



rocscience	Project	Pickles Butte	Figure 12E
	Group	SECTION F	Scenario 4H:1V Slope
	Drawn By	SG	Company Tetra Tech
	Date	7/28/2022	File Name Seismic Loading - Newmark Displacement

SLIDEINTERPRET 9.023

APPENDIX F: Previous Reporting Logs of Boring Analyses

LOGS GT-1 THROUGH GT-8 BY HOLIDAY ENGINEERING COMPANY(HOLIDAY)
LOGS PB 5 THROUGH PB12 BY HOLIDAY and DANIEL B. STEPHENS & ASSOCIATES, INC.

APPENDIX E: Borehole Logs

$*N' = N \cdot \sqrt{1/\sigma}$

Where σ = .05 T/ft² per ft depth

(φ + stiffness based on table 13.2 & 13.8)

HOLLADAY ENGINEERING COMPANY

HOLE NUMBER GT-1 JOB NUMBER 030496 PAGE 1 OF 4

PROJECT Dickles Butte Geotech OWNER Crook County LOCATION: CO. Crook SEC ___ 1/4 ___ OF 1/4 ___ T ___ N R ___ W @ 50' from Toe of fill in drainage [illegible]

LOGGED BY STROUD DATE START 11/4/01 DATE FINISHED 11/4/01 HOLE DEPTH 90 1/2 ANGLE ~90 DRILL METHOD Hollow Stem Auger SPT DIAMETER 8" Auger Split spoon DRILL MODEL [illegible] 81

(51) [illegible]

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	INDURATION & STRUCTURE	INDURATION GRAPHIC	WATER	COMMENTS: BLOW COUNTS
			Tan					
		11:50	Tan	fine sand				
4-5 1/2	loose SAMPLE			fine sand, occas. gravel pebbles ≤ 1"		4-5 1/2	moist	2, 3 and 3 4-5 1/2; 1" clast (rounded/sub-rounded); 2 1st 6"; 3 2nd 6"; 3 3rd 6"; N' = 12 (30°) *
	loose							N=5 N' = 7 (30°)
10-11 1/2	SAMPLE [illegible] + drive shelby tube		Tan to light brown	fine sand [illegible] ~ 200 lbs first 6"		10-11 1/2	moist	10-11 1/2 2, 3, 2; very weakly consolidated, breaks up easily
15-16 1/2	loose		light brn	fine sand		15-16 1/2	moist	N = 3, 3, 2; N' = 6 (29°); [illegible]
20-21 1/2		12:10	lite brn	fine sand		20-21 1/2	moist	N = 4, 2, 3; N' = 5 (28°); [illegible]
25-26 1/2		12:21	lite brn	fine sand			moist	N = 2, 3, 2; N' = 5 (28°); [illegible]
30-31 1/2		12:25	lite brn	fine sand				N = 3, 4, 6 N' = 8 (32); ditto
35-36 1/2		12:35	lite brn	fine to med sand some coarse grains + gravel				N = 6, 7, 13 N' = 15 (35°); ditto
40-41 1/2	SHELBY TUBE NO Sample			(med sand)				push 10" [illegible] 700 [illegible]; [illegible]; lost sample from hole [illegible]
45-46 1/2	[illegible] [illegible] sample [illegible]		tan	[illegible] med sand w/ [illegible] to [illegible], bottom is fine sand	drier, weakly [illegible]	45-46 1/2		push 2 1/2" @ 1000 lbs [illegible]; [illegible] (in sample); 12, 23, 32 = N; N' = 37 (40°)

(1)

HOLE NUMBER GT-1 JOB NUMBER 030496 **HOLLADAY ENGINEERING COMPANY**

PROJECT Dirkles F. Ho Gerlach OWNER ______ LOCATION: CO. ______ SEC. ____ 1/4 ____ OF 1/4 ____ T ____ N R ____ W

LOGGED BY STROUD DATE START 11/4/96 DATE FINISHED 11/6/96 HOLE DEPTH 201½ ANGLE -90° DRILL METHOD Hollow Stem Auger SPT w/ Hammer DIAMETER 8" Auger DRILL MODEL BK-81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS (BLOW COUNTS N)
50-51½	11/4	1:20	gry-	tan fine sand													med. loose		drier, weakly moist	13, 32, 41 N=46 (42°)
	55-56½	1:40		gry-tan fine to medium sand																13, 25, 34 N=36 minor clay (40°)
	60-61½ short 1 min had lunch ½ hr	1:55	tan-gry	fine to medium sand													med loose		dry	18 30 37 N=37 (40°)
	65-66½	2:20	tan/some orange FeOx	fine sand													mod loose		dry	25 42 41 N=46 (42°)
	70-71½	2:40	tan/some orange FeOx	fine sand													mod loose breaks on easily		minor moisture	25 40 44 N=45 (42°)
	75-76½	2:55	tan	fine sand													mod. loose		slightly moist	25 37 41 N=40 (42°)
	80-81½	3:05	tan	fine sand to very fine sand with silt (lower)													ditto		ditto	26 3? 50 N=43 (42°)
	85-86½	3:20	tan	[illegible]													[illegible]		ditto	26 47 / 25 47 [illegible] N=42 (42°)
	90-91½ [illegible] FOS	3:45	tan	fine silt sand													[illegible]		slightly moist	13 40 5? N=42 (42°)
95-96½	11:00	11/5 start	lite tan	SILT to 96' Clay @ 96'															very slightly dry	19 28 47 N=34 (hard)

10

HOLE NUMBER GT-1 JOB NUMBER 030496

HOLLADAY ENGINEERING COMPANY

PROJECT Dickles Butte Geotech OWNER Canyon LOCATION: CO.____ SEC.____ 1/4____ OF 1/4____ T____ N R____ W

LOGGED BY STROWD DATE START 11-4-96 DATE FINISHED____ HOLE DEPTH____ ANGLE: 90° DRILL METHOD Hollow Stem / SPT DIAMETER 8" Augers DRILL MODEL BK-81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
100-101½	11-5 * Brass Rings 1½" ID SPT	11:40	lite tan green	clay		2 Brass No Full													slightly damp	stiff N = 11 18 27 N = 20 perhaps trace clay & 2 brass rings samples
105-106½ ? (106½)	NO RINGS	12:00	lt tan	1 ft clay 6" fine sand 3" clay																very stiff 12 32 34 N = 29 penetrometer unconfined 3.0 T/ft²; confined in brass ring 4.0 T/ft²
110-111½	* BRASS RINGS	12:25	tan	Clay 8" fine sandy silt 10"		1 Brass No Full													weakly moist; penetrom. in brass ring	hard 13 32 50 @ 6" N = 35 *1 brass ring sample clay 1.5 for fine sand (T/ft²) 4.0 T/ft² for clayey silt
	115-116½ NO brass rings	12:45	light tan-grn clay, sand lite gray	interbedded very fine silty sand w/ clay (beds ~6")															very weakly moist (almost dry)	11 41 50 N = 38 (40) confined ring penetrometer in clay > 4.5 Tons/ft²
	120-121½ NO RINGS	1:10	tan	silty clay															weakly moist	12 30 48 2-4 Tons/ft² N = 32 Very stiff
125-126½	first H₂O added NO RINGS	2:00		clay contact very fine silty sand to 126															add water very slightly damp	add five gallons water 20 42 50 @ 5" N = 37 hard
	130-131½ * RINGS	2:25		clay clayey silt w/ very fine sand silty clay		4 Brass 2 ... 2 No Full											Moderate Consl.		slightly to moderately damp	30(?) 32 50 @ 5" * 4 brass rings N = 32 Very stiff
135-136½	No Rings	3:00	grayish green	Clay w/ trace silt													wk-mod. CONSL.		add water	add five gallons water 11 21 37 N = 22 penetrometer 1.75-2.75 Very stiff
140-141½	* RINGS	3:45	greenish gray	clay & silty clay interbedded		4 Brass ...											moderately Consl.		add water moderately moist (38%?)	19 27 38 N = 25 * 4 rings (test both clay & silty clay) Very Stiff
145-146½	No Rings EOS	4:30 5:00	grn-gry	top 6" clay lower 12" silty clay													WK-MOD		MODERATE MOISTURE ≈35%	23 23 28 N = 19 Very stiff

18

ℓ fell @ 33°

HOLLADAY ENGINEERING COMPANY

HOLE NUMBER GT-1 JOB NUMBER 030496

PROJECT Pickles Butte Geotech OWNER Canyon County LOCATION: CO. Canyon SEC. ___ 1/4 ___ OF 1/4 ___ T ___ N R ___ W

LOGGED BY STROUD DATE START 11-4-96 DATE FINISHED 11-6-96 HOLE DEPTH 201½ ANGLE -90 DRILL METHOD Hollow Stem Auger SPT/split spoon DIAMETER ___ DRILL MODEL BK-71

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
150-151½ *	START Sample RINGS	9:15 9:45	grn-gry	Clay w/ interbdd silt/fine sand		1 Brass No-Full											WK-MOD CONSOL Cly WK CONSL for silt/sand		clay mod damp silt almost dry ADD ~ 7 gal H₂O before pock 5 ft auger run	SILT ~ 1.5 T/ft in ring CLAY ~ 4-4.5 T/ft in Ring * ONE BRASS RING CLY & SLT
155-156½	NO RINGS	10:30	grn-gry	clay ditto													WK CONSL PLASTIC		MOD. DAMP	15 22 25 pure clay GOOD CORE SAMPLE N' = 17 stiff
160-161½ *	RINGS	11:10	grn-gry	pure clay		3 Brass 1 almost 2 - No Full											WK CONSOL PLASTIC		ADD 5 gals MOD. DAMP ~ 38-42%	18 22 24 * 3 perfect samples in rings of clay N' = 16 stiff
165-166½	NO RINGS	11:45	grn-gry	pure clay w/ 3" bd of very fine sand													MOD-MOD STG CONSOL (EXCPT SAND)		ADD 5 gal H₂O MOD DAMP ~ 40%	18 44 50 @ " N' = 33 Very stiff
170-171½	NO RINGS	12:30	grn-gry	Pure clay w/ 1" silt bed													MOD CONSL		~ 40% add water 5 gal	17 31 33 N' = 22 Very stiff
175-176½	NO RINGS	1:45	grn-gry	clayey silt													WK CONSOL		35% moist ADD 5 gal	13 22 32 2 T/ft² Penetrometer N = 18 stiff
180-181½ *	BRASS RINGS	2:25	grn-gry	SILTY CLAY		2 Brass No Full											WK-MOD CONSOL		~35% ADD 5 gal	14 22 28 N = 17 * 2 BRASS RINGS · Stiff 1.5-2.0 T/ft² Penetr.
185-186½	NO RINGS	3:05	grn-gray	SILTY CLAY													WK MOD CONSOLD		~ 35% ADD FIVE Gals	13 27 44 N' = 23 1.5 T/ft² Very stiff
190-191½ *	RINGS	3:40	grn-gray	SILTY CLAY		1 Brass No Full											WK-MOD		~ 35-38%	15 22 36 * 1 Brass RING 3.0 T/ft² [illegible] N' = 19 stiff
195-196½		4:20		clayey silt													WK		~ 30-35%	14 17 23 2.5 T/ft² N' = 13 stiff
11/7/96	ABANDON HOLE with BENTONITE CHIPS TO TOP																			
200-201½		5:00		silty clay		2 Brass [illegible]														12 17 20 / 4.5 T/ft² ' = [illegible] stiff

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HOLE NUMBER GT-2 JOB NUMBER 030491e HOLLADAY ENGINEERING COMPANY PAGE 1 OF 1

PROJECT Pickles Butte Geotech OWNER Canyon County LOCATION: CO. (see map) SEC. 1/4 OF 1/4 T N R W

LOGGED BY STRAND DATE START 11-7-96 DATE FINISHED 11-7-96 HOLE DEPTH 25½' ANGLE -90 DRILL METHOD Hollow Stem Auger DIAMETER 8" DRILL MODEL ZK-81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	START 12:25	11-7-96		Sand cover ↓ garbage															Slightly damp	check for methane. Live sample 0%
5-6½		12:35																		15 B T
2	BRASS RING			soil + trash																Dirt + trash
10-11½	NO RINGS	12:55		soil + trash ⅔ ⅓															BARELY DAMP	7.7.12 SAMP A-SOIL NO METHANE / SAMP B-TRASH
15-16½	RINGS	1:05		all garbage diaper, wood newspaper etc.															OUTSIDE SPLITSPOON WET	17 14 10 5% LEL in Auger Stem quickly drops to 1% LEL Two RINGS Jumped together
20-21½	NO RINGS	1:20		80% Trash 20% soil															MODERATELY DAMP	8 8 14
24-25½	BRASS RINGS	1:35 EOH		MOSTLY GRASS															DAMP	19 12 12 100% LEL METHANE SHUT RIG DOWN FLOOD HOLLOW STEM W/ WATER BACK OUT OF HOLE

HOLE NUMBER GT-3 JOB NUMBER 030496 HOLLADAY ENGINEERING COMPANY 4376? PAGE 1 OF 2

PROJECT Pickles Butte Geotech OWNER Canyon County LOCATION: CO Canyon across road SEC. 1/4 OF 1/4 T N R W

LOGGED BY STREWD DATE START 11/8/96 DATE FINISHED 11/8/96 HOLE DEPTH 101½ ANGLE -90 DRILL METHOD SPT/AUGER DIAMETER 8"/2" DRILL MODEL BK-81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	11-8-96	8:30																		
5-6½	NO RINGS	8:40	tan	silty very fine sand													loose		slightly damp	2 3 2
10-12	2 HELIX TUBE	8:50	tan	fine sand													med loose		dry	200 lbs lost 6"
15-16½	NO RINGS	9:00	tan	fine sand													loose		medium damp	5 12 19 minor silt
20-21½	BRASS RINGS	9:10	lite brn	fine sand		B3-BRASS NO-FILL											mod. loose		DAMP	13 21 23
25-26½	NO RINGS	9:20	lite brn	fine-med. sand													loose		VERY DAMP	13 19 29
30-31½	BRASS & PVC'S	9:30	lite brn	fine-med sand		3 BRASS NO-FILL											mod loose		very damp	14 21 33 #3 rings
35-36½	NO RINGS	10:00	lt to grey-brn	fine to med. sand													loose except for Ox "veins"		almost saturated	23 37 33
40-41½	BRASS RINGS	10:10	lite grey brn + orange	fine sand some med. limonite cemented Ox		3-BRASS NO-FILL											sand loose Ox Alot until gravel		very damp	16 25 37
45-46½	NO RINGS	10:20	lt to grey-brn	fine sand minor Ox stn													wk cohes.		very damp	22 30 35

HOLE NUMBER GT-3 JOB NUMBER 030496

HOLLADAY ENGINEERING COMPANY

PROJECT PB Geotech OWNER Canyon Co. LOCATION: CO. Canyon SEC. ___ 1/4 ___ OF 1/4 ___ T ___ N R ___ W

LOGGED BY Strowd DATE START 11/7/96 DATE FINISHED 11/8/96 HOLE DEPTH 101½ ANGLE -90 DRILL METHOD Hollow Stem Auger DIAMETER 8"/2" DRILL MODEL BE-81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
50-51½	11-8-96 # RINGS	10:25	gry tan	very fine silty sand		3 BRASS 1 - Full 2 - NO Full											WK-MOD CONSOL		moderately damp	18 31 37 #3 Rings
55-56½	NO RINGS	10:40	gry-tan	very fine silty sand													WK-MOD CONSOL		MOD-STR damp	16 29 40
60-61½	RINGS	10:50	gry-tan	very fine sand / borderline silt		3-BRASS NO-Full											WK-MOD CONSL		MOD damp	20 35 44
65-66½	NO RINGS	11:00	gry-tan; grn-grey	top 3" silty fine sand bottom 10" clay													SAND WK; MOD-STR consolid for Clay		MOD DAMP	10 29 34
70-71½	RINGS	11:15	Gray; tan gry	Top 2" Clay bottom 10" fine sand		2-BRASS No Full											MOD CLY; MOD SAND		WK to MOD DAMP [illegible]	15 20 37 2 RINGS - 80th OF SAND
75-76½	NO RINGS	11:30	grn-gry	silty clay [illegible] silt (gravel)													WK-CONSOL		WK DAMP	14 21 27 [illegible] into [illegible] of [illegible] interval
80-81½	RINGS	11:45	gry-tan	interbdd fine sand-silt-silty clay		2-BRASS No-Full											MOD-STR		slightly damp	15 44 50 @ 5" 2 RING CLAY / silty sand
85-86½	NO RINGS; hard [illegible]	12:00	tan-gry	very fine silty sand													MOD-STR		slightly damp	21 48 50 [illegible] clay [illegible] 3" bd w/ 50 [illegible]
90-91½	RINGS	12:45	tan-gry	fine silty sand ~2" clay bot		2-BRASS No-Full											MOD-STR		slightly damp	16 40 50
95-96½	NO RINGS	1:00	tan-gry	10" silt [illegible] 2" silty clay													MOD CONSL		slightly damp	22 36 40
100-101½	2 RINGS	1:20	tan grey	fine sand		2-BRASS [illegible]											MOD CONSOL		very slightly	14 32 50 END HOLE

HOLLADAY ENGINEERING COMPANY

HOLE NUMBER GT-4 JOB NUMBER D30496

PROJECT Pickles Butte Geotech OWNER Canyon County LOCATION: CO. Canyon (large motorcycle parking lot) SEC. ___ 1/4 ___ OF 1/4 ___ T ___ N R ___ W

LOGGED BY Strowd DATE START 11-11-96 DATE FINISHED 11-11-96 HOLE DEPTH 101½ ANGLE -90 DRILL METHOD Hollow Stem Auger DIAMETER 2"/2" DRILL MODEL BK-81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
		11-11-96																		
5-6½	Rings	10:00	tan	fine to med sand w/ minor clay/silt													very loose but getting denser caliche		moderately damp	2 1 1 2 rings
10-11½	No Rings	10:07	tan	clayey silt w/ minor very fine sand													loose		mod. damp	3 2 1
15-16½ (15-17')	Shelby tube	10:15	?	? ?																
20-21½	No Rings	10:25	tan	clayey fine sand													loose		somewhat damp	5 6 8 driven w/ (brass rings but used as [illegible])
25-26½	No Rings	10:30	tan	silty fine sand													mod loose		weak dampness	6 12 23
30-31½	RINGS	10:40	gry-tan	silty fine sand		2-rings no-full											med dense		almost dry	15 27 37 2 rings
35-36½	NO RINGS	10:50	gry-tan	fine sand													wk-mod dense		almost dry	12 21 32
40-40.75	Shelby tube	11:05	gry-tan	fine sand															almost dry	[illegible] 8" sample lost [illegible] minor silt & clay
45-46½		11:15	gry-tan	interbedded fine sand & silt [illegible]													wk-med dense		moist	[illegible] 20 27 32

HOLE NUMBER GT-4 JOB NUMBER D30497(?) **HOLLADAY ENGINEERING COMPANY** PAGE 2 OF 2

PROJECT [illegible] OWNER [illegible] LOCATION: CO. [illegible] SEC. ___ 1/4 ___ OF 1/4 ___ T ___ N R ___ W

LOGGED BY [illegible] DATE START 11/11/96 DATE FINISHED 11/11/96 HOLE DEPTH 101½ ANGLE -90 DRILL METHOD Hollow stem Auger DIAMETER 3½" DRILL MODEL BK-81

INTERVAL (FT)	DRILL NOTES	DATE TIME (11-11-96)	COLOR	LITHOLOGY ROCK TYPE	GEOPHYSICS LOG	INDURATION & STRUCTURE FXS, VOIDS, ETC.	WATER	COMMENTS
50-51½	Brass Rings	11:25		Silt w/ ~1" clay interbeds	2-Brass Almost	MOD-STR [illegible]	[illegible] damp	16-30 50 minor fine sand
55-56½	NO RINGS	11:40	gry-tan sand. silt clay tan-gry	fine sand ½" silt - 4" clay 10"		WK-MOD CONSOL	wk damp	11 18 31
60-61½	RINGS	11:55	gry-tan w/ orange	fine sandy silt + 1" Feldsp cemented	2-BRASS No-Full	MOD CONSOL	almost dry	23 37 50 2 RINGS
65-66½	NO RINGS	12:10	gry-tan	Grade from top to bottom w/ fine sand, silt, clay		MOD CONSOL	slightly moist	19 34 45
70-71½	RINGS	12:25	tan-gry	fine sandy silt	2-BRASS No Full	MOD CONSOL	MODERATELY MOIST	21 42 50
75-76½	NO RINGS; [illegible]	12:40	[illegible]	fine sand + silt		MOD STR CONSOL	MODERATELY MOIST	20 37 42
80-81½	NO RINGS	1:10	[illegible]	Varved clay interbedded silt [illegible]		MOD STR	SLIGHTLY MOIST	22 37 50
85-86½	NO RINGS	1:30	gry-[illegible]	Varved clay [illegible]		MOD STR	[illegible] MOIST	[illegible] 35 44
90-91½	BRASS RINGS	1:45	gry-[illegible]	varved silty clay	2-BRASS Almost	[illegible]	[illegible]	15 40 47 2 rings
95-96½	NO RINGS	[illegible]	[illegible]	varved clay with ½" fine sand intrbd		MOD STR	drill water added	16 32 50 don't use sample for moisture (drill water)
100-101½	RINGS	2:30	gry-gry	[illegible] fine sand/clay	3-[illegible]	STR [illegible]	Somewhat moist	23 47 50 END OF HOLE

HOLE NUMBER GT-5 JOB NUMBER 030496

HOLLADAY ENGINEERING COMPANY

PROJECT Pickles Butte Geotech OWNER Canyon County LOCATION: CO. Canyon Center of Landfill SEC___ 1/4___ OF 1/4___ T___ N R___ W

LOGGED BY STROUD DATE START 11/12/96 DATE FINISHED 11/14/96 HOLE DEPTH 101½ ANGLE -90 DRILL METHOD Hollow Stem Auger SPT DIAMETER 8"/3" DRILL MODEL BK-81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
0-1½	11/12/96 SHELBY	10:05		COVER & TRASH												Ex LEL 0% Check thru bolt hole in hollow stem & @ outside collar after augering			MOIST TO DRY	SHELBY TUBE THRU INTERVAL COVER CLAY/SILT & TRASH 1½ ft @ 500 lbs mashed end of tube
5-6½	NO RINGS	10:15		COVER & TRASH												Ex LEL 0% ditto procedures			MOIST	15 5 4 MOST OF SAMPLE NOT RECOVERED (SHOE BLOCKAGE)
10-11½	NO RINGS	10:30		TRASH												Ex LEL 0%			slightly damp	27 10 8 POOR RECOVERY (~3-4" sample)
15-16½	NO RINGS	10:40		TRASH												Ex LEL 0%			almost dry	70 @ 4 inches wood, plastic, paper
20-21½	NO RINGS	10:55		TRASH												Ex LEL 0%			almost dry	12 9 19 GOOD RECOVERY ~ 20" Newspaper CINDER (RED)
25-26½	NO RINGS	11:10 EOS 11-13-96		Trash												Ex LEL 0%				50 @ 4½" SHUT DOWN WAITING ON DELIVERY OF BRASS RINGS
30-31½	BRASS RINGS	11:25		Trash												Ex LEL 0%				16 7 12 Kinda moist 2 brass rings
35-36½	Auger thru NO SAMPLE			Trash												Ex LEL 100% in hollowstem & @ collar				NO MORE BLOWS COUNTS ex hazard
40-41	2½" BRASS RING	2:50		Trash												Ex LEL 100%				1 large brass ring
45	Grab Sample	3:15		trash												Ex LEL 100%				~ 8" sample
50	[illegible]	4:05 2½" ring		trash												Ex LEL 100%			~	3" sample [illegible] / [illegible] in bag

HOLE NUMBER GT-5 JOB NUMBER 030496

HOLLADAY ENGINEERING COMPANY

PROJECT [illegible] Butte [illegible] OWNER [illegible] LOCATION: CO. [illegible] SEC. ___ 1/4 ___ OF 1/4 ___ T ___ N R ___ W

LOGGED BY [illegible] DATE START 11/13/96 DATE FINISHED [illegible] HOLE DEPTH 101½ ANGLE -90° DRILL METHOD Hollow Stem DIAMETER 8½" DRILL MODEL B? - 81

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
		11-13-96																		
55	grab	4:30		fine sand																called 58 on bag
56 }	[illegible]		56'	in [illegible]																
58 }																				
60	[illegible]	4:55	tan-gray	Sand (med)																1 ring + 3" in bag
	grab	EOS"																		sand garbage 6 top
		11-14-96																		
65 →	grab	9:30	gray	sand (med)															fairly damp	
65-65.5	2½"																sand fell			
	split [illegible]	9:45	+ grab														out upon			1100 lbs [illegible] 6"
65.5-67	[illegible] 2"																retrieval			11 19 26 SPT
	split spoon [illegible]																in 2½ spoon			
																	low-MOD		mod moist	
70-71½	SPT	10:20	tan-gray	silty fine sand													CONSOL.			13 34 42
75-76½	SP	10:40	tan-gray	sand &															moderately	13 30 41
			gray-gray	clay													[illegible]		moist	sand-clay [illegible]
																	mod well			
																	CONSOLID.			
																	sand mod [illegible]			
80-81½	SPT	11:00	tan-gray	silty, fine sand													as above		moist	20 35 46
85-86½	SPT	11:15	tan-gray	fine [illegible] sand													MOD WELL		moist	20 37 50
																	CONSOL			
90-91½	SPT	11:35	tan-gray	[illegible]													MOD [illegible]		quite	16 12 22
				sand													MOD CONSOL		damp	
																			(not saturated or wet)	
95-96½	SPT	11:50	tan-gray	med sand													MOD CONSOL		[illegible]	18 32 32
																	[illegible]		damp & [illegible]	
	[illegible]																		[illegible]	
100-101½	SPT		tan-gray	fine-med sand													[illegible]		[illegible]	15 31 45

PBW-1

2692 Collar
2353 Static
2097 Water Intercept (Top)

USE TYPEWRITER OR BALL POINT PEN

State of Idaho
Department of Water Resources

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1 WELL OWNER

Name Canyon County

Address Caldwell, Idaho

Owner's Permit No. ____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement

☐ Abandoned (describe method of abandoning)

3. PROPOSED USE

☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type)

☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection

4. METHOD DRILLED

☒ Cable ☐ Rotary ☐ Dug ☐ Other

5. WELL CONSTRUCTION

Diameter of hole 20 inches Total depth 656 feet

Casing schedule: ☒ Steel ☐ Concrete

Thickness	Diameter	From	To
.375 inches	16 inches	+ 2 feet	525 feet
.250 inches	10 inches	537 feet	577 feet
.250 inches	10 inches	637 feet	658 feet
____ inches	____ inches	____ feet	____ feet
____ inches	____ inches	____ feet	____ feet

Was casing drive shoe used? ☒ Yes ☐ No

Was a packer or seal used? ☒ Yes ☐ No

Perforated? ☐ Yes ☐ No

How perforated? ☐ Factory ☐ Knife ☐ Torch

Size of perforation ____ inches by ____ inches

Number	From	To
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet
____ perforations	____ feet	____ feet

Well screen installed? ☒ Yes ☐ No

Manufacturer's name Johnson

Type Stainless Model No. ____

Diameter 10 Slot size 25 Set from 577 feet to 637 feet

Diameter ____ Slot size ____ Set from ____ feet to ____ feet

Gravel packed? ☒ Yes ☐ No Size of gravel No 16 Colm

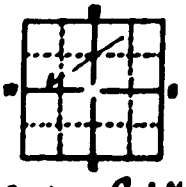
Placed from 537 feet to 658 feet

Surface seal depth 20 Material used in seal ☒ Cement grout ☐ Puddling clay ☐ Well cuttings

Sealing procedure used ☐ Slurry pit ☒ Temporary surface casing ☐ Overbore to seal depth

6. LOCATION OF WELL 63

Sketch map location must agree with written location.



Subdivision Name ____

Lot No. ____ Block No. ____

County Canyon

SW NW Sec. 21 T. 3 N R. 3 W

7. WATER LEVEL

Static water level 7.37 feet below land surface

Flowing? ☐ Yes ☐ No G.P.M. flow

Temperature ____ F. Quality ____

Artesian closed in pressure ____ p.s.i.

Controlled by ☐ Valve ☐ Cap ☐ Plug

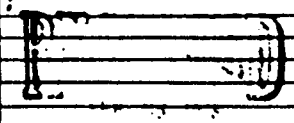
8. WELL TEST DATA

☒ Pump ☐ Bailer ☐ Other

Discharge G.P.M.	Draw Down	Hours Pumped
58 GPM	111	3

9. LITHOLOGIC LOG

Hole Diam.	Depth From	Depth To	Material	Water Yes	Water No
20	0	3	Top Soil		
11	3	45	Sand 20% Clay		
11	48	152	Sandy Clay		
11	152	205	Yellow Clay		
11	205	251	Gray Clay Sticky		
20	251	297	Blue Shale		
20	297	327	Blue Clay 10% Sand		
20	327	520	Blue Clay (Shale)		
18	520	595	Grey Shale		
16	595	640	Shale Sandy		
16	640	658	Blue Clay		



Department of Water Resources
Western Regional Office

10. Work started 10/4/77 finished 2/14/78

11. DRILLER'S CERTIFICATION

Firm Name Witt Drilling Firm No. 55

Address Caldwell, Ida. Date 2/14/78

Signed by (Firm Official) Kenneth Witt

and

Operator Orlando Dutton

IF PROVISIONAL RIGHTS IS REQUESTED FORWARD THE WHITE COPY TO THE DEPARTMENT

HOLE NUMBER PB-2-CC JOB NUMBER T1120491

HOLLADAY ENGINEERING COMPANY

COLLAR ELV. ~ 2830' (2770 LLC)

PAGE 1 OF 2

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY STROUD DATE START 4-15-92 DATE FINISHED ? -92 HOLE DEPTH 55' ANGLE 90° DRILL METHOD CORE LEXAN DIAMETER 2.4" DRILL MODEL Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	HYDRAULIC PROPERTIES: EST.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
REC 0-1	4-15-92	2:00							no core recovery/loose sand
2				silty sand	10^{-4}	unconsolid.		none	sample collected in contain-
3			lt gy br	"	"	"	R	"	at collar, prob. rd fill
4			"	"	"	"	O	"	no core rec. Rd fill sand
5	liner collapsed	2:50	"	"	"	"	A	"	
0% 6			"	"	10^{-3}	"	D	"	"
7			"	"	"	"		damp	"
8			"	"	"	"	F	dry	"
9			"	"	"	"	I	"	"
10			"	"	"	"	L	"	"
			"	"	"	"	L	"	"
		3:30	"	"	"	"		"	"
			gy wht	silty sand w/ cly	10^{-4}	minor		"	Poor went to call office about collapsing liner
10%	hole caving		"	"	"	1-2 mm voids		"	try drilling holes in Lexan
15	at 15'	5:20	"	"	"	circular void		damp ~6%	12.5-15 Finished first core Rec.
45%			"	"	10^{-3}	mod consolid		"	wk bedding
			"	clay w/ minor silt	10^{-7}	wk consolid		"	
	EOS	6:00	"	"	10^{-7}	"	massive	"	
8%	4-16-92	7:00	lt yel gry	sand	10^{-3}	unconsolid		dry	coarse immature sandstone
20	hole caving	7:30	"	mod sandstone	10^{-3}	minor wk cons		dry	bimodal grain size distrib.
0%	casing 13'	9:15	lt gy tn	fine silty sand	10^{-5}	cutting ?		dry	no rec. sample coll. @ collar
	cuttings	9:45	"	silty fine sd + cly	10^{-5}	un-wk consol		"	Tooled drillers called Ray SLC
	"		"	"	10^{-6}	wk Consol.		"	sampling bias favors coarser
	"	11:30	"	"	10^{-5}	"		"	w/ collector catching cuttings
25	"		"	silt w/ cly	10^{-5}	"		"	"
	"		"	clayey silt	10^{-6}	"	massive	"	"
	"		"	"	10^{-6}	"		"	"
	"		"	"	10^{-6}	"		"	"
	"	1:00	"	"	10^{-6}	"		"	"
30	"		"	"	10^{-5}	"		"	"
	"		"	"	10^{-5}	"		dry	"
	"		"	"	10^{-5}	"		"	"
	EOS @ 4:30	1:45	"	"	10^{-6}	"		"	1:50-3:00 REAMING STUFF to set casing
33.5	4-17-92	8:00	olive tan gr	clayey silt	10^{-4}	wk consolid		inject clear mud + water	hole bottom 33.5'
	using		"	"	10^{-4}	wk-mod consl.		"	(polymer) CORE BOXES TOO SHORT
90%	H_2O		"	"	10^{-4}	"		"	FOR LEXAN TUBES
			"	"	10^{-4}	"		"	
	drilling		"	"	10^{-4}	"		"	
38.5	fast	8:30	"	"	10^{-5}	"		"	
			olive gy gr	"	10^{-5}	"		"	
100%	drilling		"	Clayey silt	10^{-5}	"		inject H_2O	
	fast		"	"	10^{-5}	"		+ polymer	
			"	"	10^{-5}	"		"	
43.6	water run	9:05	"	"	10^{-5}	"		"	
			"	"	10^{-6}	"		"	
85%			"	"	10^{-6}	"		"	
			"	"	10^{-5}	"		"	
			"	"	10^{-5}	"		"	
48.6		10.00	"	"	10^{-4}	"		"	
90%			"	"	10^{-5}	"		"	

HOLLADAY ENGINEERING COMPANY

HOLE NUMBER PB-2 JOB NUMBER T1120491 PAGE 2 OF 2

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY Strond DATE START 4-15-92 DATE FINISHED 4-20-92 HOLE DEPTH ____ ANGLE 90° DRILL METHOD core DIAMETER 2.4" DRILL MODEL Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	fast	4-17	gry-grn	silty w/ cly + sd	10^{-4}		wkly consl.	massive	inject H_2O	+ polymer
90%	drilling		"	"	10^{-4}		"			(Fluidrill clear mud)
53'		10:50	"	siltstone w/ minor cl	10^{-5}		mod. consol.			
			olive grn	"	10^{-5}		"			
65%			"	"	10^{-5}		"			
			"	"	10^{-5}		"			
			"	"	10^{-5}		"			
58'		11:10	"		10^{-5}		"			
			"	siltstone	10^{-4}		"			
			"		10^{-4}		"			
85%			gry grn		10^{-4}		"			
			"		10^{-4}		"		Inject H_2O	
63'	lost circ	11:30	"		10^{-4}		"			
			"	fine sand	10^{-3}		wk consol.			Sand in hole bottom, losing circ.
80%			"	coarse silt	10^{-4}		"			cross beds
			gry-tan	silty sand	10^{-4}		"			x bedding
			"	silt w/ clay	10^{-4}					wk bdd
68'	Water run	12:15	"	sandy clay	10^{-5}		mod. consol.		quit for day	EOS. @2:00 high winds + dust storm
	4-18	EOS 2:00 8:30am	"	fine sand + silt	10^{-4}		wk bdd		inject H_2O	
		~~Bloom~~	"	fine sand	10^{-4}		"		+ polymer	
53%			"		10^{-4}		massive			
			"		10^{-4}		"			
73'		8:25	"		10^{-4}		"			
			"	silt	10^{-4}		wk consol			
100%			"	silt w/ minor cly	10^{-5}		"	massive		
			"		10^{-5}		"			
			"		10^{-5}		"			
78'		9:05	"	clayey silt	10^{-6}		mod. consol.			
			"	silty clay	10^{-7}		"			
			"	"	10^{-7}		"			coarse? clay gra[illegible] fine silt
55%			"	"	10^{-7}		"			
			"	"	10^{-7}		CROSS-BEDD		inject H_2O + polymer	CROSS.
83'		9:30	"	fine sand + silt	10^{-6}		"		water run	air blowby @ casing
	stuck in	4-19 8:00am	"	NO CORE SAMPLE	10^{-3}		loose fine	?	drilling dry	Hole squeezed; re-reaming 15' got
0%	hole		"	fine " (fine	10^{-3}		"		"	stuck in hole after 3 ft in
	Sand fills	10:00	"	sand)" sand)	10^{-3}		"		"	backs off hole bottom
	hole bottom		"	"	10^{-3}		"		"	fills w/ sand / air into formation
88'	losing circ	11:00	"	NO SAMPLE	10^{-3}		"	?	"	sample from sand blowing up casing
			"	NO CORE SAMPLE	10^{-3}		"		"	" " "
	Trip		"	"	10^{-3}		"		"	" " "
0%	chg bit		gry-tan	"	10^{-3}		"	?	"	" " "
			"	"	10^{-3}		"		"	" " "
93'		2:30	"	"	10^{-3}		"		"	" " "
	Try Air		tan-olive	silty fine sand	10^{-4}		wk consol	?	Air Quik +	2 inches of core recovery
3%	Quick +		"	"	10^{-4}		"		Clear Mud +	lost rest down hole
	Clear Mud		"	"	10^{-4}		"	?	H_2O inject	trip out 4:30
			"	"	10^{-4}		"		"	
		3:10	"	"	10^{-4}		"		"	
ABORT HOLE OFFSET ~60' WEST	Trip in	7:30 4/20/92								
									Lose Circ. Trip out + get stuck @ 56' ABORT HOLE	

HOLE NUMBER DB-2A JOB NUMBER T1102491

HOLLADAY ENGINEERING COMPANY

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY Strowd DATE START 4-20-92 DATE FINISHED 5-15 HOLE DEPTH 557' ANGLE -90° DRILL METHOD Rotary/Core DIAMETER DRILL MODEL Longyear 44

INTERVAL (FT) REC	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	HYDRAULIC PROPERTIES EST.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	WATER	COMMENTS
		4-22		no samp				MUD ROTARY W/ BENTONITE
				"				
103'		9:20		silt				cuttings indicate silt but [illegible]
				no samp				+ sand from uphole contamination
								does not allow further
								classification
113' 10%	START SET CASING	10:00	gry-tan	silt				REAMING TO SET CASING - ON BOTTOM
114	Punch	2:30	g "	"	10^{-6}		inject H_2O	BLOWS HYDRAULIC HOSE - DOWN
	BORE		"	fine sand w/	-4		clear mud	CASING SET TO 113' TRY PUNCH
	H_2O		"	silt	-4	minor		BORE CORE
25%	clear mud		"	"	-4	bdd		
			"	"	-4			
	remove		"	silt w/ fine	-4			core bedding / significant
120	spring	3:30	"	sand	-4	minor bdd		grain size changes
0%	core lost			NO				
	down			SAMP				
123	hole	3:45		"				
	insert			fine sand	-4	massive	too much	poor recovery from
30%	spring			clayey sd	-4		inject H_2O?	too much water? Upper
		4:15	lt gry tn	clayey silt + sd	-5			sample very wet - lower
127			"	"	-5			sample almost dry (damp).
50%			"	clay, minor silt	-7		less H_2O	clay zone
129		4:45	"	silty fine sand	-4		inj-[illegible]	
130		5:00	"	fine sandy silt	-4	massive		CORE BARREL SEPARATED [illegible]
80% 131	4-23-92	8:30	"	silt minor cly	-5		inj H_2O +	lost down hole. Size 129-131
			"	silt	-5		clear mud	retrieved 6:00 pm
133		9:10	"	fine sand w/ silt	-4			minor cly w/ silty sand
				no sample				
20%				"				
				"				
	retaining			"				
138	spring backwards	10:00	lt gry	silt w/ minor cly	-5			retaining spring in backwards. 10% recovery
139		10:05	lt grey-grn	almost pure cly	-7	plastic cly		ask Ross to use less H_2O inject
			lt tan [illegible]	clayey silt	-5			
				no sample				
				"				
10%				"				Ross says sample is packing +
				"				blocking off core barrel
145		11:20		"				
50% 146		12:00		silty fine sand	-4	massive		minor clay
37%				"	-4			try low rotation - fair recovery
148		12:45		"	-4			try no rotation - no recovery
	trip out				-4			trip out, try core drilling again
					-4			

HOLE NUMBER PB-2 JOB NUMBER T1120491 **HOLLADAY ENGINEERING COMPANY** PAGE 4 OF 12

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY Strowd DATE START 4-20-92 DATE FINISHED 5-15 HOLE DEPTH 557' ANGLE -90° DRILL METHOD Core DIAMETER 2.410 DRILL MODEL Longyear-44

Rec.	INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	WATER	COMMENTS
60%		4-23		gry-gn-tan	fine silty sand	10-4			inject H_2O	
					clay	10^{-6}		mod consol.		
	153	Trip out	2:15		clayey silt	10^{-4}				50% rec.. trip out for lexan tube bit
					"	10^{-4}				
81%				lt gry tan	silty clay	-5				
				"	silty sand	-4				
				gry-gn-tan	silty clay	-5		wk laminated		silty clays mod. consolidated
	156		3:45	lt gry tan	"	-5		bdd in clys		sands wk to unconsolidated
				"	clayey fine sand	-4		wk consol.		
				"	"	-4				
53%				"	"	-4				
				"	"	-4				
	163	EOS	11:30	"	"	-4				
		4-28-92	7:00 am		no samp.				inject H_2O	trip back in hole, load of H_2O
0%		no rec.			"					
					"					
	167	no recov.	8:15		"					
		using		lt gry tan	silty fine sand	-4		sporadic consol		
100%		bentonite		"	"	-4		minor x-bd		occurs hematite stn + cement w/ lumpy consolidated zones
		lexan press		"	clayey silt	-5		wk-uncons		mostly wk to unconsolidated
				"	silty fine sand	-4		"		
	172		9:00	"	"	-4		"		
				"	"	-5		"		some visible clay / binding sand
93%				"	"	-4				
				"	"	-4				
				"	"	-4				
	177		9:45	"	silty fine sand	-4				
				"	"	-4				
				"	"	-4				
56%				"	"	-4				
				"	"	-4				
				"	"	-4				
				"	"	-4				
	184		10:30	lt gry tan	sandy silt	-4		mod str consl		
77%				"	silty clay	-6		wk consl.		
				"	silty fine sand	-4				
				"	"	-4				
	188		11:15	"	"	-4		mod consl.		bedding structures
				lt gry tan	sandy silt w/ cly	-5				"
				"	"	-5				more clay less sand
93				"	"	-5		"		
				"	"	-5				
	193		11:45	"	silty sand	-4		wk consol	inject H_2O	consolidation limited to
				lt gry tan	clayey silt	-5				zones inches to a foot thk
100				"	"	-5				
				"	silty fine sand	-4				
				"	"	-4				
	198		12:30	"	fine sand	-3				
				"	sandy silt	-4				
				"	"	-4				

HOLE NUMBER PB-2 JOB NUMBER T1120491 **HOLLADAY ENGINEERING COMPANY**

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY Strowd DATE START 4-20-92 DATE FINISHED 5-15 HOLE DEPTH 557' ANGLE -90 DRILL METHOD CORE DIAMETER 2.4"/4" OD DRILL MODEL Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	HYDRAULIC PROPERTIES: EST.	HYDRAULIC PROPERTIES: MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	WATER	COMMENTS
	mud + H_2O		lt gy tan	sandy silt	-4			inject H_2O	minor clay fraction
82 %			"	"	-4		bedding on	w/ bentonite	low water mod. high rotation
			"	"	-4		mm's to		low bentonite
204		1:00	"	"	-5		several mm		increasing clay component
			"	fine sandy silt	-5		scale		
96 %			"		-5		sporadic mod		
			orange	silty sand			consolidation		orange hematite stain
			lt gy tan		-4				
209		1:30	"	silty sand	-4		laminate bdd		fine bedding on splitting core open
			"	"	-4				can't see fine structures in Lexan
50 %			"	"	-4		wk consol.		degree of rounding rarely
			"	"	-4				seems to change
	low rec.		"	"	.4				
214	didn't [illegible]	2:00	"	silt & fine sand	-5				Possibly lost some fines downhole
			"	"	-4				
86 %			"	"	-4				
			"	"	-4				
			"	"	-4				tell driller will blow hole
			"	"	-4				clear of water at EOS to test
220		2:45	"	"	-4				for methane
			"	clayey siltstone	-4				
			"	fine sandy silt	-4		bdd consol.		bdd planes [illegible]
			"	w/ minor cly	-4		mod. consol.		sedimentary features
			"	"	-4				masked from Lexan
			"	"	-4				tubes.
			"	"	-4				
			"	"	-4				
			"	"	-4				
229		3:45	lt tan gy	"	-4				
			"	clayey silt w/	-5		wk-mod		
			"	fine sand	-5		consolid.		
72 %			"	"	-5				
			"	"	-4				
			"	"	-5				
			"	"	-5				
236	EOS	4:30	"	"	-5				blow H_2O from hole - methane chk
	4-29-92	8:00	lt tan gy	"	-5		mod. consol.		mod. induration - holds together
100 %	using		"	"	-5				but can be easily broken by
	H_2O + mud		" w/ org	"	-5				hand
			"	clayey silt w/	-5				~3 mm round blebs of orange
241		8:45	"	fine sand	-5	sampled			hematite stain
			lt tan gy	siltstone w/ cly	-6	-4' send	mod-strong		
100 %			"	Claystone w/	-6		Consolidation		POSSIBLE MONITORING HORZ
			"	Siltstone	-6		clay clasts		HEMATITE rimmed clasts of clay
			"	oxidized	-6				within fine silt/clay matrix
246		9:40	"	"	-6				10^{-5} w/ 10^{-7} clay beds
	drill w/o		"	clay bed 4" + 1"	-6		bedded sands		drill without Lexan liner for
60 %	Lexan		"	clay 13" THK	10^{-7}		massive clay		better logging.
	liner		"	clay & fine sand	10^{-6}		silty sand/clay		
			"	mixed sd slt cly	10^{-4}				

HOLE NUMBER PB#2 JOB NUMBER T1120491

HOLLADAY ENGINEERING COMPANY

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SE OF 1/4 NW 2

LOGGED BY [illegible] DATE START 4-20-92 DATE FINISHED 5-75 HOLE DEPTH 557' ANGLE -90 DRILL METHOD Core DIAMETER 2-[illegible]/4 OD DRILL MODEL [illegible] 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	WATER	COMMENTS
			lt. gry tan	silty sand	10^{-4}		very wk consol.	inject H_2O	poor recovery - sand washing
252	stop drill / Bar hole	10:30	"	" "	10^{-3}		unconsolid.	blow dry hole	out of barrel w/o liner
253		2:50	lt. gry yellow	clay + silty sand	10^{-7}		cly str consol.	NO GRD H_2O	ATTEMPT GRD-WATER MEAS. + AIR CORE
	Drill wet		lt. gry tan	silty fine sand	10^{-4}		unconsolid	after 3½ hrs.	START DRILL AGAIN @ 2:00 -
63% (inverted)			"	" "	10^{-4}		"	AIR CORE	LOSING AIR CIRC. PLUG BEHIND BIT
			"	silty clay	10^{-7}		mod str. consl	INJECT H_2O +	CLEAR MUD & NO LINER
			"	silty clay/silty sd	10^{-7}		"		Thin 1" sand bed in clay
		4:45	"	" "	10^{-7}		mod. consolid		2" + 3" sand beds in clay
259	EOS	4:45	"	"	10^{-7}		mod str consl		
	4-30-92	8:00	"	silty sand	10^{-4}		mod cons.		
	DRILL		"	"	10^{-4}		"		ORIENTATION NEW HELPER 7:00-8:00
	WET		"	sandy silt	10^{-5}		mod str.		could define bedding ∠30°
50%	w/o		yel. gry gn	"	10^{-5}		"		
	LINER		"	"	10^{-5}		"		sub horiz. bdd.
	penetration		"	"	10^{-5}		"		parting on bdd planes
	slowing		"	"	10^{-5}		"		on well consolid. material
	down		grn gry tn	silty sandstone	10^{-6}		"		
268		9:30	"	silty sand	10^{-4}		wk consol.		
			"	clayey siltstone	10^{-6}		mod. consol.		
				" " w/ sand	10^{-5}		"		
85%			"	clayey siltstone	-5		mod str consl		
			"	"	-5		"		hematite stn on bd plane
273		10:00	grn-gry tn	"	-5		"		
	slower		"	silty claystone	-6		mod consl.		
73%	drilling		"	"	-6		"		
	more		"	"	-6		"		
	induration		"	"	-6		"		
			"	"	-7		"		
279		11:15	"	clayey siltstone	-4		"		
			"	silty claystone	-6		consolidated		material is "tight" and dense
86%			"	"	-6		"		and has become more consistently
			"	"	-6		bdd ≈ ∠10°		consolidated since about 250'.
284		12:40	"	"	-6		"		Decide to case to this zone
	5-1-92			no sample	-6		"		and try air core again.
	Tricone			"					
	to set			"					Tricone Ream hole 113'-
	casing			"					288 - set casing to 259'
288				"	-6		horiz. bdd. massive		
	5-2-92		grn-tan	clayey siltstone	-6			damp from	
	AIR CORE		"	"	-6			previous	Establish circ. blow water
28%	"		"	"	-6			injected	dry hole 7:00-9:00
	"		"	"	-6			H_2O ??	minor fossil wood stems?
294	blow dry	10:15	"	clayey siltstone	-6				parting planes on bedding
	more		"	silty claystone	-6				minor "hematite" spots"
50%	clay		"	"	-7		gritty,	AIR BLOW	GOOD SAMPLE (drill without air circulation)
297	collecting	4:30	"	"	-7		massive, dense massive	DRY MOST	FOR HYDRAULIC
100% 298	off	8:30	"	"	-7		dense	OF DAY	CONDUCTIVITY
100% 299	Push no air	10:00	"	"	-7		damp	FORMATION H_2O	9:00 [illegible] probe - damp clay [illegible]
	casing [illegible]	12:45	"	"coarse" clay	-7			damp clay?	
					-7		INJECT H_2O	INJECT H_2O	due to plugging up bit air

HOLE NUMBER PB-2 JOB NUMBER T1120491

HOLLADAY ENGINEERING COMPANY

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY Strowd DATE START 4-20-92 DATE FINISHED 5-15 HOLE DEPTH 557' ANGLE -90 DRILL METHOD CORE DIAMETER 2.4"/4" DRILL MODEL Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	HYDRAULIC PROPERTIES EST.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
			gry-grn tan	"coarse" clayst	10^{-7}	some fine		inject H_2O	clay size fraction but not
100 %			"	" "	-7	bdd subhorz			a plastic or putty type.
			"	"	-7	mod. str.			a "coarse" powdery damp
304		12:05	"	claystone minor	-7	consolidation			clay w/ minor silt fraction
	Try blocking		"	silt component	-6		massive		perhaps slit siltyer than prev.
	water off		"	"	-6				run.
84 %	inside core		"	"	-6				
	tube-		"	"	-6				SAWED INTO TO CHECK SITUATION
	marginally		"	"	-6				
310	successful	1:20	"	"	-6	bdd struct.			CRUSHED LINER BLOCKING OFF
	using		gry grn tan	silty claystone	-6				Occassional bands, blebs,
	H_2O		"	"	-6				and erratic zones of hematite
84 %	without		"	"	-6				stain are present in all of
	clear		"	"	-6		massive		the clays. Minor fossil
	mud or		"	"	-6				plant debris, possible
316	air	2:00	"	"	-6				gastrods + small mammal bones
	Quick		"	silty claystone	-6	bdd			present
100 %			"	"	-6				
			"	"	-6				
			"	"	-6				
321		2:40	"	"	-6	mod strong	massive		
			gry grn tan	silty claystone	-6	induration			same powdery damp clay
100 %			"	"	-6				
			"	"	-6				
			"	"	-6				
326		3:15	"	"	-6				
			gy grn tan	silty claystone	-6				
85 %			"	"	-6				
			"	"	-6				
			"	"	-6				
			"	"	-6				
332		4:00	"	"	-6				blow hole dry
100 %	DRILL DRY	5-4/8:10	"	"	-6			NO WATER	DRILL DRY W/O AIR (280% rec)
334	230% rec	8:10	"	"	-6			INJ. SAMPLE	SAMPLE DAMP BUT NOT SATURATED
	DRILL WET		gy grn tan	silty claystone	-6	Str indur.		INJECT H_2O	SAME MATERIAL MASSIVE clys.
			"	"	-6				BUT BECOMING HARDER
74 %			"	"	-6				
			"	"	-6				
			"	"	-6				
340		3:45	"	"	-6	bdd Horz.			
			"	silty claystone	-6				
			"	"	-6				
92 %			"	"	-6				
			"	"	-6				
345		9:30	"	"	-6	bdd			
			"	silty claystone	-6	strong			
84 %			"	"	-6	induration			occassional hematite orange
			"	"	-6				stains
			"	"	-6				
350			"	"	-6				

HOLE NUMBER PB-2 JOB NUMBER T1120491 HOLLADAY ENGINEERING COMPANY PAGE 8 OF 12

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY STROUD DATE START 4-20-92 DATE FINISHED 5-15 HOLE DEPTH 5-57 ANGLE -90° DRILL METHOD CORE DIAMETER 2.4"/4" DRILL MODEL Longyear '44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
351	INTECT	10:30	gy-grn to	silty claystone											10-6				inject H_2O	ABIT COARSER THAN PREVIOUS
	H_2O up	COLOR	"	"											-6		Mod str ind.			hematite stain blebs but
382	no	CHANGE	darker	"											-6		parting on		moist-damp	becoming darker
	ADDITIVES	↓	gy-grn	"											-6		bedding		claystone	iron mineral is reduced
			grey-grn	"											-6					form as metallic gray blebs
357		12:10	"	"											-6		mud is shrunk			no hematite / possible
			grey-brn	"											-6		CHANNELING			REDOX around 351 1/2'
832			"	"											-6		PLANT TRASH			TRANSITIONAL OXIDATION
			"	"											-6		OCCASS.			NO MATERIAL CHANGE OTHER
			"	"											-6		bdd - HOLE		INJECTING H_2O	THAN OXID.
			"	"											-6				NO APPARENT	PARTIAL REDUCTION HERE
		COLOR CHANGE	blue-grey	"											-6				CHANGE IN	REDUCED HERE
363		12:45	"	"											-6		STRONG INDUR.		NATIVE	ON DRYING CLAYSTONE BECOMES
	DRILLING		"	silty claystone											-6				MOISTURE	POWDERY BUT MOD. HARD
	SLOWER		"	"											-6				CONTENT ~	BECOMES LIGHT GRAY ON DRYING
717	HARDER		"	"											-6		HOLE BDD		10-12%	CARBON PLANT TRASH
			"	"											-6					COMMON SINCE REDUCED
			"	"											-6					
			"	"											-6					
370	STUCK	1:45	"	"											-6			coarser		GOT STUCK 10 MINUTES BREAKING
			MED. GRY	silty claystone											-6		fine bdd		INJECTING H_2O	BDD JOINT ABOVE HOLE BOTTOM.
			"	"											-6		HOLE			APPEARS SLIGHTLY MORE SILTY
832	RUNNING		"	"											-6				TRACE CLAY	
	OFF @		"	"											-6				10-12%	MUSCOVITE MORE ABUNDANT
	6 FT UP		"	"											-6		MOD STR	MASSIVE		
376	5 FT LARGE	2:20	"	"											-6		CONSOLIDATION			HOMOGENEOUS SILTY CLAY
			MED. GRY WET	silty claystone											-6					HAS NOT HARDED MUCH
872			LIGHT GRY	"											-6					PHYSICALLY SINCE ~ 370'
			DRY	"											-6					
			"	"											-6					
			"	"											-6				INJECTING H_2O	
382		2:50	MED GRY	"											-6					SAMPLE HARD SUFFICIENTLY
	Rose says		"	silty claystone											-6		platy shear		MOIST CLAY	TO CRACK IN LINER EVEN
	more fines		"	"											-6				10-12%	WHEN FLUID FILLED
	are being		"	"											-6		HOLE BDD			
632	carried		"	"											-6					
	away by		"	"											-6		MOD STR			
	H_2O in		"	"											-6		CONSOLID.			
	thirsty		"	"											-6					
390	material	3:30	"	"											-6		CARBON BDD FRACTURES			
															-6		plant trash			
			MED. GRY	silty claystone											-6				INJECT H_2O	CARBONATED CARBON BDD
			"	"											-6		INJECT H_2O			THIS RUN DOESN'T HAVE
100 %			"	"											-6					MUCH INJECTED H_2O IN
			"	"											-6		HOLE BDD			SAMPLE LINER - GOOD TEST SAMP
395	EOS	4:10	"	"											-6					
	5-5-92	7:30	"	claystone											-7		BLOWN DRY HOLE			BLEW DRY FOR 1 HR 4:15-5:15
100% 397	DRILL DRY	8:15	"												-7					LESS SILTY
			"												-7		10-12% H_2O	PLASTIC		
			"												-7		strong consist.		NO H_2O INJ.	sticky clay / moisture 10-12% ?
			"												-7				" " "	almost pure modeling clay

HOLLADAY ENGINEERING COMPANY

HOLE NUMBER PB-2 JOB NUMBER T1120491

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY Strowd DATE START 4-20-92 DATE FINISHED 5-15 HOLE DEPTH 557' ANGLE -90 DRILL METHOD CORE DIAMETER 2.4" DRILL MODEL Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	HYDRAULIC PROPERTIES: EST.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
100%	INJECTING		MED. GRY	claystone	10^{-7}	strong		inject H_2O	sticky cly w/ minor silt
	H_2O +		"	"	-7	consolidation	massive	est. 10-18%	
403	AIR QUIK	9:00 am	"	"	-7			formation	moist + sticky
			"	"	-7	massive w/		H_2O	MEDIUM GRAY BECOMES
			"	"	-7	hints of			VERY LIGHT CEMENT GRAY
100%			"	"	-7	bdd struc.			ON DRYING OUT
			"	"	-7				
408		9:30	"	"	-7			10-14%	~2% silt 98% cly
			MED GRY	CLAYSTONE	-7	STR. CONSOL.		native H_2O	NOT AS CARBONACEOUS
			"	"	-7				
80%			"	"	-7				
			"	"	-7				
			"	"	-7				
414		10:00	"	"	-7				
	WATER	1:00	MED GRY	claystone	-7	STR CONSOL.			
	TRUCK		"	"	-7				
83%	DOWN		"	"	-7				
	WIRE LINE		"	"	-7				
	PROBLEMS		"	"	-7				
420		1:30	"	"	-7			DAMP CLY	
	[illegible]	1:40	MED GRY	CLAYSTONE	-7			INJECTING	QUAD DEFECTIVE ON CORE
	INJ. H_2O		"	"	-7			WATER	TUBE HAS TO TRIP 3:20-4:00
58%			"	"	-7				REPLACED UNIT - SHOE AT
			"	"	-7				BIT WASN'T IN ALL THE WAY
			"	"	-7				
426	Tripout	3:30	"	"	-7				
		4:45	MED GRY	CLAYSTONE	-7	STRONG			
			"	"	-7	CONSOLIDATED			
71%			"	"	-7				
			"	"	-7				
			"	"	-7				
			"	"	-7				
433	EOS	5:30	"	"	-7	SUB HORIZ bdd.			3½ HRS DOWN 6½ DRILL
	5-6-92	7:00	MED GRY	CLAYSTONE	-7	STRONG		INJECT H_2O	BROUGHT IN LARGER COMPRESSOR
			"	"	-7	CONSOLID.			220 psi ; DRILL STEM WAS
			"	"	-7				STUCK IN HOLE AT
71%			"	"	-7			10-14% natural	BEGINNING OF SHIFT
			"	"	-7			moisture in	MATERIAL FRACTURES
			"	"	-7			sample	WITH AND ACROSS BEDDING
440		8:45	"	"	-7				
			MED GRY	CLAYSTONE	-7	HORIZ. BDD		INJ. H_2O	
			"	"	-7	STD CONS.			
			"	"	-7				
70%			"	"	-7				
			"	"	-7				
			"	"	-7				
447	"	9:16	"	"	-7				
			"	"	-7				
76%			"	"	-7				
			"	"	-7				

HOLE NUMBER PB-2 JOB NUMBER T1120491 HOLLADAY ENGINEERING COMPANY PAGE 10 OF 12

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO Canyon SEC. 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY Stroud DATE START 4-20-93 DATE FINISHED 5-15-93 HOLE DEPTH 557' ANGLE -90° DRILL METHOD CORE DIAMETER 2.4" DRILL MODEL Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK.	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	DRILLING		MED. GRY	CLAYSTONE											10^-7		MOD STR. CONSOLID.	MASSIVE	INJECT H_2O	MATERIAL BASICALLY
	WET		"	"											-7				UNCHANGED SINCE 395'	
			"	"											-7				OR EVEN 362'	
454		9:45	"	"											-7				NATIVE	
			MED. GRY	CLAYSTONE											-7				MOISTURE	
			"	"											-7				~10-12%	
100			"	"											-7					
			"	"											-7					
			"	"											-7					
460		10:00	"	"											-7					
			MED GRY	CLAYSTONE											-7		MOD STRONG CONSOLID		INJECT H_2O	
			USAY	"											-7					
			UNIFORM	"											-7					
712			GRAY	"											-7					
			COLOR	"											-7					
			"	"											-7					
467		11:30	"	"											-7					
			"	CLAYSTONE											-7					
832			"	"											-7					
			"	"											-7					
			"	"											-7				INJECT H_2O	
			"	"											-7					
473		12:15	"	"											-7					
			MED GRY	CLAYSTONE											-7		MOD STR. CONSOLID.			
			"	"											-7					
832			"	"											-7					
			"	"											-7					
			"	"											-7					
479		12:45	"	"											-7					
			MED GRAY	CLAYSTONE											-7					CARBONACEOUS WOOD FLAGS
			"	"											-7					LINER CRUSHED BY COMPRESSION
953			"	"											-7				NATIVE MOIST	
			"	"											-7				~12-14%	
485		1:30	"	"											-7					GOT STUCK IN HOLE 15 MIN.
		2:00	MED. GRY	CLAYSTONE											-7		MOD STRONG CONSOLID.		USING H_2O	
			"	"											-7				+ CLEAN MUD	
832			"	"											-7				(POLYMER)	
			"	"											-7					
	CASING		"	"											-7					
	SEAL		"	"											-7					CASING WORKING LOOSE
491	CAVING	7:45	"	"											-7					
			MED GRY	CLAYSTONE											-7					
			"	"											-7					
			"	"											-7					
			"	"											-7					
496	MUDDY	3:45	"	"											-7				RETURN	
497	5-7-93	10:15	MED GRY	CLAYSTONE			DRILL DRY THIS ONE FOOT SAMPLE								-7				WATER IN HOLE BOTTOM IN MORNING	4:00 blow hole - return air
	5-15-93	10:00		NO SAMPLE			NO SAMP - PACKER BLOCKED OFF TIME													carney from inside casing
0%																				RESEAL CASING + DRY TILL 5:30
																				SET NONE CASING FROM 290 TO 295

HOLLADAY ENGINEERING COMPANY

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HOLE NUMBER PB2 JOB NUMBER T112091

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO Canyon SEC 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY STROUD DATE START 4/20/92 DATE FINISHED 5-15 HOLE DEPTH 557' ANGLE -90° DRILL METHOD CORE DIAMETER 2.4"/4" DRILL MODEL Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
4	NO SAMPLE PACKER BLOCKED OFF						CORE TUBE													
0% 505			± MED GY	CLAYSTONE											10^-7		MOD STR. CONSOLID.	MASSIVE	INJECT H_2O CLEAR MUD	SAME RUBBER PACKER DEBRIS MIXED WIT SAMPLE
65% 507	10:45	DRILLING	"	"											-7		Grn Gold		NATIVE MOISTURE IN SHOE CORE WETTING FRONT ~ 15%-20%	
100 %			"												-7				15-20 %	
512		11:30	MED GY.												-7		MOD STR COAS.	MASSIVE		* MED GRAY COLOR IS VERY LIGHT TAN-GRY UPON DRYING. THIS COLO CHARACTERISTIC APPLIES TO ALL GRY CLAYSTONE ENCOUNTERED THUS FAR.
100%			"	CLAYSTONE											-7					
517		12:00	"	"											-7		Grn Laminae Gold			
70%	LOST RECOVERED SAMPLE		MED GRY	CLAYSTONE											-7					RUBBER PACKER DEBRIS IN SAMP
	RETRIEVE INNER TUBE		"	"											-7		Grn Gold.			
524	1:00	1:00	"	"											-7					
			MED GRY	CLAYSTONE											-7				20-26% NATIVE H_2O	CUT HOLES IN SLEEVE RELEASED INJ. H_2O & RETAPPED
83%			"	"											-7					
530		1:15	"	"											-7				20-25 NATIVE MOISTURE	GOOD SAMPLE FOR UNDISTURBED SAMPLE NO PACKER IN INJECT. H_2O (DRILLED W/O LEXAN LINER)
5 hrs	DRILLED W/O LINER		MED GRY	CLAYSTONE											-7					
442			"	"											-7					
536		2:00	"	"											-7					
	WITH LINER		MED GRY	CLAYSTONE											-7					
100%			"	"											-7					
540		2:30	"	"											-7					
			MED GRY	CLAYSTONE											-7					CLAYSTONE BECOMING SLIGHTLY COARSER GRAINED
100%			"	"											-7					
545		3 3:00	"	"											-7					
			MED GY	CLAYSTONE											-7					
83%															-7					

HOLE NUMBER: 7B2 JOB NUMBER: I1120491

HOLLADAY ENGINEERING COMPANY

PROJECT: Pickles Butte OWNER: Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SE OF 1/4 NW T 2 N R 3 W

LOGGED BY: Stroud DATE START: 4-20-92 DATE FINISHED: 5-15-92 HOLE DEPTH: 557' ANGLE: -90° DRILL METHOD: Core DIAMETER: 2.4"/4" DRILL MODEL: Longyear 44

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY: ROCK TYPE	LITHOLOGY: GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT: CLY	SLT	SAND	GRAV	GRAIN ROUNDING: ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES: EST.	MEAS.	INDURATION & STRUCTURE EXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
551'		3:30	MED GRY	CLAYSTONE											10^{-7}		MOD STR.			
83%			"	"											-7		CONSOL.		INJECT H_2O	DRAINED INJECTED
			"	"											-7				+ CLEAR MUD	WATER FROM LINER
			"	"											-7					
			"	"											-7					
			"	"											-7					
557	BLOW DRY	4:00	"	"											-7					
	EOH	5/16/92																	NATIVE H_2O	
																			20-25%	ATTEMPT BLOW HOLE DRY EO
																			48' water in	COMPRESSOR WON'T START
																			hole @ 7:00am	Formation water?

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY ELEV. ~ 2930 PAGE 1 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC 21 1/4 SW OF 1/4 SE - 2 N R 3 W

LOGGED BY Smeuo DATE START 9-29-92 DATE FINISHED 10-21-92 HOLE DEPTH 640 ANGLE -90° DRILL METHOD Air Rotary R.C. DIAMETER 12 1/4" DRILL MODEL Schramm T685-DA

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS. ETC.	GRAPHIC	WATER	COMMENTS
	Reverse Circ. Air Rotary	9-29-92																		
5	5 1/4" will Ream to 12 1/4" mud Rotary	4:20	lt gy-tan	Road fill of fine sand + Gravel											~10^-2		WK consolidation		~8%	Gravel fraction well rounded may be formation gravel in part or gravel from pad construction
10		4:24	lt ba-tan	fine sand/GRV											10^-2 to 3		WK		~10%	Gravel clasts 1/4 to +2" and Brahams Loader
15		4:26	lt ba-tan	fine sand minor gravel											10^-2 to 3		WK-mod		~12%	slightly damp
20		4:30	lt ba-tan	fine sand minor GRV.											10^-2 to 3		WK-mod		~12%	slightly damp
25		4:37	lt ba-tan	fine sand some silt											10^-3		WK		~10%	drier
30		4:36	tan	clayey silt w/ fine-med sand											10^-4 to 1		WK-mod		~10%	dry
35	EOS	4:40 9-30-92	tan	clayey sandy clay											10^-6		mod		~15%	slightly damp
40		7:30	tan	clayey fine sand											10^-5		mod.		~17%	
45		7:45	tan	clayey fine sand w/ minor gravel											10^-5		mod		~15%	very poorly sorted material
50				clayey silt + clay											10^-5		mod		~17%	SATD

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 2 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE - 2 N R 3 W

LOGGED BY STROUD DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90° DRILL METHOD AIR ROTARY R.C. DIAMETER ____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS. ETC.	GRAPHIC	WATER	COMMENTS
	R.C. AIR ROTARY 5¼"	9-30-92																		
55	▽	9:15	tan	silty clay											10^{-6}		mod.		~28%	clay is partially "balling up"
60		9:30	tan	silty clay w/ minor sand											10^{-5}		mod.		~20%	somewhat "damp" feeling
65		9:45	gy-tan	fine sandy silt											10^{-4}		wk-mod.		~15%	almost "dry + dusty" trace gravel
70		9:00	gy-tan	fine sandy silt											10^{-5}		wk-mod		~15%	minor gravel
75		9:02	gy-tan	silty fine sand											10^{-4}		wk-mod		~15%	"flowing sand" almost "dry"
40		9:05	tan	fine sandy silt											10^{-5}		wk-mod		~15%	
85		9:08	tan	clayey fine sandy silt											10^{-5}		WK-mod		~15%	
90		9:10	gy-tan	fine sandy gravel											10^{-4}		wk-mod		~12%	
95		9:12	lt tan	silty fine sand											10^{-5}		wk-mod		~12%	
100		9:15	lt tan	clayey silty fine sand											10^{-4}		wk		~15%	almost damp feeling

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 3 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE T. 2 N R. 3 W

LOGGED BY Strawb DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90 DRILL METHOD _____ DIAMETER _____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
R.C. Air Rotary	D.C. AIR ROTARY 5¼"	9-30-92																		
105		9:18	lt bn-tan	silty fine sand											10^{-5}		wk-mod		~12-15%	
110		9:20	lt bn-tan	silty fine sand											10^{-3}		wk		~10%	DRY, almost no cly fraction
115		9:25	lt bn-tan	silty fine sand											10^{-4}		wk-mod		~12%	some clay again
120		9:30	lt gy-tan	silty fine sand											10^{-3}		wk		~12%	less clay
125		9:32	lt gy-tan	clayey silt w minor gravel											10^{-5}		wk mod		~12%	
130	START USING AUX. COMPRESSOR MIXER Tripping up.	9:35	lt gy-tan	clayey silt w minor gravel											10^{-5}		wk mod		~12%	almost dry
135		9:40	lt gy-tan	silty fine sand											10^{-4}		wk		~10%	Dry
140		9:45	lt gy-tan	silty fine sand minor gravel											10^{-4}		wk		~12%	
145		9:51	lt gy-tan	silty fine sand											$10^{-3}/10^{-4}$		wk		~15%	almost clean / clean sand less clay
150		9:58		silty fine sand											10^{-4}		wk-mod		~17.9%	

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 4 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Stroud DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90 DRILL METHOD _____ DIAMETER _____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	AIR ROTARY R.C. 5 1/8"																			
155		10:00	lt brn-tan	sandy silt w/ minor gravel											10^{-5}		wk-mod		12-15%	
160		10:10	tan-brn	silty fine sand w/ gravel											10^{-4}		wk-mod		~12-15%	
165		10:20	tan-brn	silty fine sand											10^{-3}		wk		~12%	ALMOST DRY
170	some torque up on drill stem	10:30	lt brn tan	silty fine sand											10^{-3}		wk		~12%	still "flowing" sand
175		10:40	brn-tan	fine sandy gravel											10^{-3}		wk-mod		~12-15%	LIMONITE RIND ON MANY CLASTS CLASTS HAVE BEEN WELL ROUNDED
180		10:45	brn-tan	fine sandy gravel											10^{-3}		wk-mod		~12%	
185		10:50	tan-brn	fine sand											10^{-3}		wk		~12%	fairly well sorted sand w/ possible few gravel clasts
190		10:55	tan-brn	fine sand											10^{-3}		wk		~12%	clean sand
195		11:00	tan-brn	fine sand											10^{-3}		wk		~10%	DRY
200		11:05	tan brn	silty fine sand											$10^{-3}/10^{-4}$		wk		~12%	finer sand more silt

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 5 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Steowd DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90 DRILL METHOD _____ DIAMETER _____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	R.C. AIR ROTARY 5 1/4"	9-30-92																		
205	↓	11:15	tan-brn	silty fine sand											10^{-4}		wk-mod		~12%	ALMOST DRY; "HINT" OF MOISTURE
210		11:25	tan-brn	fine to coarse sand											10^{-3}		wk		~12%	LESS SILT
215		11:30	tan brn	silty sand											10^{-4}		wk		~12%	MORE SILT AS BEFORE
220		11:40	tan-brn	silty fine sand											10^{-5}		wk-mod		~12%	MORE CLAY
225	drilling slowing down	11:55	tan brn	fine-coarse sand w/ some GRAVEL											10^{-3}		wk-mod		~10-12%	NO CLAY
230	Torque up	12:10	brn-tan	silty sand w/ gravel											10^{-4}		mod		AIR QUICK Inject Polymer ~12%	RODS STICKING - silt binding + caving on RODS
235		12:30	brn tan	silty fine sand											10^{-4}		wk-mod		~12%	
240		12:50	tan-brn	silty fine sand											10^{-4}		wk-mod		~12%	
245		MUD	tan-brn	~~silty fine sand~~ fine sandy silt											$10^{-4}/10^{-5}$		wk-mod		~12%	GETTING FINER
250		11:30	tan brn	fine sandy silt															~12%	

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 6 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO Canyon SEC 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Strowd DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90° DRILL METHOD _____ DIAMETER _____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	R.C.	9-30-92																		
	AIR																			
	ROTARY																			
	5 1/8"																			
255	↓	1:45	brn-tan	silty fine sand											10^{-4}		MOD CONSOLIDATED		~12-15%	TRACE CLAY
	Then																			
	ream to																			
	12 1/4"																			
260	+	2:00	brn-tan	f-m sandy silt											10^{-5}		MOD		~12%	VIRTUALLY DRY & DUSTY
	Set																			
	Casing																			
	from																			
	0 to																			
265	270	2:05	brn-tan	f-m sandy silt minor gravel											10^{-5}		WK-MOD		~12%	
CASING																				
270	DEGAS.	2:10	lt brn	claystone											10^{-6}/10^{-7}		MOD-STR		INJECT POLYMER	INSITU MOISTURE WAS "DRY" SAMPLE WETTED TRACE SAND, MINOR SILT
BOTTOM @ 272	POLYMER																			
	INJECTN																			
	SAND-SILT																			
	CAVING																			
275	TORQUING UP ON RODS	2:15	lt brn	CLAYSTONE											10^{-7}		MOD-STR		?	WETTED SAMPLE BUT CLAY DUST BEFOR INJECTION
280		2:20	tan	CLAYSTONE											10^{-7}		MOD-STR		<20%	DUST @ DISCHARGE (DRY) MUCH OF SILT FRACTION BENT COLLECTED @ SAMPLE DISCHARGE AS DUST CLAY BLOWING AWAY
285		2:25	tan	CLAYSTONE											10^{-7}		MOD-STR		~25%	WETTED BY INJECTION SLIGHTLY
290		2:30	tan	CLAYSTONE											10^{-7}		MOD-STR		<20%	
295		2:35	tan	CLAYSTONE											10^{-7}		MOD-STR		<20%	TRIPS OUT - CAN'T GO FURTHER R.C. AIR: WILL REAM 12¼" MUD ROTARY 0-300 FT. END OF SHIFT @ 5:00
300	TRIPS	2:40	tan	CLAYSTONE											10^{-7}		MOD-STR		<20%	

HOLE NUMBER PB-4 JOB NUMBER T1124091 HOLLADAY ENGINEERING COMPANY PAGE 7 OF 13

PROJECT Pickles Butte OWNER Canyon Co LOCATION: CO Canyon SEC 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY STROUD DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90° DRILL METHOD AIR ROTARY DIAMETER 8" DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	8" AIR ROTARY	10-13-92																	NO H_2O	REAMED 0-279'
																			INJECT	CHECK FOR WATER - SAND
																			↓	FOAM & RETURN WATER
																				BLOW HOLE WAIT 2 HRS - NO H.
305		7:40	LT-TAN	SILTY CLAY											10^{-6}		WK-MOD CONSOLID			WATER in hole SAMPLE 2c
																				NOT REPRESENTIVE - HOLE REQUIRES CLEANING
	AIR CORE		LT-TAN	SILTY CLAY											10^{-6}		WK-MOD	LOOSE LOW DENSITY CLAY BUT NO OPEN VOIDS	~35%	
			"	"											10^{-6}		"		" ?	
310			"	"											10^{-6}		"		" ?	POOR SAMPLE CORE
	↓	2:30	"	"											10^{-6}		"		" ?	309 - 311; 1 1/2 ft RECOVERED
	AIR CORE		LT TAN	SILTY CLAY											10^{-6}		"		> 35%	
	AGAIN	5:	"	"											10^{-6}		"		> 35%	CORE ATTEMPT AGAIN
	↓	5:30	"	"											10^{-6}		"		> 35%	LOW RECOVERY (311 - 315
315	AIR ROTARY 5"	10-14-92													10^{-6}		"		> 35%	SAMPLE VERY DAMP - RELEASE FILM OF MOISTURE ON CORE 312-313 Pulled for lab test
320	↓	7:15	LT TAN	SILTY CLAY											$10^{-5}/10^{-6}$		WK MOD		> 35%	SLIGHTLY DRIER FROM HOT COMPRESSED AIR ROTARY
325		7:25	LT TAN	SILTY CLAY											10^{-6}		WK-MOD		> 35%	
330		7:50	LT TAN	CLAYEY SILT											10^{-5}		WK		~ 35%	
335		8:05	LT TAN	CLAYEY SILT											10^{-5}		WK		~ 32%	
340		8:15	LT TAN	CLAYEY SILT											10^{-5}		WK		~ 35%	
345		8:30	LT TAN	CLAYEY SILT											10^{-5}		WK		> 35%	QUITE DAMP
350		9:45	LT TAN	CLAYEY SILT											$10^{-5}/-6$		WK		> 35%	

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 8 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Strowd DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90 DRILL METHOD _____ DIAMETER _____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS. ETC.	GRAPHIC	WATER	COMMENTS
	AIR ROTARY 8"	10-14-92																	No H2O INJECTION	
355		9:50	LT TAN	SILTY CLAY											10-6		WK-MOD CONSOLIDATED		~35%	
360		9:00	LT TAN	SILTY CLAY											10-6		WK-MOD		~35%	
ONLY 10% RECOVERY	AIR CORE																			LOST CORE BARREL DOWN HOLE 11:45 - 2:00
365	AIR ROTARY	3:45	LT TAN	CLAYEY SLT											10-5		WK		~35%	
370		3:50	LT TAN	SILTY CLAY											10-6		WK-MOD		~35%	MORE CLAY
375		3:55	LT TAN	SILTY CLAY											10-6		MOD		~35%	
380		4:00	LT TAN	SILTY CLAY											10-6		MOD		~35%	
385		4:05	LT TAN	SILTY CLAY											10-6		MOD		~35%	
390		4:10	LT TAN	CLAYSTONE											10-7		MOD		>35%	
395		4:15	LT TAN	CLAYSTONE											10-7		MOD		~35%	
400	EOS	4:20	LT TAN	CLAYSTONE											10-7		MOD		~35%	QUITE DAMP

HOLE NUMBER PB-4 JOB NUMBER T2120491

HOLLADAY ENGINEERING COMPANY

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Strowd DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90 DRILL METHOD AIR ROTARY DIAMETER 8" DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	HYDRAULIC PROPERTIES EST.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	EST. WATER	COMMENTS
	AIR	10-15-92	LT GRN-	CLAY	10^{-7}	WK-MOD	+35%	CHECK FOR WATER - PROBE GOES
	CORE	7:45	BRN	"	-7	CONSOLIDATION	+35%	DOWN TO 388' (TD @ 400) NEGATIVE
			"	"	-7	"	+35%	LEXAN LINER COMPRESSED SPLIT
			LIGHT	"	-7	"	+35%	TUBE IN CORE BARREL MAKING
405	↓	10:20	GRN-BRN	"	-7	"	+35%	EXTRACTION OF SPLIT TUBE DIFFICULT
	AIR						CORE	SAMPLE QUITE DAMP, SOME
	ROTARY							LAMINATED THIN BEDDING
	DRILLING							NO H_2O INJECTION IN HOLE
	DRY		LT					404 - 405 pulled for lab tests
410		12:05	GRN-BRN	CLAY	-7	MOD. CONSL.	+35%	FORMS CLAY BALLS @ DRILL
								DISCHARGE VERY DAMP
								feeling
415		12:10	LT GRN-BRN	CLAY	-7	MOD CONSL.	+35%	trace silt
420		12:25	GRN-BRN	CLAY	-7	MOD CONSL.	+35%	↑
								OXIDIZED
								REDUCED
425		12:40	BRN-GRY	CLAY	-7	MOD CONSL.	+35%	↓
430		12:55	BRN-GRY	CLAY	-7	MOD. CONSL	+35%	TRACE SILT
435		1:05	-GRY	CLAY	-7	MOD CONSL	+35%	
440	↓ EOS	1:20	-GRY	CLAY	-7	MOD CONSL.	+35%	DRILLER LEAVES
	Trip in	10-20-92	GRY-GRN-	sandy silt		WK-CONSOL. BROKEN	Groundwater	check after sitting 4-days - none.
60%	for AIR	OXIDIZED	BRN	w/ clay		WK	VERY	(GOT TO WITHIN 3FT OF HOLE
	CORE	"	"	"		WK AND	DAMP but	BOTTOM) HOLE BLOWN CLEAN but
	[illegible]	"	"	"		WK LOOSE	NOT "WET"	CORE SAMPLE 400-405
445	sample	9:30	"	"	-5 ?? silt?		+35%	appears to be hole shaft
								CORE BIT BURNED + FAILED
								HAVE TO ORDER ANOTHER
								Pull 444-449 for lab tests
450		12:00		fine sl. [illegible] silt	-6	WK	+35%	PARTIALLY OXIDIZED

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 10 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO Canyon SEC 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Stroud DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 660 ANGLE -90 DRILL METHOD AIR ROTARY DIAMETER 8" DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	HIGH PENETRATION RATE IN THIN MARINE	10-20-92																		
455		9:50	GRY-ORN	fine sandy silt											-5		WK		+35%	VERY DAMP PARTIALLY OXIDIZED
460		12:15	GRY-BRN	clayey silt											-6		WK		+35%	BECOMING LESS OXIDIZED
465		12:25	GRN-BRN	clayey silt											-6		WK		~35%	MORE OXIDIZED
470		12:30	DARK BRN	CLAYEY SILT											-5/-6		WK		~35%	
475		12:34	BRN-GRY	CLAYEY SILT											-5/-6		WK		~35%	
480		12:39	BRN-GRY	CLAYEY SILT											-6		WK		+35%	VERY DAMP
485		12:46	BRN GRY	CLAYEY SILT											-5/-6		WK		~35%	
490		12:45	BRN GRY	CLAYEY SILT											-6		WK		~35%	STILL PARTIALLY OXIDIZED
495		12:50	MED GRY	SILTY CLAY											-6/-7		WK-MOD		+35%	QUITE DAMP - MORE CLAY
500		12:55	MED GRY	SILTY CLAY											-7		WK-MOD		+35%	TD point @ 500 - Check for water - more DAMP CLAY INCREASING

HOLE NUMBER 20-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 11 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Stroud DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90° DRILL METHOD ____ DIAMETER ____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS. VOIDS. ETC.	GRAPHIC	WATER	COMMENTS
	AIR CORE NO RECOVERY	10-20-92																		Clean Probe by Trip in thru water change 4:00 - 10:30
		10-21-92																		None (10-21-92)
505	AIR ROTARY	10:35	DARK GRAY	CLAY											10-7		WK-MOD CONSOLIDATION		NO WATER 1" morning	10-20-92 AIR CORE HAD NO RECOVERY DUE TO LOOSE FORMATION - AIR BLOWING MATERIAL +35% 500-505 OUT OF SIDE TUBE. ROTARY CUTTING 500-505 VERY DAMP
510		10:40	DARK GRAY	SILTY CLAY											-7		WK-MOD		+35%	MORE SILT - STILL "BALLING"
515		10:45	RED GRY	SILTY CLAY											-6		WK - LOOSE		~35%	AIR LOWER IN HALLS @ DISCHG
520		10:47	MED GRY	CLAYEY SILT											-5/-6		WK		~35%	
525		10:50	GRAY	SILTY CLAY											-6/-7		WK		~35%	TRACE SAND
530		10:52	GRAY	CLAY											-7		WK		+35%	
535		10:55	GRAY	SILTY CLAY											-7		WK-CONSOL		+35%	
540		10:58	GRAY	SILTY CLAY											-7		WK-MOD		+35%	DUITE DAMP
545		11:01	GRAY	SILTY CLAY											-7		WK to MOD		+35%	
550		11:05	GRAY	SILTY CLAY											-7		WK to MOD		+35%	

HOLE NUMBER PB-4 JOB NUMBER T2120491 HOLLADAY ENGINEERING COMPANY PAGE 12 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO. Canyon SEC. 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY Stowell DATE START 9-29-92 DATE FINISHED 10-21 HOLE DEPTH 640 ANGLE -90° DRILL METHOD _____ DIAMETER _____ DRILL MODEL Schramm

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL. PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	Air Rotary 8"	10-21-92																		
555		11:10	GRAY	CLAYSTONE											10-7		WK-MOD		~35%	
560		11:14	GRAY	CLAYSTONE											-7		WK-MOD		+35%	
565		11:16	GRAY	CLAYSTONE											-7		WK-MOD		+35%	VERY DAMP
570		11:20	GRAY	CLAYSTONE											-7		WK-MOD		+35%	VERY DAMP; TRACE SILT
575		11:24	GRAY	CLAYSTONE											-7		WK-MOD		+35%	VERY DAMP · ZONE 565-575 or 580 drill screen zone. ALTHOUGH NO APPRECIABLE YIELD EVIDENCE IN HOLE DURING DRILLING.
580		11:28	GRAY	CLAYSTONE											-7		WK-MOD		+35%	
585		11:30	GRAY	CLAYSTONE											-7		MOD CONSOLID		+35%	ADD HARDER MATERIAL
590		11:35	GRAY	CLAYSTONE											-7		MOD		+35%	
595		11:40	GRAY	CLAYSTONE											-7		MOD		+35%	

HOLE NUMBER PD-4 JOB NUMBER 7120491 HOLLADAY ENGINEERING COMPANY PAGE 13 OF 13

PROJECT Pickles Butte OWNER Canyon Co. LOCATION: CO Canyon SEC 21 1/4 SW OF 1/4 SE T 2 N R 3 W

LOGGED BY JTROWD DATE START 9-29-92 DATE FINISHED 10-21-92 HOLE DEPTH 640 ANGLE -90° DRILL METHOD Air Rotary DIAMETER 8" DRILL MODEL Schramm T685

INTERVAL (FT)	DRILL NOTES	DATE TIME	COLOR	LITHOLOGY ROCK TYPE	LITHOLOGY GRAPHIC	GEOPHYSICS LOG	GRAIN SIZE REL PERCENT CLY	SLT	SAND	GRAV	GRAIN ROUNDING ANG	WK	MOD	WELL	HYDRAULIC PROPERTIES EST.	MEAS.	INDURATION & STRUCTURE FXS, VOIDS, ETC.	GRAPHIC	WATER	COMMENTS
	AIR ROTARY 8"	10-21-92																		
605		11:50	GRAY	CLAYSTONE											10-7		MOD CONSOLIDATED		+35%	VERY DAMP
610		11:55	GRAY	CLAYSTONE											-7		MOD		+35%	VERY DAMP
615		12:00	GRAY	CLAYSTONE											-7		MOD		+35%	
620		12:08	GRAY	CLAYSTONE											-7		MOD		+35%	DRILLER FEELS POSSIBLE WATER BEARING ZONE
625		12:15	GRAY	CLAYSTONE											-7		MOD		+35%	ABIT MORE SILT - DRILLER FEELS MAKING MINOR WATER 610-630 POSSIBLE SCREEN ZONE
630		12:20	GRAY	CLAYSTONE											-7		MOD		~35%	ABIT DRIER FEELING
635		12:25	GRAY	CLAYSTONE											-7		MOD		~30-35%	DISTINCTLY LESS MOISTURE PARTIALLY OXIDIZED CLAY CLASTS
640	TD	12:30	GRAY	CLAYSTONE											-7		MOD		~30-35%	WATER CHECK - WATER IN THE PARTIALLY OXIDIZED CLAY CLASTS

Form 238-7
4/92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name PICKLES BUTTE SANITARY LANDFILL

Address 115 Albany, Caldwell, ID 83605

Drilling Permit No. 63-93-W-0554-~~0001~~004

Water Right Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☒ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Auger ☒ Reverse rotary
☐ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.25 inches	4 inches	+ 2.5 feet	512.5 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

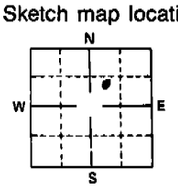
Well screen installed? ☐ Yes ☐ No
Manufacturer Houston Type Pre-pack
Top Packer or Headpipe _____
Bottom of Tailpipe _____

Diameter 4 Slot size .020 Set from 512.5 feet to 522.5 feet
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Gravel packed? ☒ Yes ☐ No ☐ Size of gravel 10/20
Placed from 496 feet to 535 feet
Surface seal depth 400-496 Material used in seal: ☐ Cement grout ☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☒ Slurry pit ☐ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☒ Threaded ☐ Welded ☐ Solvent Weld ☐ Cemented between strata

Describe access port Top of casing with locking cap and protective cover

6. LOCATION OF WELL

Sketch map location **must** agree with written location.



Subdivision Name Pickles Butte Landfill
Lot No. _____ Block No. _____
County Canyon
Address of Well Site Perch Road, Pickles Butte
(give at least name of road)
SW ¼ NE ¼ Sec. 21, T. 2 N ☒ or S ☐, R. 3 E ☐ or W ☒

7. WATER LEVEL

Static water level 514 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 77 °F. Quality Poor
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

70568

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
12¾"	0	40	tan fine sandy silt		
"	40	48	brown sandy gravel		
"	48	140	tan silty clay		
"	140	185	gray silty fine sand		
"	185	225	gray fine to med sand		
"	225	240	light gray clayey silt		
"	240	250	light gray silty fine sand		
"	250	275	tan clay		
"	275	320	fine to med sand		
"	320		mixed gray fine sand and		
"		400	tan clayey silts		
"	400	435	gray fine sand		
12¾"	435	455	no sample		
10"	455	485	tan gray silty claystone		
10"	485	560	gray brown silty fine sand	x	
5¼"	560	620	clayey silt and fine sand	x	
5¼"	620	660	blue gray claystone		

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WESTERN REGION

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NOV 26 1993
Department of Water Resources

FEB 09 1994

10.

Work started 7-7-93 finished 11-23-93

11. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Boyles Brothers Firm No. 503
Address Box 25608 Salt Lake, Ut Date 11-23-93
Signed by Drilling Supervisor Gary K Will
and
(Operator) _____ *(If different than the Drilling Supervisor)*

USE ADDITIONAL SHEETS IF NECESSARY. RETURN THE WHITE COPY TO THE DEPARTMENT

Form 298-7
4/92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name PICKLES BUTTE SANITARY LANDFILL

Address 6284 Perch Road, Caldwell

Drilling Permit No. 63-93-W-0554-001

Water Right Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☒ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Auger ☒ Reverse rotary
☐ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.25 inches	4 inches	+ 2.5 feet	487.5 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☐ Yes ☐ No
Manufacturer Houston Type Stainless Steel
Top Packer or Headpipe _____
Bottom of Tailpipe _____

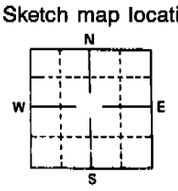
Diameter 4 Slot size .020 Set from 487.5 feet to 497.5 feet
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____
Placed from 478 feet to 515 feet

Surface seal depth 478 Material used in seal: ☐ Cement grout
☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit
☒ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☒ Threaded ☐ Welded
☐ Solvent Weld ☐ Cemented between strata

Describe access port Top of casing with locking cap and protective cover.

6. LOCATION OF WELL

Sketch map location **must** agree with written location.



Subdivision Name Pickles Butte Landfill
Lot No. _____ Block No. _____
County Canyon
Address of Well Site 6284 Perch Road
(give at least name of road)
SE ¼ NW ¼ Sec. 21, T. 3 N ☒ or S ☐, R. 3 E ☐ or W ☒

7. WATER LEVEL

Static water level 491 feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 75 °F. Quality Poor
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

9. LITHOLOGIC LOG

70567

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
12 3/4	0	17	silty sand		
"	17	18	sandy gravel		
"	18	60	tan silty clay		
"	60	95	med sand		
"	95	125	tan calyey silt		
"	125	160	tan clay		
12 3/4	160	195	fine sand		
7 7/8	195	220	silty clay		
"	220	360	fine and med sand		
"	360	380	tan clayey silt		
"	380	435	fine sand		
"	435	510	435-490 tan, 490-510 gray silt x		
"	510	620	gray silty clay		
"	620	690	gray clay stone		
7 7/8	690	700	gray silty clay		

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WESTERN REGION

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NOV 26 1993
Department of Water Resources

10.

Work started 7-31-93 finished 11-20-93

11. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Boyles Brothers Firm No. 503
Address _____ Date 11-23-93
Signed by Drilling Supervisor Darryl Hill
and
(Operator) _____
(If different than the Drilling Supervisor)

FILMED
SEP 09 1994

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE ORIGINAL COPY TO THE DEPARTMENT

Form 238-7
4/92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name PICKLES BUTTE SANITARY LANDFILL

Address 6284 Perch Road, Caldwell

Drilling Permit No. 63-93-w-0554-~~001~~ 003

Water Right Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☒ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Auger ☒ Reverse rotary
☐ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION

Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____

Thickness	Diameter	From	To
.25 inches	4 inches	+ 2.2 feet	535 feet
_____ inches	_____ inches	_____ feet	_____ feet
_____ inches	_____ inches	_____ feet	_____ feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☐ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? _____ inches by _____ inches

Number	From	To
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet
_____ perforations	_____ feet	_____ feet

Well screen installed? ☒ Yes ☐ No
Manufacturer Houston Type Wire Wrap
Top Packer or Headpipe _____
Bottom of Tailpipe _____

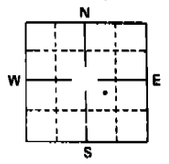
Diameter 4" Slot size .02 Set from 535 feet to 555 feet
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Gravel packed? ☒ Yes ☐ No ☐ Size of gravel 10/20
Placed from 525 feet to 566 feet

Surface seal depth 520 Material used in seal: ☒ Cement grout
☐ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit
☐ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☒ Threaded ☐ Welded
☐ Solvent Weld ☐ Cemented between strata

Describe access port Top of casing with protective cover and lock

6. LOCATION OF WELL

Sketch map location **must** agree with written location.



Subdivision Name Pickles Butte Landfill
Lot No. _____ Block No. _____
County Canyon
Address of Well Site 6284 Perch Road
(give at least name of road)
NW ¼ SE ¼ Sec. 21, T. 2 N ☒ or S ☐, R. 3 E ☐ or W ☒

7. WATER LEVEL

Static water level 539' feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 77 °F. Quality Poor
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

70565

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
12¾	0	25	tan clayey sand		
"	25	35	sandy gravel		
"	35	55	fine sand		
"	55	65	tan clayey silt		
"	65	130	fine and med sand		
"	130	185	tan clay		
"	185	210	clayey fine sand		
"	210	250	silty clay		
"	250	260	fine sand		
"	260	280	clayey silt		
"	280	370	fine sand		
"	370	390	clayey silt		
12¾	390	455	fine sand		
10"	455	515	silt		
"	515	525	tan clayey silt		
"	525	540	gray clayey silt	x	
10"	540	570	gray clay	x	
5¼"	570	600	gray silty clay		
5¼"	600	630	blue gray clay		

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Department of Water Resources

10.

Work started 10-01-93 finished 11-20-93

11. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Boyles Brothers Firm No. 503
Address _____ Date 11-23-93
Signed by Drilling Supervisor Gary K Hill
and
(Operator) _____
(If different than the Drilling Supervisor)

FILED
FEB 09 1994

USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THE ORIGINAL TO THE DEPARTMENT

Form 238-7
4/92

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

USE TYPEWRITER OR BALLPOINT PEN

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER

Name CANYON COUNTY (PICKLES BUTTE LANDFILL)

Address 115 Albany, Caldwell, ID 83605

Drilling Permit No. 63-93-W-0554-~~001~~ 002

Water Right Permit No. _____

2. NATURE OF WORK

☒ New well ☐ Deepened ☐ Replacement
☐ Well diameter increase ☐ Modification
☐ Abandoned (describe abandonment or modification procedures such as liners, screen, materials, plug depths, etc. in lithologic log, section 9.)

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☒ Monitor
☐ Industrial ☐ Stock ☐ Waste Disposal or Injection
☐ Other _____ (specify type)

4. METHOD DRILLED

☒ Rotary ☒ Air ☐ Auger ☒ Reverse rotary
☐ Cable ☐ Mud ☐ Other _____ (backhoe, hydraulic, etc.)

5. WELL CONSTRUCTION

Casing schedule: ☐ Steel ☐ Concrete ☒ Other Stainless

Thickness	Diameter		From	To
.25	inches 4	inches +	2.5 feet	377 feet
	inches	inches	feet	feet
	inches	inches	feet	feet

Was casing drive shoe used? ☐ Yes ☒ No
Was a packer or seal used? ☐ Yes ☒ No
Perforated? ☐ Yes ☒ No
How perforated? ☒ Factory ☐ Knife ☐ Torch ☐ Gun
Size of perforation? .020 inches by _____ inches

Number		From	To
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet
_____	perforations	_____ feet	_____ feet

Well screen installed? ☒ Yes ☐ No
Manufacturer Houston Type Stainless Steel
Top Packer or Headpipe _____
Bottom of Tailpipe 10' S.S. Sump

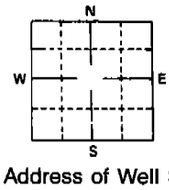
Diameter 4" Slot size .020 Set from 377 feet to 407 feet
Diameter _____ Slot size _____ Set from _____ feet to _____ feet
Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____
Placed from 299 feet to 424 feet

Surface seal depth 294 Material used in seal: ☒ Cement grout
☒ Bentonite ☐ Puddling clay ☐ _____
Sealing procedure used: ☐ Slurry pit
☒ Temp. surface casing ☐ Overbore to seal depth
Method of joining casing: ☒ Threaded ☐ Welded
☐ Solvent Weld ☐ Cemented between strata

Describe access port Top of casing with protective cover and locking cap.

6. LOCATION OF WELL

Sketch map location **must** agree with written location.



Subdivision Name Pickles Butte Sanitary Landfill
Lot No. _____ Block No. _____
County Canyon
Address of Well Site Perch Road, Pickle Butte
(give at least name of road)
SW ¼ NW ¼ Sec. 21, T. 2 N ☒ or S ☐, R. 3 E ☐ or W ☒

7. WATER LEVEL

Static water level 393' feet below land surface.
Flowing? ☐ Yes ☒ No G.P.M. flow _____
Artesian closed-in pressure _____ p.s.i.
Controlled by: ☐ Valve ☐ Cap ☐ Plug
Temperature 74 °F. Quality Poor
Describe artesian or temperature zones below.

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Air ☐ Other _____

Discharge G.P.M.	Pumping Level	Hours Pumped

70566

9. LITHOLOGIC LOG

Bore Diam.	Depth From	Depth To	Material	Water Yes	Water No
12 3/4	0	10	tan silty sand		x
"	10	25	tan clayey silt		x
"	25	35	fine sand		x
"	35	50	tan clayey silt		x
"	50	70	tan clay		x
"	70	100	silty fine sand		x
"	100	105	clay		x
"	105	115	fine sand		x
"	115	120	tan clay		x
"	120	125	fine sand		x
"	125	145	tan silty clay		x
"	145	150	sand with cobbles		x
"	150	240	tan silty clay		x
"	240	365	gray clay		x
12 3/4	365	424	gray clay	x	

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10.

Work started 10-26-93 finished 11-20-93

11. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Boyles Brothers Firm No. 503
Address _____ Date 11-23-93
Signed by Drilling Supervisor Daryl Hill
and
(Operator) _____ *(if different than the Drilling Supervisor)*

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USE ADDITIONAL SHEETS IF NECESSARY — FORWARD THIS REPORT TO THE DEPARTMENT

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7/94

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

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WATER RESOURCES WESTERN REGION

1 of 2

1. DRILLING PERMIT NO. 63-95-W-0564-001
Other IDWR No.

2. OWNER: County of Canyon
Name HOLLADAY ENGINEERING
Address 1431 BUS ALT HWY 95
City PAYETTE State ID Zip 83661

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 2 North ☒ or South ☐
Rge. 3 East ☐ or West ☒
Sec. 21, SW 1/4 NE 1/4 ____ 1/4 ____ 1/4
(10 acres / 40 acres / 160 acres)
Gov't Lot ____ County Canyon

Address of Well Site PICKLE BUTTE DUMP
PB #9 City
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name

4. PROPOSED USE:
☐ Domestic ☐ Municipal ☒ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK
☒ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☐ Mud Rotary ☒ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
BENTONITE	0	381	12000#	POUR

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? Y ☐ N ☐ How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
4"	+3	508		SMLS	☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe ____ Length of Tailpipe 5'

9. PERFORATIONS/SCREENS
☐ Perforations Method
☒ Screens Screen Type JOHNSON

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
508	543	.020		4"	SS	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
513.11 ft. TOC below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

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Water Temp. ____ Bottom hole temp.
Water Quality test or comments:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
12	1	10	TOP SOIL : DUST		
	10	17	GRAVEL IN HARD PAN		
	17	28	LARGER GRAVEL + HARD PAN		
	28	30	CLAY + SMALL GRAVEL		
	30	32	MORE GRAVEL LOOSER		
	32	40	CLAY - TIGHT IN SMALL GRAVEL		
10	40	90	CLAY - TIGHT IN SMALL GRAVEL		
	90	95	COARSE SAND IN CLAY		
	95	112	SANDY CLAY		
	112	120	CLAY		
	120	135	CLAY W/ COARSE SAND		
	135	180	HARD CLAY		
	180	182	SUPER HARD CLAY		
	182	205	CLAY		
	205	210	COARSE SAND + CLAY		
	210	263	VERY HARD CLAY THRU REG		
	263	265	VERY HARD CLAY		
	265	305	SOFT CLAY / SANDY CLAY		
	305	315	SAND		
	315	375	CLAY		
	375	400	VERY HARD CLAY (CLAY ROCK)		
	400	405	SOFT SANDY CLAY / CLAY		
	405	430	REG CLAY		
	430	435	SOFT CLAY OR SANDY CLAY		
	435	445	CLAY REG TYPE		
	445	455	HARD CLAY W/ DARK PEA GRAVEL/COARSE SAND		
	455	465	SAME " " " " "		"
	465	470	SOFT CLAY LIKE SANDY CLAY		
	470	475	CLAY		
	475	480	CLAYSTONE + SANDSTONE LIKE PCS		
8	480	487	" " " " " "		"
8	487	510	GRAY BLUE CLAY		
			CONTINUED		

Completed Depth 544 (Measurable)
Date: Started ____ Completed MAR 07 1996

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name ADAMSON PUMP & DRILLING Firm No. 0457
Firm Official Dave Adamson Date 11-17-95
and
Supervisor or Operator Dave Adamson Date 11-17-95
(Sign once if Firm Official & Operator)

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Form 238-7
7/94

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

63656

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PG 2 of 2

1. DRILLING PERMIT NO. 63-95-W-0564-001
Other IDWR No.

2. OWNER:
Name
Address
City State Zip

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 2 North ☒ or South ☐
Rge. 3 East ☐ or West ☒
Sec. 21, 10 acres 1/4 SW 40 acres 1/4 NE 160 acres 1/4
Gov't Lot County Canyon

Address of Well Site
City
(Give at least name of road + Distance to Road or Landmark)

Lt. Blk. Sub. Name

4. PROPOSED USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK
☐ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☐ Mud Rotary ☐ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? Y☐ N☐ How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe Length of Tailpipe

9. PERFORATIONS/SCREENS
❑ Perforations Method
❑ Screens Screen Type

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
ft. below ground Artesian pressure lb.
Depth flow encountered ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. Bottom hole temp.
Water Quality test or comments:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	510	511	FRAC GRAY & BLUE CLAY		
"	511	519	REG. " / " "		
"	519	528	FRAC CLAY		
"	528	528.6	VERY HARD CLAY BLUE/GRAY		
"	528.6	530	REG.		
"	530	531	FRAC / HARD DRILLING CLAY Pgs		
"	531	544	REG CLAY BLUE/GRAY		

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MAR 07 1996

Completed Depth 544 (Measurable)
Date: Started 8-25-95 Completed 9-29-95

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name ADAMSON PUMP & DRILLING Firm No. 0457
Firm Official Dave Adamson Date 11-17-95
and
Supervisor or Operator Dave Adamson Date 11-17-95
(Sign once if Firm Official & Operator)

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WELL DRILLER'S REPORT

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WATER RESOURCES WESTERN REGION

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Pg 1 of 2

1. DRILLING PERMIT NO. 63-95-W-0565-001
Other IDWR No.

2. OWNER: County of Canyon
Name HOLLADAY ENGINEERING CO
Address 1431 BUS. ALT HWY 95
City PAYETTE State ID Zip 83661

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 2 North ✱ or South ☐
Rge. 3 East ☐ or West ✱
Sec. 21, SW (10 acres) 1/4 NE (40 acres) 1/4 (160 acres) 1/4
Gov't Lot ____ County Canyon

Address of Well Site 15500 MISSOURI,
PICKLEBUTTE LANDFILL City
(Give at least name of road + Distance to Road or Landmark)

Lt. ____ Blk. ____ Sub. Name PB10

4. PROPOSED USE:
☐ Domestic ☐ Municipal ✱ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK
✱ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☐ Mud Rotary ✱ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD
BENTONITE		20	12,000	POUR

Was drive shoe used? ✱ Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? Y ☐ N ☐ How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
10	0	140	.125	STEEL	✱	☐	☐	☐
8	+2	500	.125	STEEL	✱	☐	☐	☐
4	+2	504		STAINLESS	☐	☐	☐	☒

Length of Headpipe ____ Length of Tailpipe ____

9. PERFORATIONS/SCREENS
☐ Perforations Method
✱ Screens Screen Type HOUSTON

MAR 07 1996

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
504	534	.020		4"	STAINLESS	☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
____ ft. below ground Artesian pressure ____ lb.
Depth flow encountered ____ ft. Describe access port or control devices:

11. WELL TESTS: ☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

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Water Temp. ____ Bottom hole temp. ____
Water Quality test or comments:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
10	1	5	TOP SOIL		
12	5	10	CLAY W/SMALL GRAVEL		
?	10	20	GRAVEL & SAND		
10	20	31	GRAVEL & SAND		
	31	45	CLAY W/SOME SMALL GRAVEL		
	45	55	" " " COARSE SAND		
	55	73	COARSE SAND W/SOME CLAY (SLOW DRILLING)		
	73	100	CLAY		
	100	105	SAND		
	105	115	SAND (COARSE) W/CLAY SOFT & HARD		
	115	120	COARSE SAND / SMALL GRAVEL W/ CLAY		
	120	125	SAND W/GRAVEL-SMALL & Clay		
	125	130	SAND W/LITTLE CLAY		
	130	135	SAND & MORE CLAY		
	135	136	VERY HARD CLAY		
	136	205	REG CLAY		
8	205	210	SANDY CLAY		
	210	215	SANDY CLAY W/HARD PCS CLAY		
	215	220	SANDY CLAY - VERY HARD DRILLING		
	220	275	SANDY CLAY - MORE CLAY		
	275	300	SANDY CLAY W/HARD PCS OF CLAY FAIRLY FAST DRILLING		
	300	305	SAND		
	305	339	CLAY		
	339	341	VERY HARD CLAY		
	341	430	CLAY		
	430	455	VERY HARD CLAY (DRILLING SLOWER)		
	455	457	"SUPER" VERY HARD CLAY		
	457	466	REG. CLAY		
	466	470	CLAY & SMALL GRAVEL		
	470	515	CLAY W/IRON SPOTS		
	515	518	TURNING GRY		
	518	525	BROWN CLAY		
	525	540	SAND COARSE W/CLAY		

Completed Depth CONTINUED (Measurable)
Date: Started 8-25-95 Completed 9-29-95

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name ADAMSON PUMP & DRILLING Firm No. 04157
Firm Official Dave Adamson Date 11-17-95
and
Supervisor or Operator Dave Adamson Date 11-17-95
(Sign once if Firm Official & Operator)

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IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

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63658 C Pg 2 of 2

1. DRILLING PERMIT NO. 63-95-W-0565-001
Other IDWR No.

2. OWNER:
Name HOLLADAY ENGINEERING CO
Address
City PB#10 State Zip

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

N / W / E / S

Twp. 2 North ☒ or South ☐
Rge. 3 East ☐ or West ☒
Sec. 21, 1/4 SW 1/4 NE 1/4 (10 acres / 40 acres / 160 acres)
Gov't Lot County Canyon

Address of Well Site
City
(Give at least name of road + Distance to Road or Landmark)

Lt. Blk. Sub. Name

4. PROPOSED USE:
☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK
☐ New Well ☐ Modify or Repair ☐ Replacement ☐ Abandonment

6. DRILL METHOD
☐ Mud Rotary ☐ Air Rotary ☐ Cable ☐ Other

7. SEALING PROCEDURES

SEAL/FILTER PACK Material	From	To	AMOUNT Sacks or Pounds	METHOD

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s)
Was drive shoe seal tested? Y☐ N☐ How?

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe Length of Tailpipe

9. PERFORATIONS/SCREENS
☐ Perforations Method
☐ Screens Screen Type

MAR 07 1996

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
ft. below ground Artesian pressure lb.
Depth flow encountered ft. Describe access port or control devices:

11. WELL TESTS:
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. Bottom hole temp.
Water Quality test or comments:

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water Y	Water N
8	540	560	TURNING BLUE CLAY W/ COARSE SAND		
			CAVED IN TO 544		

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WATER RESOURCES WESTERN REGION

Completed Depth 544 (Measurable)
Date: Started 8-25-95 Completed 9-29-95

13. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Firm No.
Firm Official Dave Adamson Date 11-17-95
and
Supervisor or Operator Dave Adamson Date 11-17-95
(Sign once if Firm Official & Operator)

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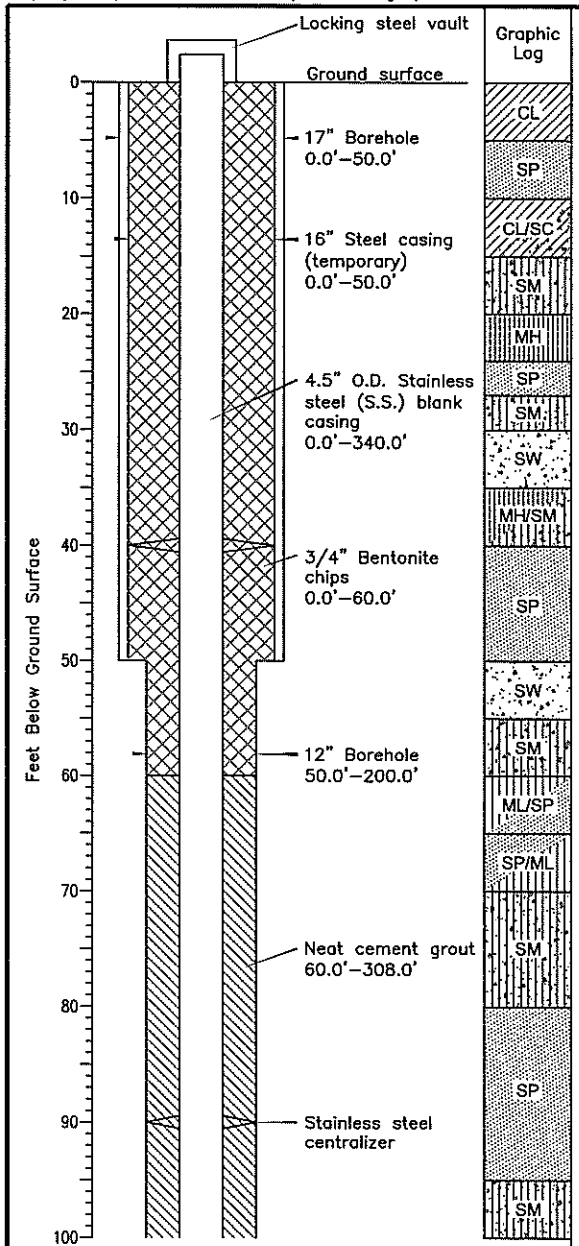
S:\Projects\ES09.0154_Pickles\VR_Drawings\ES09_0154_07B_borelogs.dwg PB-11 (1of5)



Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
CL	40%/40%	0–5	CL	Silty clay, light brownish gray (2.5Y 6/2).
SP	70%/90%	5–10	SP	Sand, light gray (10YR 7/2), medium gravel, well sorted.
CL/SC	25%/25%	10–15	CL–SC	Sandy clay/clayey sand, light brownish gray (2.5Y 6/2).
SM	40%/50%	15–20	SM	Silty sand, light yellowish brown (7.5Y 7/3), fine–grained, well sorted.
MH	90%/90%	20–24	MH	Clayey silt, grayish brown (2.5YR 5/2), low plasticity, hard.
SP	90%/90%	24–25	SP	Sand, dark yellowish brown (10YR 4/4), medium–grained, well sorted, well cemented, hard.
	70%/90%	25–27	SP	Same as above.
SM	70%/90%	27–30	SM	Silty sand, light olive brown (2.5Y 5/4), fine– to medium–grained, moderately sorted, soft.
SW	50%/50%	30–35	SW	Sand, light brownish gray (2.5Y 6/2), thinly laminated, fine– to medium–grained, moderately sorted, moderately cemented.
MH/SM	75%/75%	35–40	MH–SM	Clayey silt and silty fine sand, light gray (5Y 7/1), laminated, some orange banding, moderately indurated.
SP	70%/70%	40–45	SP	Sand, dry color light gray (10YR 7/2), medium–grained, moderately to well sorted, moderately to well indurated.
	75%/75%	45–50	SP	Same as above.
SW	30%/30%	50–55	SW	Sand, light gray (2.5YR 7/1) to light brownish gray (2.5YR 6/2), prominent orange banding, medium–grained, moderately sorted, soft.
SM	20%/20%	55–60	SM	Silty sand, light olive brown (2.5Y 5/4) to grayish brown (2.5YR 5/2), fine–grained, weakly indurated.
ML/SP	40%/40%	60–65	ML–SP	Silty very fine sand, gray (2.5Y 6/1), massive, grading downward to sand, olive yellow (2.5Y 6/6), medium–grained, well sorted, hard.
SP/ML	45%/45%	65–70	SP–ML	Sand, as above, grading downward to silt and silty fine sand, slightly moist.
SM	60%/60%	70–75	SM	Silty sand, light brownish gray (2.5Y 6/2), fine–grained, slightly moist.
	20%/20%	75–80	SM	Similar to above, finer–grained, dry.
SP	65%/65%	80–85	SP	Sand, light brownish gray (2.5Y 6/2), fine–grained, well sorted, moderately indurated, slightly moist.
	55%/55%	85–90	SP	Same as above, dry.
	20%/20%	90–95	SP	Sand, light brownish gray (7.5YR 6/2), fine– to medium–grained, moderately sorted.
SM	85%/85%	95–100	SM	Sand, light gray (2.5Y 6/1), silty fine–grained, softer than above, slightly moist.

Geologist: J. Raucci
Driller: HAZ–Tech
Date completed: 6–30–11

Drilling method: Core, air rotary
Bit diameters: 19" (0'–50'), 12" (50'–200'), 9 7/8" (200'–420')
Sampling device: HQ core, air rotary cuttings (400'–420')
Steel suface casing: 16" steel (0'–50')

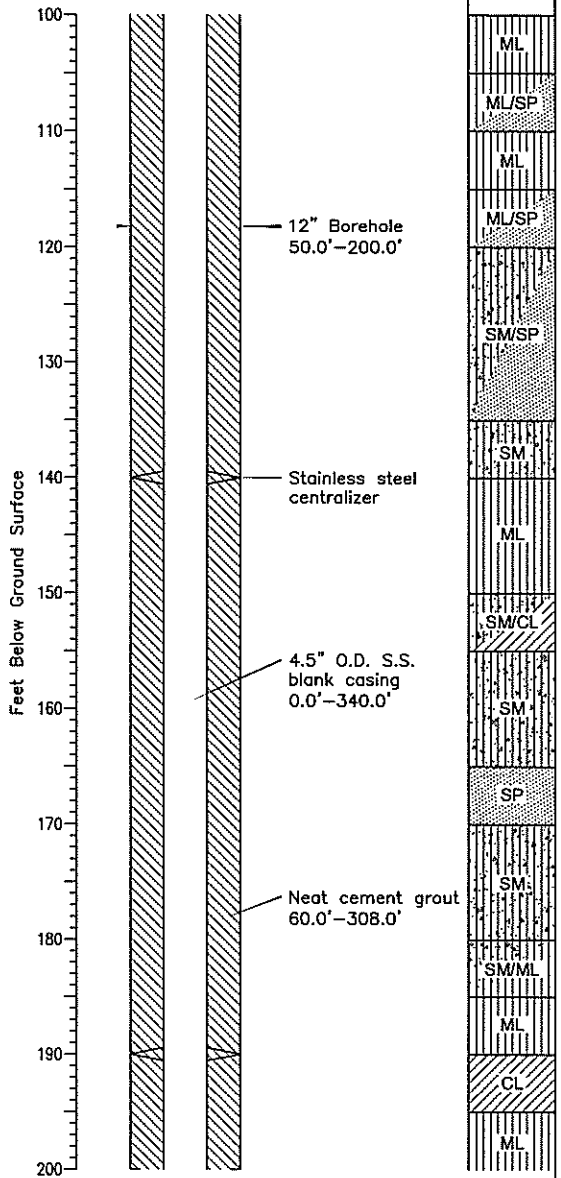
Northing: 668731.199
Easting: 243735.206
Elevation: 2654.1 (TOC)

Note: TOC = top of casing

PICKLES BUTTE
Well Log: PB-11

Daniel B. Stephens & Associates, Inc.
6–05–2012
JN ES09.0154

S:\Projects\ES09.0154_Pickles\VR_Drawings\ES09_0154_07B_borelogs.dwg PB-11 (2of5)



Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
ML	20%/20%	100–105	ML	Sandy silt, pale yellow (2.5Y 8/2), moderately indurated, dry.
ML/SP	20%/20%	105–110	ML–SP	Same as above, interbedded with dark gray (2Y 3/1), medium–grained sandstone, very hard, CaCO3 cement.
ML	20%/20%	110–115	ML	Sandy silt and silt, light olive gray (5Y 6/2), weakly indurated, slightly moist.
ML/SP	20%/20%	115–120	ML–SP	Same as above, interbedded with dark gray medium–grained sandstone.
SM/SP	50%/50%	120–125	SM–SP	Sandy silt, light olive gray, similar to above, slightly moist, with white fine–grained, well sorted sandstone, cross bedded, some yellow with orange banding, dry, hard.
	20%/20%	125–130	SM–SP	Same as above, interbedded with sandstone, dark gray (2Y 3/1), medium–grained.
	60%/60%	130–135	SM–SP	Sandy silt, pale yellow (2.5Y 7/3), with white fine–grained sand with yellow color banding, dry.
SM	30%/30%	135–140	SM	Silty sand, light gray (5Y 7/2), fine–grained, moist, reddish yellow color banding.
ML	0%/30%	140–145	ML	Sandy silt, light gray (2.5Y 7/2), fine–grained, slightly moist with small (less than 1 inch) reddish yellow clay lenses.
	55%/55%	145–150	ML	Siltstone, light gray (2.5Y 7/2), hard, dry.
SM/CL	100%/100%	150–155	SM–CL	Interbedded, silty sand/sandy silt, light brownish gray (7.5Y 6/2) with clay, dark greenish gray (5GY 4/1), thin bands of reddish clay, fine–grained.
	20%/20%	155–160	SM	Silty sand, light yellowish brown (2.5Y 6/4), laminated and color banded, cross bedded, fine–grained, weakly cemented, slightly moist.
SM	50%/50%	160–165	SM	Silty sand, light brownish gray (2.5YR 6/2), otherwise as above, very fine–grained, borderline sandy silt.
	100%/100%	165–168	SP	Similar to above, but dominantly fine sand.
SP	100%/100%	168–170	SP	Sandstone, light olive brown (2.5Y 5/4), color banded, cross bedded, fine, soft, slightly moist.
	50%/50%	170–175	SM	Silty sandstone, grayish brown (7.5Y 5/2), massive to laminated, color banding (yellow), trough cross bedded, fine–grained, organic material (?).
SM	30%/50%	175–180	SM	Silty sandstone, light olive brown (7.5Y 5/3), fine–grained, similar to above, slightly moist.
SM/ML	100%/100%	180–185	SM–ML	Sandy silt and silty sand, gray (5Y 5/1) to grayish brown (2.5Y5/2), moderately indurated, slightly moist.
ML	85%/85%	185–190	ML	Siltstone, gray (5Y 5/1), moderately to strongly cemented, massive, slightly moist to dry.
CL	0%/0%	190–195	CL	Little recovery, clay, appears to be dark gray (5Y 4/1).
ML	65%/75%	195–200	ML	Siltstone, sandy silt and clayey silt intervals, gray (5Y 5/1), reddish brown color banding, moderately indurated, very slightly moist.

Geologist: J. Raucci
Driller: HAZ–Tech
Date completed: 6–30–11

Drilling method: Core, air rotary
Bit diameters: 19" (0'–50'), 12" (50'–200'), 9 7/8" (200'–420')
Sampling device: HQ core, air rotary cuttings (400'–420')
Steel suface casing: 16" steel (0'–50')

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6–05–2012
JN ES09.0154

PICKLES BUTTE
Well Log: PB-11

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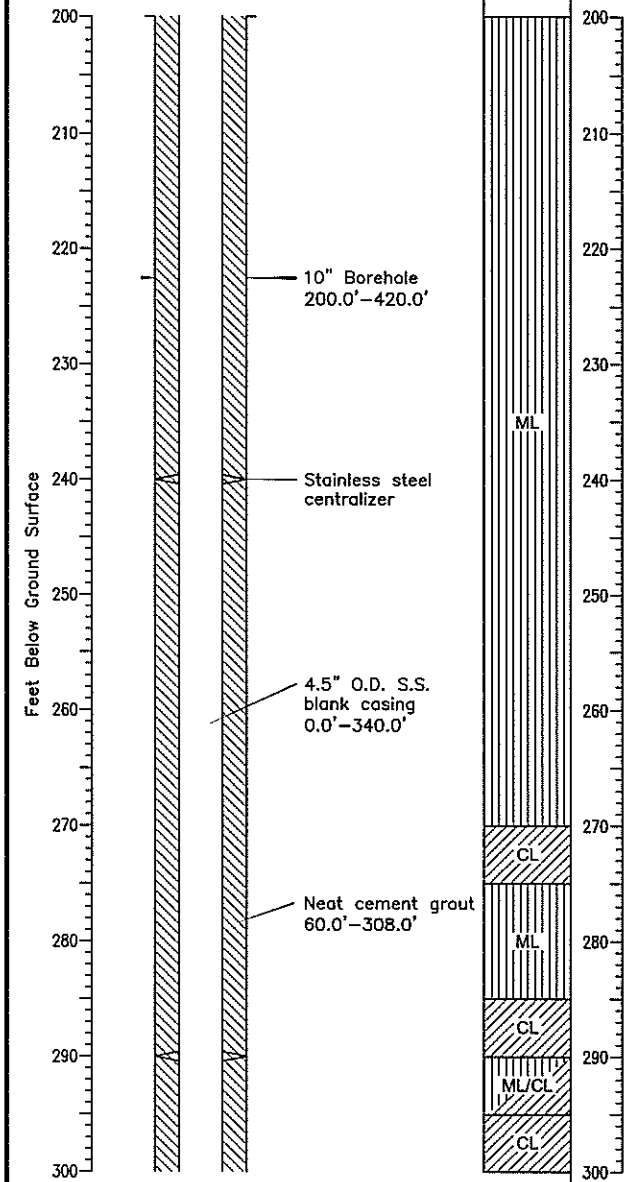

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
ML	60%/85%	200–205	ML	Siltstone, gray (5Y 5/1), same as above.
	90%/100%	205–210	ML	Same as above.
	100%/100%	210–215	ML	Same as above.
	85%/100%	215–220	ML	Same as above.
	100%/100%	220–225	ML	Siltstone, dark gray (5Y 4/1), finely laminated, moderately indurated, slightly moist.
	100%/100%	225–230	ML	Same as above.
	75%/85%	230–235	ML	Same as above.
	90%/90%	235–240	ML	Same as above, lighter color (5Y 5/1).
	25%/75%	240–245	ML	Same as above, highly fractured.
	90%/90%	245–250	ML	Same as above.
	40%/100%	250–255	ML	Same as above, many fractures.
	60%/100%	255–260	ML	Same as above.
	70%/100%	260–265	ML	Same as above.
	80%/100%	265–270	ML	Same as above.
CL	85%/85%	270–275	CL	Similar to above, finer-grained (claystone, some silt).
	100%/100%	275–280	ML	Similar to above, silty, locally cross bedded.
ML	100%/100%	280–285	ML	Siltstone, same as above.
	50%/100%	285–290	CL	Silty claystone, similar to above.
CL	50%/100%	290–295	ML/CL	Siltstone and claystone, same as above, fractured.
ML/CL	60%/100%	295–300	CL	Predominantly silty claystone, two prominent, steeply inclined fractures.
CL				

Geologist: J. Raucci
Driller: HAZ-Tech
Date completed: 6-30-11

Drilling method: Core, air rotary
Bit diameters: 19" (0'–50'), 12" (50'–200'), 9 7/8" (200'–420')
Sampling device: HQ core, air rotary cuttings (400'–420')
Steel suface casing: 16" steel (0'–50')

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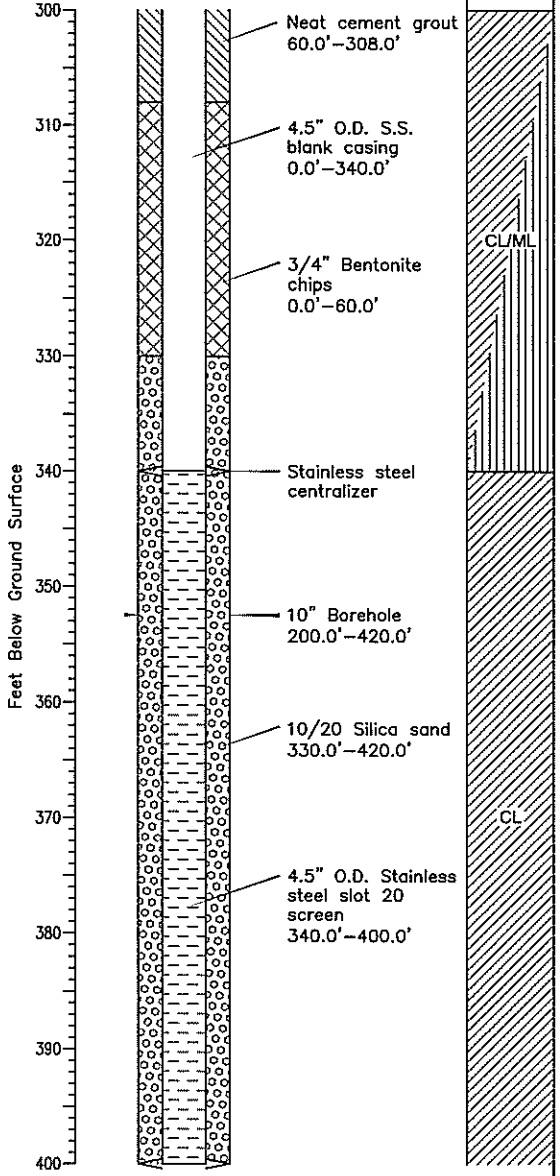

Graphic Log	Rock Quality Designation/Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
CL/ML	100%/100%	300–305	CL/ML	Clay, silty claystone and siltstone, color as above (5YR 4/1–5/1), siltstones are laminated, locally cross bedded, claystone is massive to finely laminated, slightly moist, moderately indurated, brittle to slightly plastic.
	100%/100%	305–310	CL–ML	Same as above.
	40%/75%	310–315	CL–ML	Same as above.
	80%/100%	315–325	CL–ML	Same as above.
	100%/100%	325–330	CL–ML	Same as above.
	100%/100%	330–335	CL–ML	Same as above.
	100%/100%	335–340	CL–ML	Becoming more dominantly claystone and silty claystone.
	100%/100%	340–345	CL	Same as above.
	90%/90%	345–350	CL	Same as above.
	75%/90%	350–355	CL	Claystone, silty claystone and siltstone, gray (5Y 5/1), interbedded, predominantly claystone and silty claystone, slightly moist, slight to moderate plasticity.
	100%/100%	355–360	CL	Same as above.
	90%/90%	360–365	CL	Same as above.
	85%/85%	365–370	CL	Same as above.
CL	95%/95%	370–375	CL	Same as above.
	75%/90%	375–380	CL	Same as above.
	100%/100%	380–385	CL	Same as above.
	80%/80%	385–390	CL	Same as above.
	55%/100%	390–395	CL	Same as above.
	90%/90%	395–420	CL	Same as above.

Geologist: J. Raucci
Driller: HAZ–Tech
Date completed: 6–30–11

Drilling method: Core, air rotary
Bit diameters: 19" (0'–50'), 12" (50'–200'), 9 7/8" (200'–420')
Sampling device: HQ core, air rotary cuttings (400'–420')
Steel suface casing: 16" steel (0'–50')

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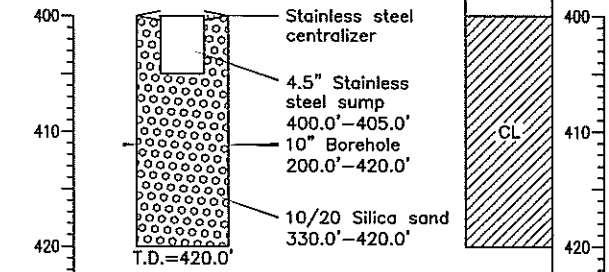

Feet Below Ground Surface

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
CL			CL	Same as above, rotary cuttings.

Geologist: J. Raucci
Driller: HAZ–Tech
Date completed: 6–30–11

Drilling method: Core, air rotary
Bit diameters: 19" (0'–50'), 12" (50'–200'), 9 7/8" (200'–420')
Sampling device: HQ core, air rotary cuttings (400'–420')
Steel suface casing: 16" steel (0'–50')

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Well Log: PB-11

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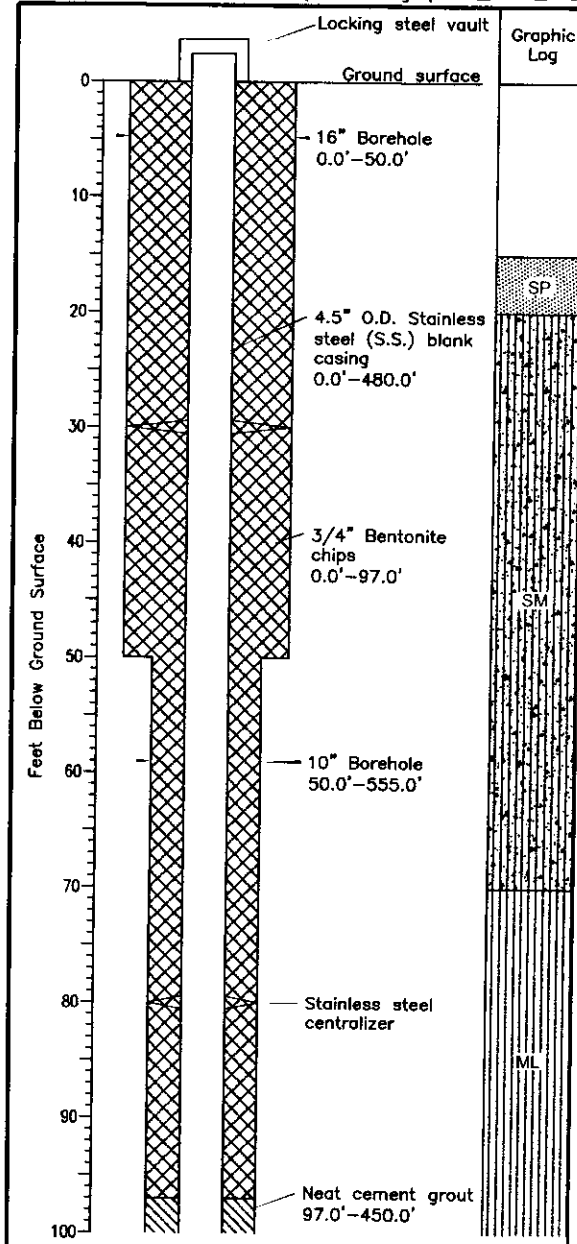

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
0%/0%	0–15		No recovery.
0%/20%	15–20	SP	Sand, olive brown (2.5Y 4/3), coarse–grained, no plasticity.
35%/60%	20–25	SM	Silty sand, olive brown (2.5Y 4/4), fine–grained, no plasticity.
35%/60%	25–30	SM	Same as above.
25%/55%	30–35	SM	Same as above.
25%/55%	35–40	SM	Same as above.
100%/100%	40–45	SM	Silty sand, olive brown (2.5Y 4/3), fine–grained.
100%/100%	45–50	SM	Clayey silty sand, light olive brown (2.5Y 5/4), very low plasticity.
25%/90%	50–60	SM	Silty sand grading into sand, light yellowish brown (2.5Y 6/3), fine– to medium–grained, no plasticity, hard, clayey silty sand, light olive brown (2.5Y 5/3), fine–grained, hard no plasticity.
100%/100%	60–70	SM	Clayey silty sand, light olive brown (2.5Y 5/3), hard no plasticity.
95%/95%	70–80	ML	Sandy silt, light yellowish brown (2.5Y 6/3), no plasticity.
100%/100%	80–90	ML	Clayey sandy silt, grayish brown (2.5YR 5/2).
100%/100%	90–100	ML	Same as above.

Geologist: M. Nauck
Driller: HAZ–Tech
Date completed: 7–15–11

Drilling method: Core, air rotary
Bit diameters: 16" (0'–50'), 9 7/8" (50'–555')
Sampling device: HQ core (0'–350'), air rotary cuttings (350'–555')
Steel suface casing: None

Northing: 667697.966
Easting: 243653.665
Elevation: 2657.2 (TOC)

Note: TOC = top of casing

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Well Log: PB-12

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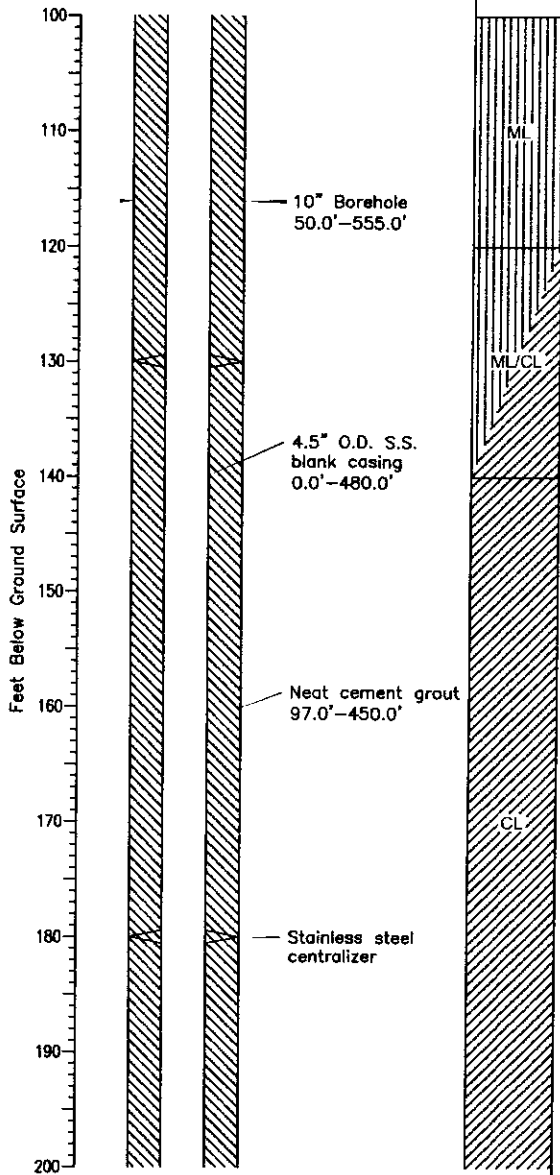

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
ML	35%/48%	100–110	ML	Clayey silt with abrupt transition to clay, light olive brown (2.5Y 5/4), clay has iron and manganese stain.
	100%/100%	110–120	ML	Same as above with interbedded silty sand.
ML/CL	100%/100%	120–130	ML–CL	Silty claystone, gray (5Y 5/4), no plasticity, hard.
	100%/100%	130–140	ML–CL	Same as above.
	40%/65%	140–150	CL	Similar to above; claystone, gray (5Y 5/1), no plasticity, hard to brittle.
	100%/100%	150–160	CL	Same as above.
	100%/39%	160–170	CL	Same as above.
CL	100%/100%	170–180	CL	Same as above.
	5%/18%	180–190	CL	Same as above with multiple fractures.
	90%/100%	190–200	CL	Same as above.

Geologist: M. Nauck
Driller: HAZ–Tech
Date completed: 7–15–11

Drilling method: Core, air rotary
Bit diameters: 16" (0'–50'), 9 7/8" (50'–555')
Sampling device: HQ core (0'–350'), air rotary cuttings (350'–555')
Steel suface casing: None

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Well Log: PB-12

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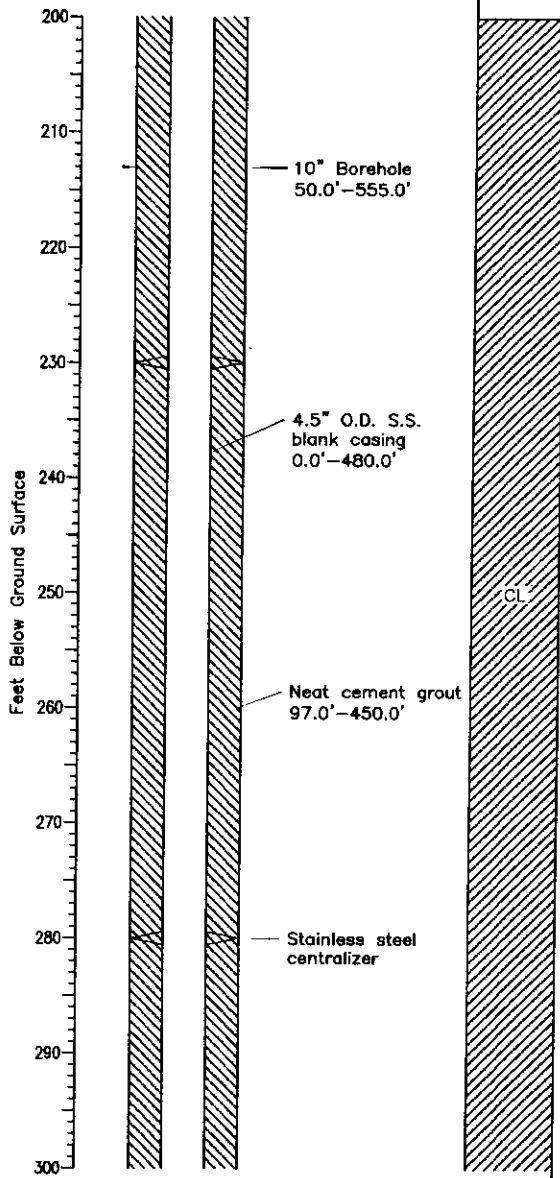

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
	100%/100%	200–210	CL	Same as above.
	85%/89%	210–220	CL	Same as above.
	100%/100%	220–230	CL	Same as above.
	85%/95%	230–240	CL	Same as above, massive, non-fractured.
	75%/75%	240–250	CL	Claystone, gray (5Y 5/1), no plasticity, hard, brittle, slightly moist.
	90%/90%	250–260	CL	Same as above.
	100%/100%	260–270	CL	Same as above.
	100%/100%	270–280	CL	Same as above.
	100%/35%	280–290	CL	Same as above.
	100%/100%	290–300	CL	Same as above.

Geologist: M. Nauck
Driller: HAZ-Tech
Date completed: 7-15-11

Drilling method: Core, air rotary
Bit diameters: 16" (0'–50'), 9 7/8" (50'–555')
Sampling device: HQ core (0'–350'), air rotary cuttings (350'–555')
Steel suface casing: None

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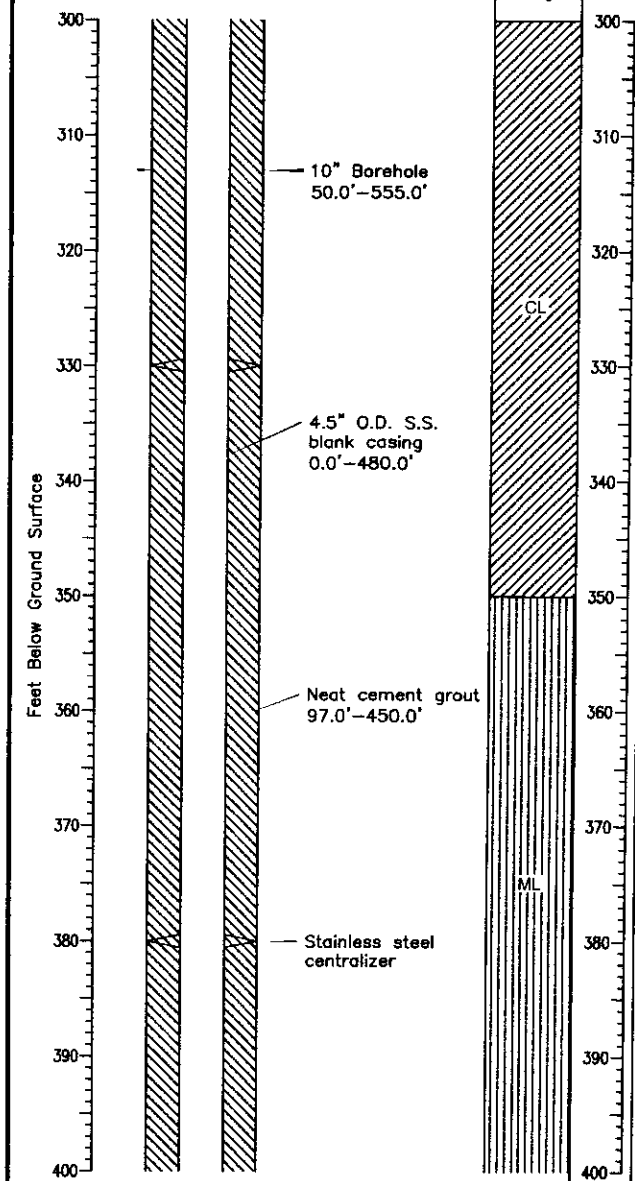

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
CL	100%/100%	300–310	CL	Same as above.
	100%/100%	310–320	CL	Same as above.
	100%/100%	320–330	CL	Same as above.
	100%/100%	330–340	CL	Same as above.
	100%/100%	340–350	CL	Same as above.
ML	NA	350–555	ML	Cuttings not sampled at discrete intervals from 350 feet to 555 feet. Visual inspection indicated predominantly gray silt with varying amounts of clay and sand.

Geologist: M. Nauck
Driller: HAZ–Tech
Date completed: 7–15–11

Drilling method: Core, air rotary
Bit diameters: 16" (0'–50'), 9 7/8" (50'–555')
Sampling device: HQ core (0'–350'), air rotary cuttings (350'–555')
Steel suface casing: None

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Well Log: PB-12

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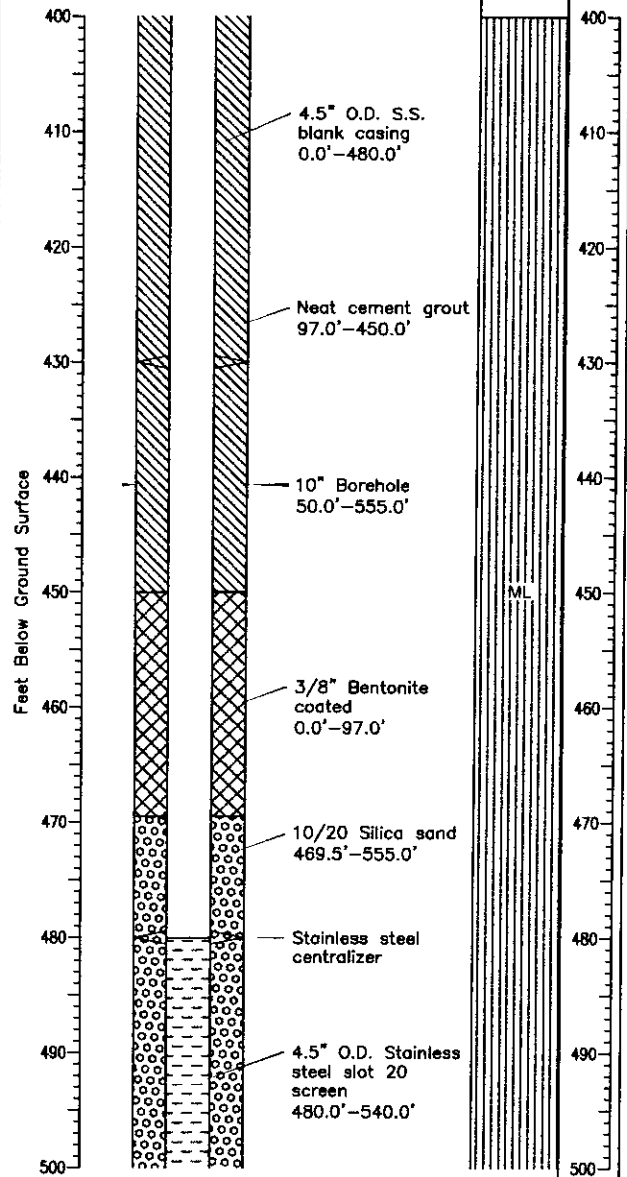

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
	NA		ML	Cuttings not sampled at discrete intervals from 350 feet to 555 feet. Visual inspection indicated predominantly gray silt with varying amounts of clay and sand.

Geologist: M. Nauck
Driller: HAZ-Tech
Date completed: 7-15-11

Drilling method: Core, air rotary
Bit diameters: 16" (0'–50'), 9 7/8" (50'–555')
Sampling device: HQ core (0'–350'), air rotary cuttings (350'–555')
Steel suface casing: None

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Well Log: PB-12

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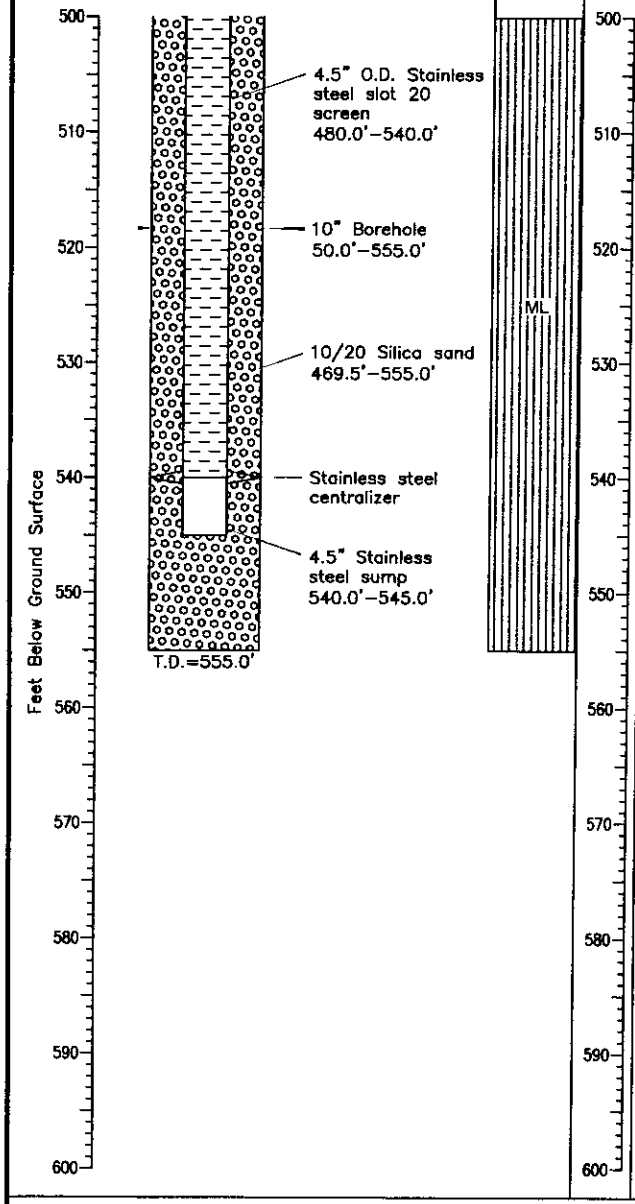

Feet Below Ground Surface	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
500–600	NA		ML	Cuttings not sampled at discrete intervals from 350 feet to 555 feet. Visual inspection indicated predominantly gray silt with varying amounts of clay and sand.

Geologist: M. Nauck
Driller: HAZ–Tech
Date completed: 7–15–11

Drilling method: Core, air rotary
Bit diameters: 16" (0'–50'), 9 7/8" (50'–555')
Sampling device: HQ core (0'–350'), air rotary cuttings (350'–555')
Steel suface casing: None

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Well Log: PB-12

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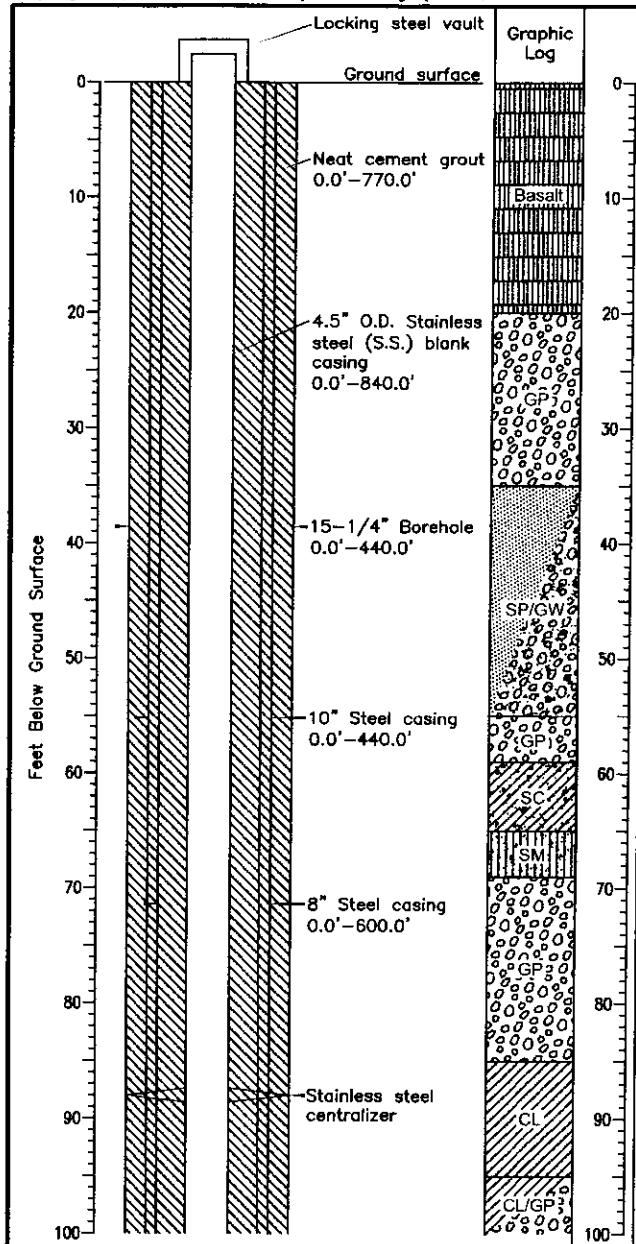

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
90%/95%	0–5		Vesicular basalt, gray (2.5Y 5/1), several fractures near top of core, slightly glassy texture.
100%/100%	5–10		Same as above.
80%/95%	10–15		Same as above with vertical and horizontal fractures.
25%/70%	15–20		Vesicular basalt, gray (2.5Y 5/1), highly fractured.
0%/2%	20–25	GP	Gravel, unconsolidated, well rounded, loose, 1 to 2.5 inches diameter.
0%/10%	25–35	GP	Same as above, 0.25 to 3.0 inches diameter.
0%/0%	35–45	SP/GW	No core recovery. Rotary cuttings indicate predominantly medium– to coarse–grained sand and interbedded gravel.
0%/0%	45–55	SP/GW	No core recovery, same as above.
8%/15%	55–65	GP SC	Gravel, 0.5 to 3.0 inches diameter with abrupt change to clayey silty fine sand, light olive brown (2.5Y 5/3), very fine–grained, well graded, well rounded, moderate plasticity, soft.
0%/23%	65–75	SM	65 to 69 feet silty fine sand, light olive brown (2.5Y 5/3). 69 to 75 feet coarse sandy gravel, polychromic, well rounded, 0.25 to 2.0 inches diameter, loose.
0%/10%	75–85	GP	Greater than 2 inches diameter, loose.
85%/95%	85–95	CL	Claystone to silty claystone, pale olive (5Y 6/3), none to medium plasticity, hard to stiff, dry, transition to very well consolidated to well consolidated.
55%/55%	95–105	CL/GP	Silty claystone, light yellowish brown (2.5Y), medium plasticity, medium density, slightly moist, some ferric like staining. Gravel lenses noted at 95 to 100 feet in rotary cuttings.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Northing: 666231.696
Easting: 243986.781
Elevation: 3073.9 (TOC)
Notes: HAZ–Tech core drilling 0'–666'; Adamson Pump and Drill air rotary drilling 666'–920'
TOC = top of casing

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Well Log: PB-13

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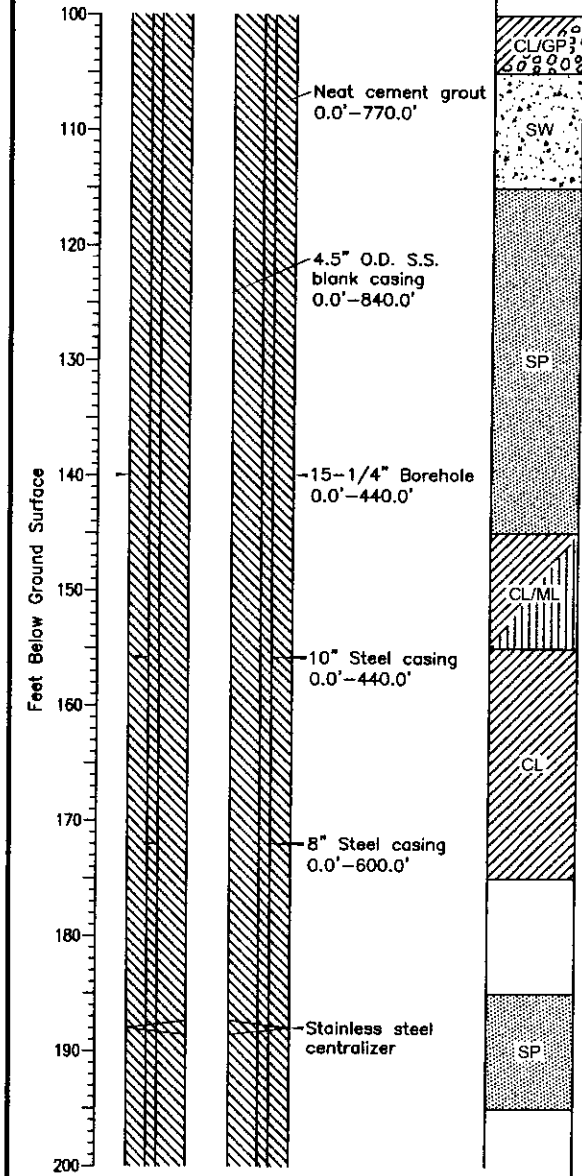

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
CL/GP, SW	0%/12%	105–115	SW	Sand, grayish brown (2.5Y 5/2), medium– to fine–grained, subrounded, poorly sorted, no plasticity, soft, wet (drilling fluid).
	0%/0%	115–125	SP	No core recovery. Rotary cuttings predominantly loose, medium–grained sand with few fines.
SP	0%/0%	125–135	SP	No core recovery, same as above.
	0%/0%	135–145	SP	No core recovery, same as above.
CL/ML	12%/25%	145–155	CL–ML	Silty claystone to claystone, light brownish gray (2.5Y 6/2), stiff/brittle, dry.
CL	15%/22%	155–165	CL	Claystone, light brownish gray (2.5Y 6/2), stiff, dry.
	15%/20%	165–175	CL	Same as above.
	0%/0%	175–180		No recovery.
SP	0%/18%	185–195	SP	Fine to medium sand, olive gray (5Y 5/2), poorly graded, loose, wet.
	0%/0%	195–205		No recovery.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ–Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

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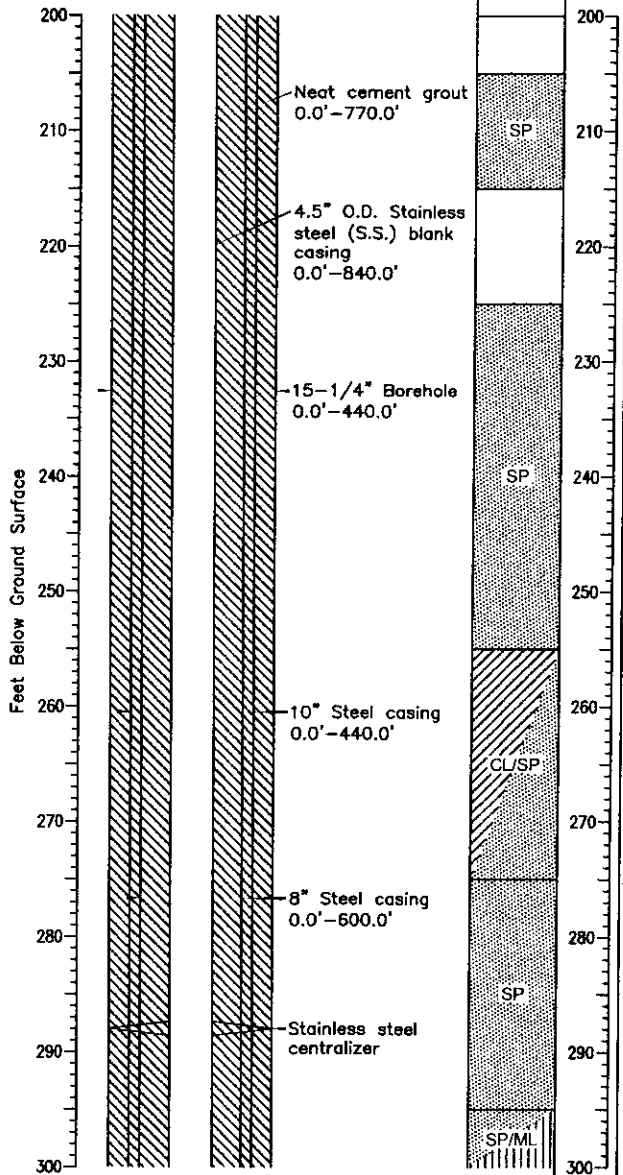

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
0%/20%	205–215	SP	Sand, olive brown (2YR 4/3), medium–grained, well sorted, loose, wet.
0%/0%	215–225		No recovery.
0%/15%	225–235	SP	Same as above.
0%/15%	235–245	SP	Same as above.
0%/35%	245–255	SP	Sand, same as above, color (2.5Y 4/2), then 3 inches of claystone, light yellowish brown (2.5Y 6/2), slight plasticity, slightly moist.
35%/90%	255–265	CL–SP	Interbedded brown sand, same as above, with light yellowish brown claystone, some oxidation color banding.
30%/80%	265–275	CL–SP	Same as above, predominantly sand with sandy claystone interbeds.
50%/100%	275–285	SP	Sand, light yellowish brown (2.5Y 6/3), fine–grained, well sorted, micaceous, claystone interbeds, moderately compact, slightly moist.
45%/95%	285–295	SP	Sand, grayish brown (7.5Y 5/3) medium–grained, well sorted with uncommon silty and clayey interbeds, 1 to 2 centimeters thick, loose to weakly cemented, moist, prominent oxidation color banding.
40%/90%	295–305	SP–ML	Similar to above, grayish brown sand interbedded with lighter colored silty fine sand and sandy clay, loose to weakly cemented.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ–Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

PICKLES BUTTE
Well Log: PB-13

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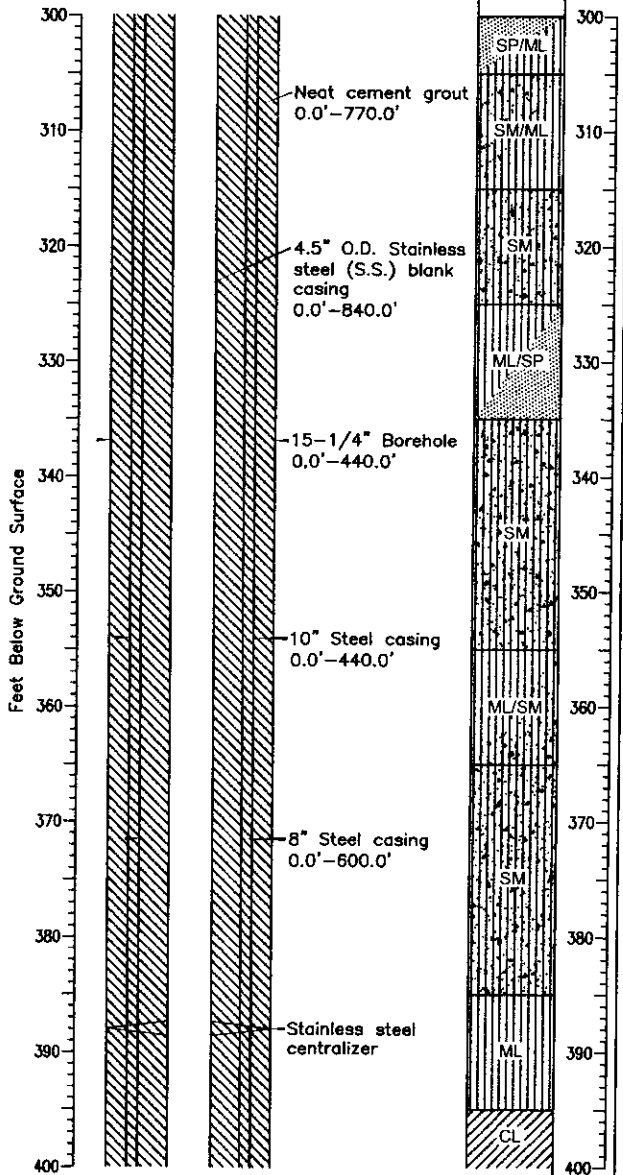

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
SP/ML	50%/85%	305–315	SM–ML	Sandy silt and silty sand, light yellowish brown (2.5Y 6/3–6/4), fine–grained, weakly cemented, brittle, moist, interbedded with olive brown sand, similar to above.
SM/ML	70%/100%	315–325	SM	Similar to above, but also several thin layers (5 to 10 centimeters) very hard fine sandstone, pale yellow (5Y 8/2), prominent oxidation color sanding, hard rock is dry.
SM	50%/100%	325–335	ML–SP	Sandy siltstone, pale yellow (2.5Y 7/4), hard, dry, interbedded with light olive brown loose sand, similar to above.
ML/SP	0%/90%	335–345	SM	Silty sandstone and sandy siltstone, light yellow brown (2.5Y 6/4), generally weakly cemented with loose and very hard layers, oxidation staining especially in very hard layers.
SM	60%/90%	345–355	SM	Same as above, color mottled with olive yellow (2.5Y 6/6), massive to finely laminated, dry to slightly moist.
ML/SM	40%/90%	355–365	ML–SM	Siltstone, sandy siltstone and very fine sandstone, pale yellow (2.5Y 7/4) to light olive brown (2.5Y 6/3), weakly to moderately cemented, laminated, local oxidation staining, dry to slightly moist.
SM	50%/90%	365–375	SM	Interbedded silty fine sandstone, and siltstone, same as above, with olive brown, fine– to medium–grained sandstone, weakly cemented, slightly moist.
SM	40%/75%	375–380	SM	Sandstone, light olive brown, fine–grained, similar to above, finely laminated, cross–bedded, claystone 384 to 385 feet, slightly moist.
ML	25%/75%	385–395	ML	Similar to above, sandy siltstone and very fine–grained silty sandstone, local oxidation staining, highly fractured, slightly moist.
CL	0%/15%	395–405	CL	Sandy claystone and siltstone, color same as above.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ–Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

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6–05–2012
JN ES09.0154

PICKLES BUTTE
Well Log: PB-13

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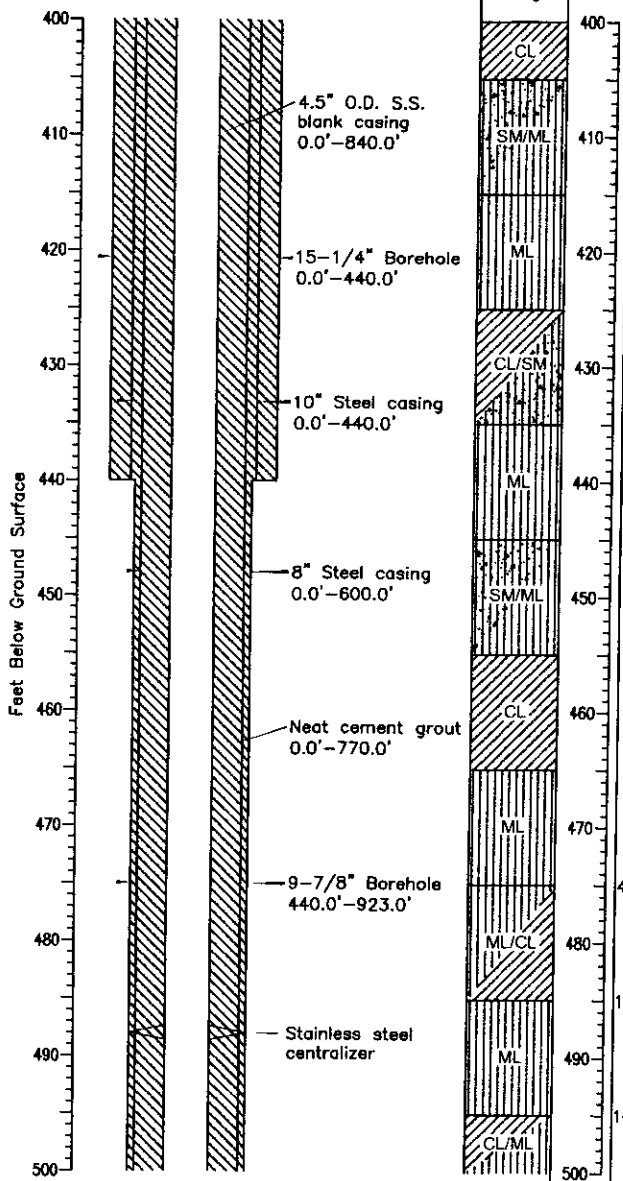

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
20%/70%	405–415	SM–ML	Sandy siltstone and sandstone, light olive brown, finely laminated, cross–bedded, very fine–grained local oxidation staining, slightly moist.
0%/15%	415–425	ML	Silty claystone and siltstone, light yellowish brown to pale olive.
60%/80%	425–435	CL–SM	Similar to above, light olive brown fine–grained sediments, some organic material, slightly moist, laminated, weakly to moderately cemented.
75%/85%	435–445	ML	Same as above, dominantly sandy silt, clayey fine sand, color same as above.
15%/50%	445–455	SM–ML	Same as above, a bit more sand.
20%/50%	455–465	CL	Silty claystone, olive gray (5Y 5/2), massive, micaceous, brittle, very slightly moist.
30%/90%	465–475	ML	Similar to above, siltier (clayey siltstone), sub–vertical fractures 460 to 465 feet.
40%/100%	475–485	ML–CL	Same as above, color pale olive (5Y 6/3).
100%/100%	485–495	ML	Same as above, clayey siltstone, pale olive, some oxidation staining, few fractures.
100%/100%	495–505	CL–ML	Siltstone and claystone with minor very fine sandstone, light olive gray (5Y 6/2), micaceous, dry to slightly moist, indurated, oxidation staining along bedding.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ–Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

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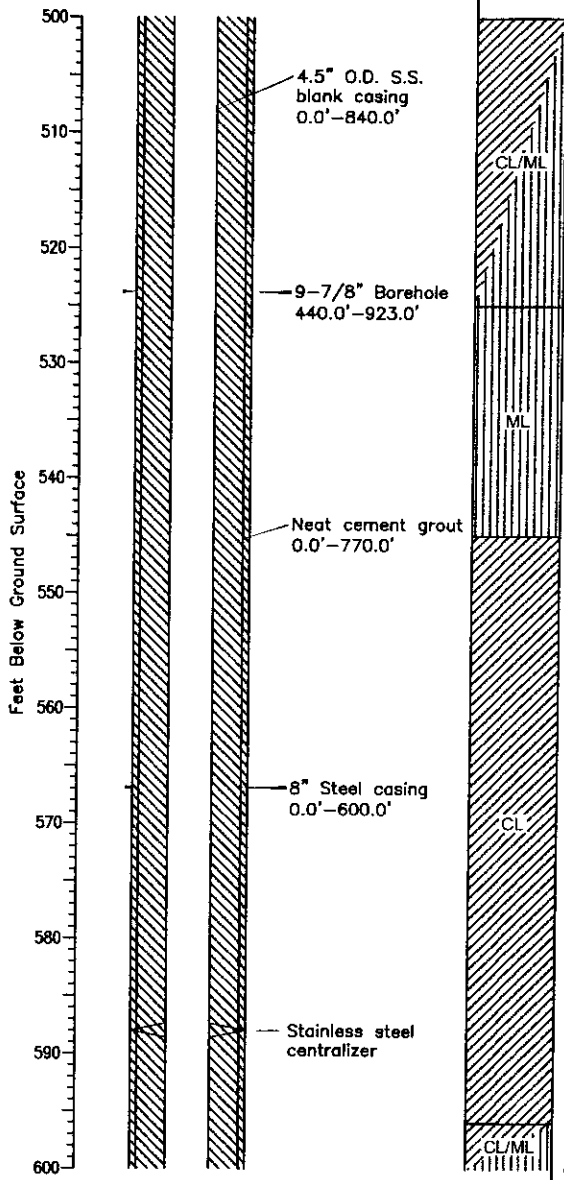

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
CL/ML	80%/100%	505–515	CL–ML	Same as above, silty clay and clayey silt, abundant organic material and oxidation staining.
	0%/100%	515–525	CL–ML	Same as above.
ML	80%/100%	525–535	ML	Similar to above, less muddy, siltstone and silty very fine sandstone with claystone, olive (5Y 5/3), sandy layers are laminated, cross-bedded.
	0%/100%	535–545	ML	Predominantly fine-grained silt, sandstone and clayey siltstone.
CL	100%/100%	545–555	CL	Silty claystone, pale olive to olive gray, weakly cemented to 553 feet, then clayey siltstone, gray (5Y 5/1), dense, finely laminated, slightly moist. Contact with "blue clay" unit at 552.5 feet.
	not recorded	555–565	CL	Silty claystone with minor sand, gray (5Y 5/1), massive to laminated, fine-grained, weakly to moderately cemented, dense, very slightly moist.
	40%/100%	565–576	CL	Silty claystone, dark greenish gray (Gley1 4/1), hard, brittle, numerous fractures.
	70%/100%	576–586	CL	Same as above.
	85%/100%	586–596	CL	Silty claystone, dark greenish gray (Gley1 4/1), slight plasticity, brittle, slightly moist, micaceous.
CL/ML	80%/100%	596–606	CL–ML	Same as above, a bit siltier, greenish gray (Gley1 5/1), interbedded with hard micaceous siltstone.

Geologist: M. Nauck/J. Raucci
Driller: HAZ-Tech
Date completed: 12-15-11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ-Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

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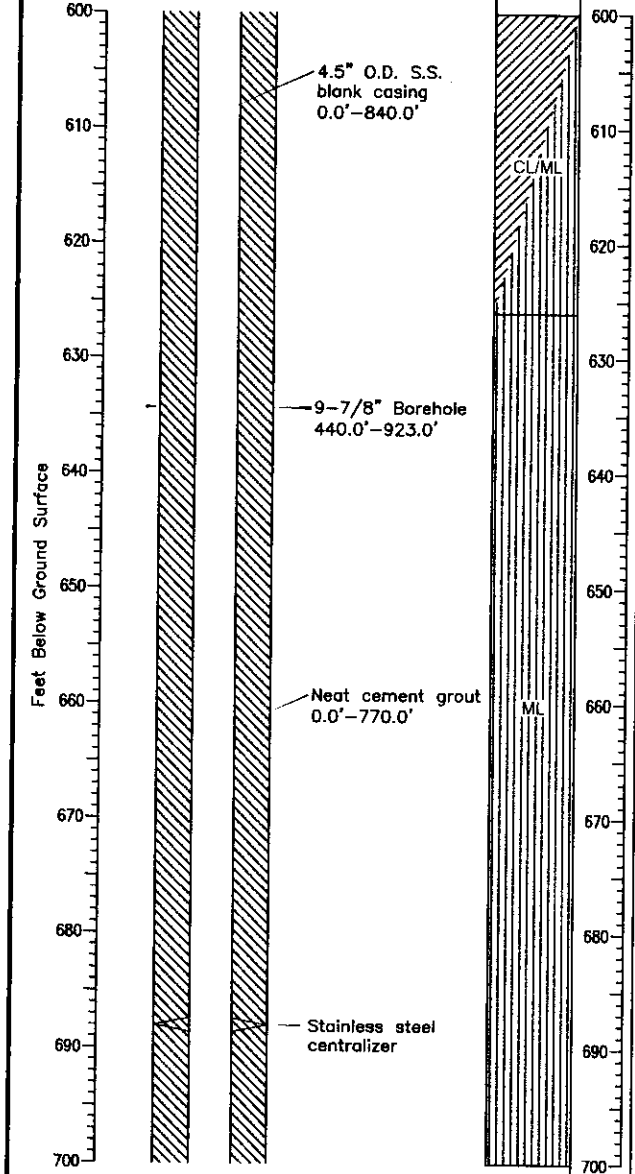

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
100%/100%	606–616	CL–ML	Same as above. Large steeply dipping fracture at 5 feet.
100%/100%	616–626	CL–ML	Siltstone and interbedded claystone, greenish gray (Gley1 5/10Y–5/N), micaceous, harder than above, (claystone is soft).
100%/100%	626–636	ML	Same as above, predominantly siltstone.
100%/100%	636–646	ML	Siltstone with minor sand and mud, dark greenish gray (Gley1 4/1–10/Y), laminated, fine–grained, hard, slightly moist.
80%/90%	646–656	ML	Same as above.
40%/40%	656–666	ML	Same as above.
	666–923	ML	Cuttings not sampled at discrete intervals from 666 feet to 923 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ–Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

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Well Log: PB-13

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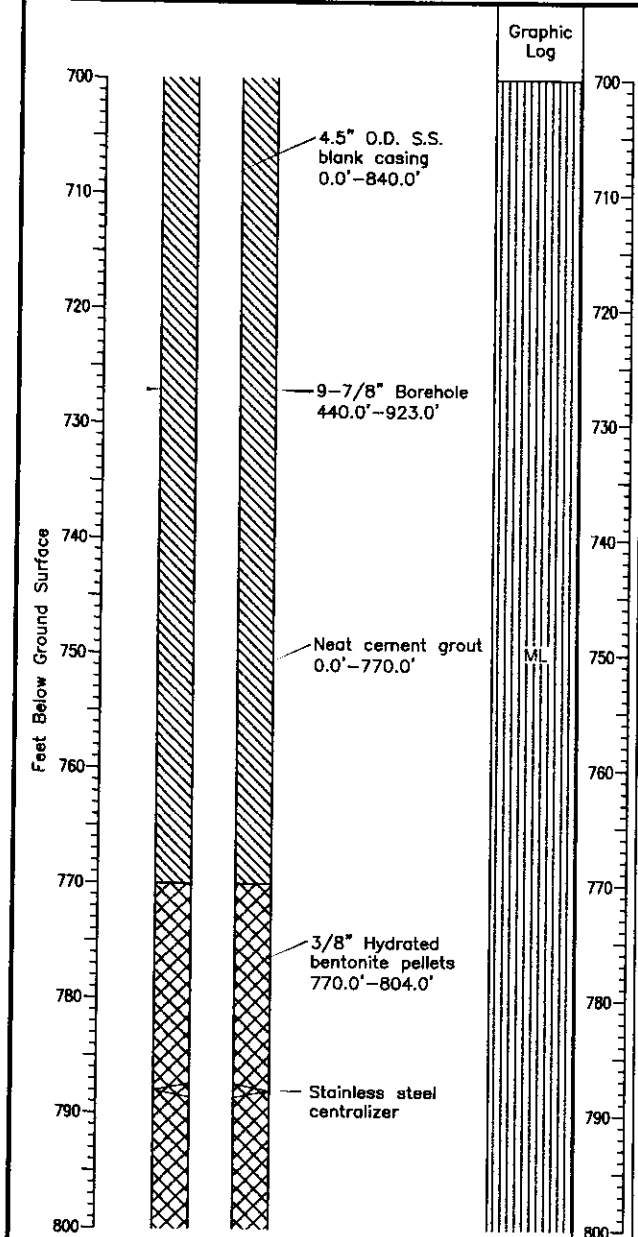

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
ML			ML	Cuttings not sampled at discrete intervals from 666 feet to 923 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ–Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

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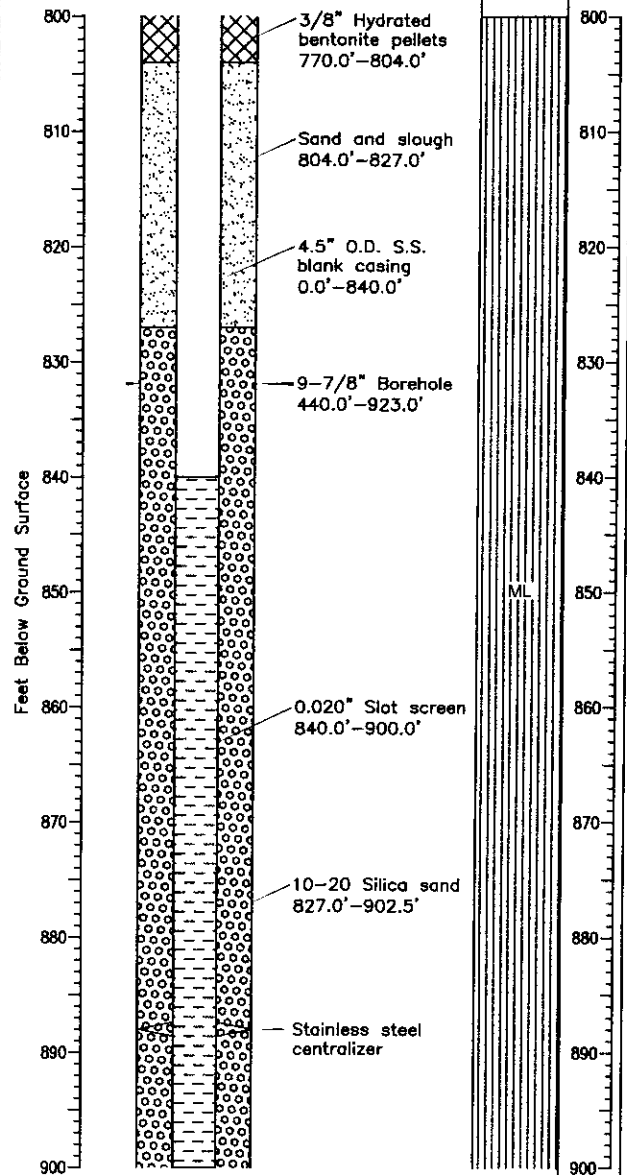

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
		ML	Cuttings not sampled at discrete intervals from 666 feet to 923 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech
Date completed: 12–15–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'–440'), 9 7/8" (440'–923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'–600'), 10" (0'–440')

Note: HAZ–Tech core drilling 0'–666';
Adamson Pump and Drill air rotary drilling
666'–920'

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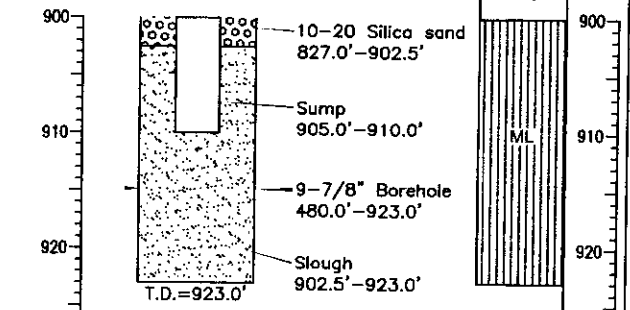

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
		ML	Cuttings not sampled at discrete intervals from 666 feet to 923 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: M. Nauck/J. Raucci
Driller: HAZ-Tech
Date completed: 12-15-11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15 1/4" (0'-440'), 9 7/8" (440'-923')
Sampling device: HQ core, air rotary cuttings
Steel suface casing: 8" (0'-600'), 10" (0'-440')

Note: HAZ-Tech core drilling 0'-666';
Adamson Pump and Drill air rotary drilling
666'-920'

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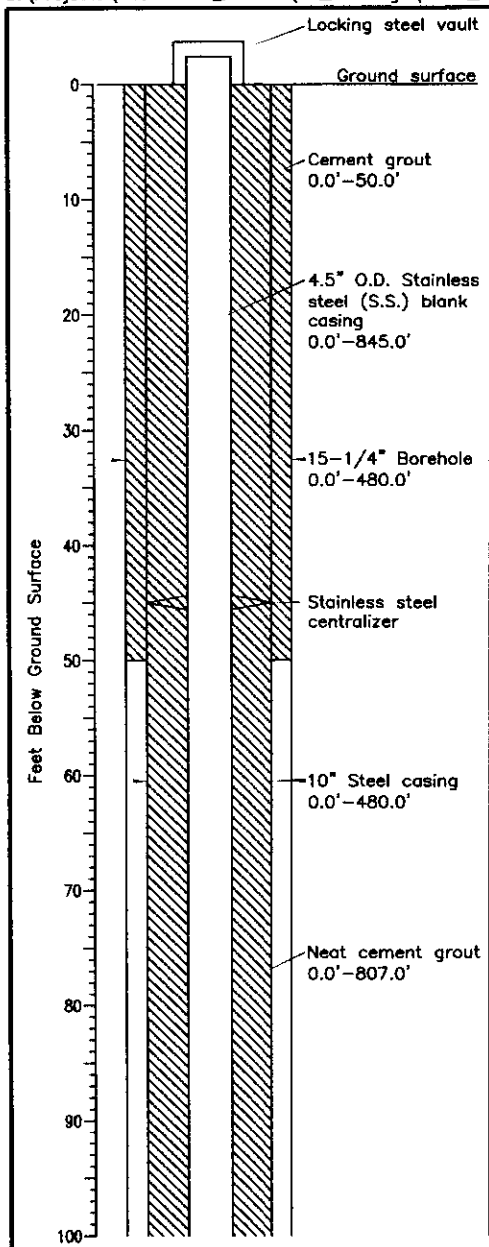

Rock Quality Designation Recovery	Sample interval (feet bgs)	USCS Symbol	Comments and Lithology
0%/0%	0–10	GP	No core recovery. 0 to 30 feet description based on rotary cuttings unconsolidated gravel, meterolithic clasts up to 3 inches, rounded, coarse-grained, poorly sorted, sand matrix.
	10–20	GP	Same as above.
	20–30	SP	Sand, medium- to coarse-grained, moderately well sorted, loose.
80%/80%	30–35	ML	Silstone, light brownish gray (2.5Y 6/2), weakly cemented.
85%/85%	35–40	ML	Siltstone–sandy siltstone, light brownish gray (2.5Y 6/2), weakly cemented.
85%/85%	40–45	ML	Siltstone–clayey siltstone, pale yellow (2.5Y 7/3), weakly cemented.
45%/75%	45–50	ML	Sandy silstone, light yellowish brown (2.5Y 6/3), very weakly cemented, highly fractured, oxidation staining.
60%/75%	50–55	ML	Same as above.
25%/40%	55–60	ML	Same as above, fine-grained.
50%/95%	60–65	ML	Same as above, fine-grained, highly fractured.
35%/35%	65–75	SM	Silty sandstone, light yellowish brown (2.5Y 5/4), laminated, fine- to medium-grained, weakly cemented.
25%/30%	75–85	SM	Same as above, light olive brown (2.5Y 5/4).
19%/19%	85–91	SM	Same as above with coarse-grained sand in drilling fluid matrix.
	91–95	GP	Rotary cuttings indicate gravel layer at 91 to 95 feet.
60%/99%	95–100	SW	Sand, pale yellow (2.5Y 8/3), coarse-grained, subrounded, loose, wet.
60%/99%	100–105	SM	Silty sandstone, pale yellow (2.5Y 8/3), fine-grained, weakly cemented.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–11–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15–1/4" and 9–7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"
Note: TOC = top of casing

Northing: 665549.182
Easting: 244947.947
Elevation: 3080.9 (TOC)
Note: HAZ–Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

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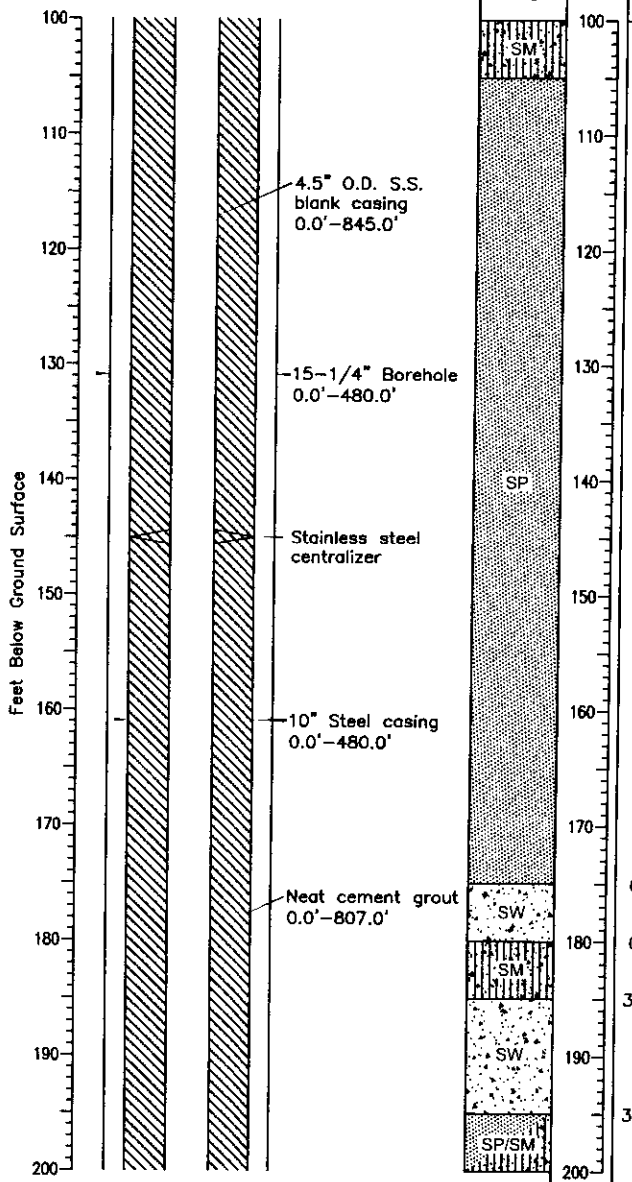

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
0%/0%	105–115	SP	No core recovery 105 feet to 175 feet, rotary cuttings indicate dominantly medium sand, moderately well sorted, unconsolidated.
0%/0%	115–125	SP	Same as above.
0%/0%	125–175	SP	Same as above to 175 feet (rotary cuttings).
0%/50%	175–180	SW	Sand, dark yellowish brown (10YR 4/4), coarse–grained, non–plastic, loose, wet.
0%/50%	180–185	SM	Silty sand, light yellowish brown (2.5Y 6/4), fine–grained, low plasticity, loose, wet.
30%/40%	185–195	SW	Sandstone, dark grayish brown (2.5Y 5/2), coarse–grained, subrounded, weakly cemented, vertical fractures.
35%/35%	195–205	SP–SM	Sandstone grading to silty sandstone, olive brown (2.5Y 4/3), coarse– to fine–grained, weakly cemented.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–11–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15–1/4" and 9–7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ–Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

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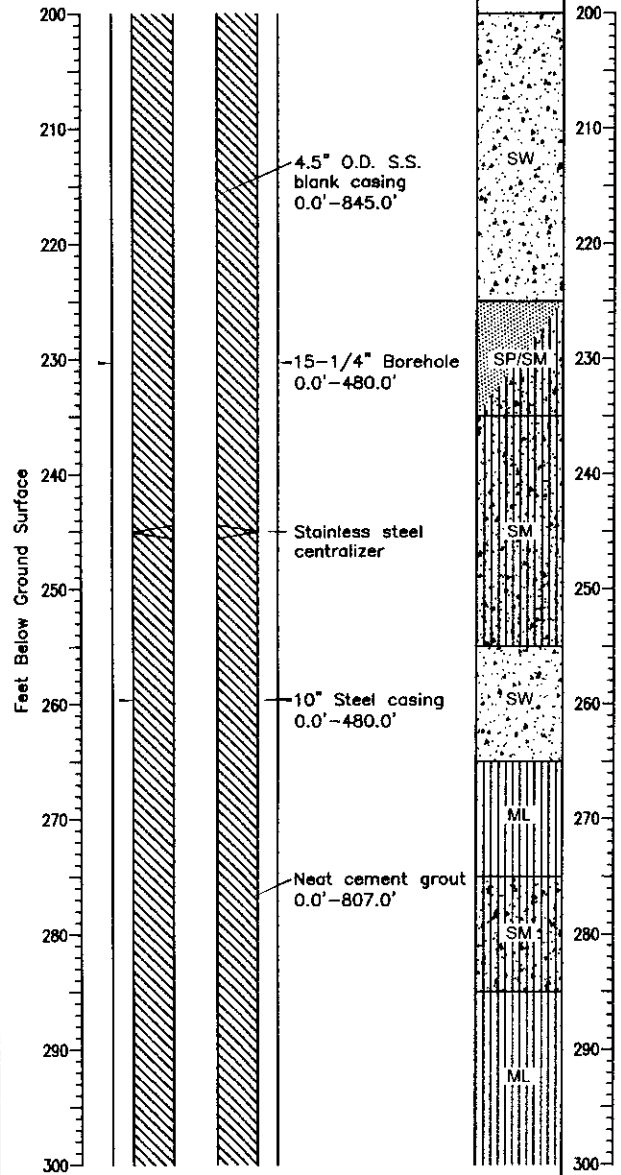

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
SW	0%/48%	205–215	SW	Sand, dark yellowish brown (10YR 4/4), coarse-grained, non-plastic, loose, wet.
SW	0%/48%	215–225	SW	Same as above.
SP/SM	0%/48%	225–235	SP-SM	Loose sand graiding to silty sandstone, light yellowish brown (2.5Y 6/3), fine-grained, weakly cemented.
SP/SM	0%/48%	235–245	SM	Silty sandstone, light yellowish brown (2.5Y 6/3), fine- to medium-grained, weakly cemented, fractured.
SM	0%/48%	245–255	SM	Same as above with iron staining.
SW	0%/48%	255–265	SW	Sandstone, light olive brown (2.5Y 5/3), laminated, coarse-grained, very weakly cemented, iron staining.
SW	0%/48%	265–275	ML	Sandy clayey silt, light yellowish brown (2.5Y 6/3), low plasticity, soft, damp.
ML	0%/48%	275–285	SM	Silty sandstone, light yellowish brown (2.5Y 6/3), iron stained banding, fine-grained, weakly cemented.
SM	0%/48%	285–295	ML	Sandy siltstone, light yellowish brown (2.5Y 6/3), fine-grained, weakly cemented, fractured.
ML	0%/48%	295–305	ML	Same as above, light olive brown (2.5Y 5/3).

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ-Tech; Adamson Pump and Drill
Date completed: 10-11-11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15-1/4" and 9-7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ-Tech core drilling 0'-385', 520'-750' (NQ core 600'-750'); Adamson Pump and Drill mud rotary drilling 385'-520', air rotary drilling 750'-923'

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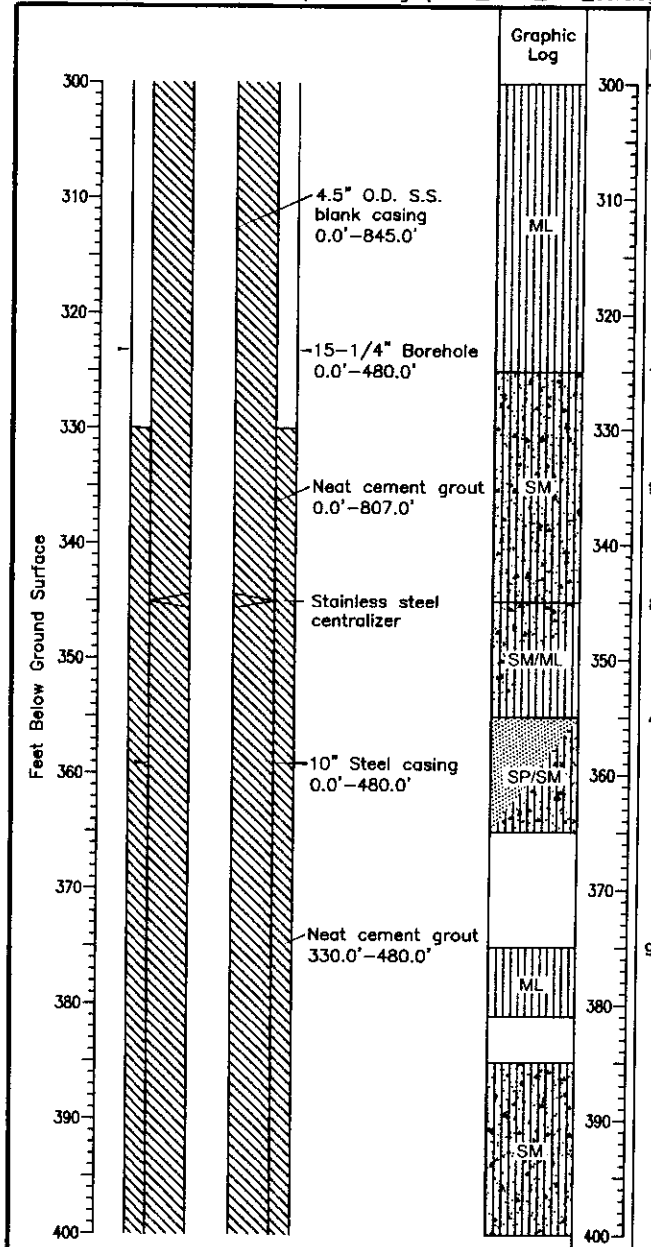

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
100%/100%	305–315	ML	Same as above.
100%/100%	315–325	ML	Same as above, light olive brown (2.5Y 6/2).
100%/100%	325–335	SM	Silty sandstone, light olive brown (2.5Y 5/3), fine–grained, moderatedly cemented.
100%/100%	335–345	SM	Silty sandstone, pale yellow (2.5Y 7/3), fine–grained, weakly cemented dry.
85%/95%	345–355	SM–ML	Same as above grading into siltstone, light yellowish brown (2.5Y 6/3), weakly cemented.
45%/88%	355–365	SP–SM	Same as above, with loose medium–grained sand.
0%/0%	365–375		No recovery.
95%/95%	375–381	ML	Siltstone, plae yellow (2.5Y 7/3), weakly cemented, dry.
0%/0%	381–385		No recovery.
NA	385–395	SM	Clayey silty sand, light yellowish brown (2.5Y 6/3), fine– to medium–grained, moderately sorted, moderate plasticity, soft (cuttings from mud rotary).
NA	395–405	SM	As above, more sand than fines (cuttings from mud rotary).

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–11–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15–1/4" and 9–7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ–Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

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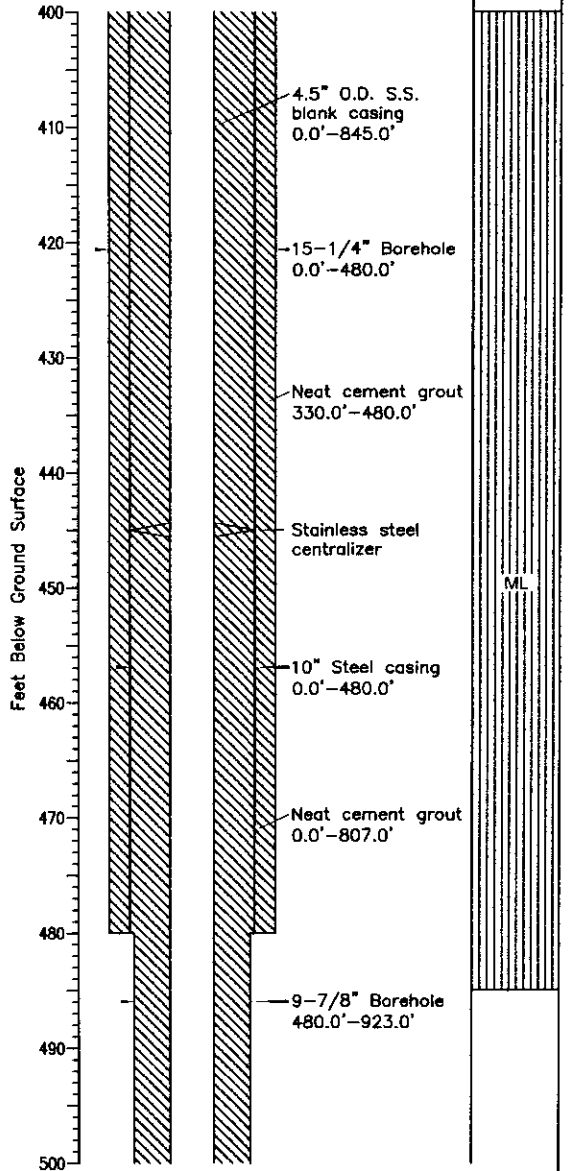

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
ML	NA	405–415	ML	Same as above, clayey silt with sand, more fines than sand (cuttings from mud rotary).
	NA	415–425	ML	Same as above (cuttings from mud rotary).
	NA	425–435	ML	Same as above (cuttings from mud rotary).
	NA	435–445	ML	Same as above, few cutting returns (cuttings from mud rotary).
	NA	445–455	ML	Same as above (cuttings from mud rotary).
	NA	455–465	ML	Same as above (cuttings from mud rotary).
	NA	465–475	ML	Same as above (cuttings from mud rotary).
	NA	475–485	ML	Same as above (cuttings from mud rotary).
	NA	485–520		No cuttings return.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–11–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15–1/4" and 9–7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ–Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

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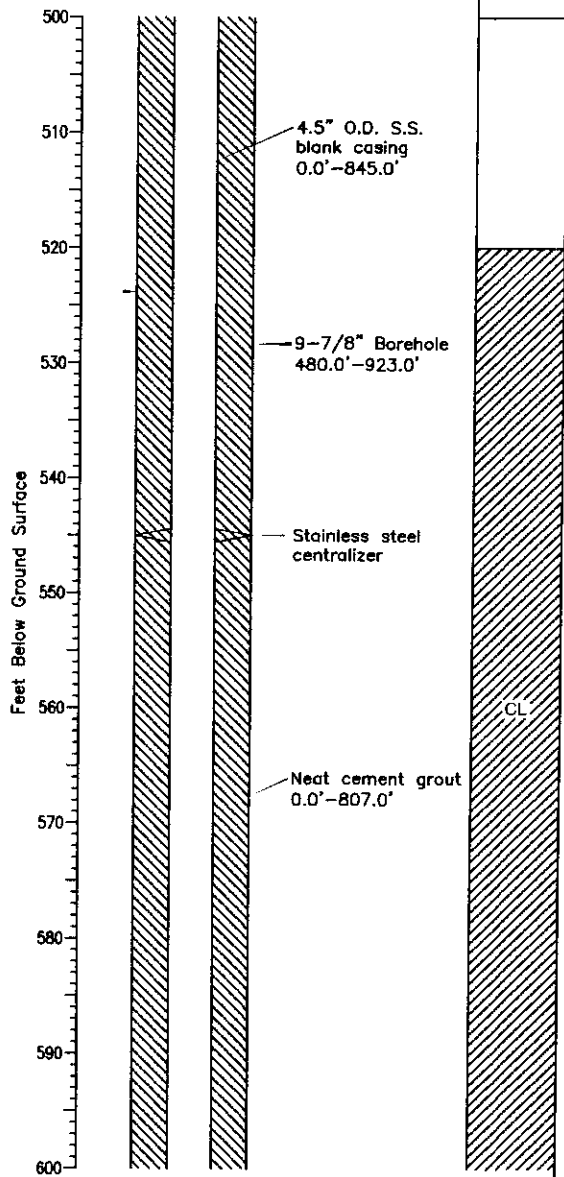

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
	NA			No cuttings return.
	70%/77%	520-525	CL	Silty claystone, olive gray (5Y 3/2), weakly cemented.
	96%/96%	525-530	CL	Same as above.
	90%/90%	530-540	CL	Silty sandy claystone, dark olive gray (5Y 3/2), fine-grained, weakly cemented, moist.
	90%/95%	540-550	CL	Same as above, with dark gray mottling, moderately cemented, few fractures.
	95%/95%	550-560	CL	Same as above.
CL	95%/95%	560-570	CL	Same as above.
	70%/95%	570-580	CL	Sandy silty claystone, light yellowish brown (7.5Y 6/3), very fine-grained, weakly cemented, slight to moderate plastice when wet.
	82%/82%	580-590	CL	Same as above, some fractures.
	70%/90%	590-595	CL	Sandy silty claystone, dark greenish brown (2.5Y 4/2), very fine-grained, weakly cemented, dry to damp.
	0%/37%	595-605	CL	Sandy silty claystone, greenish gray (Gley1 5/1), very fine-grained, slight plasticity, moderately cemented, brittle, dry.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ-Tech; Adamson Pump and Drill
Date completed: 10-11-11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15-1/4" and 9-7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ-Tech core drilling 0'-385', 520'-750' (NQ core 600'-750'); Adamson Pump and Drill mud rotary drilling 385'-520', air rotary drilling 750'-923'

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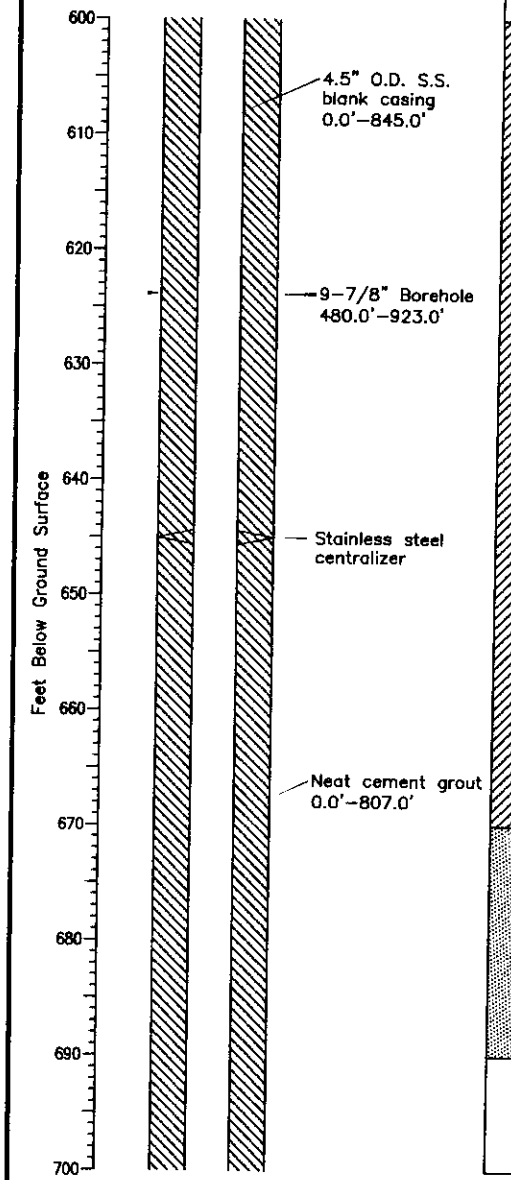

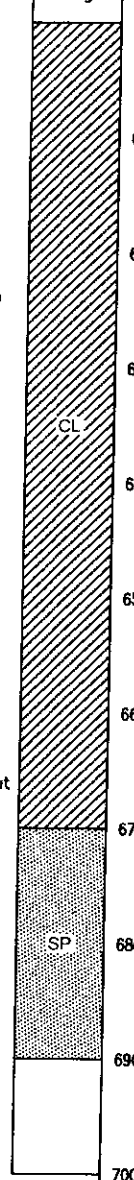

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
10%/81%	605–615	CL	Sandy silty claystone, dark greenish gray (Gley1 4/1), fine-grained, slight to moderate plasticity when wet, dry (608–615 feet no recovery).
65%/84%	615–625	CL	Same as above.
40%/64%	625–635	CL	Claystone, dark greenish gray (Gley1 4/1), plastic when wet, hard, brittle, dry–damp, massive.
0%/84%	635–640	CL	Same as above.
0%/20%	640–650	CL	Same as above.
30%/44%	650–660	CL	Same as above.
10%/34%	660–670	CL	Same as above.
0%/38%	670–690	SP	Sandstone, dark greenish gray (Gley1 4/1), fine-grained, well sorted, round to subround, non-plastic, hard, dry–damp.
0%/0%	690–700		No recovery.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ-Tech; Adamson Pump and Drill
Date completed: 10-11-11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15-1/4" and 9-7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ-Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

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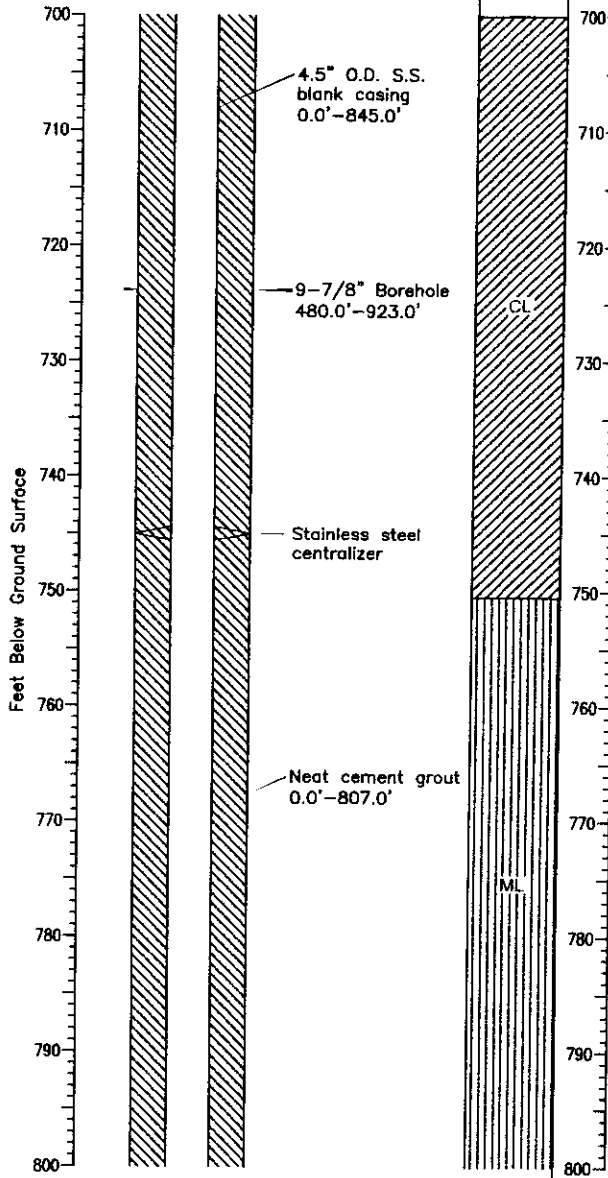

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
CL	15%/58%	700–710	CL	Claystone, dark greenish gray (Gley1 4/1), plastic when wet, hard, brittle, damp.
CL	0%/63%	710–720	CL	Same as above, most likely borehole slough.
CL	20%/55%	720–730	CL	Claystone, dark greenish gray (Gley1 4/1), plastic when wet, hard, brittle, dry–damp, massive, with few fractures.
CL	90%/96%	730–740	CL	Same as above, without fractures.
CL	70%/100%	740–750.5	CL	Same as above.
ML	NA	750.5–923	ML	Cuttings not sampled at discrete intervals from 750.5 feet to 923 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–11–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15–1/4" and 9–7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ–Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

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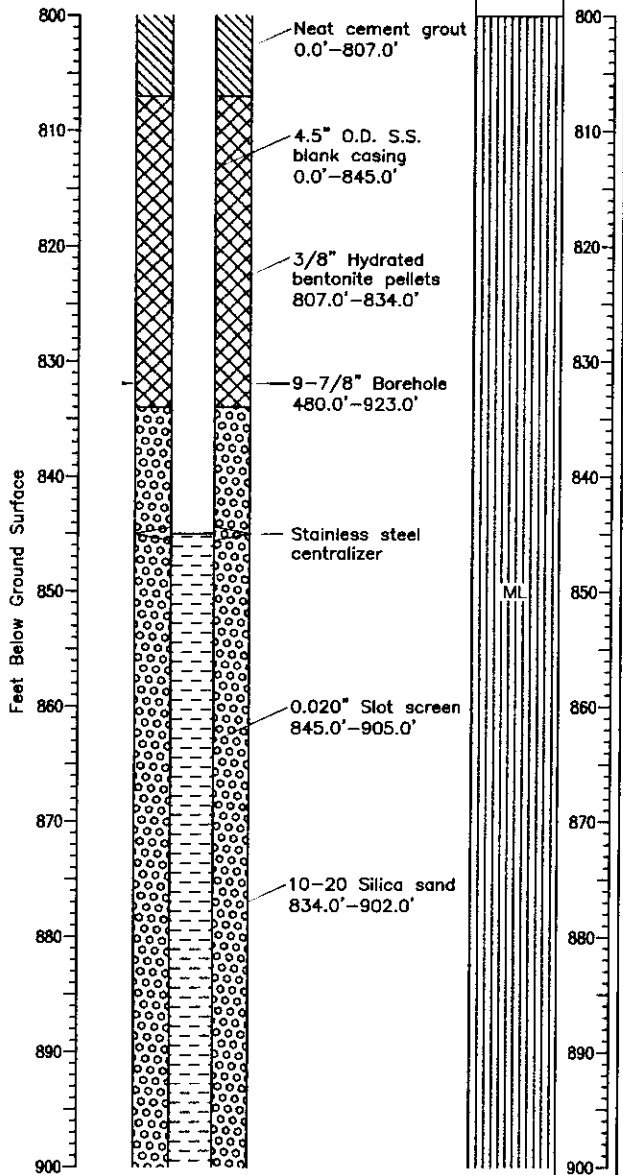

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
ML	NA		ML	Cuttings not sampled at discrete intervals from 750.5 feet to 923 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–11–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15–1/4" and 9–7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ–Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

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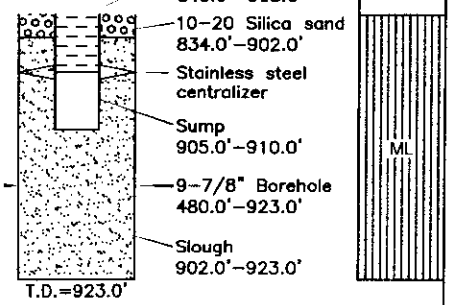

Feet Below Ground Surface

900 910 920 930 940 950 960 970 980 990 1000

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
NA		ML	Cuttings not sampled at discrete intervals from 750.5 feet to 923 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: J. Fisher/M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–11–11

Drilling method: Core, mud rotary, air rotary
Bit diameters: 15–1/4" and 9–7/8"
Sampling device: HQ core, NQ core, rotary cuttings
Steel suface casing: 10"

Note: HAZ–Tech core drilling 0'–385', 520'–750' (NQ core 600'–750'); Adamson Pump and Drill mud rotary drilling 385'–520', air rotary drilling 750'–923'

PICKLES BUTTE
Well Log: PB-14

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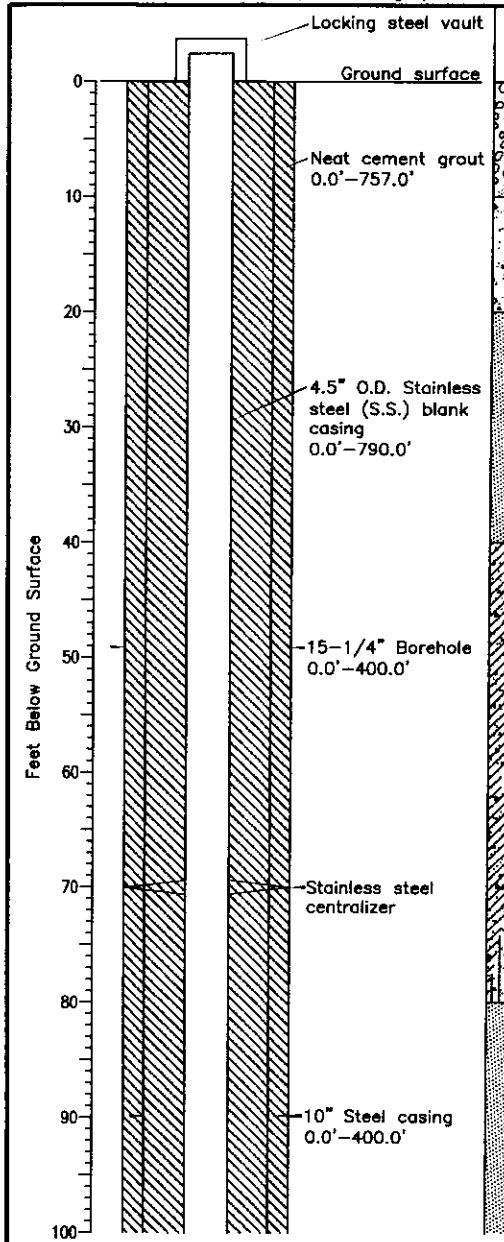

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
GP/SP	NA	0–10	GP–SP	Gravelly sand, olive gray (5Y 5/2), fine– to medium–grained, subrounded, well sorted, non–plastic, loose, moist.
SW	NA	10–20	SW	Sand, light gray (5Y 7/2), fine– to coarse–grained, well sorted, subrounded, non–plastic, loose, dry.
SP	NA	20–30	SP	Same as above.
SP	NA	30–40	SP	Same as above.
SC/SM	NA	40–50	SC–SM	Clayey silty sand, pale yellow (5Y 7/3), fine–grained, subrounded, low plastic, soft, slightly moist.
SC/SM	NA	50–60	SC–SM	Same as above.
SC/SM	NA	60–70	SC–SM	Same as above.
SC/SM	NA	70–80	SC–SM	Clayey silty sand, light olive brown (2.5Y 5/3), fine– to coarse–grained, rounded to subrounded, low plastic, soft, moist.
SP	NA	80–90	SP	Sand, pale yellow (2.5Y 7/4), fine–grained, non–plastic, loose, moist.
SP	NA	90–100	SP	Same as above.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–26–11

Drilling method: Core, mud rotary
Bit diameters: 15–1/4", 12" and 9–7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"
Note: TOC = top of casing

Northing: 665617.168
Easting: 246058.254
Elevation: 3023.3 (TOC)
Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ–Tech core drilling 425'–625'; air rotary drilling 625'–870'

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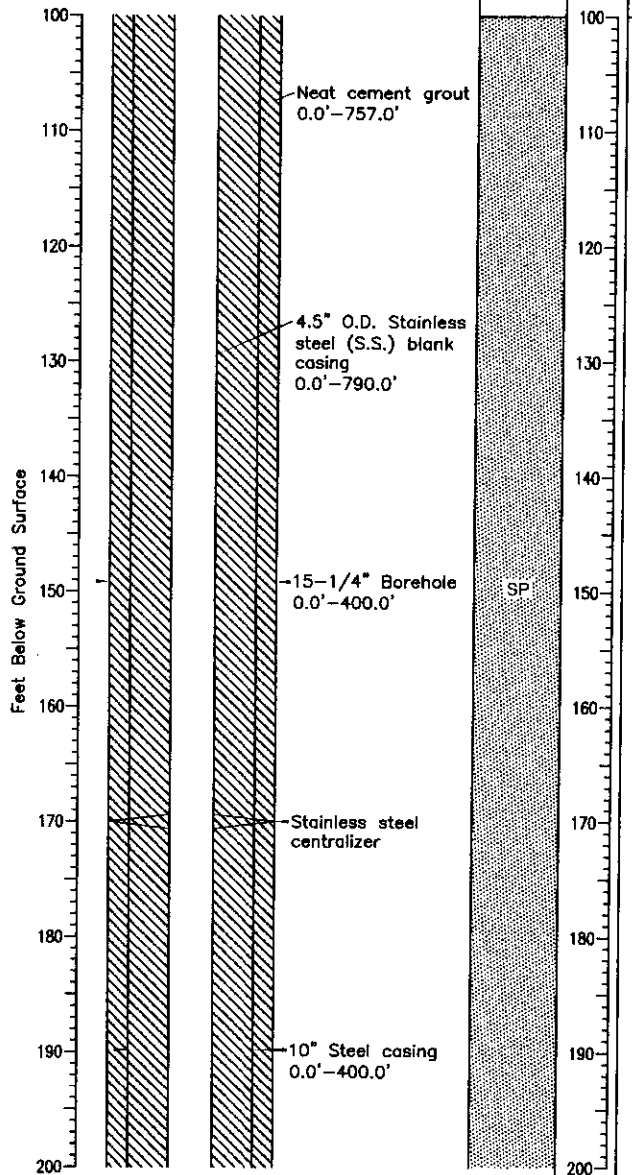

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
SP	NA	100–110	SP	Sand, light yellowish brown (2.5Y 6/3), fine–grained, poorly sorted, subrounded, non–plastic, loose, moist.
	NA	110–120	SP	Sand, light olive brown (2.5Y 5/3), fine– to medium–grained, subrounded, poorly sorted, non–plastic, loose, moist.
	NA	120–130	SP	Same as above.
	NA	130–140	SP	Same as above.
	NA	140–150	SP	Same as above.
	NA	150–160	SP	Same as above.
	NA	160–170	SP	Same as above.
	NA	170–180	SP	Same as above.
	NA	180–190	SP	Same as above with iron staining.
	NA	190–200	SP	Sand, pale yellow (2.5Y 8/4), fine– to coarse–grained, poorly sorted, subangular to subrounded, non–plastic, loose, dry.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–26–11

Drilling method: Core, mud rotary
Bit diameters: 15–1/4", 12" and 9–7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ–Tech core drilling 425'–625'; air rotary drilling 625'–870'

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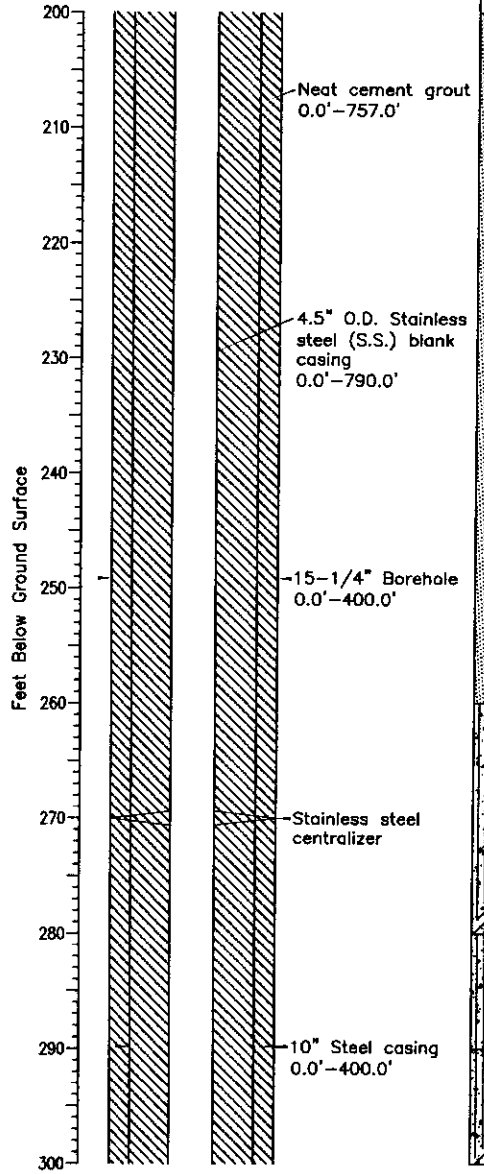

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
SP	NA	200–210	SP	Same as above, medium–coarse grained.
	NA	210–220	SP	Same as above.
	NA	220–230	SP	Same as above.
	NA	230–240	SP	Same as above with iron staining.
	NA	240–250	SP	Same as above.
	NA	250–260	SP	Sand, pale yellow (2.5Y 8/3), fine–grained, well sorted, subrounded, non–plastic, loose, dry.
SM/SC	NA	260–270	SM–SC	Silty clayey sand, pale yellow (5Y 7/3), fine–grained, subrounded, low plastic, soft, moist.
	NA	270–280	SM–SC	Same as above.
SM	NA	280–290	SM	Silty sand, pale olive (5Y 6/3), fine–grained, subrounded, non–plastic, loose, slightly moist.
SM/SC	NA	290–300	SM–SC	Clayey silty sand, olive (5Y 5/3), fine–grained, subrounded, very low plastic, soft, slightly moist.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–26–11

Drilling method: Core, mud rotary
Bit diameters: 15–1/4", 12" and 9–7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ–Tech core drilling 425'–625'; air rotary drilling 625'–870'

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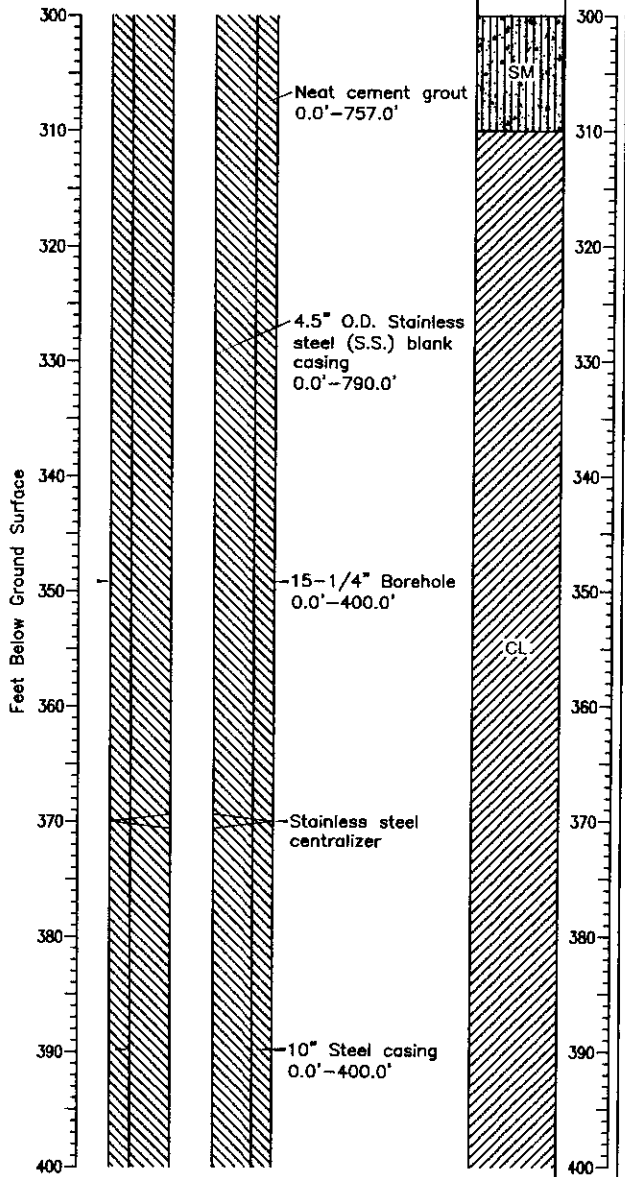

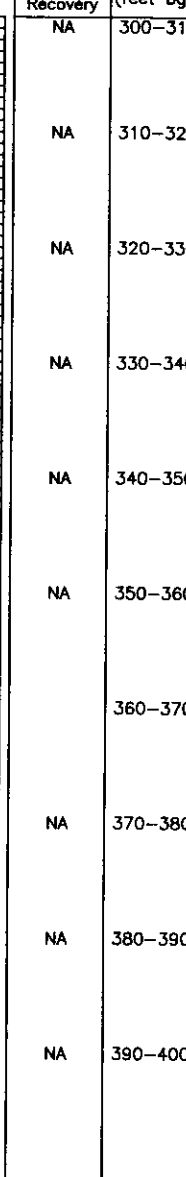

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
NA	300–310	SM	Silty sand, pale yellow (5Y 8/2), fine-grained, subrounded, non-plastic, loose, dry.
NA	310–320	CL	Sandy silty clay, light yellowish brown (2.5Y 6/4), fine-grained, subrounded, medium plastic, soft, moist.
NA	320–330	CL	Same as above.
NA	330–340	CL	Same as above.
NA	340–350	CL	Same as above.
NA	350–360	CL	Silty clay, pale olive (5Y 6/3), very fine-grained, highly plastic, soft, wet.
	360–370		
NA	370–380	CL	Same as above.
NA	380–390	CL	Same as above.
NA	390–400	CL	Same as above.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–26–11

Drilling method: Core, mud rotary
Bit diameters: 15–1/4", 12" and 9–7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ–Tech core drilling 425'–625'; air rotary drilling 625'–870'

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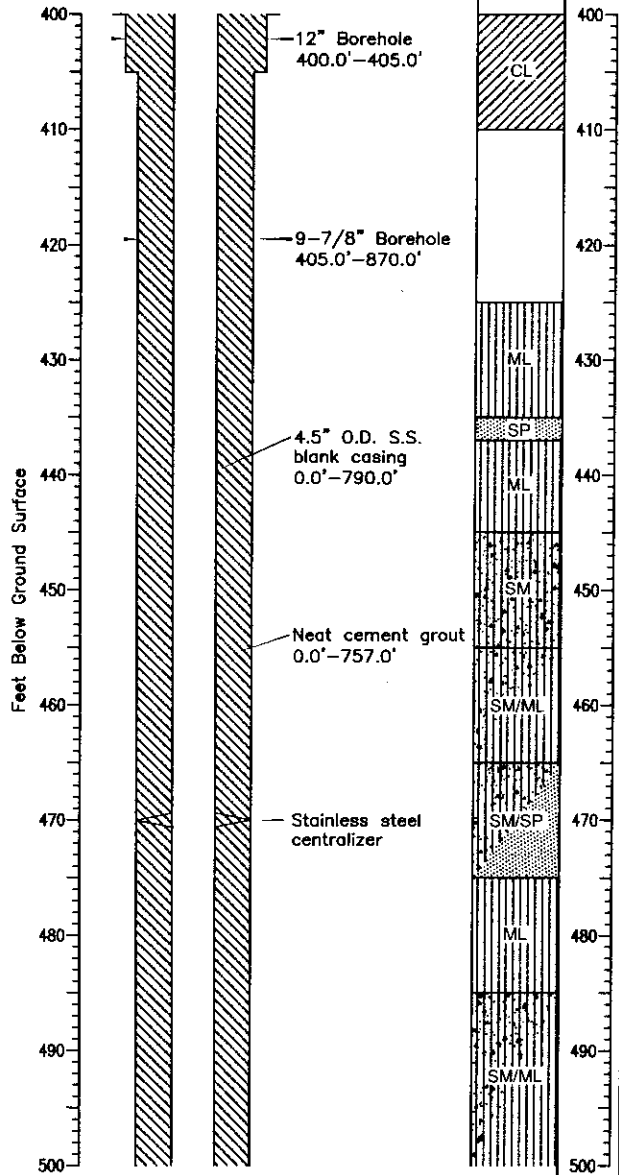

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
NA	400–410	CL	Same as above.
NA	410–425		No recovery.
30%/65%	425–435	ML	Siltstone, pale yellow (5Y 7/3) to light yellowish brown (2.5Y 6/3), moderately soft, significant clay fraction.
75%/100%	435–445	SP ML	Sand, light yellowish brown (2.5Y 6/4), medium-grained, well sorted, loose (from 435 to 437 feet) then siltstone as above to 445 feet.
50%/75%	445–455	SM	Silty clayey sand, pale olive (5Y 6/3), fine-grained, appreciable clay with alternately clayey soft and hard layers, with organic material and orange oxidation. No recovery from 452.5 to 455 feet.
100%/100%	455–465	SM-ML	Silty sand and sandy silt, pale olive (5Y 6/3), laminated, fine-grained, alternating soft and hard layers, brittle to plastic, slightly moist, with abundant organic material.
100%/100%	465–475	SM-SP	Same as above interbedded with sand, olive gray (5Y 5/2), fine- to medium-grained, moderately well sorted, loose, soft.
85%/100%	475–485	ML	Sandy siltstone, pale olive (5Y 6/3), laminated, weakly to moderately cemented, micaceous with some clay.
60%/80%	485–495	SM-ML	Similar to above silty sand and sandy silt, color mottled pale olive (5Y 6/3) to light olive gray (5Y 6/2), massive to laminated, weakly cemented, interbedded clay and clayey layers.
60%/75%	495–505	SM-ML	Same as above, less sand.

Geologist: M. Nauck/J. Raucci
Driller: HAZ-Tech; Adamson Pump and Drill
Date completed: 10-26-11

Drilling method: Core, mud rotary
Bit diameters: 15-1/4", 12" and 9-7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ-Tech core drilling 425'–625'; air rotary drilling 625'–870'

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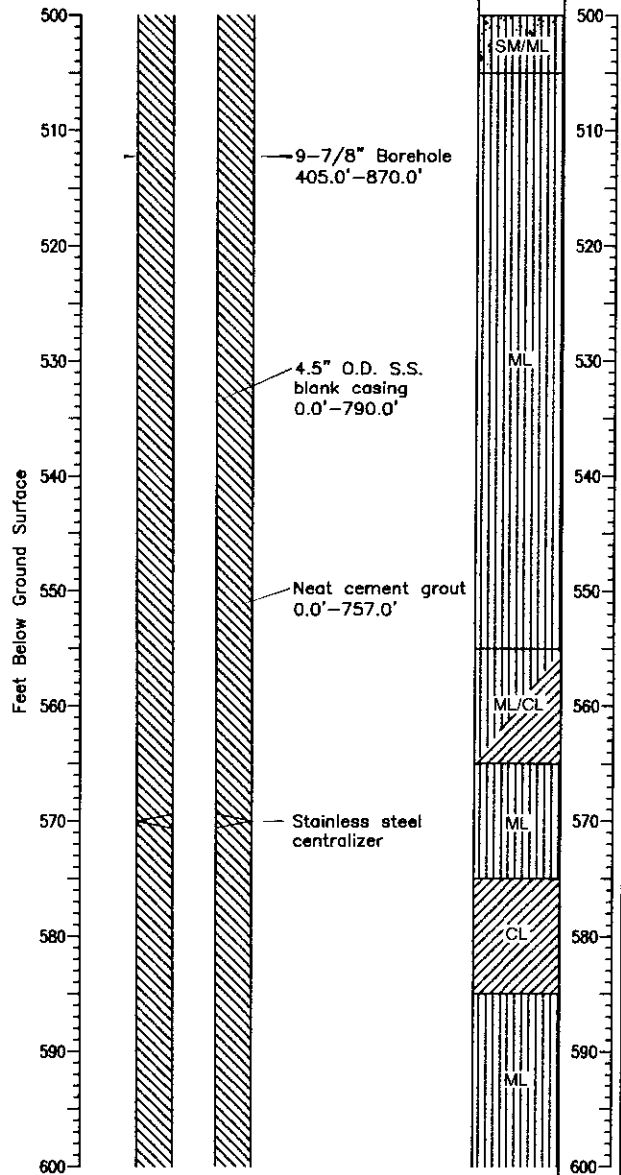

Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
SM/ML	90%/100%	505–515	ML	Same as above, predominantly silt.
	80%/90%	515–525	ML	Same as above.
ML	85%/100%	525–535	ML	Same as above, predominantly silt with minor sand and clay, massive to laminated, locally crossbedded, slightly moist.
	50%/65%	535–545	ML	Same as above.
	100%/100%	545–555	ML	Similar to above, clayey siltstone, light yellowish brown (2.5Y 6/2–6/3).
ML/CL	100%/100%	555–565	ML–CL	Same as above at 555 feet silty clay, brownish gray (2.5Y 5/2), at 565 feet weakly to moderately cemented.
ML	100%/100%	565–575	ML	Clayey silt, olive (5Y 4/3), soft, slightly plastic to 568.5 feet, silstone, dark greenish gray (Gley1 10Y 4/1), siltstone with sand and clay, sandy at top, well cemented, contact w/ "blue clay" unit at 568.5 feet.
CL	20%/30%	575–585	CL	Sandy clay, dark gray (Gley1 4/N), well cemented, slightly plastic when wet, micaceous, dry.
	100%/100%	585–595	ML	Silstone with clay and minor sand, mottled dark gray (Gley1 4/N), well cemented, micaceous.
ML	90%/95%	595–605	ML	Sandy silstone with clay, dark gray (Gley1 4/N), massive to laminated, micaceous.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–26–11

Drilling method: Core, mud rotary
Bit diameters: 15–1/4", 12" and 9–7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ–Tech core drilling 425'–625'; air rotary drilling 625'–870'

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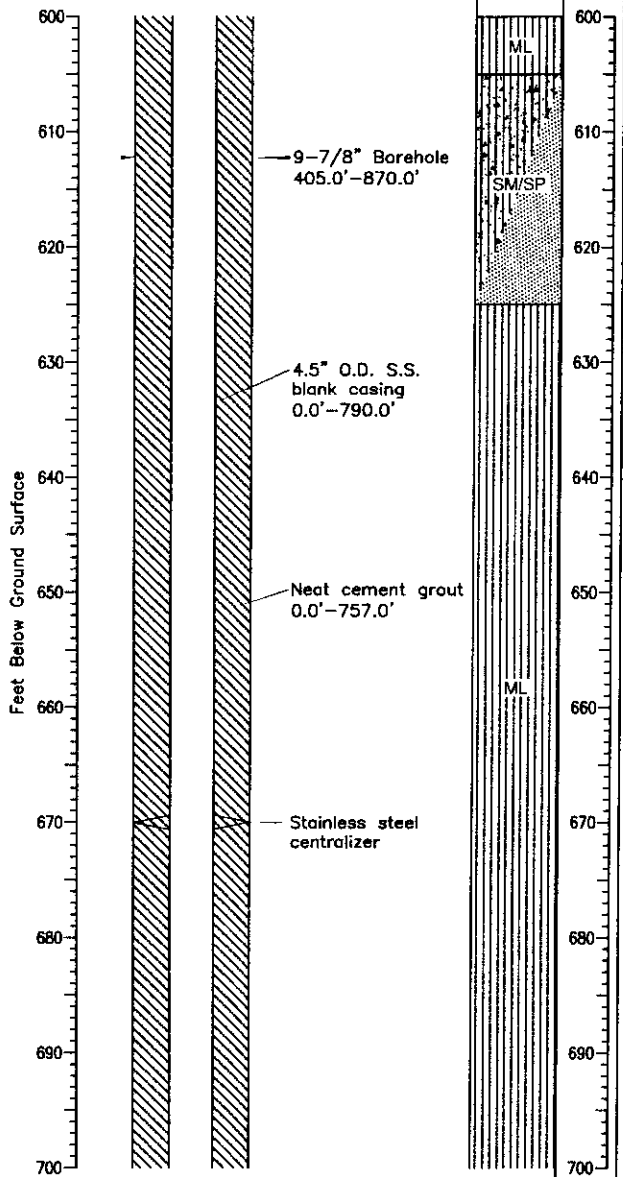

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
80%/90%	605–625	SM–SP	Sand and silty sand, mottled gray and light gray, laminated, fine– to medium–grained, moderately sorted, loose to well cemented, slightly moist to moist; interbedded w/ thin (1 to 2 cm) clay lenses.
	625–870	ML	Cuttings not sampled at discrete intervals from 625 feet to 870 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: M. Nauck/J. Raucci
Driller: HAZ–Tech; Adamson Pump and Drill
Date completed: 10–26–11

Drilling method: Core, mud rotary
Bit diameters: 15–1/4", 12" and 9–7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ–Tech core drilling 425'–625'; air rotary drilling 625'–870'

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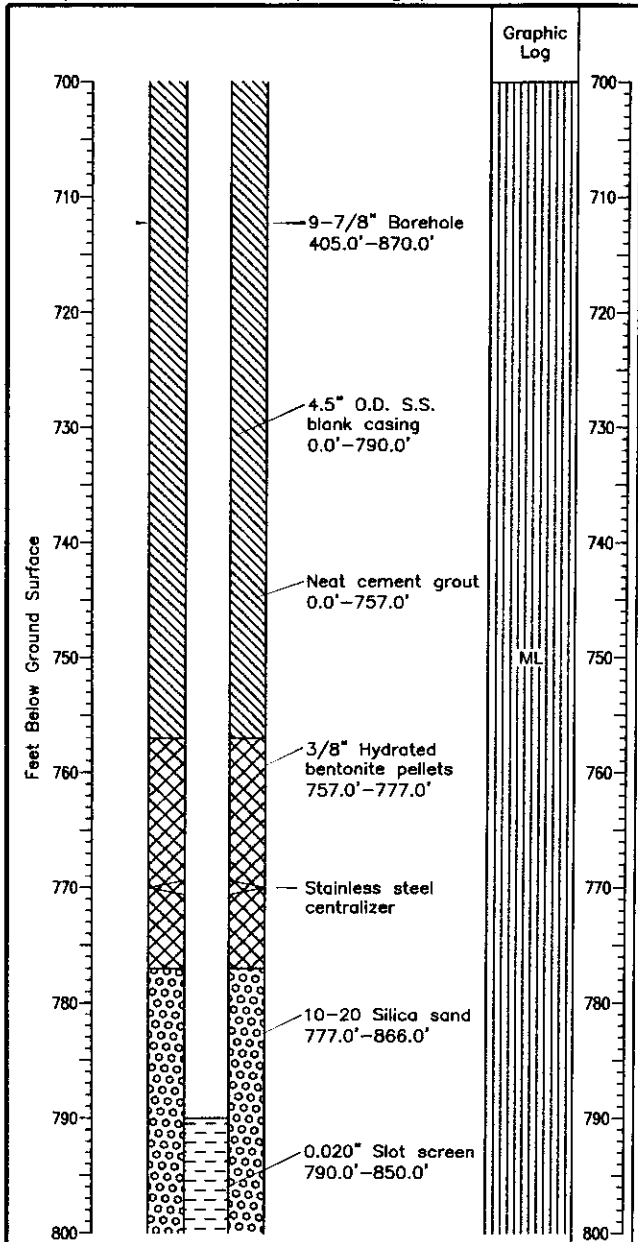

Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
		ML	Cuttings not sampled at discrete intervals from 625 feet to 870 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: M. Nauck/J. Raucci
Driller: HAZ-Tech; Adamson Pump and Drill
Date completed: 10-26-11

Drilling method: Core, mud rotary
Bit diameters: 15-1/4", 12" and 9-7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'-425'; HAZ-Tech core drilling 425'-625'; air rotary drilling 625'-870'

PICKLES BUTTE
Well Log: PB-15

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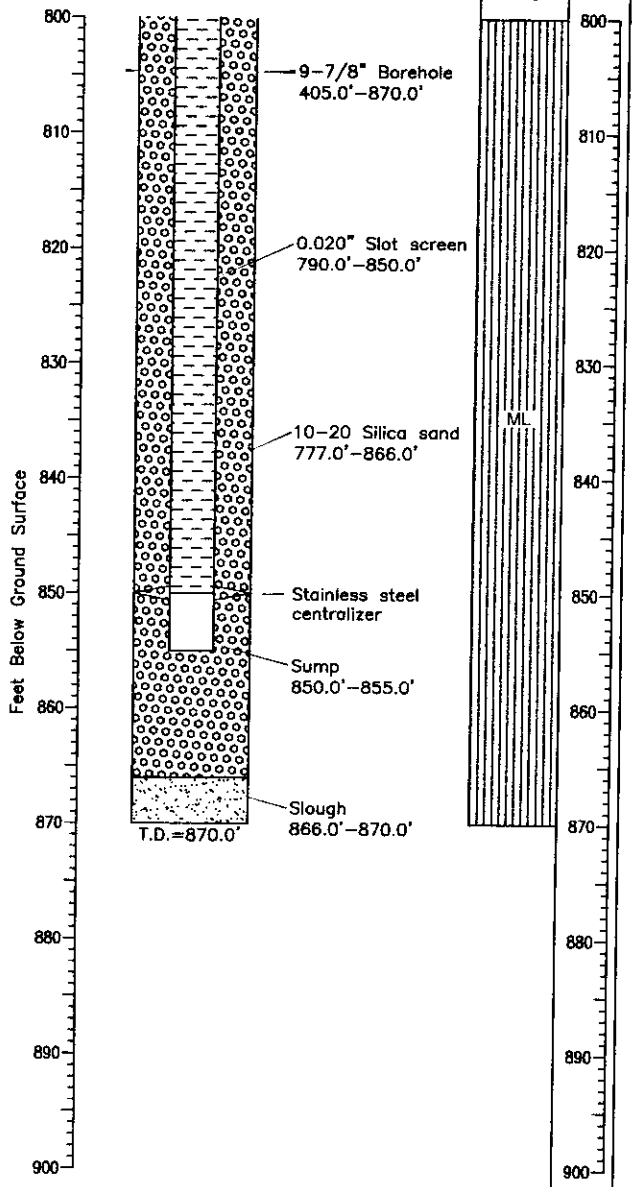
S:\Projects\ES09.0154_Pickles\VR_Drawings\ES09_0154_07B_borelogs.dwg PB-15 (9of9)



Graphic Log	Rock Quality Designation Recovery	Sample Interval (feet bgs)	USCS Symbol	Comments and Lithology
ML			ML	Cuttings not sampled at discrete intervals from 625 feet to 870 feet. Air rotary drilling method only enabled amalgamated bulk sample collection. Visual inspection indicated predominantly gray silt with lesser amounts of clay and sand.

Geologist: M. Nauck/J. Raucci
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Bit diameters: 15–1/4", 12" and 9–7/8"
Sampling device: HQ core, rotary cuttings
Steel suface casing: 10"

Note: Adamson Pump and Drill mud rotary drilling 0'–425'; HAZ–Tech core drilling 425'–625'; air rotary drilling 625'–870'

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Well Log: PB-15