11800 South Zone C Reservoirs

Geotechnical Engineering Report

November 8, 2023 | Terracon Project No. 61225118

Prepared for:

Jacobs Engineering Group
6440 S Millrock Drive, Ste 300
Salt Lake City, Utah 84121

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November 8, 2023

Jacobs Engineering Group
6440 S Millrock Drive, Ste 300
Salt Lake City, Utah 84121

Attn: Ryan Willeitner, P.E.
P: (385) 474-8564
E: Ryan.Willeitner@jacobs.com

Re: Geotechnical Engineering Report
11800 South Zone C Reservoirs
7185 West 11800 South
South Jordan, Utah
Terracon Project No. 61225118

Dear Mr. Willeitner:

We have completed the scope of Geotechnical Engineering services for the above-referenced project in general accordance with Terracon Proposal No. 61227189 dated June 27, 2022, and updated in December 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and below-grade water tank structures for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

JOSHUA DANIEL WHITE
No. 4940715-2202

Joshua D. White, P.E.
Senior Project Manager

11/10/2023

John B. Mancini, P.E
Senior National Account Manager

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Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks that direct the reader to that section and clicking on the Terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**.

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Geotechnical Engineering services performed for the proposed water tanks to be located at 7185 West 11800 South in South Jordan, Utah. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- Seismic Site Class
- site preparation and earthwork
- foundation design and construction
- tank slab design and construction
- lateral earth pressure
- corrosivity
- Site Location and Exploration Plans

The geotechnical engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown in the **Site Location** and **Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included in the boring logs in the **Exploration Results** section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	The Jordan Valley Water Conservancy District (JVWCD) issued a "*Request for Statement of Qualifications to Provide Professional Engineering Services for 11800 South Zone C Reservoir"* dated April 2022, and Terracon provided an original proposal for the proposed project dated May 10, 2022. Jacobs Engineering Group (Jacobs) has done some preliminary design on the project, and the project was preliminarily designed since its initial proposal. Jacobs requested that Terracon provide an updated scope of services and cost estimate to provide geotechnical support services for the updated Project Design. A subsequent email dated December 9, 2022, provided the updated design of a two-tank system and approximate locations. Preliminary design information was provided by emails dated March 30 and 31, 2023.
Project Description	Design of two new buried water tanks each at 5 million gallons (MG) capacity including chlorine building, vaults and pipe up to 48 inches in diameter. The eastern tank will be built first, with the western tank to be built later.
Proposed Structures	Each tank is specifically a wire wrapped, circular prestressed concrete tank, approximately 170 feet in diameter with a maximum of 31.5 feet in water height, operating at 30.5 feet in water height, and with each tank having the top exposed to the atmosphere. The sidewalls will be buried and/or backfill supported to the top. The chlorine building is planned to be a CMU building at grade next to the valve vault which is 18 feet by 18 feet buried 14 feet. The pipes will be up to 48 inches in diameter connecting the tanks and vault to existing systems.
Finished Tank Floor Elevation	Tank floor level (TFL) elevation is anticipated to be 5,127.5 feet mean sea level, with the maximum tank operating water level (HWL) elevation at 5,158 feet, the top of overflow at 5,159 feet, and the top of tank ceiling at approximately 5,163 feet.
Maximum Loads	Wall loads estimated at approximately 10 kips per foot with a water load on each slab of approximately 2 kips per square foot. Distance between columns of approximately 20 feet.
Grading/Slopes	Based on TFL elevation of 5,127.5 feet, grading cuts ranging on the order of 20 to 30 feet below existing grades will be needed to excavate the tank areas. Finished grades along the top of the tanks are estimated to be 5,162 feet, sloping down to existing ground elevations.

Item	Description
Below-Grade Structures	Preliminary layouts show that the two tanks will be buried structures.
Pavements	None
Design Standard	Improvements shall be designed to withstand forces anticipated during a seismic event. Determine hazard curves using a 2 percent probability of exceedance in 50 years and the latest ground motion maps prepared by the U.S. Geological Survey. Design per ACI 350.3-06 for facilities considered to be an essential part of a lifeline system.

Terracon should be notified if any of the above information is inconsistent with the planned construction, especially the grading limits, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at 7185 West 11800 South in South Jordan, Utah. The location is at Latitude: 40.5364°N, Longitude: 112.06724°W (approximate). See **Site Location**
Existing Improvements	The property is undeveloped agricultural fields containing an existing mound of placed fill approximately 170 feet in diameter and ranging in height from 5 to 20 feet as seen in **Exploration Plan**.
Current Ground Cover	Agricultural vegetation and native grasses
Existing Topography	Slopes from the 11800 South Roadway at approximately 5,155 feet downward to the south at approximately 5,135 feet above mean sea level over approximately 350 linear feet.

Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based on our review of the subsurface exploration, laboratory data, geologic setting, and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of the site. Conditions observed at each exploration point are indicated in the individual logs. The individual logs can be found in the **Exploration Results** and the GeoModel can be found in the **Figures** attachment of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Topsoil**	Vegetative layer (i.e., topsoil) Varied from about 6 to 8 inches in depth with an average of about 7 inches encountered in B-01, B-02, B-03, B-06, and B-07
2	**Fill**	Existing fill encountered in B-04, B-05, and B-08 that varied from 17.5 to 18 feet in depth
3	**Lean Clay**	Medium stiff to hard lean clay with varying amounts of silt, sand, and gravel
4	**Silt**	Stiff to hard silt with varying amounts of sand
5	**Sand**	Medium dense to very dense sand with varying amounts of lean clay, silt, and gravel
6	**Gravel**	Dense to very dense gravel with varying amounts of lean clay, silt, and sand

The borings were observed during the field exploration for the presence and level of groundwater. Groundwater was not encountered in any of the borings during or after field exploration. These observations and interpretations represent groundwater conditions at the time of the field exploration and may not be indicative of other times or at other locations.

It should be recognized that fluctuations of the groundwater table will occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the future may be higher or lower than the levels indicated in the boring logs and should be considered when developing design and construction plans for the project. However, we do not believe groundwater will significantly impact the proposed construction.

Geologic Hazards

The project site is located in west Salt Lake County, Utah in the southwest corner of the town of South Jordan City. The site is located east of the Oquirrh Mountains along the eastern margin of the Basin and Range physiographic province. The northwest portion of the Basin and Range province is situated north of the Colorado Plateau and is bounded by the Wasatch Mountains to the east. Formed during middle and late Tertiary time (1 million years to 23 million years ago), the Basin and Range province is dominated by fault-controlled topography. The topography consists of mountain ranges and relatively flat, broad alluvial valleys. These mountain ranges and valleys have evolved from generally complex movements and associated erosional and depositional processes. Structurally, the site lies within the Salt Lake Valley. Drainage flows along local streams and rivers and slope wash during late Tertiary time, coupled with structural activity and Lake Bonneville deposition, are generally responsible for the present-day topography within the basin. The site is located in an area mapped as having very low liquefaction potential.[1]

The geologic unit mapped[2] at the surface of the site is quaternary deposits from Lake Bonneville deposits and older alluvial deposits consisting of a mix of fine-grained and coarse-grained soils.

- Based on the project site, the density and type of subsurface soils encountered, and the lack of water table, the site has a very low liquefaction potential.
- The nearest known Quaternary fault is 7.1 miles west of the site along the Oquirrh-Southern Oquirrh Mountains fault zone.[3]
- The nearest controlling Quaternary fault is 12.1 miles east of the site along the Wasatch Fault Zone — Salt Lake City section.[3]

Faults are mapped along the nearby mountain foothills, at the base of the Wasatch Mountains to the east, and at the base of the Oquirrh Mountains to the west.

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[1] Utah Geological Survey. (2020, May). *Utah Geologic Hazards Portal*. Retrieved April 10, 2023, from **https://geology.utah.gov/apps/hazards/**

[2] Hintze, L.F. (1980). *Geologic map of Utah: Utah Geological and Mineral Survey*, scale 1:500,000.

[3] U.S. Geological Survey and Utah Geological Survey. *Quaternary Fault and Fold Database for the United States*. Retrieved April 10, 2023, from **https://www.usgs.gov/natural-hazards/earthquake-hazards/faults**

Seismic Site Class

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the 2005 International Building Code (IBC). Based on the soil and geophysical properties observed at the site and as described in the exploration logs and results, our professional opinion is that a **Seismic Site Classification of D** be considered for the project. Subsurface explorations at this site were extended to a maximum depth of 90.4 feet and the average shear wave velocity of the two tests was **969.5 feet/second** based on Multichannel Analysis of Surface Waves (MASW).

Description	Value
Risk Category	III
2005 International Building Code Site Classification	D
Site Latitude	40.5369°
Site Longitude	-112.0682°

Liquefaction

The Maximum Considered Earthquake (MCE) used in our analysis is a magnitude 7.0 produced by the nearest controlling fault to the site, the Salt Lake City section of the Wasatch Fault (approximately 12.1 miles directly east of the proposed project site). The site modified peak ground acceleration of 0.403 g was used for calculation at the project site. A 2% probability of exceedance in 50 years (return period of 2,475 years) was used for the analysis.

Liquefaction potential was evaluated for borings B-07 and B-08. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Based on the observed density of soils, and lack of observable water table, the potential for liquefiable soils was calculated as very low.

Corrosivity

The table below lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary

Boring	Sample Depth (feet)	Soil Description	Soluble Sulfate (mg/kg)	Soluble Chloride (mg/kg)	Total Salts (mg/kg)	Electrical Resistivity (Ω-cm)	pH
B-01	0.5–1.5	Lean Clay with Sand	47	376	621	3,300	8.1
B-01	15–16.5	Silt with Sand	1,618	1,180	3,585	390	9.0
B-02	0.3–1.5	Silty Clay with Sand	96	320	545	3,100	7.2
B-04	0.3–1	Silty Clayey Sand with Gravel	129	219	755	4,000	8.8
B-06	15–16.5	Silty Sand	622	333	1,615	820	9.5
B-08	25–26.5	Sandy Silt	332	292	820	1,300	9.8

As discussed in Section 10.7.5 of the AASHTO LRFD Bridge Manual, 9th Edition, 2020, soils with resistivity values less than 2,000 ohm-cm can be indicative of a corrosive situation to ferrous materials. Based on the resistivity test results, the samples are indicative of a corrosive potential to ferrous materials.

Results of soluble sulfate testing indicate samples of the on-site soils tested possess low to moderate sulfate concentrations when classified in accordance with the ACI Design Manual 318. Concrete should be designed in accordance with the exposure class S1 and S2 provisions of the ACI Design Manual.

The pH, sulfates, sulfides, total dissolved salts, oxidation-reduction potential, and chlorides can affect the aggressiveness of corrosion to buried metal structures. These test results are provided to assist in determining the type and degree of corrosion protection that may be required. We recommend that a certified corrosion engineer be employed to determine the need for corrosion protection and to design appropriate protective measures.

Geotechnical Overview

The site appears suitable for the proposed construction based on geotechnical conditions encountered in the test borings, provided that the recommendations provided in this report are implemented in the design and construction phases of this project.

The subsurface materials generally consisted of gravel, sand, silt, and clay with varying amounts of silt, clay, and gravel extending to the maximum depth of the borings. Groundwater was not encountered within the maximum depths of exploration during or at the completion of drilling.

Based on the tank floor level (TFL) elevation of 5,127.5 feet, between 10 and 30 feet of excavation will be required to reach the elevation. Soils at this depth are expected to consist of lean clay with varying amounts of sand, silt, sandy silt, clayey sand, and poorly graded gravel with clay and sand. Based on the conditions encountered and estimated load-settlement relationships, the proposed tanks can be supported on conventional continuous or spread footings. Due to the varying types of soils near tank foundation elevations, the foundations should be supported on a 2-foot-thick uniform pad Structural Fill. Grading for the proposed foundations should incorporate the limits of the foundations plus a lateral distance beyond the outside edge of footings, where space is available. On-site soils are considered suitable to be used as backfill materials.

The near-surface, stiff to hard medium plasticity lean clay and high plasticity fat clay could become unstable with typical earthwork and construction traffic, especially after precipitation events. Effective drainage should be completed early in the construction sequence and maintained after construction to avoid potential issues. If possible, the grading should be performed during the warmer and drier times of the year. If grading is performed during the winter months, an increased risk for possible undercutting and replacement of unstable subgrade will persist. Additional site preparation recommendations, including subgrade improvement and fill placement, are provided in the **Earthwork** section.

The soils that form the bearing stratum for shallow foundations vary and exhibit potential for shrink-swell movements with changes in moisture. The **Shallow Foundations** section addresses support of the building directly bearing on engineered fill. We do expect significant live load on the floors and recommend overexcavation of near-surface soils to reduce the heave potential or use of suspended slabs to accommodate potential ground heave. The **Tank Bottom Slab** section addresses slab-on-grade support of the tanks using overexcavation techniques.

The recommendations contained in this report are based on the results of field and laboratory testing (presented in the **Exploration Results**), engineering analyses, and our current understanding of the proposed project. The **General Comments** section provides an understanding of the report’s limitations.

Earthwork

Earthwork is anticipated to include clearing and grubbing, excavations, and engineered fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations and on-grade slabs.

Site Preparation

Prior to placing fill, any existing vegetation, topsoil, and root mats should be removed. Complete stripping of the topsoil should be performed in the proposed structure(s) and parking/driveway areas.

Where fill is placed on existing slopes steeper than 5H:1V, benches should be cut into the existing slopes prior to fill placement. The benches should have a minimum vertical face height of 1 foot and a maximum vertical face height of 3 feet and should be cut wide enough to accommodate the compaction equipment. This benching will help provide a positive bond between the fill and natural soils and reduce the possibility of failure along the fill/natural soil interface.

Although no evidence of unexpected fill or underground facilities (such as septic tanks, cesspools, basements, and utilities) was observed during the exploration and site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed, and the excavation thoroughly cleaned prior to backfill placement and/or construction.

Subgrade Preparation

We recommend that the soils within the footprint of the proposed structures be removed to a minimum depth of 2 feet below the bottom of foundations (about 3 feet below bottom of tank bottom slab). Structural Fill placed beneath the entire footprint of the foundations should extend horizontally a minimum distance of 3 feet beyond the outside edge of footings. On-site soils are considered suitable to be used as backfill materials in non-structural areas due to the variability of fine-grained soils.

The subgrade should be proofrolled with an adequately loaded vehicle such as a fully loaded tandem-axle dump truck. The proofrolling should be performed under the observation of the Geotechnical Engineer or representative. Areas excessively deflecting under the proofroll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed or modified by treating/applying/mixing with Portland cement or class C fly ash. Excessively wet or dry material should either be removed or moisture conditioned and recompacted.

All exposed areas that will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of 10 inches, moisture conditioned as necessary, and compacted per the compaction requirements in this report. Compacted Structural Fill soils should then be placed to the proposed design grade, and the moisture content and compaction of subgrade soils should be maintained until foundation or pavement construction.

Based on the subsurface conditions determined from the geotechnical exploration, subgrade soils exposed during construction are anticipated to be relatively workable; however, the workability of the subgrade may be affected by precipitation, repetitive construction traffic, or other factors. If unworkable conditions develop, workability may be improved by scarifying and drying.

Existing Fill

As noted in **Geotechnical Characterization**, borings B-04, B-05, and B-08 encountered previously placed fill to depths ranging from about 17.5 to 18 feet. We have no records to indicate the degree of control, and consequently, the fill is considered unreliable for support of foundation loads. However, even with the recommended construction procedures, inherent risk exists for the owner that compressible fill or unsuitable material, within or buried by the fill, will not be discovered. This risk of unforeseen conditions cannot be eliminated without completely removing the existing fill but can be reduced by following the recommendations contained in this report.

We recommend that this existing fill from the eastern tank area be placed in the western tank area to help minimize settlement associated to both tanks. Prior to the placement of fill, settlement monitors should be placed in at least 4 areas with one additional monitor placed in the middle. After fill is placed, the monitors should be checked periodically until less than 1/8th of an inch of movement is observed over at least 2 successive readings in a month. The estimated settlement from the proposed western tank is just over 1 inch. If a surcharge of the excess fill with a height of approximately 15 feet is placed, the estimated amount of settlement should take approximately 10 months or less.

Excavation

We anticipate that excavations for the proposed construction can be accomplished with conventional earthmoving equipment. The bottom of excavations should be thoroughly cleaned of loose soils and disturbed materials prior to backfill placement and/or construction.

Soil Stabilization

Methods of subgrade improvement, as described below, could include scarification, moisture conditioning and recompaction, removal of unstable materials and replacement with granular fill (with or without geosynthetics). The appropriate method of improvement, if required, would be dependent on factors such as schedule, weather, the size of the area to be stabilized, and the nature of the instability. More detailed recommendations can be provided during construction as the need for subgrade stabilization occurs. Performing site grading operations during warm seasons and dry periods would help reduce the amount of subgrade stabilization required.

If the exposed subgrade is unstable during proofrolling operations, it could be stabilized using one of the methods outlined below.

- **Scarification and Recompaction** — It may be feasible to scarify, dry, and recompact the exposed soils. The success of this procedure would depend primarily upon favorable weather and sufficient time to dry the soils. Stable subgrades likely would not be achievable if the thickness of the unstable soil is greater than about 1 foot, if the unstable soil is at or near groundwater levels, or if construction is performed during a period of wet or cool weather when drying is difficult.
- **Crushed Stone** — The use of crushed stone or crushed gravel is a common procedure to improve subgrade stability. Typical undercut depths would be expected to range from about 12 to 24 inches below finished subgrade elevation. The use of high modulus geotextiles (i.e., engineering fabric or geogrid) could also be considered after underground work, such as utility construction, is completed. Prior to placing the fabric or geogrid, we recommend that all below-grade construction, such as utility line installation, be completed to avoid damaging the fabric or geogrid. Equipment should not be operated above the fabric or geogrid until one full lift of crushed stone fill is placed above it. The maximum particle size of granular material placed over geotextile fabric or geogrid should not exceed 1½ inches.

Further evaluation of the need and recommendations for subgrade stabilization can be provided during construction as the geotechnical conditions are exposed.

Fill Material Types

Fill required to achieve design grade should be classified as Structural Fill and General Fill. Structural Fill is material used below or within 10 feet of structures or constructed slopes. General Fill is material used to achieve grade outside of these areas.

Reuse of On-Site Granular Soil: Excavated on-site soil may be selectively reused as backfill around the tanks where it meets requirements of project specifications.

Excavated on-site soil with fine-grained soils is not suitable for reuse as Structural Fill and should not be placed beneath settlement sensitive structures and within foundation bearing zones. Portions of the on-site soil have an elevated fines content and will be sensitive to moisture conditions (particularly during seasonally wet periods) and may not be suitable for reuse when above optimum moisture content.

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than 4 inches in size. Pea gravel or other similar noncementitious, poorly graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer. Fill material should meet the following requirements:

Fill Type[1]	**Application**	**Requirements**		
		Gradation		**Plasticity**
		Size	**Percent finer by weight**	
Structural Fill[2]	Below foundations, concrete slabs, or other structural areas, and within 5 feet of the building perimeter	4 inch No. 4 Sieve No. 200 Sieve	100 25–60 < 8 max	Liquid Limit 20 max Plasticity Index 5 max
Stabilization Fill[2]	Fill used to stabilize soft, potentially pumping subgrade	4 inch No. 200 Sieve	100 5 max	--
On-Site Fill	General Fill unless it can meet Structural Fill requirements	4 inch No. 200 Sieve	100 < 35	Liquid Limit 35 max Plasticity Index 15 max
On-Grade Slab Base Course	Immediately below on-grade slabs	In accordance with American Concrete Institute (ACI) 302.1R-15 and 360R-10		

1. All fill should consist of approved materials that are free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the geotechnical engineer for evaluation.
2. Crushed angular rock with more than 50 percent with two fractured faces as per ASTM D 5821.

Fill Placement and Compaction Requirements

Structural and General Fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e., jumping jack or plate compactor) is used	Same as Structural Fill
Minimum Compaction Requirements[1]	**98% of max** below tank foundations and bottom slab. 95% of max above foundations (backfill)	92% of max
Water Content Range[1]	Low plasticity cohesive: -2% to +3% of optimum Granular: -3% to +3% of optimum	As required to achieve minimum compaction requirements

1. Maximum density and optimum water content as determined by the Modified Proctor test (ASTM D 1557).

Utility Trench Backfill

Any soft or unsuitable materials encountered at the bottom of utility trench excavations should be removed and replaced with Structural Fill or bedding material in accordance with public works specifications for the utility to be supported. This recommendation is particularly applicable to utility work requiring grade control and/or in areas where subsequent grade raising could cause settlement in the subgrade supporting the utility. Trench excavation should not be conducted below a downward 1:1 projection from existing foundations without engineering review of shoring requirements and geotechnical observation during construction.

On-site materials are considered suitable for backfill of utility and pipe trenches from 1 foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances and meets requirements of project specifications.

Trench backfill should be mechanically placed and compacted as discussed earlier in this report. Compaction of initial lifts should be accomplished with hand-operated tampers or other lightweight compactors. Where trenches are placed beneath slabs or footings, the backfill should satisfy the gradation requirements of engineered fill discussed in this report. Flooding or jetting for placement and compaction of backfill is not recommended.

Grading and Drainage

All grades must provide effective drainage away from the building during and after construction and should be maintained throughout the life of the structure. Water retained next to the building can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential slab and/or foundation movements, cracked slabs and walls, and roof leaks.

Exposed ground should be sloped and maintained at a minimum of 5% away from the tank structures for at least 10 feet beyond the perimeter of the tank structure. After building construction and landscaping have been completed, final grades should be verified to document that effective drainage has been achieved. Grades around the structure should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structure, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations for the proposed structure are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to the construction of grade-supported improvements such as on-grade slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices and in accordance with any applicable local and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety or the contractor's activities; such responsibility shall neither be implied nor inferred.

Excavations or other activities resulting in ground disturbance have the potential to affect adjoining properties and structures. Our scope of services does not include review of available final grading information or consider potential temporary grading performed by the contractor for potential effects such as ground movement beyond the project limits. A preconstruction/precondition survey should be conducted to document nearby property/infrastructure prior to any site development activity. Excavation or ground disturbance activities adjacent to or near property lines should be monitored or instrumented for potential ground movements that could negatively affect adjoining property and/or structures.

Construction Observation and Testing

The earthwork efforts should be observed by the Geotechnical Engineer (or others under their direction). Observation should include documentation of adequate removal of surficial materials (vegetation, topsoil, and pavements), evaluation and remediation of existing fill materials, and proofrolling and mitigation of unsuitable areas delineated by the proofroll.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, as recommended by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. Where not specified by local ordinance, one density and water content test should be performed for every 100 linear feet of compacted utility trench backfill, and a minimum of one test should be performed for every 12 vertical inches of compacted backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated by the Geotechnical Engineer. If unanticipated conditions are observed, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer’s presence into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer’s evaluation of subsurface conditions, including assessing variations and associated design changes.

Shallow Foundations

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations.

Design Parameters — Compressive Loads

Item	Description
Maximum Net Allowable Bearing Pressure[1, 2]	6,000 psf — foundations bearing upon Structural Fill (for tanks)

Item	Description
	2,000 psf – foundations bearing upon Structural Fill (for vaults and structures)
Required Bearing Stratum[3]	24" of Structural Fill extending to undisturbed native soils
Ultimate Passive Resistance[4] **(equivalent fluid pressures)**	480 pcf (granular backfill — unsaturated) 310 pcf (granular backfill — saturated)
Sliding Resistance[5]	0.45 allowable coefficient of friction — granular material
Estimated Total Settlement From Structural Loads[2]	Less than about 1/4 inch (East Tank with existing fill) Less than about 1/2 inch (West Tank with use of surcharge) Less than 1 inch (vaults and structures)
Estimated Differential Settlement[2, 7]	About 1/2 of total settlement

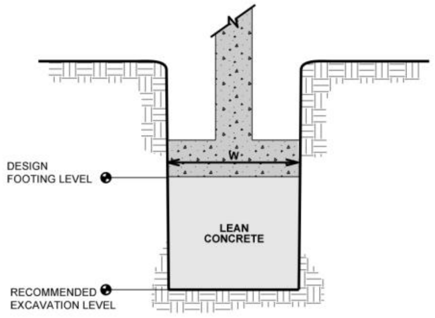
1. The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation.
2. Values provided are for maximum loads noted in **Project Description**. Additional geotechnical consultation will be necessary if higher loads are anticipated.
3. Unsuitable or soft soils should be overexcavated and replaced per the recommendations presented in **Earthwork**.
4. Use of passive earth pressures requires the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed and compacted Structural Fill be placed against the vertical footing face. Assumes no hydrostatic pressure.
5. Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Frictional resistance for granular materials is dependent on the bearing pressure, which may vary due to load combinations. For fine-grained materials, lateral resistance using cohesion should not exceed ½ the dead load.
6. Differential settlements are noted for equivalent-loaded foundations and bearing elevation as measured over a span of 50 feet.

Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the observation of the Geotechnical Engineer. The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

Sensitive soils exposed at the surface of footing excavations may require surficial compaction with handheld dynamic compaction equipment prior to placing Structural Fill, steel, and/or concrete. Should surficial compaction not be adequate, construction of a working surface consisting of either crushed stone or a lean concrete mud mat may be required prior to the placement of reinforcing steel and construction of foundations.

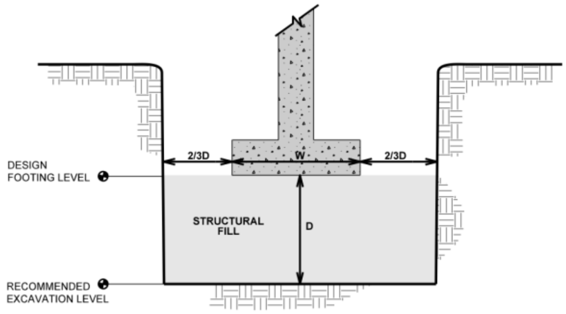
If unsuitable bearing soils are observed at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils; the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. The lean concrete replacement zone is illustrated in the sketch below.



LEAN CONCRETE BACKFILL

NOTE: EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

Overexcavation for Structural Fill placement below footings should be conducted as shown below. The overexcavation should be backfilled up to the footing base elevation, with well graded gravel placed, as recommended in the **Earthwork** section.



OVER-EXCAVATION / BACKFILL ZONE

NOTE: EXCAVATIONS ARE SHOWN VERTICAL; HOWEVER, THE SIDEWALLS SHOULD BE SLOPED AS NECESSARY FOR SAFETY

Tank Bottom Slab

Design parameters for tank bottom slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the tank slab. As described previously, tank slabs should supported on at least 3 feet of compacted Structural Fill.

On-Grade Slab Design Parameters

Item	Description
Slab Support[1]	Use 4 inches base course meeting material specifications of ACI 302, placed on minimum 3 feet of compacted Structural Fill extending to native soils. Subgrade compacted to recommendations in **Earthwork**
Estimated Modulus of Subgrade Reaction[2]	400 pounds per square inch per inch (psi/in.) for point loads

1. Modulus of subgrade reaction is an estimated value based on our experience with the subgrade condition, the requirements noted in **Earthwork**, and the slab support as noted in this table. It is provided for point loads. For large area loads, the modulus of subgrade reaction would be lower.

Slab Construction Considerations

Finished tank subgrade should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until tank slabs are constructed. If the subgrade should become damaged or desiccated prior to the construction of slabs, the affected material should be removed, and Structural Fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the slab support course.

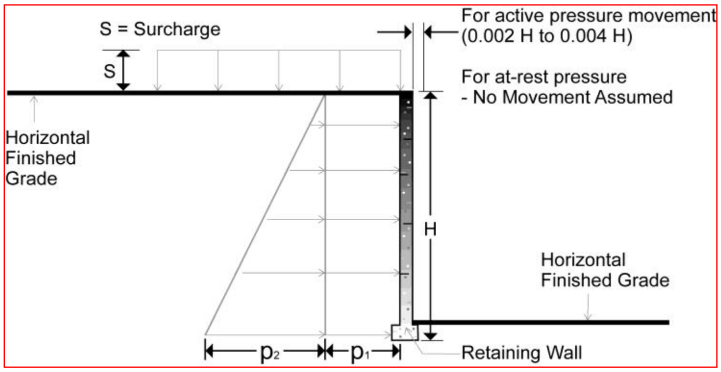
The Geotechnical Engineer should observe the condition of the tank slab subgrades immediately prior to placement of the slab support course, reinforcing steel, and concrete.

Lateral Earth Pressures

Design Parameters

Tank walls should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by the structural design of the walls, conditions of wall restraint, methods of construction and/or compaction, and the strength of the materials being restrained.

Two wall restraint conditions are shown in the diagram below – active and at-rest. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. This condition may exist if the tank walls are backfilled before construction of the tank top. The "at-rest" condition assumes no wall movement and would be the condition if the tank walls are backfilled after construction of the tank top. Note that the recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



Lateral Earth Pressure Design Parameters

Earth Pressure Condition[1]	Coefficient for Backfill Type[2]	Surcharge Pressure[3] p_1 (psf)	Equivalent Fluid Pressures (psf)[2,4]	
			Unsaturated[5]	Submerged[5]
Active (K_a)	Granular — 0.27	(0.27)S	(35)H	(80)H
At-Rest (K_o)	Granular — 0.43	(0.43)S	(55)H	(90)H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 *H* to 0.004 *H*, where *H* is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance. Fat clay or other expansive soils should not be used as backfill behind the wall.
2. Uniform, horizontal backfill, with a maximum unit weight of 115 pcf for cohesive soils and 130 pcf for granular soils.
3. Uniform surcharge, where *S* is surcharge pressure.

Lateral Earth Pressure Design Parameters

Earth Pressure Condition[1]	Coefficient for Backfill Type[2]	Surcharge Pressure[3] p_1 (psf)	Equivalent Fluid Pressures (psf)[2,4]	
			Unsaturated[5]	Submerged[5]

4. Loading from heavy compaction equipment is not included.
5. To achieve "Unsaturated" conditions, follow guidelines in **Subsurface Drainage for Below-Grade Walls** below. "Submerged" conditions are recommended when drainage behind walls is not incorporated into the design.

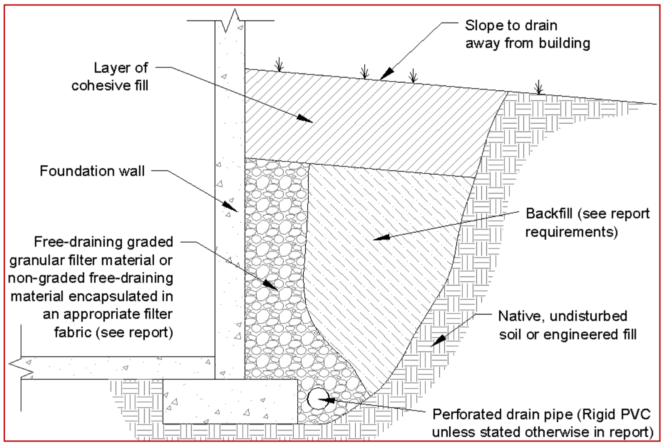
Backfill placed against structures should consist of granular soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 degrees from vertical for the active case.

Loads bearing on backfill behind the tank walls may have a significant influence on the lateral earth pressure. Placing footings within wall backfill and in the zone of active soil influence on the wall should be avoided unless structural analyses indicate the wall can safely withstand the increased pressure.

The lateral earth pressure recommendations given in this section are applicable to the design of rigid retaining walls subject to slight rotation, such as cantilever or gravity type concrete walls. These recommendations are not applicable to the design of modular block geogrid reinforced backfill walls (also termed MSE walls). Recommendations covering these types of wall systems are beyond the scope of services for this project.

Subsurface Drainage for Below-Grade Walls

A perforated rigid plastic drain line installed behind the base of walls and extending below adjacent grade is recommended to prevent hydrostatic loading on the walls. The invert of a drain line around a below-grade building area or exterior retaining wall should be placed near foundation bearing level. The drain line should be sloped to provide positive gravity drainage to daylight or to a sump pit and pump. The drain line should be surrounded by clean, free-draining granular material having less than 5% passing the No. 200 sieve, such as No. 57 aggregate. The free-draining aggregate should be encapsulated in a filter fabric. The granular fill should extend to within 2 feet of final grade, where it should be capped with compacted cohesive fill to reduce infiltration of surface water into the drain system.



As an alternative to free-draining granular fill, a prefabricated drainage structure may be used. A prefabricated drainage structure is a plastic drainage core or mesh that is covered with filter fabric to prevent soil intrusion and is fastened to the wall prior to placing backfill.

General Comments

Our analysis and opinions are based on our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, or bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or hazardous conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly affect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others.

Construction and site development have the potential to affect adjacent properties. Such impacts can include damage due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, and noise or air quality concerns. Evaluation of these items on nearby properties is commonly associated with contractor means and methods and is not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of the surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Figures

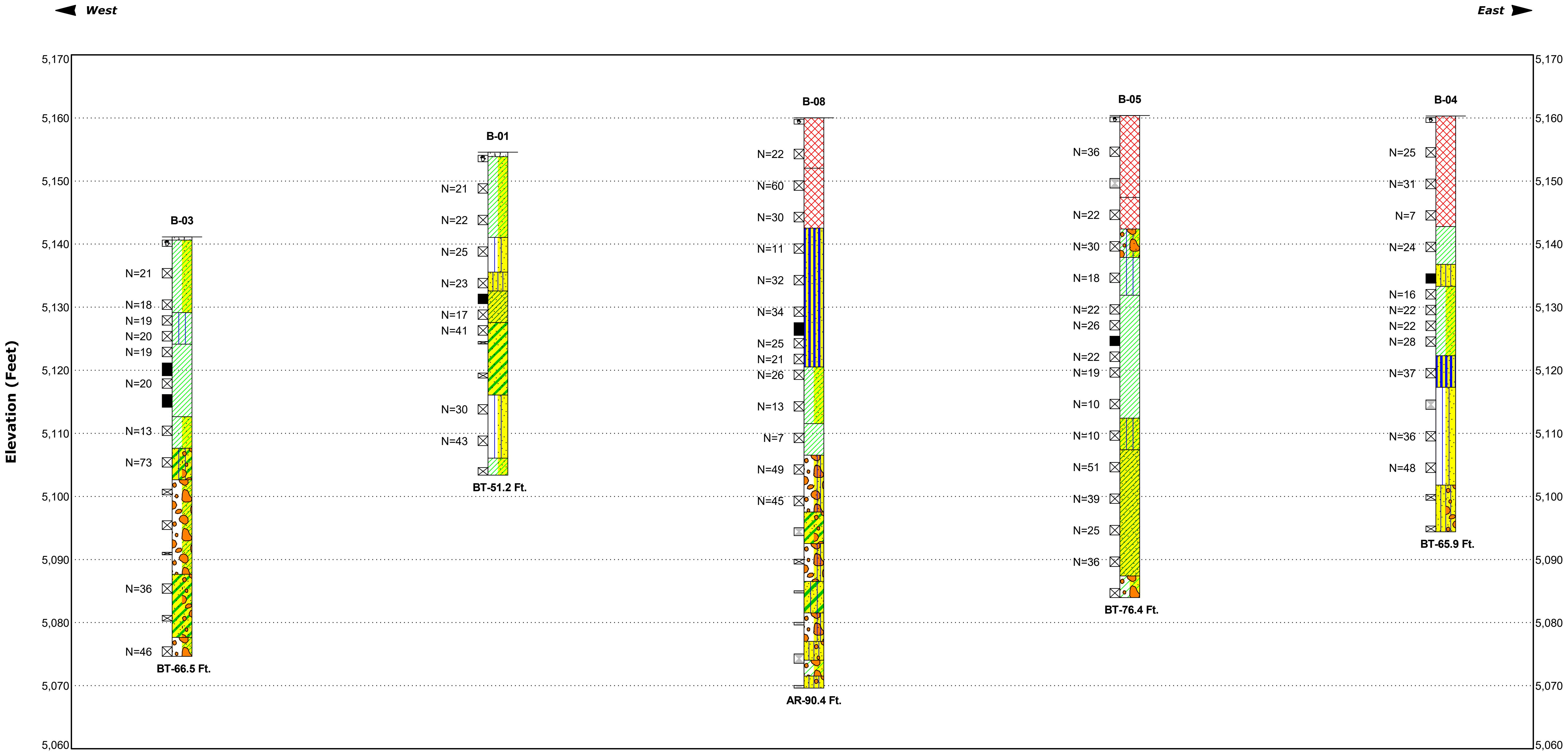
Contents:

Jacobs - 118th South Water Tanks
11800 South and U-111 | Herriman, Utah
Terracon Project No. 61225118

Subsurface Profile

East Tank

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT



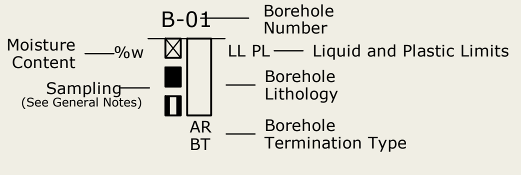
Notes

See Exploration Plan for orientation of soil profile.
See General Notes in Supporting Information for symbols and soil classifications.
Soils profile provided for illustration purposes only.
Soils between borings may differ
AR - Auger Refusal
BT - Boring Termination

Water Level Observations

▽ Water Level Reading at time of drilling.
Water Level Reading after drilling.

Explanation



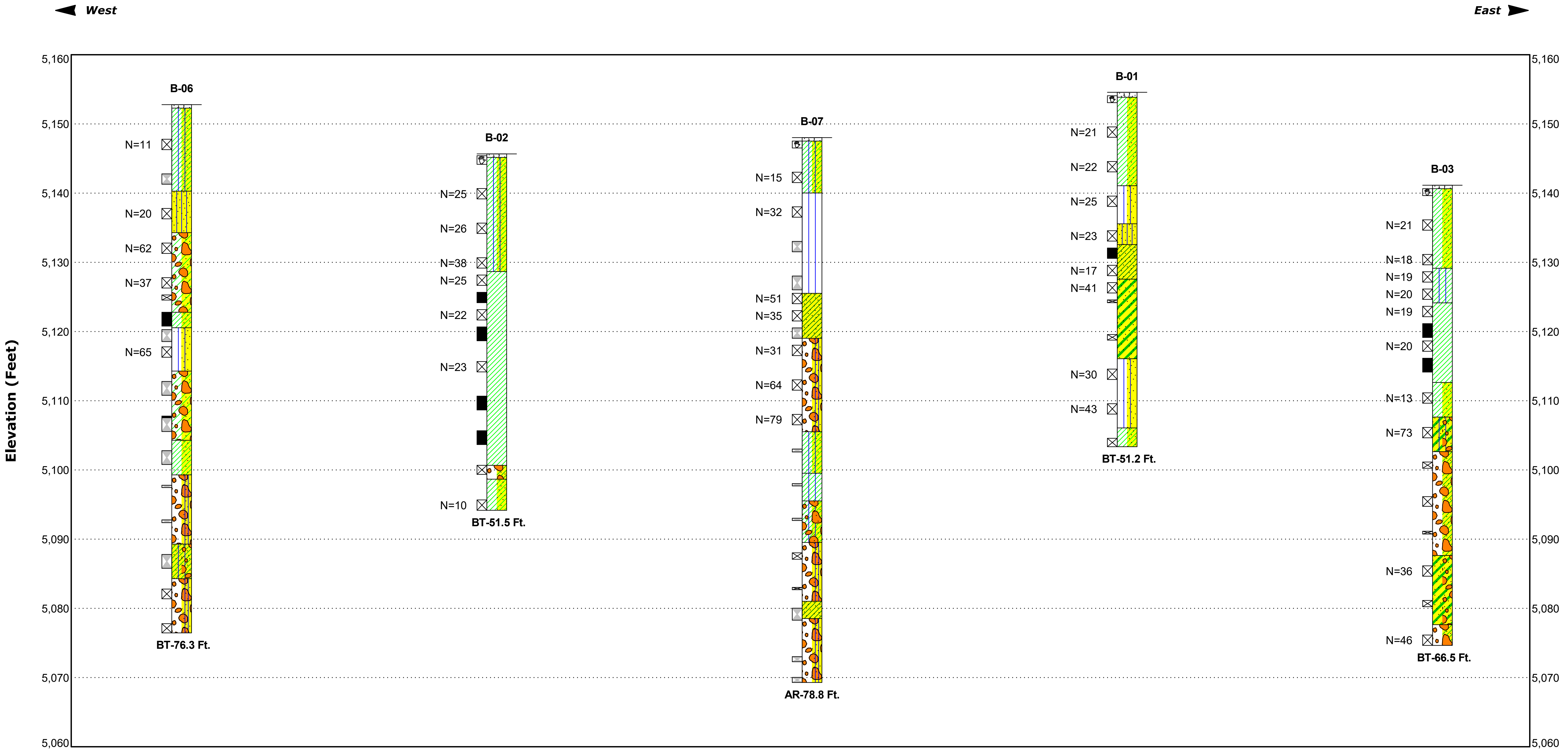
Material Legend

- Topsoil
- Lean Clay with Sand
- Silt with Sand
- Silty Sand
- Sandy Lean Clay
- Clayey Sand
- Silty Clay
- Lean Clay
- Silty Clayey Sand with Gravel
- Poorly-graded Gravel with Clay and Sand

Subsurface Profile

West Tank

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT



Notes

See Exploration Plan for orientation of soil profile.
See General Notes in Supporting Information for symbols and soil classifications.
Soils profile provided for illustration purposes only.
Soils between borings may differ
AR - Auger Refusal
BT - Boring Termination

Water Level Observations

∇ Water Level Reading at time of drilling.

Water Level Reading after drilling.

Explanation

B-01 — Borehole Number
Moisture Content — %w
LL PL — Liquid and Plastic Limits
Sampling (See General Notes)
Borehole Lithology
AR BT — Borehole Termination Type

Material Legend

▨	Topsoil
▨	Lean Clay with Sand
▨	Silt with Sand
▨	Silty Sand
▨	Sandy Lean Clay
▨	Clayey Sand
▨	Silty Clay with Sand
▨	Lean Clay
▨	Poorly-graded Gravel with Clay and Sand
▨	Silty Clay

Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
2	50	Tank Walls
2	65	Tank Walls +15 feet of cover
2	75	Tank Walls + 20 feet of cover
1	95	Tank Interior (Western Tank)
1	110	Tank Interior + 20 feet of cover (Eastern Tank)

Boring Layout and Elevations: Terracon personnel provided the boring layout using handheld GPS equipment (estimated horizontal accuracy of about ±10 feet) and referencing existing site features. Approximate ground surface elevations were estimated using Google Earth. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a truck-mounted rotary drill rig using continuous flight hollow-stem augers. Four samples were obtained in the soils near the foundation elevations of each boring and at intervals of 5 feet thereafter. In the thin-walled tube sampling procedure, a thin-walled, seamless steel tube with a sharp cutting edge was pushed hydraulically into the soil to obtain a relatively undisturbed sample. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as *N*-values, are indicated in the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring-lined sampler was used for sampling. Ring-lined, split-barrel sampling procedures are similar to standard split-spoon sampling procedures; however, blow counts are typically recorded at 6-inch intervals for a total of 12 inches of penetration. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion.

We also observed the boreholes while drilling and at the completion of drilling for the presence of groundwater. Groundwater was not observed at these times in the boreholes.

The sampling depths, penetration distances, and other sampling information were recorded in the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials observed during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Geophysical Survey: Terracon subcontracted with Intermountain GeoEnvironmental Services, Inc. to perform a series of shear wave velocity surveys using the Multichannel Analysis of Surface Waves (MASW) technique at the site. A dispersion curve is calculated from the data that shows the phase velocity of the surface wave as a function of frequency or wavelength. A shear wave velocity depth profile is then modeled from the dispersion curves and the shear wave velocity profile of the shallow subsurface is reported (V_{S100}).

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests. The laboratory testing program included the following types of tests:

- Moisture Content
- Dry Unit Weight
- Consolidation
- Unconsolidated-Undrained Triaxial Compression
- Grain Sieve
- Atterberg Limits
- Chemical Analyses — pH, Sulfates, Chloride Ion, Total Salts, Electrical Resistivity

The laboratory testing program often included examination of soil samples by an engineer. Based on the results of our field and laboratory programs, we described and classified the soil samples in accordance with the Unified Soil Classification System.

Site Location and Exploration Plans

Contents:

Note: All attachments are one page unless noted above.

Site Location

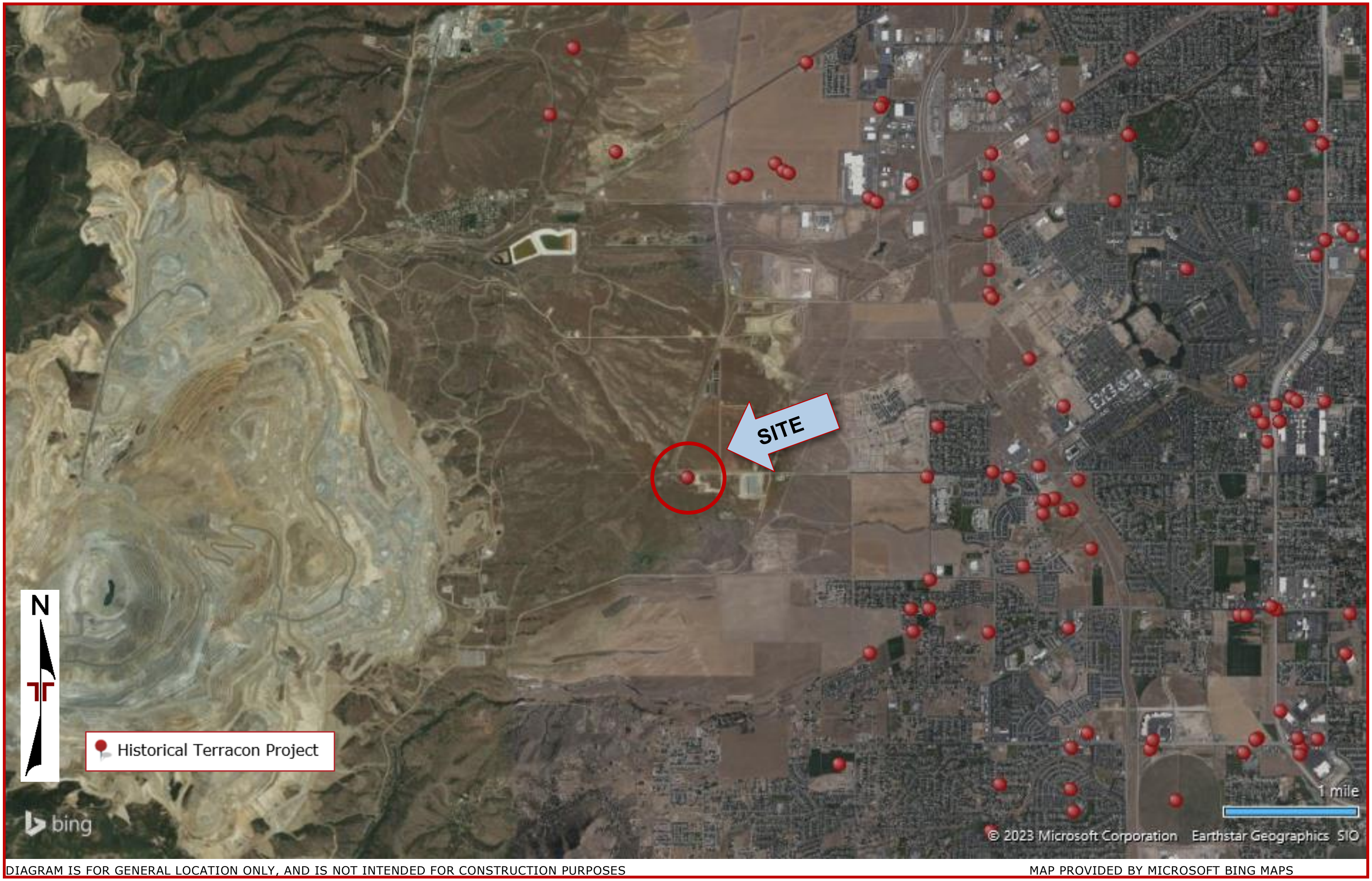


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Exploration Plan

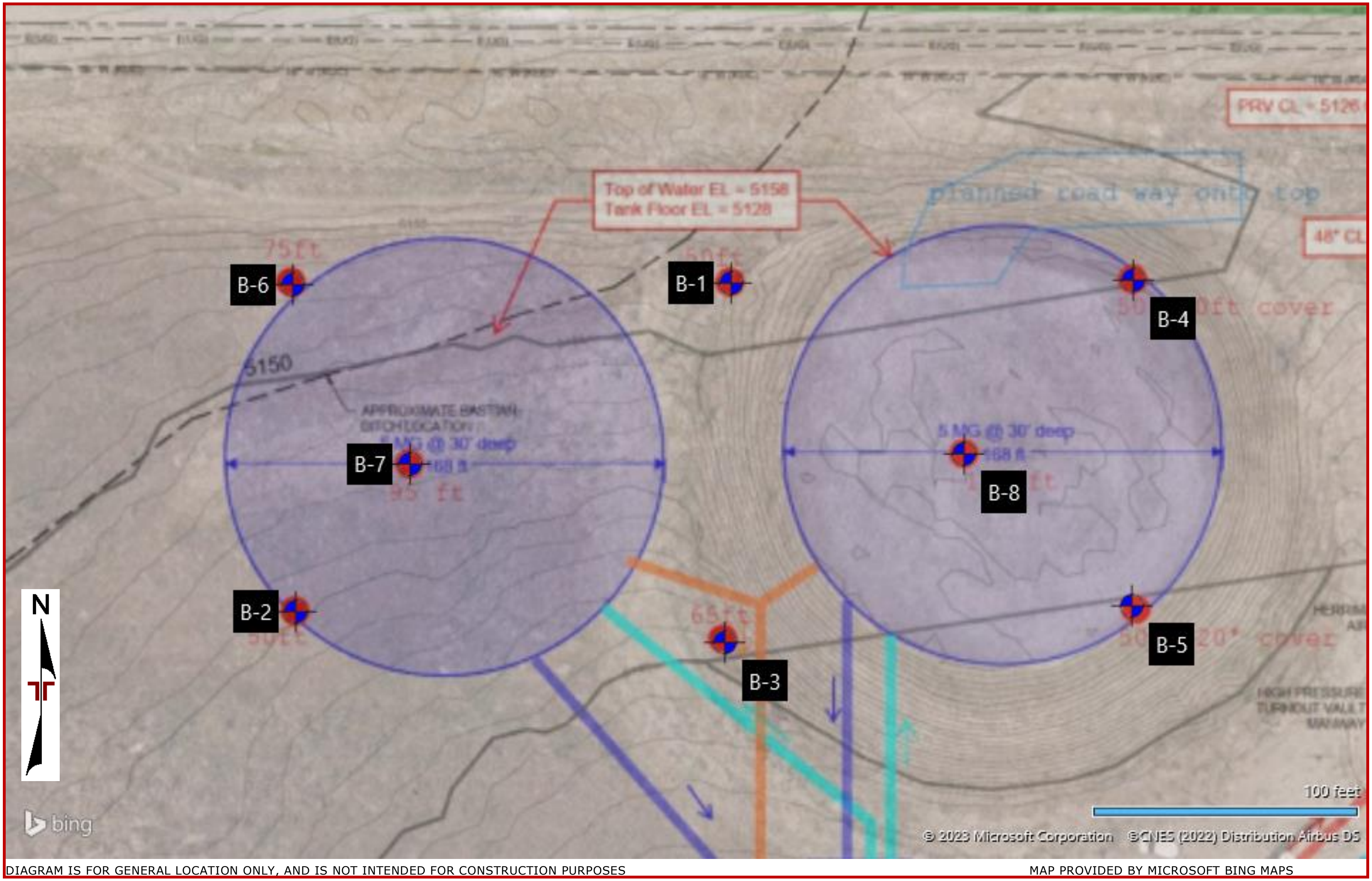


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

Geologic Map

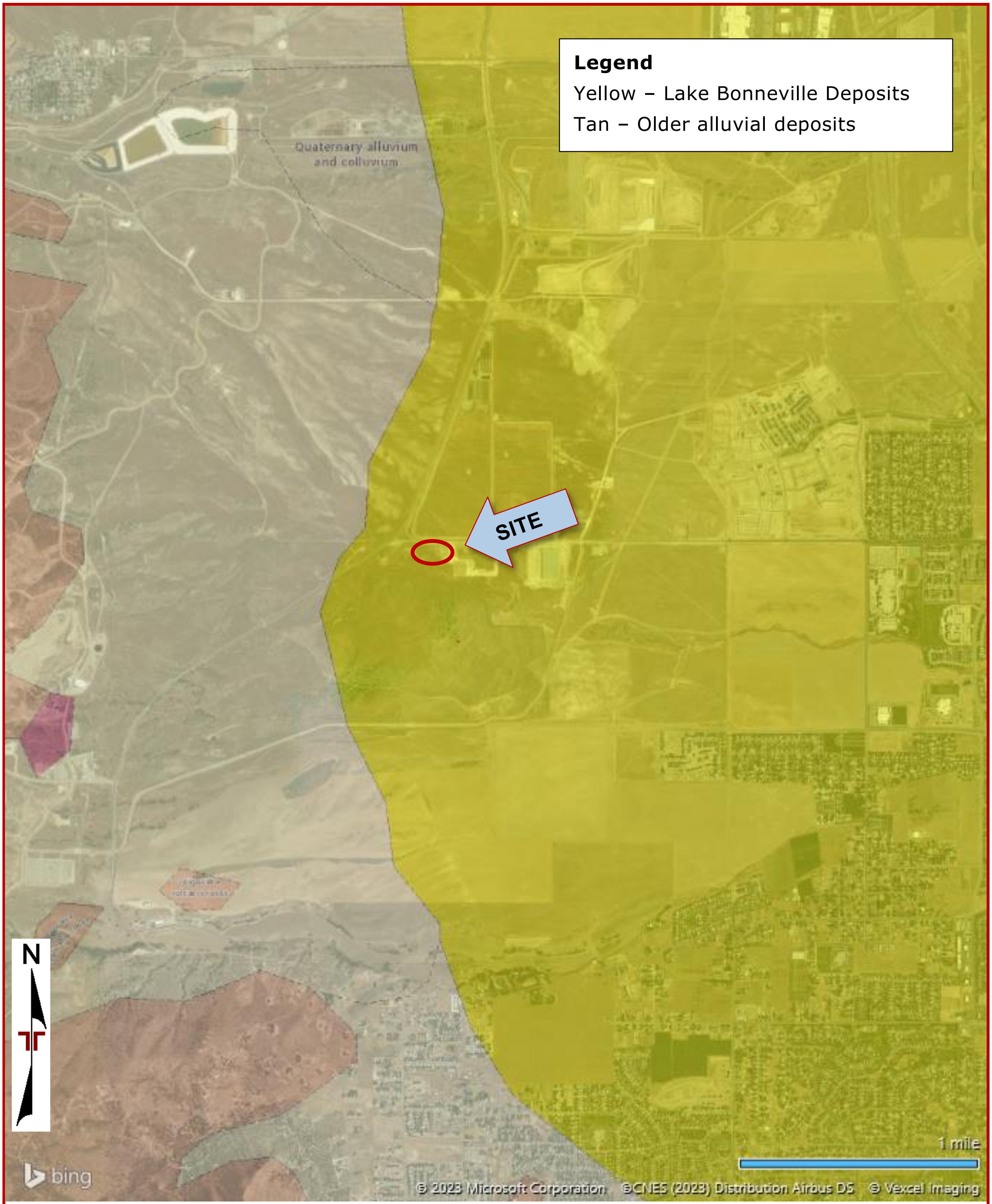


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES MAP PROVIDED BY MICROSOFT BING MAPS

Exploration and Laboratory Results

Contents:

Note: All attachments are one page unless noted above.

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-01

Location: See Exploration Plan

Latitude: 40.5367° Longitude: -112.0670°

Depth (Ft.)	Description	Elevation.: 5154.5668 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.7	**TOPSOIL**	5153.87									
	LEAN CLAY WITH SAND (CL), light brown, very stiff				✋			16.3		26-17-9	76
			5		☒	4	7-10-11 N=21	16.3			
			10		☒	7	5-10-12 N=22	15.6			
13.5		5141.07									
	SILT WITH SAND (ML), light brown, very stiff		15		☒	11	7-12-13 N=25	13.8			
19.0		5135.57									
	SILTY SAND (SM), light brown, medium dense		20		☒	7	9-11-12 N=23				
22.0		5132.57									
	SANDY LEAN CLAY (CL), light brown to brown, very stiff, trace pinholes				■	20		21.3	97	34-15-19	70
			25		☒	22	5-7-10 N=17	22.5			
27.0		5127.57									
	CLAYEY SAND (SC), trace gravel and cobbles, brown, dense to very dense				☒	20	6-20-21 N=41	13.3		32-16-16	47
			30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes
Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-24-2023

Boring Completed
01-24-2023

Jacobs - 118th South Water Tanks
11800 South and U-111 | Herriman, Utah
Terracon Project No. 61225118

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-01

Location: See Exploration Plan

Latitude: 40.5367° Longitude: -112.0670°

Depth (Ft.) Elevation.: 5154.5668 (Ft.)

Depth (Ft.)	Material Description	Elevation (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	CLAYEY SAND (SC), trace gravel and cobbles, brown, dense to very dense *(continued)*				☒	0	50/5"				
			35		☒	6	41-50/4"	5.6			
38.5		5116.07									
	SILT WITH SAND (ML), brown, very stiff to hard, trace pinholes		40		☒	10	8-14-16 N=30	19.4			
			45		☒	10	12-20-23 N=43	22.0		NP	85
48.5		5106.07									
	LEAN CLAY WITH SAND (CL), trace gravel, brown, hard		50		☒	15	1-27-50/2"	20.3			
51.2		5103.37									
	Boring Terminated at 51.2 Feet										

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-24-2023

Boring Completed
01-24-2023

Jacobs - 118th South Water Tanks
11800 South and U-111 | Herriman, Utah
Terracon Project No. 61225118

6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-02

Location: See Exploration Plan

Latitude: 40.5363° Longitude: -112.0676°

Graphic Log	Depth (Ft.) / Description / Elevation.: 5145.665 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	0.5 **TOPSOIL** 5145.17									
▨	**SILTY CLAY WITH SAND (CL-ML)**, light brown, very stiff to hard			✋			15.1		23-18-5	72
▨	- trace gravel	5		☒	7	6-11-14 N=25	9.2			
▨		10		☒	6	7-13-13 N=26	8.7			
▨		15		☒	7	8-16-22 N=38	10.4			
▨	17.0 5128.67									
▨	**LEAN CLAY (CL)**, light gray, very stiff, oxidation stains			☒	10	9-11-14 N=25	16.6			
▨		20		■	18		20.5		34-19-15	93
▨				☒	13	6-10-12 N=22	33.7			
▨		25		■	25		24.4	87	37-20-17	93
		30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-24-2023

Boring Completed
01-24-2023

Boring Log No. B-02

Graphic Log	Location: See Exploration Plan Latitude: 40.5363° Longitude: -112.0676° Depth (Ft.) Elevation.: 5145.665 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	**LEAN CLAY (CL)**, light gray, very stiff, oxidation stains *(continued)*			☒	13	6-10-13 N=23	19.4			
▨		35		■	23		31.0		36-20-16	92
▨		40		■	24		25.5	100		
▨	45.0 5100.67 **POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC)**, brown, very dense	45		☒	10	9-12-50/4"	10.5			
▨	47.0 5098.67 **LEAN CLAY WITH SAND (CL)**, trace gravel, brown, stiff									
▨		50		☒	18	2-4-6 N=10	23.8		33-19-14	79
	51.5 5094.17 ***Boring Terminated at 51.5 Feet***									

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-24-2023

Boring Completed
01-24-2023

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-03

Location: See Exploration Plan

Latitude: 40.5363° Longitude: -112.0670°

Depth (Ft.)		Elevation.: 5141.1474 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.5	**TOPSOIL**	5140.65									
	LEAN CLAY WITH SAND (CL), light brown, very stiff				✋						
			5		☒	6	3-8-13 N=21	14.2			
			10		☒	9	4-8-10 N=18	12.9			
12.0		5129.15									
	SILTY CLAY (CL-ML), light brown, very stiff				☒	7	7-8-11 N=19	17.5			
			15		☒	13	6-9-11 N=20	21.0			
17.0		5124.15									
	LEAN CLAY (CL), light brown, very stiff				☒	13	5-8-11 N=19	20.3			
			20		■	23		21.3	92	33-19-14	88
	- silty sand lenses				☒	14	5-9-11 N=20	19.1		30-19-11	90
			25		■	23		23.3			
28.5		5112.65									
	LEAN CLAY WITH SAND (CL), light brown, stiff		30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-25-2023

Boring Completed
01-25-2023

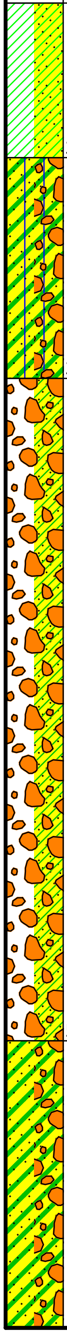
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-03

Location: See Exploration Plan

Latitude: 40.5363° Longitude: -112.0670°

Depth (Ft.) Elevation.: 5141.1474 (Ft.)



LEAN CLAY WITH SAND (CL), light brown, stiff *(continued)*

33.5 5107.65

SILTY CLAYEY SAND WITH GRAVEL (SC-SM), light brown, very dense

38.5 5102.65

POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), light brown to brown, very dense

53.5 5087.65

CLAYEY SAND WITH GRAVEL (SC), light brown to brown, dense to very dense

- 4 inch cobbles

Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
		☒	17	5-7-6 N=13	28.3		35-20-15	83
35		☒	7	16-37-36 N=73	9.1			
40		☒	7	39-50/5"				
45		☒	7	28-36-50/5"	5.7			
50		☒	5	50/5"				
55		☒	10	11-16-20 N=36	9.8		26-16-10	33
60								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes
Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-25-2023

Boring Completed
01-25-2023

Boring Log No. B-03

Graphic Log	Location: See Exploration Plan Latitude: 40.5363° Longitude: -112.0670° Depth (Ft.) Elevation.: 5141.1474 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	**CLAYEY SAND WITH GRAVEL (SC)**, light brown to brown, dense to very dense *(continued)*			☒	7	33-50/5"				
	63.5 5077.65									
▨	**POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC)**, light brown to brown, dense	65		☒	10	34-16-30 N=46	8.1			
	66.5 5074.65									
	Boring Terminated at 66.5 Feet									

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-25-2023

Boring Completed
01-25-2023

Notes

Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Boring Log No. B-04

Location: See Exploration Plan

Latitude: 40.5366° Longitude: -112.0665°

Elevation.: 5160.2975 (Ft.)

Graphic Log	Depth (Ft.)	Description	Elevation (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨		**FILL - SILTY CLAYEY SAND WITH GRAVEL (SC-SM)**, brown to dark brown, loose to dense				✋			10.2		24-17-7	48
				5		☒	7	3-14-11 N=25				
		- cobbles 4" - 6"										
		- more clay		10		☒	14	13-14-17 N=31				
				15		☒	3	3-3-4 N=7	8.2			
▨	17.5	**LEAN CLAY (CL)**, light brown to brown, medium stiff to very stiff	5142.8									
				20		☒	6	6-10-14 N=24	12.5			
▨	23.5	**SILTY SAND (SM)**, light brown	5136.8									
				25		■			8.3			
▨	27.0	**LEAN CLAY WITH SAND (CL)**, light brown, very stiff	5133.3									
						☒	7	7-7-9 N=16				
				30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes
Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-25-2023

Boring Completed
01-25-2023

Boring Log No. B-04

Graphic Log	Location: See Exploration Plan Latitude: 40.5366° Longitude: -112.0665° Depth (Ft.) Elevation.: 5160.2975 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	LEAN CLAY WITH SAND (CL), light brown, very stiff *(continued)*			☒	9	6-11-11 N=22				
				☒	10	5-10-12 N=22	14.3		29-18-11	79
		35		☒	10	5-12-16 N=28	17.5			
	38.0 5122.3									
	SANDY SILT (ML), trace gravel, light brown, hard									
		40		☒	12	7-13-24 N=37	9.7			
	43.0 5117.3									
	SILT WITH SAND (ML), light brown, hard									
		45		⧗	16	20-29-33	21.8		NP	76
	- trace pinholes	50		☒	11	9-14-22 N=36	18.7			
		55		☒	13	13-21-27 N=48	16.8			
	58.5 5101.8									
	SILTY SAND WITH GRAVEL (SM), light brown, very dense									
		60								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-25-2023

Boring Completed
01-25-2023

Boring Log No. B-04

Graphic Log	Location: See Exploration Plan Latitude: 40.5366° Longitude: -112.0665° Depth (Ft.) Elevation.: 5160.2975 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	**SILTY SAND WITH GRAVEL (SM)**, light brown, very dense *(continued)*			☒	8	40-50/5"	8.0		NP	40
		65		☒	11	29-50/5"	4.1			
	65.9 5094.4									
	Boring Terminated at 65.9 Feet									

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes
Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-25-2023

Boring Completed
01-25-2023

Jacobs - 118th South Water Tanks
11800 South and U-111 | Herriman, Utah
Terracon Project No. 61225118

6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-05

Location: See Exploration Plan

Latitude: 40.5362° Longitude: -112.0665°

Depth (Ft.) Elevation.: 5160.3966 (Ft.)

Graphic Log	Description	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	**FILL - SILTY CLAYEY SAND WITH GRAVEL (SC-SM)**, brown to dark brown, dense			✋						
▨		5		☒	8	11-17-19 N=36				
▨		10		⧗	14	5-22-43	6.6	106		
▨	13.0 5147.4									
▨	**FILL - SANDY LEAN CLAY WITH GRAVEL (CL)**, brown to dark brown, very stiff									
▨		15		☒	10	3-6-16 N=22				
▨	18.0 5142.4									
▨	**GRAVELLY SILTY CLAY WITH SAND (CL-ML)**, dark brown, very stiff to hard									
▨		20		☒	12	9-15-15 N=30	10.8			
▨	22.5 5137.9									
▨	**SILTY CLAY (CL-ML)**, light brown, very stiff									
▨		25		☒	12	4-7-11 N=18	12.2			
▨	28.5 5131.9									
▨	**LEAN CLAY (CL)**, light brown to gray, stiff to very stiff, oxidation stains	30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Notes

Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-26-2023

Boring Completed
01-26-2023

Boring Log No. B-05

Graphic Log	Location: See Exploration Plan Latitude: 40.5362° Longitude: -112.0665° Depth (Ft.) Elevation.: 5160.3966 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	**LEAN CLAY (CL)**, light brown to gray, stiff to very stiff, oxidation stains *(continued)*			☒	17	4-8-14 N=22	23.6			
▨				☒	15	6-11-15 N=26	19.2		30-19-11	92
▨	- pinholes	35		■	18	PP = 5.0 tsf	20.7			
▨				☒	13	7-9-13 N=22	20.3			
▨		40		☒	18	5-8-11 N=19	24.6			
▨		45		☒	18	5-5-5 N=10	25.7		34-19-15	89
▨	48.0 5112.4									
▨	**SANDY SILTY CLAY (CL-ML)**, gray, stiff, oxidation stains									
▨		50		☒	17	3-3-7 N=10	24.6			
▨	53.0 5107.4									
▨	**SANDY LEAN CLAY (CL)**, gray to brown, very stiff to hard									
▨		55		☒	11	3-21-30 N=51	20.1			
		60								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-26-2023

Boring Completed
01-26-2023

Boring Log No. B-05

Graphic Log	Location: See Exploration Plan Latitude: 40.5362° Longitude: -112.0665° Depth (Ft.) Elevation.: 5160.3966 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	**SANDY LEAN CLAY (CL)**, gray to brown, very stiff to hard *(continued)*			☒	15	1-10-29 N=39	18.0		32-18-14	70
▨		65		☒	6	7-10-15 N=25				
▨		70		☒	9	11-17-19 N=36	9.2			
▨	73.0 5087.4									
▨	**CLAYEY GRAVEL WITH SAND (GC)**, trace cobbles, gray to brown, very dense									
▨		75		☒	7	29-38-50/5"				
▨	76.4 5083.98									
	Boring Terminated at 76.42 Feet									

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
LL

Boring Started
01-26-2023

Boring Completed
01-26-2023

6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-06

Location: See Exploration Plan

Latitude: 40.5366° Longitude: -112.0676°

Elevation.: 5152.792 (Ft.)

Depth (Ft.)	Material Description	Elevation (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.5	**TOPSOIL**	5152.29									
	SILTY CLAY WITH SAND (CL-ML), tan, stiff to very stiff, oxidation stains										
			5		☒	7	3-5-6 N=11	11.1			
	- cementation		10		⧗	14	8-14-15 PP = 3.0 tsf	12.9			
12.5	**SILTY SAND (SM)**, trace gravel, tan to brown, medium dense, oxidation stains	5140.29									
			15		☒	16	5-8-12 N=20	7.8			
18.5	**CLAYEY GRAVEL WITH SAND (GC)**, tan to brown, dense to very dense, oxidation stains, cobbles	5134.29									
			20		☒	12	13-27-35 N=62				
	- trace clay, cementation, cobbles		25		☒	10	19-22-15 N=37	7.1		25-17-8	31
	- absence of clay				☒	8	46-50/3"	3.2			
30.0		5122.79	30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-31-2023

Boring Completed
01-31-2023

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-06

Location: See Exploration Plan

Latitude: 40.5366° Longitude: -112.0676°

Depth (Ft.)	Description	Elevation.: 5152.792 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	LEAN CLAY WITH SAND (CL), trace gravel, tannish brown, oxidation stains, pinholes					20		28.6		38-18-20	80
32.3	**SILT WITH SAND (ML)**, tannish brown, hard	5120.54				19	12-27-48-70/3" PP = 3.5 tsf	24.5		NP	73
	- absence of pinholes and gravel		35			14	16-29-36 N=65	19.8			
38.5	**CLAYEY GRAVEL WITH SAND (GC)**, brown, medium dense to very dense, oxidation stains	5114.29	40			22	1-6-10-15 PP = 3.0 tsf	24.9	86		
	- cobbles, white mineralization crystals		45			0					
						18	45-24-21-28	11.1	98		
48.5	**LEAN CLAY WITH SAND (CL)**, trace gravel, brown, very stiff, oxidation stains	5104.29	50			20	4-12-23-33	11.4	104	27-15-12	73
53.5	**POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM)**, trace clay, brown, very dense, oxidation stains, cementation, cobbles	5099.29	55			3	70/4"				
			60								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-31-2023

Boring Completed
01-31-2023

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-06

Location: See Exploration Plan

Latitude: 40.5366° Longitude: -112.0676°

Graphic Log	Depth (Ft.) / Elevation.: 5152.792 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), trace clay, brown, very dense, oxidation stains, cementation, cobbles *(continued)*				0	70/5"				
	63.5 — 5089.29									
	SANDY SILTY CLAY WITH GRAVEL (CL-ML), dark brown, hard, cementation	65			21	10-42-29-30 PP = 2.5 tsf	25.4	94		
	68.5 — 5084.29									
	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), trace clay, brown to gray, very dense, oxidation stains, white mineralization crystals	70			14	31-46-50/5"	6.5			
		75			8	24-42-50/4"	6.1			
	76.3 — 5076.46									
	Boring Terminated at 76.33 Feet									

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-31-2023

Boring Completed
01-31-2023

Boring Log No. B-07

Location: See Exploration Plan

Latitude: 40.5365° Longitude: -112.0675°

Graphic Log	Depth (Ft.)	Elevation.: 5148.0271 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.5 **TOPSOIL**	5147.53									
	SILTY CLAY WITH SAND (CL-ML), tan, stiff to hard				✋						
			5		☒	8	3-6-9 N=15				
	8.0	5140.03									
	SILT (ML), tan, stiff to hard, oxidation stains										
			10		☒	8	7-14-18 N=32				
	- with sand		15		⧗	16	23-28-40	12.1	82		
			20		⧗	18	28-40-49-53	9.8		27-22-5	86
	22.5	5125.53									
	SANDY LEAN CLAY (CL), tan, very stiff to hard, oxidation stains				☒	10	12-22-29 N=51	9.4			
			25		☒	10	10-15-20 N=35	8.9		25-17-8	61
	- cementation				⧗	13	8-13-19	15.9			
	29.0	5119.03									
			30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-31-2023

Boring Completed
02-01-2023

Notes

Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

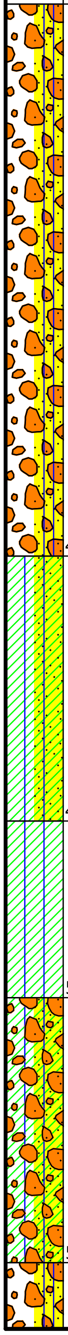
Abandonment Method
Boring backfilled with auger cuttings upon completion.

Boring Log No. B-07

Location: See Exploration Plan

Latitude: 40.5365° Longitude: -112.0675°

Depth (Ft.) Elevation.: 5148.0271 (Ft.)



Depth (Ft.) / Description	Elevation	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), with clay, brown to gray, dense to very dense, oxidation stains, white crystal mineralization *(continued)*				⊠	15	5-13-18 N=31	8.8			
		35		⊠	14	14-23-41 N=64	6.4			
		40		⊠	12	22-34-45 N=79	6.5			
42.5	5105.53									
SILTY CLAY WITH SAND (CL-ML), tan, hard, cementation		45		⧗	4	70/5"	5.4			
48.5	5099.53									
SILTY CLAY (CL-ML), trace sand, tan, hard		50		⧗	4	70/4"	4.6			
52.5	5095.53									
GRAVELLY SILTY CLAY WITH SAND (CL-ML), tan, hard		55		⧗	4	70/4"	5.3			
58.5	5089.53									
POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), trace clay, brown to gray, very dense, oxidation stains		60								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-31-2023

Boring Completed
02-01-2023

Boring Log No. B-07

Location: See Exploration Plan

Latitude: 40.5365° Longitude: -112.0675°

Depth (Ft.)	Description	Elevation.: 5148.0271 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), trace clay, brown to gray, very dense, oxidation stains *(continued)*				☒	5	30-50/5"	4.6			
			65		☒	3	50/4"				
67.0		5081.03									
	SANDY LEAN CLAY (CL), trace gravel, brown, hard, oxidation stains				⧗	24	11-15-28-70/3"	16.4		31-14-17	53
69.5		5078.53									
	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), trace clay, brown, dense to very dense, oxidation stains, cobbles		70								
			75		⧗	8	41-70/3"	8.4			
					⧗	0	50-70/3"				
78.8		5069.28									
	Auger Refusal at 78.75 Feet										

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-31-2023

Boring Completed
02-01-2023

Jacobs - 118th South Water Tanks
11800 South and U-111 | Herriman, Utah
Terracon Project No. 61225118

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-08

Graphic Log	Location: See Exploration Plan Latitude: 40.5365° Longitude: -112.0667° Depth (Ft.) Elevation.: 5160.0337 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
▨	**FILL - SILTY CLAYEY SAND WITH GRAVEL (SC-SM)**, light brown, medium dense			✋						
▨		5		☒	14	6-13-9 N=22				
▨	8.0 5152.03									
▨	**FILL - SILTY SAND WITH GRAVEL (SM)**, light brown, dense to very dense									
▨		10		☒	11	20-31-29 N=60	5.2		19-18-1	22
▨		15		☒	8	7-18-12 N=30				
▨	17.5 5142.53									
▥	**SANDY SILT (ML)**, trace gravel, light brown, stiff to hard									
▥		20		☒	8	4-5-6 N=11	9.7			
▥		25		☒	10	7-13-19 N=32	16.2			
		30								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-26-2023

Boring Completed
01-30-2023

Jacobs - 118th South Water Tanks
11800 South and U-111 | Herriman, Utah
Terracon Project No. 61225118

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-08

Location: See Exploration Plan

Latitude: 40.5365° Longitude: -112.0667°

Elevation.: 5160.0337 (Ft.)

Graphic Log	Depth (Ft.)	Description	Elevation (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
		SANDY SILT (ML), trace gravel, light brown, stiff to hard *(continued)*				☒	14	7-15-19 N=34	16.7			
						■			10.3		NP	60
				35		☒	12	5-9-16 N=25	15.5			
						☒	12	5-9-12 N=21	15.9			
	39.5		5120.53									
		LEAN CLAY WITH SAND (CL), light brown, stiff to very stiff		40		☒	15	7-11-15 N=26	16.8		28-19-9	82
				45		☒	20	4-6-7 N=13	24.1			
	48.5		5111.53									
		LEAN CLAY (CL), trace sand, grayish brown, medium stiff, trace pinholes, oxidation stains		50		☒	24	2-3-4 N=7	38.2		40-21-19	94
	53.5		5106.53									
		POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), trace clay, brown, dense, oxidation stains		55		☒	18	15-16-33 N=49	8.7			
				60								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations
No free water observed

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-26-2023

Boring Completed
01-30-2023

Notes

Elevation Reference: Elevations were provided by others.

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

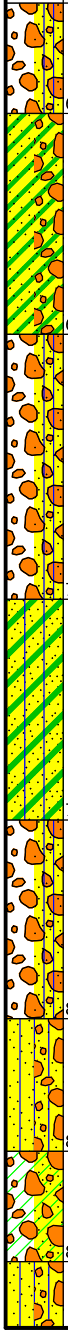
6949 S High Tech Dr Ste 100
Midvale, UT

Boring Log No. B-08

Location: See Exploration Plan

Latitude: 40.5365° Longitude: -112.0667°

Elevation.: 5160.0337 (Ft.)



Depth (Ft.)	Description	Elevation (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), trace clay, brown, dense, oxidation stains *(continued)* - absence of clay				10	30-29-16 N=45	6.9			
62.5	**CLAYEY SAND WITH GRAVEL (SC)**, brown, very dense, oxidation stains, cobbles	5097.53			18	11-52-70/3"	10.8	99	26-13-13	46
67.5	**POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM)**, trace clay, grayish brown, very dense, oxidation stains, cementation	5092.53			6	48-50/3"	6.2			
73.5	**SILTY CLAYEY SAND (SC-SM)**, trace gravel, tan, very dense, trace cementations	5086.53			4	70/4"	4.2			
78.5	**POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM)**, trace clay, brown, very dense, oxidation stains, cobbles	5081.53			6	70/5"				
83.0	**SILTY SAND WITH GRAVEL (SM)**, brown, medium dense, cobbles	5077.03			20	24-16-21 PP = 3.0	22.4	99		
86.0	**CLAYEY GRAVEL WITH SAND (GC)**, brown, dense	5074.03								
88.5	**SILTY SAND WITH GRAVEL (SM)**, brown, very dense, cobbles	5071.53								

Depth scale: 65, 70, 75, 80, 85, 90

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-26-2023

Boring Completed
01-30-2023

Boring Log No. B-08

Location: See Exploration Plan

Latitude: 40.5365° Longitude: -112.0667°

Graphic Log	Depth (Ft.) / Elevation.: 5160.0337 (Ft.)	Depth (Ft.)	Water Level Observations	Sample Type	Recovery (In.)	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	90.4 5069.61				5	70/5"				
	Auger Refusal at 90.42 Feet									

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes

Elevation Reference: Elevations were provided by others.

Water Level Observations
No free water observed

Advancement Method
Hollow Stem Auger

Abandonment Method
Boring backfilled with auger cuttings upon completion.

Drill Rig
CME 75

Hammer Type
Automatic

Driller
Davis

Logged by
VP

Boring Started
01-26-2023

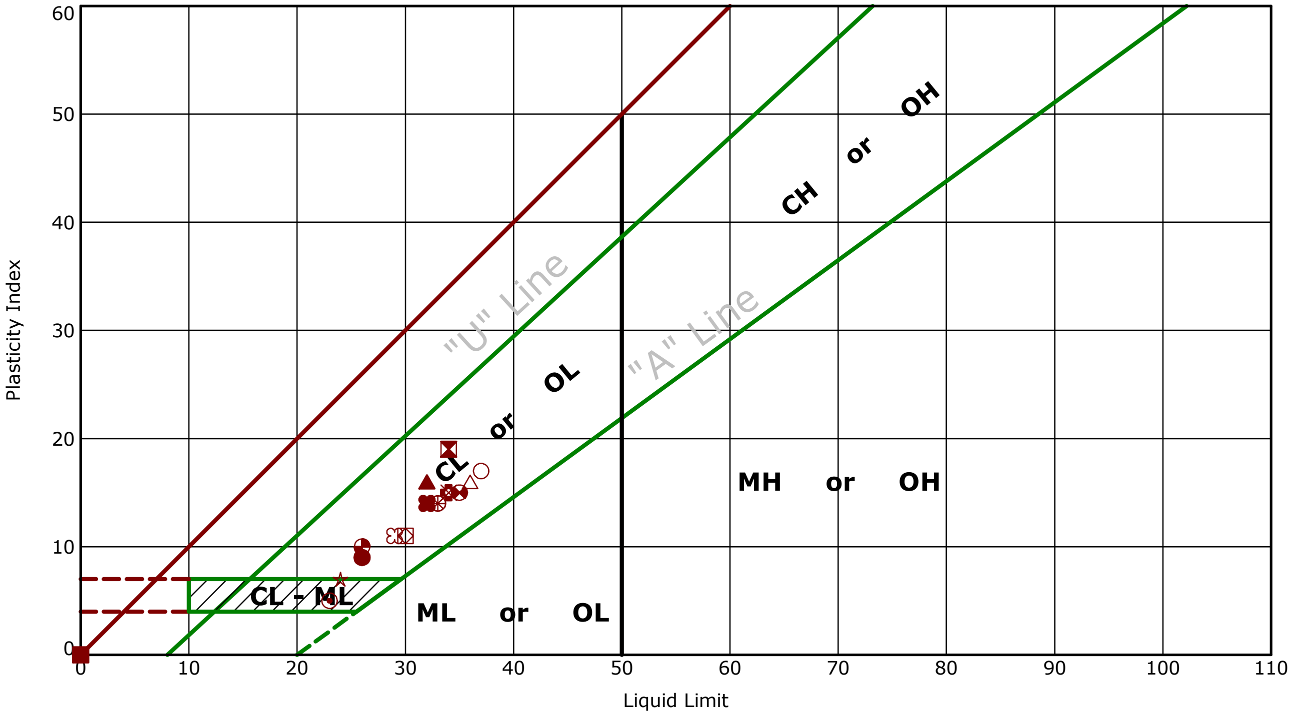
Boring Completed
01-30-2023

Jacobs - 118th South Water Tanks
11800 South and U-111 | Herriman, Utah
Terracon Project No. 61225118

6949 S High Tech Dr Ste 100
Midvale, UT

Atterberg Limit Results

ASTM D4318

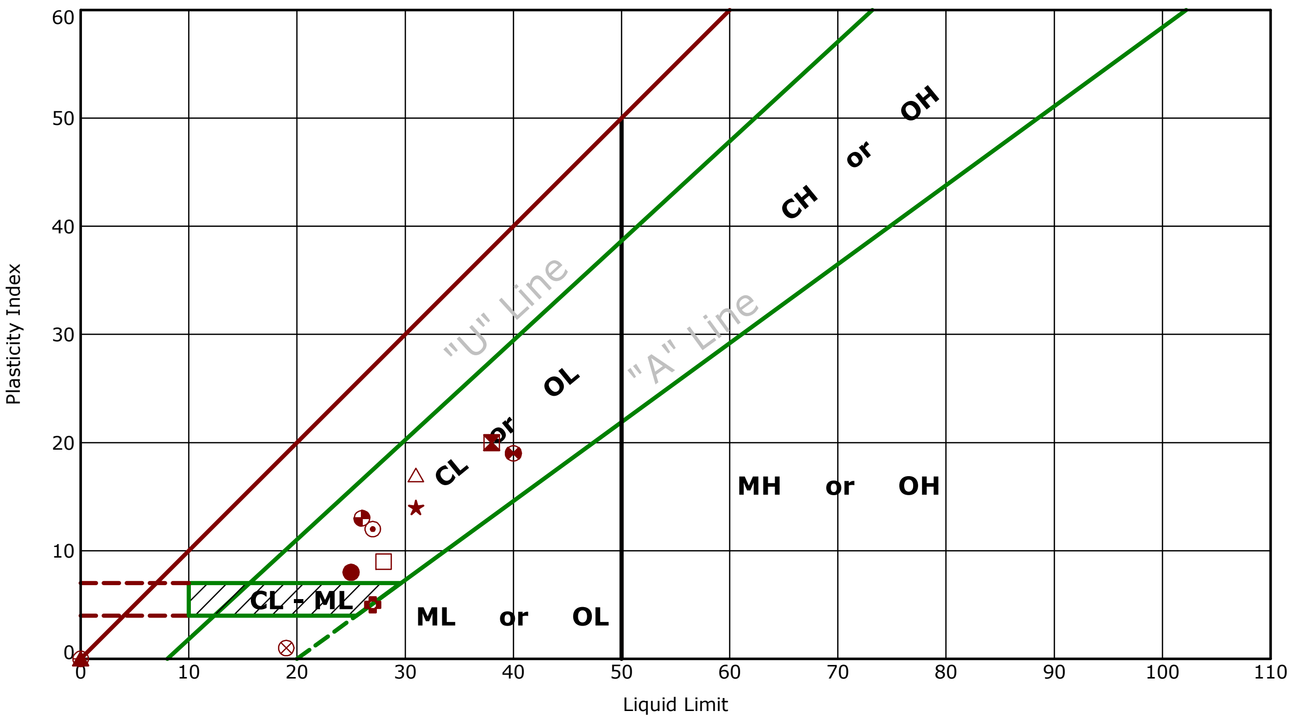


	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	B-01	0.5 - 1.5	26	17	9	76.0	CL	LEAN CLAY with SAND
⊠	B-01	22.5 - 24	34	15	19	69.5	CL	SANDY LEAN CLAY
▲	B-01	27.5 - 29	32	16	16	47.2	SC	CLAYEY SAND
★	B-01	45 - 46.5	NP	NP	NP	84.6	ML	SILT with SAND
⊙	B-02	0.3 - 1.5	23	18	5	71.8	CL-ML	SILTY CLAY with SAND
✚	B-02	20 - 21.5	34	19	15	93.4	CL	LEAN CLAY
○	B-02	25 - 27	37	20	17	93.0	CL	LEAN CLAY
△	B-02	35 - 37	36	20	16	92.2	CL	LEAN CLAY
⊗	B-02	50 - 51.5	33	19	14	79.4	CL	LEAN CLAY with SAND
⊕	B-03	20 - 22	33	19	14	87.7	CL	LEAN CLAY
□	B-03	22.5 - 24	30	19	11	90.2	CL	LEAN CLAY
⨂	B-03	30 - 31.5	35	20	15	83.0	CL	LEAN CLAY with SAND
◕	B-03	55 - 56.5	26	16	10	32.7	SC	CLAYEY SAND with GRAVEL
☆	B-04	0.3 - 1	24	17	7	47.6	SC-SM	SILTY, CLAYEY SAND with GRAVEL
⌘	B-04	32.5 - 34	29	18	11	79.0	CL	LEAN CLAY with SAND
■	B-04	45 - 46.5	NP	NP	NP	76.0	ML	SILT with SAND
◆	B-04	60 - 60.9	NP	NP	NP	39.8	SM	SILTY SAND with GRAVEL
◇	B-05	32.5 - 34	30	19	11	91.7	CL	LEAN CLAY
×	B-05	45 - 46.5	34	19	15	88.6	CL	LEAN CLAY
✤	B-05	60 - 61.5	32	18	14	69.6	CL	SANDY LEAN CLAY

6949 S High Tech Dr Ste 100
Midvale, UT

Atterberg Limit Results

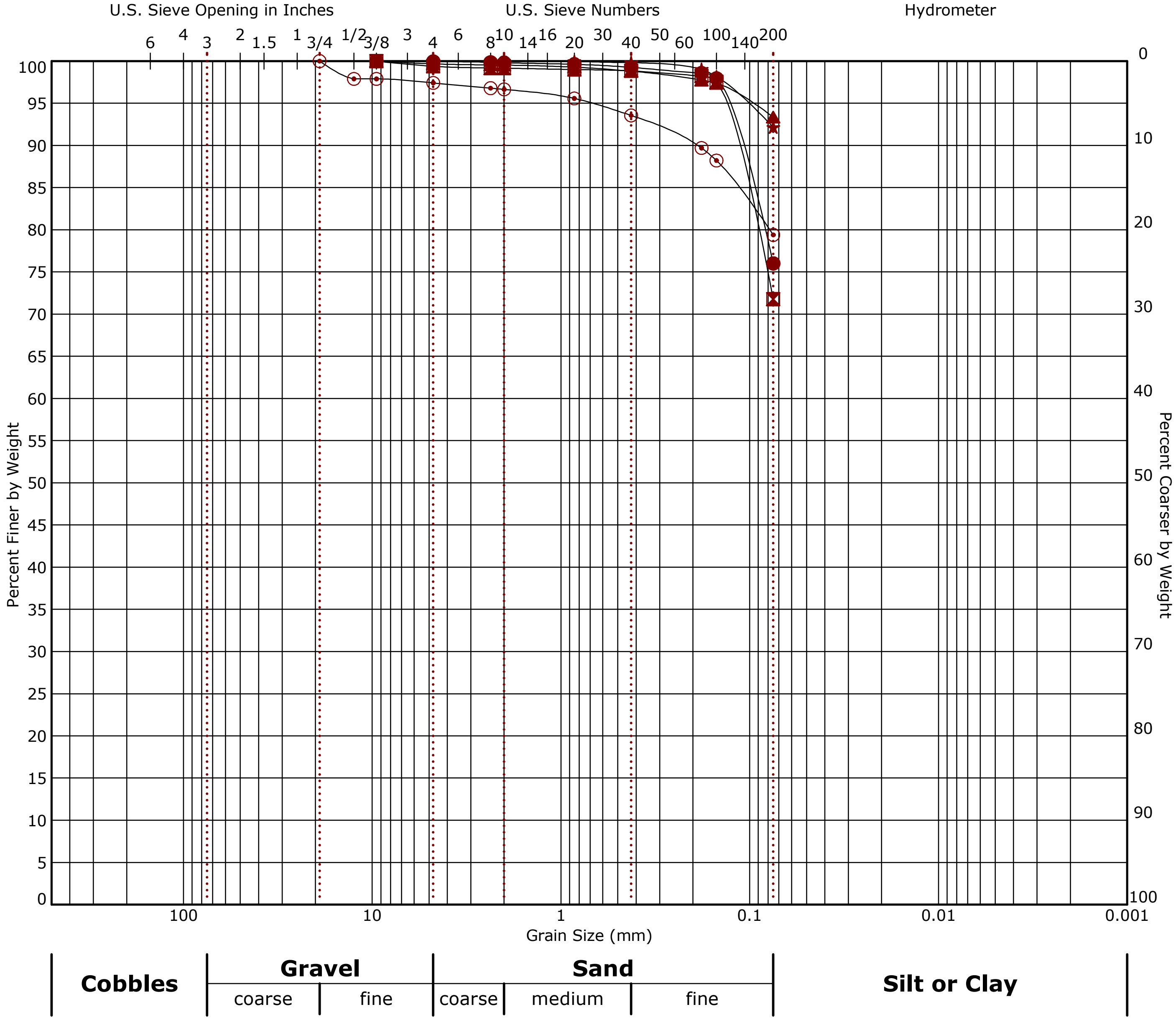
ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	B-06	25 - 26.5	25	17	8	31.4	GC	CLAYEY GRAVEL with SAND
⊠	B-06	30 - 32	38	18	20	80.4	CL	LEAN CLAY with SAND
▲	B-06	32.5 - 34.3	NP	NP	NP	73.1	ML	SILT with SAND
★	B-06	45.3 - 47.3	31	17	14	15.6	SC	CLAYEY SAND
⊙	B-06	50 - 52	27	15	12	72.9	CL	LEAN CLAY with SAND
✚	B-07	20 - 22	27	22	5	85.5	ML	SILT
○	B-07	25 - 26.5	25	17	8	60.9	CL	SANDY LEAN CLAY
△	B-07	68 - 69.8	31	14	17	52.6	CL	SANDY LEAN CLAY
⊗	B-08	10 - 11.5	19	18	1	22.4	SM	SILTY SAND with GRAVEL
⊕	B-08	32.5 - 34.5	NP	NP	NP	60.0	ML	SANDY SILT
□	B-08	40 - 41.5	28	19	9	82.3	CL	LEAN CLAY with SAND
⊛	B-08	50 - 51.5	40	21	19	93.6	CL	LEAN CLAY
◕	B-08	65 - 66.3	26	13	13	46.4	SC	CLAYEY SAND with GRAVEL

Grain Size Distribution

ASTM D422 / ASTM C136



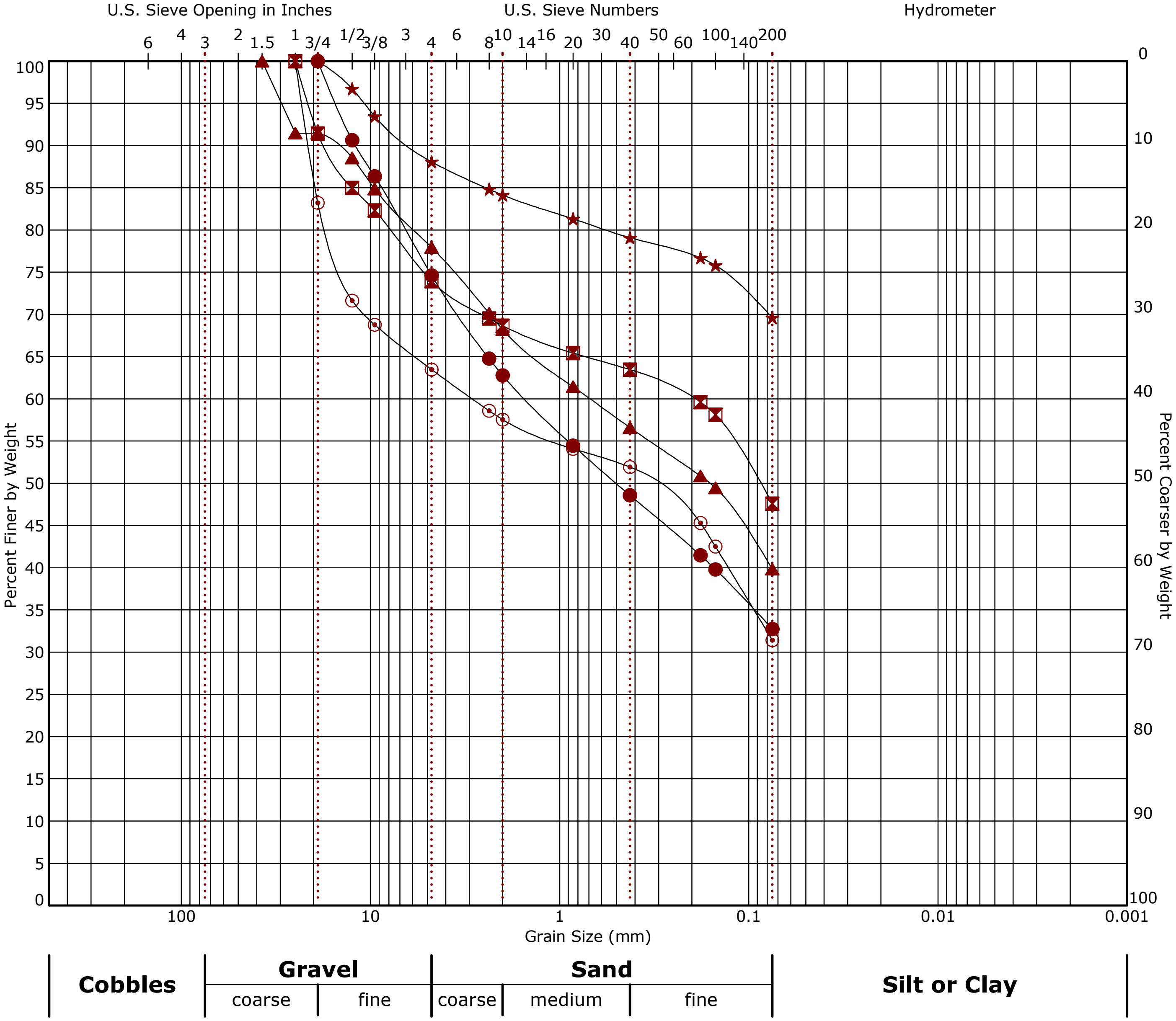
	Boring ID	Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
●	B-01	0.5 - 1.5	LEAN CLAY with SAND	CL	26	17	9		
⊠	B-02	0.3 - 1.5	SILTY CLAY with SAND	CL-ML	23	18	5		
▲	B-02	20 - 21.5	LEAN CLAY	CL	34	19	15		
★	B-02	35 - 37	LEAN CLAY	CL	36	20	16		
⊙	B-02	50 - 51.5	LEAN CLAY with SAND	CL	33	19	14		

	Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-01	0.5 - 1.5	9.5				0.0	0.0	23.9	76.0		
⊠	B-02	0.3 - 1.5	9.5				0.0	0.6	27.6	71.8		
▲	B-02	20 - 21.5	9.5				0.0	0.3	6.3	93.4		
★	B-02	35 - 37	2				0.0	0.0	7.8	92.2		
⊙	B-02	50 - 51.5	19				0.0	2.6	18.0	79.4		

Terracon
6949 S High Tech Dr Ste 100
Midvale, UT

Grain Size Distribution

ASTM D422 / ASTM C136

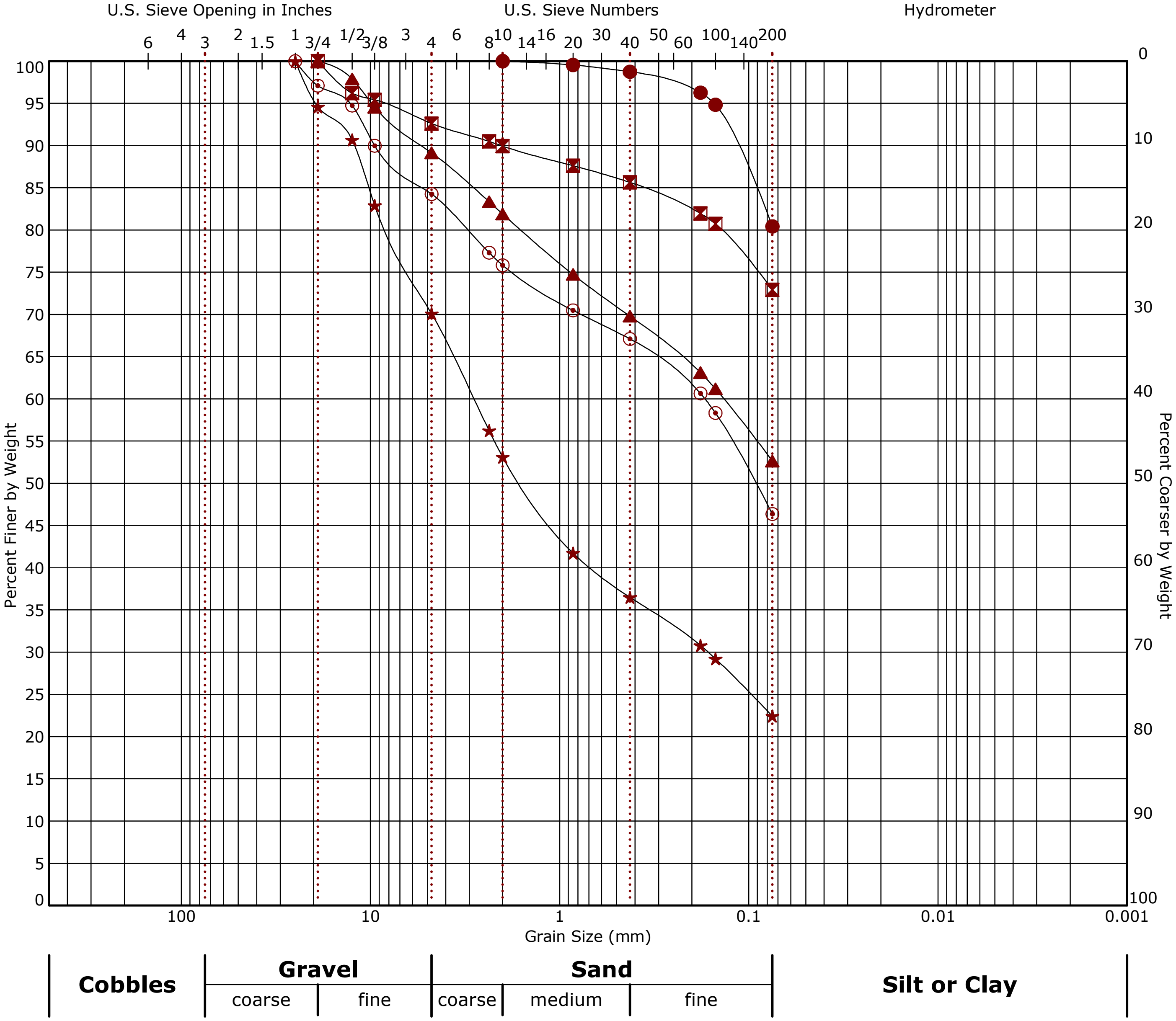


Boring ID		Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
●	B-03	55 - 56.5	CLAYEY SAND with GRAVEL	SC	26	16	10		
☒	B-04	0.3 - 1	SILTY, CLAYEY SAND with GRAVEL	SC-SM	24	17	7		
▲	B-04	60 - 60.9	SILTY SAND with GRAVEL	SM	NP	NP	NP		
★	B-05	60 - 61.5	SANDY LEAN CLAY	CL	32	18	14		
⊙	B-06	25 - 26.5	CLAYEY GRAVEL with SAND	GC	25	17	8		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-03	55 - 56.5	19	1.502			0.0	25.4	41.9	32.7		
☒	B-04	0.3 - 1	25	0.196			0.0	26.1	26.3	47.6		
▲	B-04	60 - 60.9	37.5	0.692			0.0	22.1	38.1	39.8		
★	B-05	60 - 61.5	19				0.0	11.9	18.5	69.6		
⊙	B-06	25 - 26.5	25	2.888			0.0	36.5	32.1	31.4		

Grain Size Distribution

ASTM D422 / ASTM C136



Boring ID	Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
● B-06	30 - 32	LEAN CLAY with SAND	CL	38	18	20		
⊠ B-06	50 - 52	LEAN CLAY with SAND	CL	27	15	12		
▲ B-07	68 - 69.8	SANDY LEAN CLAY	CL	31	14	17		
★ B-08	10 - 11.5	SILTY SAND with GRAVEL	SM	19	18	1		
⊙ B-08	65 - 66.3	CLAYEY SAND with GRAVEL	SC	26	13	13		

Boring ID	Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
● B-06	30 - 32	2				0.0	0.0	19.6	80.4		
⊠ B-06	50 - 52	19				0.0	7.4	19.7	72.9		
▲ B-07	68 - 69.8	19	0.136			0.0	10.9	36.5	52.6		
★ B-08	10 - 11.5	25	2.854	0.164		0.0	29.9	47.7	22.4		
⊙ B-08	65 - 66.3	25	0.171			0.0	15.7	37.9	46.4		

One-Dimensional Consolidation Properties of Soils

(In general accordance with ASTM D2435 and D4546)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

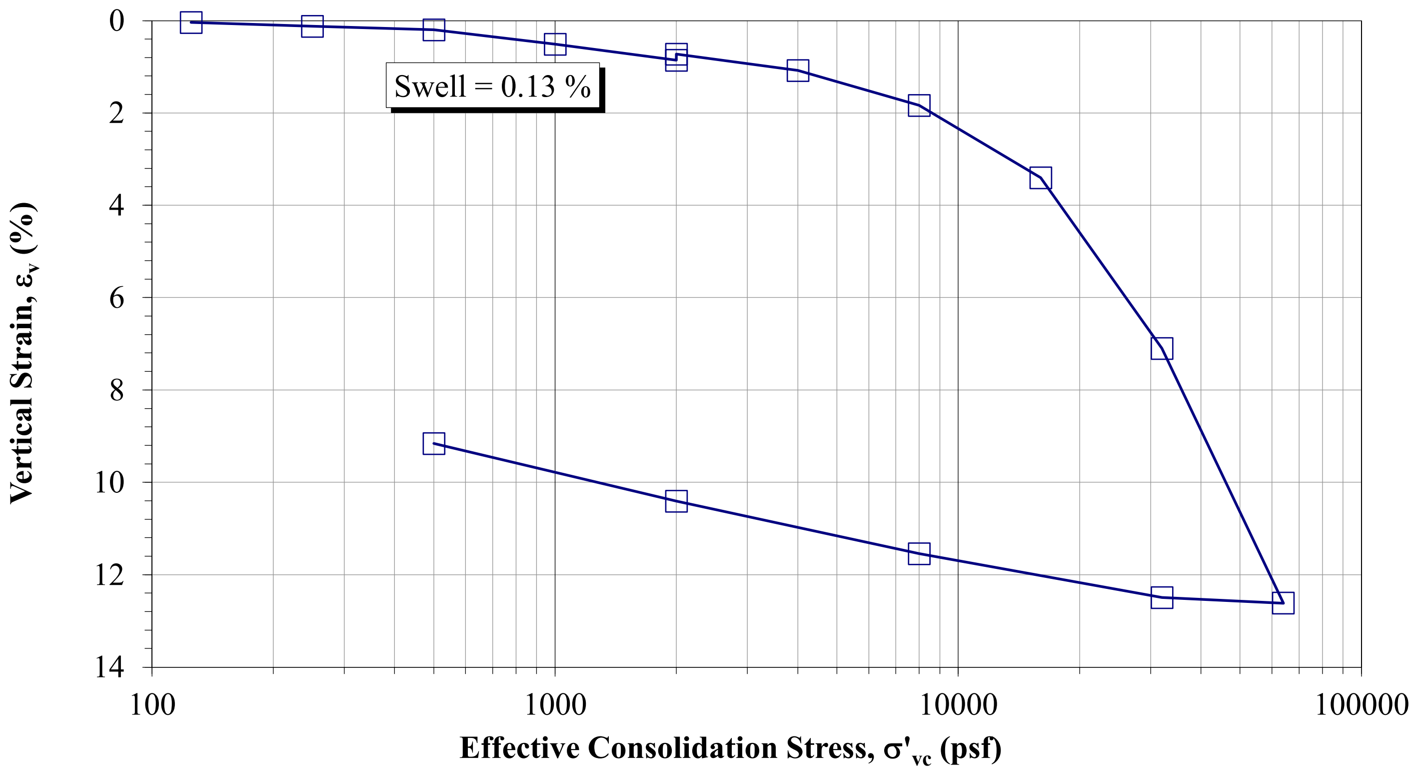
Boring No.: B-02
Sample:
Depth: 20.0-21.5'
Sample Description: Light brown silt
Engineering Classification: Not requested
Sample type: Undisturbed-trimmed from Shelby tube

Test method: A
Inundation stress (psf), timing: 2000 Beginning
Specific gravity, G_s 2.70 Assumed
Swell (%) 0.13
Swell stress (psf) 2000
Water type used for inundation Tap

	Initial (o)	Final (f)
Sample height, H (in.)	0.916	0.832
Sample diameter, D (in.)	2.421	2.421
Wt. rings + wet soil (g)	159.00	166.66
Wt. rings/tare (g)	42.18	42.18
Moist unit wt., γ_m (pcf)	105.5	123.80
Wet soil + tare (g)	330.10	248.15
Dry soil + tare (g)	297.18	222.12
Tare (g)	121.76	124.10
Water content, w (%)	18.8	26.6
Dry unit wt., γ_d (pcf)	88.9	97.8
Saturation	0.57	0.99

*Note: C_v, C_c, C_r, and σ_p' to be determined by Geotechnical Engineer.

Stress (psf)	Dial (in.)	1-D ε_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9160	0.8968
125	0.0004	0.04	0.9156	0.8960
250	0.0011	0.12	0.9149	0.8944
500	0.0019	0.20	0.9141	0.8929
1000	0.0047	0.51	0.9113	0.8871
2000	0.0079	0.86	0.9081	0.8805
2000	0.0067	0.73	0.9093	0.8829
4000	0.0099	1.08	0.9061	0.8763
8000	0.0168	1.84	0.8992	0.8619
16000	0.0312	3.41	0.8848	0.8322
32000	0.0650	7.10	0.8510	0.7621
64000	0.1155	12.61	0.8005	0.6575
32000	0.1145	12.50	0.8015	0.6598
8000	0.1057	11.54	0.8103	0.6778
2000	0.0953	10.41	0.8207	0.6994
500	0.0839	9.16	0.8321	0.7230



Entered: ________
Reviewed: ________

One-Dimensional Consolidation Properties of Soils

(In general accordance with ASTM D2435 and D4546)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

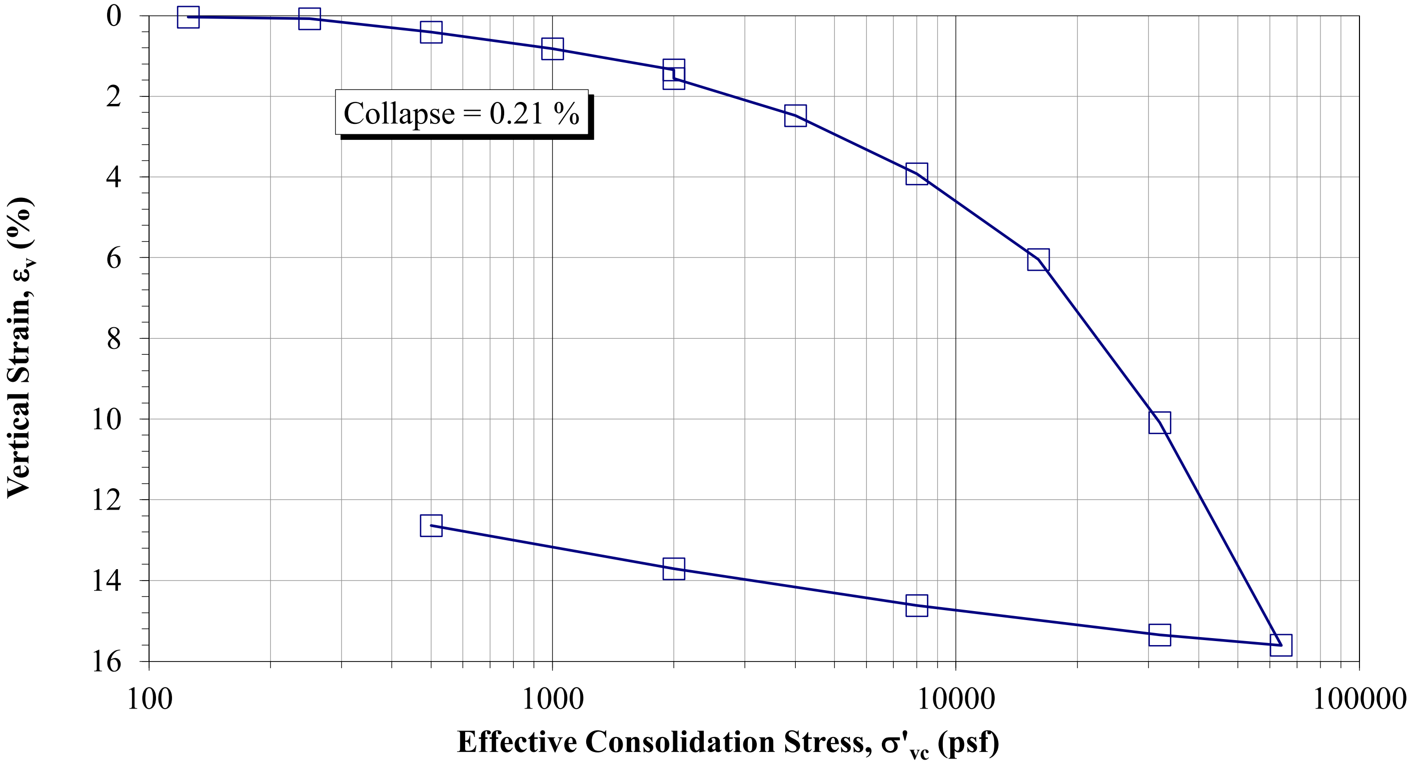
Boring No.: B-02
Sample:
Depth: 35.0-37.0'
Sample Description: Brown clay
Engineering Classification: Not requested
Sample type: Undisturbed-trimmed from Shelby tube

Test method:	A	
Inundation stress (psf), timing:	2000	Beginning
Specific gravity, G_s	2.70	Assumed
Collapse (%)	0.21	
Collapse stress (psf)	2000	
Water type used for inundation	Tap	

	Initial (o)	Final (f)
Sample height, H (in.)	0.924	0.807
Sample diameter, D (in.)	2.422	2.422
Wt. rings + wet soil (g)	165.60	159.88
Wt. rings/tare (g)	44.10	44.10
Moist unit wt., γ_m (pcf)	108.7	118.60
Wet soil + tare (g)	633.57	269.83
Dry soil + tare (g)	500.99	243.48
Tare (g)	126.85	152.81
Water content, w (%)	35.4	29.1
Dry unit wt., γ_d (pcf)	80.3	91.9
Saturation	0.87	0.94

*Note: C_v, C_c, C_r, and σ_p' to be determined by Geotechnical Engineer.

Stress (psf)	Dial (in.)	1-D ε_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9240	1.0996
125	0.0004	0.04	0.9236	1.0988
250	0.0007	0.07	0.9233	1.0980
500	0.0038	0.41	0.9202	1.0910
1000	0.0076	0.83	0.9164	1.0822
2000	0.0124	1.35	0.9116	1.0713
2000	0.0144	1.56	0.9096	1.0669
4000	0.0229	2.48	0.9011	1.0475
8000	0.0362	3.92	0.8878	1.0172
16000	0.0559	6.05	0.8681	0.9726
32000	0.0932	10.09	0.8308	0.8878
64000	0.1442	15.61	0.7798	0.7719
32000	0.1418	15.35	0.7822	0.7774
8000	0.1351	14.62	0.7889	0.7926
2000	0.1267	13.71	0.7973	0.8117
500	0.1168	12.64	0.8072	0.8342



Entered: ________

Reviewed: ________

One-Dimensional Consolidation Properties of Soils

(In general accordance with ASTM D2435 and D4546)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/7/2023
By: EH

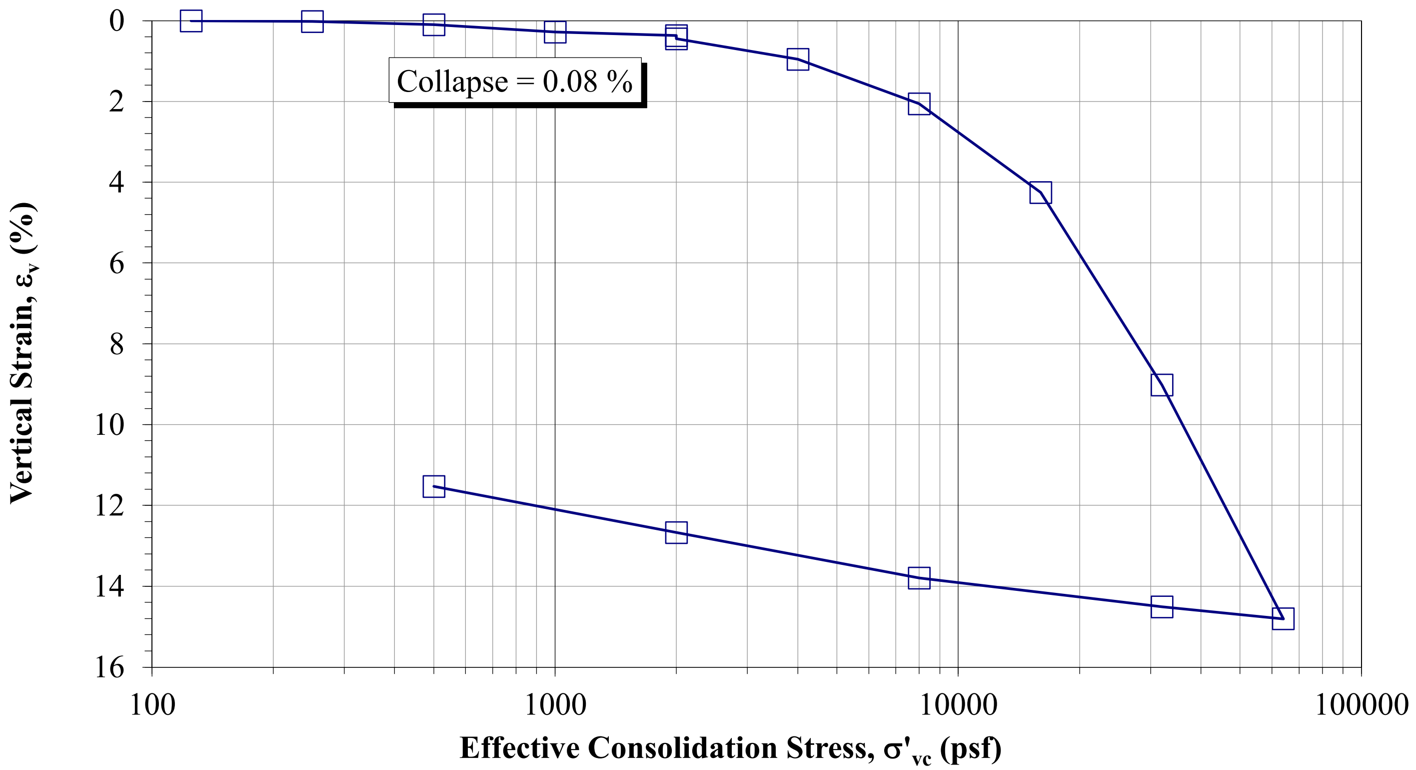
Boring No.: B-03
Sample:
Depth: 20.0-22.0'
Sample Description: Brown clay
Engineering Classification: Not requested
Sample type: Undisturbed-trimmed from Shelby tube

Test method:	A	
Inundation stress (psf), timing:	2000	Beginning
Specific gravity, G_s	2.70	Assumed
Collapse (%)	0.08	
Collapse stress (psf)	2000	
Water type used for inundation	Tap	

	Initial (o)	Final (f)
Sample height, H (in.)	0.924	0.818
Sample diameter, D (in.)	2.422	2.422
Wt. rings + wet soil (g)	164.70	168.45
Wt. rings/tare (g)	44.10	44.10
Moist unit wt., γ_m (pcf)	107.9	125.78
Wet soil + tare (g)	628.93	242.40
Dry soil + tare (g)	532.41	216.22
Tare (g)	126.88	121.55
Water content, w (%)	23.8	27.7
Dry unit wt., γ_d (pcf)	87.2	98.5
Saturation	0.69	1.00

*Note: C_v, C_c, C_r, and σ_p' to be determined by Geotechnical Engineer.

Stress (psf)	Dial (in.)	1-D ε_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9240	0.9335
125	0.0000	0.00	0.9240	0.9334
250	0.0002	0.02	0.9238	0.9331
500	0.0010	0.10	0.9230	0.9315
1000	0.0026	0.28	0.9214	0.9281
2000	0.0034	0.37	0.9206	0.9263
2000	0.0042	0.45	0.9198	0.9248
4000	0.0088	0.95	0.9152	0.9151
8000	0.0191	2.06	0.9049	0.8936
16000	0.0393	4.26	0.8847	0.8513
32000	0.0833	9.01	0.8407	0.7592
64000	0.1368	14.81	0.7872	0.6473
32000	0.1341	14.51	0.7899	0.6529
8000	0.1275	13.80	0.7965	0.6667
2000	0.1171	12.67	0.8069	0.6885
500	0.1065	11.53	0.8175	0.7107



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One-Dimensional Consolidation Properties of Soils

(In general accordance with ASTM D2435 and D4546)

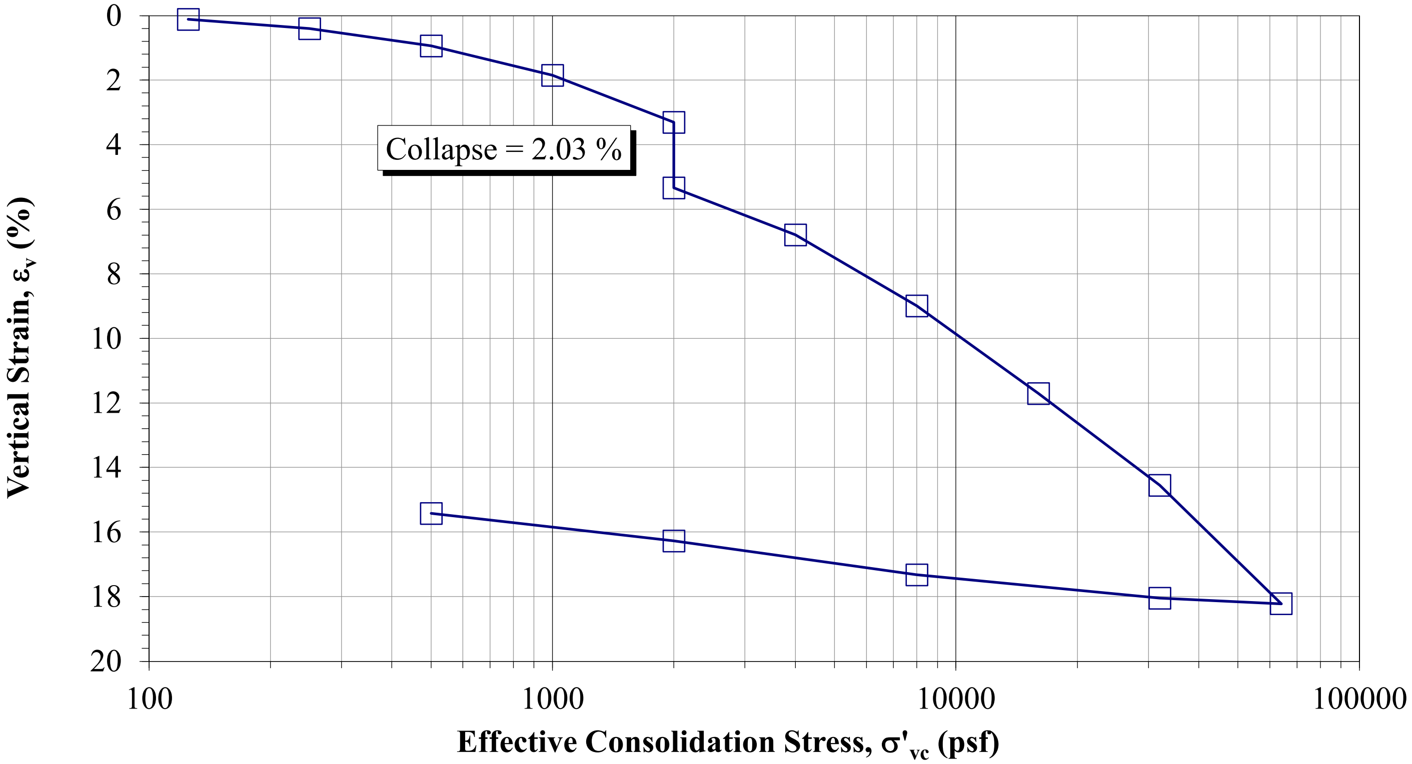
Project:	**Terracon**	**Boring No.:**	**B-04**
No:	**M00385-498 (61225118)**	**Sample:**	
Location:	Jacobs - 118th South Water Tanks	**Depth:**	**45-46.5'**
Date:	3/8/2023	Sample Description:	Brown silt
By:	EH	Engineering Classification:	Not requested
		Sample type:	Undisturbed-trimmed from Shelby tube

Test method:	A	
Inundation stress (psf), timing:	2000	Beginning
Specific gravity, G_s	2.70	Assumed
Collapse (%)	2.03	
Collapse stress (psf)	2000	
Water type used for inundation	Tap	

	Initial (o)	Final (f)
Sample height, H (in.)	0.923	0.781
Sample diameter, D (in.)	2.416	2.416
Wt. rings + wet soil (g)	142.79	157.34
Wt. rings/tare (g)	45.74	45.74
Moist unit wt., γ_m (pcf)	87.4	118.79
Wet soil + tare (g)	319.99	230.56
Dry soil + tare (g)	293.71	203.64
Tare (g)	120.82	120.73
Water content, w (%)	15.2	32.5
Dry unit wt., γ_d (pcf)	75.8	89.7
Saturation	0.34	1.00

*Note: C_v, C_c, C_r, and σ_p' to be determined by Geotechnical Engineer.

Stress (psf)	Dial (in.)	1-D ε_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9230	1.2223
125	0.0011	0.12	0.9219	1.2198
250	0.0037	0.40	0.9193	1.2133
500	0.0087	0.94	0.9143	1.2015
1000	0.0171	1.85	0.9059	1.1812
2000	0.0306	3.31	0.8924	1.1487
2000	0.0493	5.34	0.8737	1.1037
4000	0.0627	6.79	0.8603	1.0714
8000	0.0830	8.99	0.8400	1.0224
16000	0.1081	11.71	0.8149	0.9621
32000	0.1343	14.56	0.7887	0.8989
64000	0.1681	18.22	0.7549	0.8175
32000	0.1666	18.05	0.7564	0.8213
8000	0.1599	17.33	0.7631	0.8372
2000	0.1502	16.28	0.7728	0.8606
500	0.1423	15.42	0.7807	0.8797



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One-Dimensional Consolidation Properties of Soils

(In general accordance with ASTM D2435 and D4546)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/7/2023
By: EH

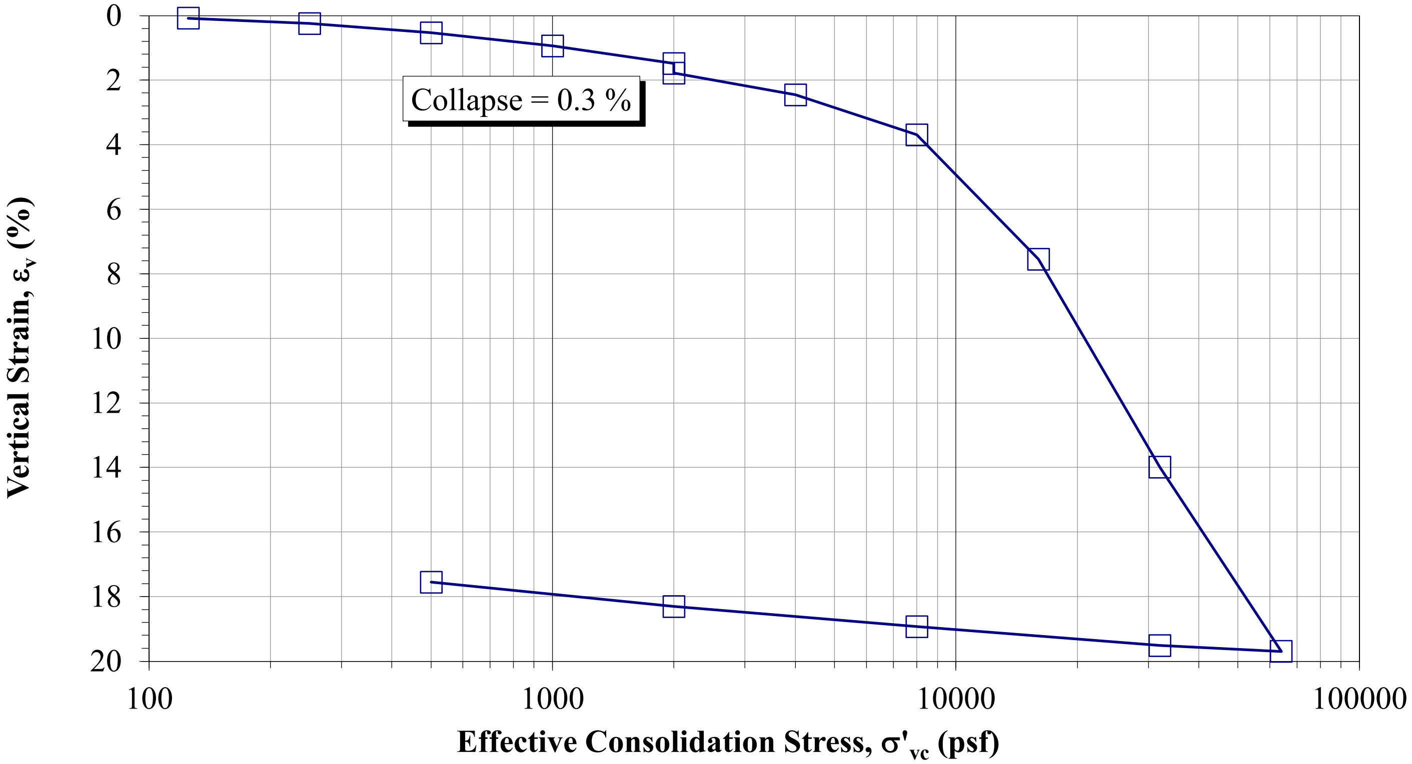
Boring No.: B-05
Sample:
Depth: 35.0-36.5'
Sample Description: Brown silt
Engineering Classification: Not requested
Sample type: Undisturbed-trimmed from Shelby tube

Test method:	A	
Inundation stress (psf), timing:	2000	Beginning
Specific gravity, G_s	2.70	Assumed
Collapse (%)	0.30	
Collapse stress (psf)	2000	
Water type used for inundation		Tap

	Initial (o)	Final (f)
Sample height, H (in.)	0.917	0.756
Sample diameter, D (in.)	2.418	2.418
Wt. rings + wet soil (g)	150.91	153.46
Wt. rings/tare (g)	44.70	44.70
Moist unit wt., γ_m (pcf)	96.1	119.33
Wet soil + tare (g)	467.55	240.44
Dry soil + tare (g)	406.31	217.88
Tare (g)	129.31	127.77
Water content, w (%)	22.1	25.0
Dry unit wt., γ_d (pcf)	78.7	95.4
Saturation	0.52	0.88

*Note: C_v, C_c, C_r, and σ_p' to be determined by Geotechnical Engineer.

Stress (psf)	Dial (in.)	1-D ε_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9170	1.1420
125	0.0007	0.08	0.9163	1.1403
250	0.0023	0.25	0.9147	1.1367
500	0.0049	0.53	0.9121	1.1306
1000	0.0086	0.94	0.9084	1.1218
2000	0.0136	1.48	0.9034	1.1102
2000	0.0163	1.78	0.9007	1.1038
4000	0.0225	2.46	0.8945	1.0894
8000	0.0339	3.70	0.8831	1.0628
16000	0.0692	7.55	0.8478	0.9803
32000	0.1283	13.99	0.7887	0.8423
64000	0.1806	19.69	0.7364	0.7202
32000	0.1789	19.51	0.7381	0.7241
8000	0.1736	18.93	0.7434	0.7365
2000	0.1678	18.30	0.7492	0.7500
500	0.1609	17.55	0.7561	0.7661



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One-Dimensional Consolidation Properties of Soils

(In general accordance with ASTM D2435 and D4546)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/8/2023
By: EH

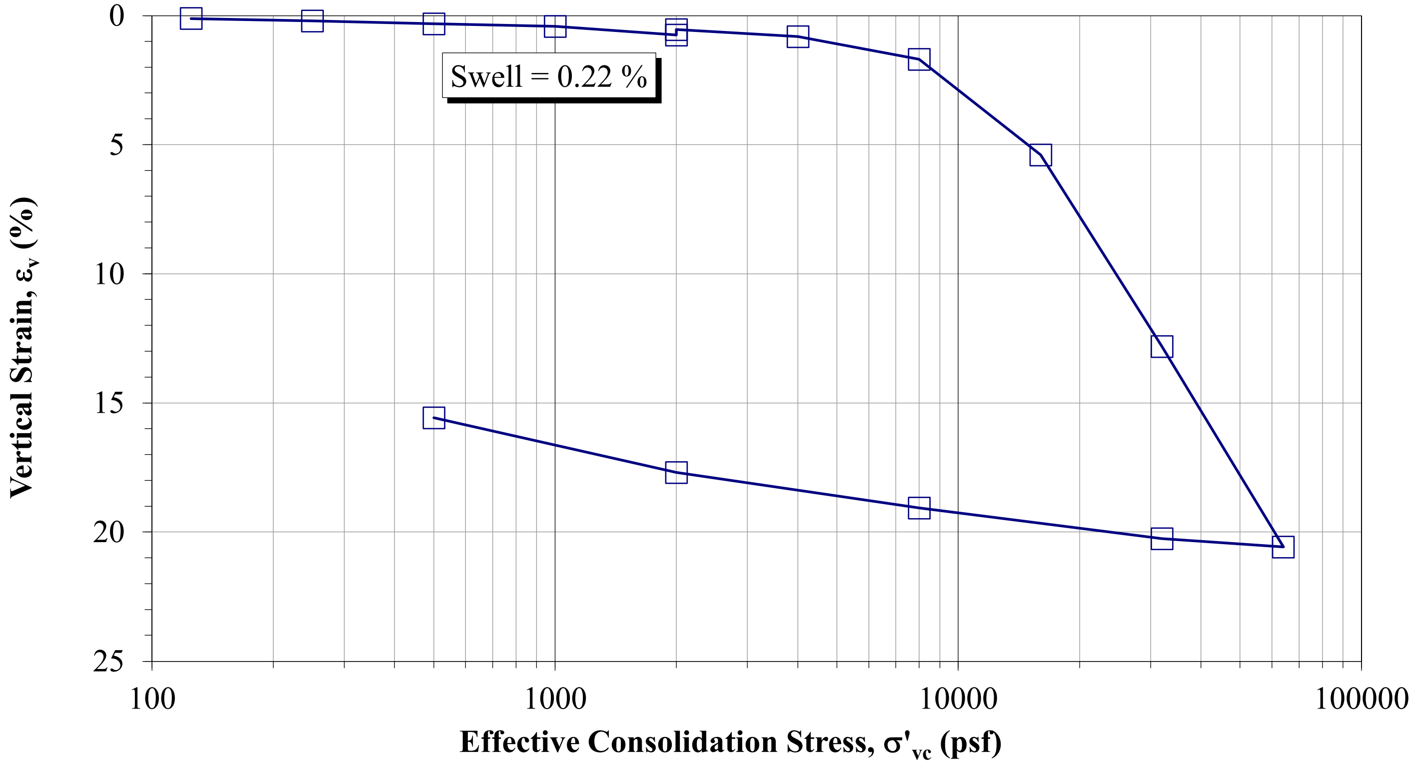
Boring No.: B-06
Sample:
Depth: 30.0-32.0'
Sample Description: Brown clay
Engineering Classification: Not requested
Sample type: Undisturbed-trimmed from Shelby tube

Test method:	A	
Inundation stress (psf), timing:	2000	Beginning
Specific gravity, G_s	2.70	Assumed
Swell (%)	0.22	
Swell stress (psf)	2000	
Water type used for inundation	Tap	

	Initial (o)	Final (f)
Sample height, H (in.)	0.924	0.780
Sample diameter, D (in.)	2.422	2.422
Wt. rings + wet soil (g)	157.71	155.59
Wt. rings/tare (g)	44.10	44.10
Moist unit wt., γ_m (pcf)	101.7	118.17
Wet soil + tare (g)	431.40	236.19
Dry soil + tare (g)	349.75	208.32
Tare (g)	126.85	126.54
Water content, w (%)	36.6	34.1
Dry unit wt., γ_d (pcf)	74.4	88.1
Saturation	0.78	1.00

*Note: C_v, C_c, C_r, and σ_p' to be determined by Geotechnical Engineer.

Stress (psf)	Dial (in.)	1-D ε_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9240	1.2652
125	0.0011	0.11	0.9229	1.2626
250	0.0019	0.21	0.9221	1.2605
500	0.0030	0.32	0.9210	1.2579
1000	0.0039	0.42	0.9201	1.2557
2000	0.0070	0.75	0.9170	1.2481
2000	0.0050	0.54	0.9190	1.2530
4000	0.0076	0.82	0.9164	1.2466
8000	0.0156	1.69	0.9084	1.2269
16000	0.0499	5.40	0.8741	1.1429
32000	0.1184	12.82	0.8056	0.9748
64000	0.1901	20.58	0.7339	0.7991
32000	0.1872	20.26	0.7368	0.8064
8000	0.1762	19.07	0.7478	0.8332
2000	0.1634	17.69	0.7606	0.8645
500	0.1439	15.58	0.7801	0.9124



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One-Dimensional Consolidation Properties of Soils

(In general accordance with ASTM D2435 and D4546)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/8/2023
By: EH

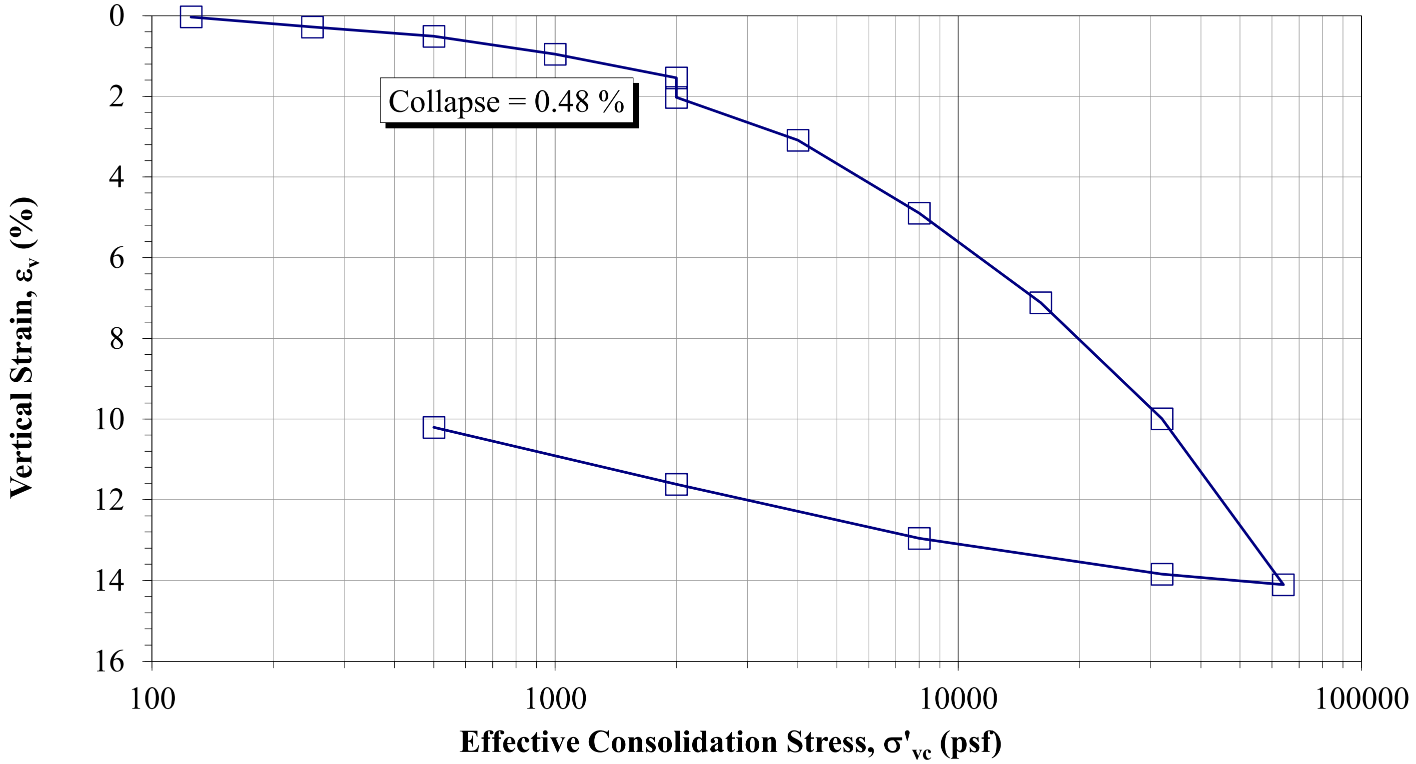
Boring No.: B-07
Sample:
Depth: 27.5-29.0'
Sample Description: Brownish grey clay
Engineering Classification: Not requested
Sample type: Undisturbed-trimmed from Shelby tube

Test method:	A	
Inundation stress (psf), timing:	2000	Beginning
Specific gravity, G_s	2.70	Assumed
Collapse (%)	0.48	
Collapse stress (psf)	2000	
Water type used for inundation	Tap	

	Initial (o)	Final (f)
Sample height, H (in.)	0.916	0.822
Sample diameter, D (in.)	2.376	2.376
Wt. rings + wet soil (g)	189.39	212.58
Wt. rings/tare (g)	64.21	64.21
Moist unit wt., γ_m (pcf)	117.4	154.99
Wet soil + tare (g)	507.20	251.29
Dry soil + tare (g)	487.91	226.75
Tare (g)	122.19	127.70
Water content, w (%)	5.3	24.8
Dry unit wt., γ_d (pcf)	111.5	124.2
Saturation	0.28	1.00

*Note: C_v, C_c, C_r, and σ_p' to be determined by Geotechnical Engineer.

Stress (psf)	Dial (in.)	1-D ε_v (%)	H_c (in.)	e
Seating	0.0000	0.00	0.9160	0.5112
125	0.0003	0.03	0.9157	0.5108
250	0.0026	0.28	0.9134	0.5070
500	0.0047	0.52	0.9113	0.5034
1000	0.0087	0.95	0.9073	0.4968
2000	0.0142	1.55	0.9018	0.4879
2000	0.0186	2.03	0.8974	0.4806
4000	0.0283	3.09	0.8877	0.4646
8000	0.0448	4.89	0.8712	0.4373
16000	0.0652	7.11	0.8508	0.4037
32000	0.0916	10.00	0.8244	0.3602
64000	0.1292	14.10	0.7868	0.2981
32000	0.1268	13.84	0.7892	0.3020
8000	0.1187	12.96	0.7973	0.3154
2000	0.1064	11.62	0.8096	0.3357
500	0.0935	10.21	0.8225	0.3570



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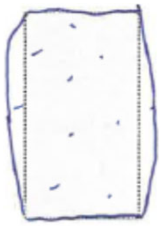
Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

(ASTM D2850)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

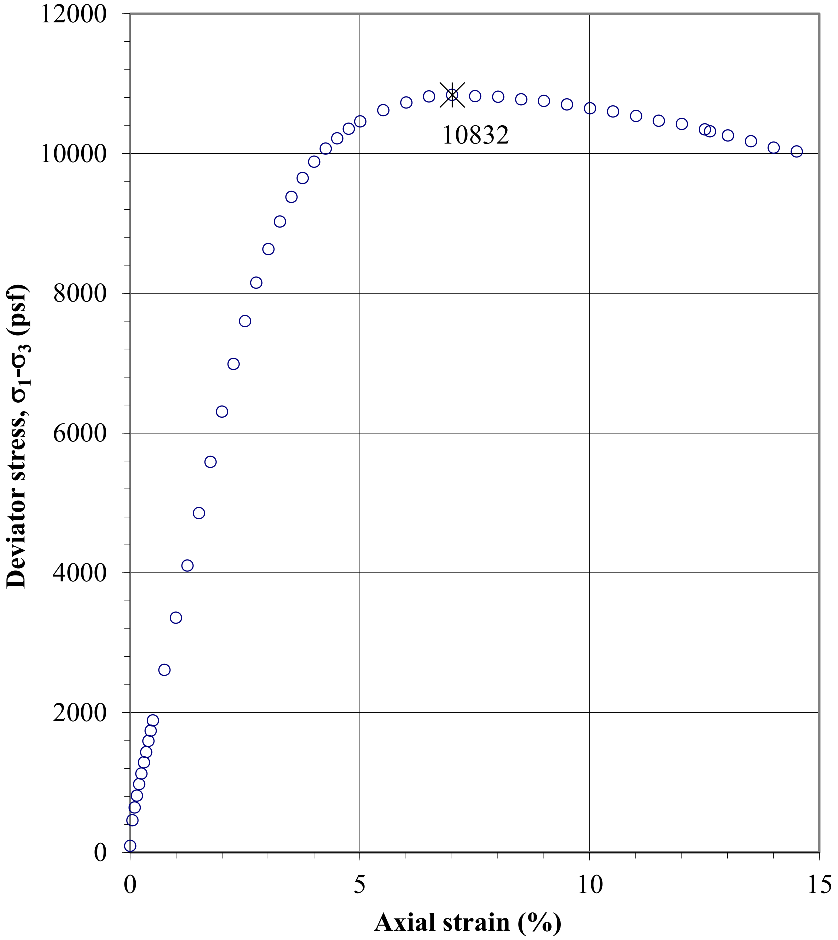
Boring No.: B-02
Sample:
Depth: 25.0-27.0'
Sample Description: Brown silt
Sample type: Undisturbed-trimmed from Shelby tube

Specific gravity, Gs	2.70	Assumed
Sample height, H (in.)	6.024	
Sample diameter, D (in.)	2.869	
Sample volume, V (ft^3)	0.0225	
Wt. rings + wet soil (g)	1412.35	
Wt. rings/tare (g)	281.01	
Moist soil, Ws (g)	1131.34	
Moist unit wt., γ_m (pcf)	110.7	
Dry unit wt., γ_d (pcf)	**89.7**	
Saturation (%)	71.6	
Void ratio, *e*	0.88	



Wet soil + tare (g)	381.99
Dry soil + tare (g)	332.91
Tare (g)	123.52
Water content, w (%)	**23.4**
Confining stress, σ_3 (psf)	3093
Shear rate (in/min)	0.0181
Strain at failure, ε_f (%)	7.01
Deviator stress at failure, $(\sigma_1\text{-}\sigma_3)_f$ (psf)	10832
Shear stress at failure, $q_f = (\sigma_1\text{-}\sigma_3)_f/2$ (psf)	5416

Axial Strain	σ_d σ_1-σ_3	Q 1/2 σ_d
0.00	89.2	44.6
0.05	452.8	226.4
0.10	635.5	317.8
0.15	805.3	402.6
0.20	971.7	485.8
0.25	1121.5	560.7
0.30	1281.7	640.8
0.35	1429.9	715.0
0.40	1589.2	794.6
0.45	1735.8	867.9
0.50	1884.7	942.3
0.75	2604.2	1302.1
1.00	3352.7	1676.4
1.25	4096.2	2048.1
1.50	4849.2	2424.6
1.75	5583.2	2791.6
2.00	6298.5	3149.3
2.25	6980.4	3490.2
2.50	7596.1	3798.0
2.75	8146.7	4073.3
3.01	8625.8	4312.9
3.26	9018.1	4509.1
3.51	9370.2	4685.1
3.76	9644.6	4822.3
4.01	9874.7	4937.3
4.26	10063.2	5031.6
4.51	10211.6	5105.8
4.76	10345.6	5172.8
5.01	10453.2	5226.6
5.51	10612.1	5306.0
6.01	10722.1	5361.1
6.51	10811.1	5405.6
7.01	10831.6	5415.8
7.51	10816.0	5408.0
8.01	10804.5	5402.2
8.51	10768.7	5384.3
9.01	10747.4	5373.7
9.51	10693.6	5346.8
10.01	10639.7	5319.8
10.51	10593.5	5296.7
11.01	10529.3	5264.6
11.51	10461.4	5230.7
12.01	10414.1	5207.1
12.51	10340.2	5170.1
12.62	10313.1	5156.6
13.01	10252.6	5126.3
13.51	10170.8	5085.4
14.01	10077.9	5038.9
14.51	10020.8	5010.4



Comments:

Horizontal cracks in specimen.

Entered by:____________

Reviewed:____________

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
(ASTM D2850)

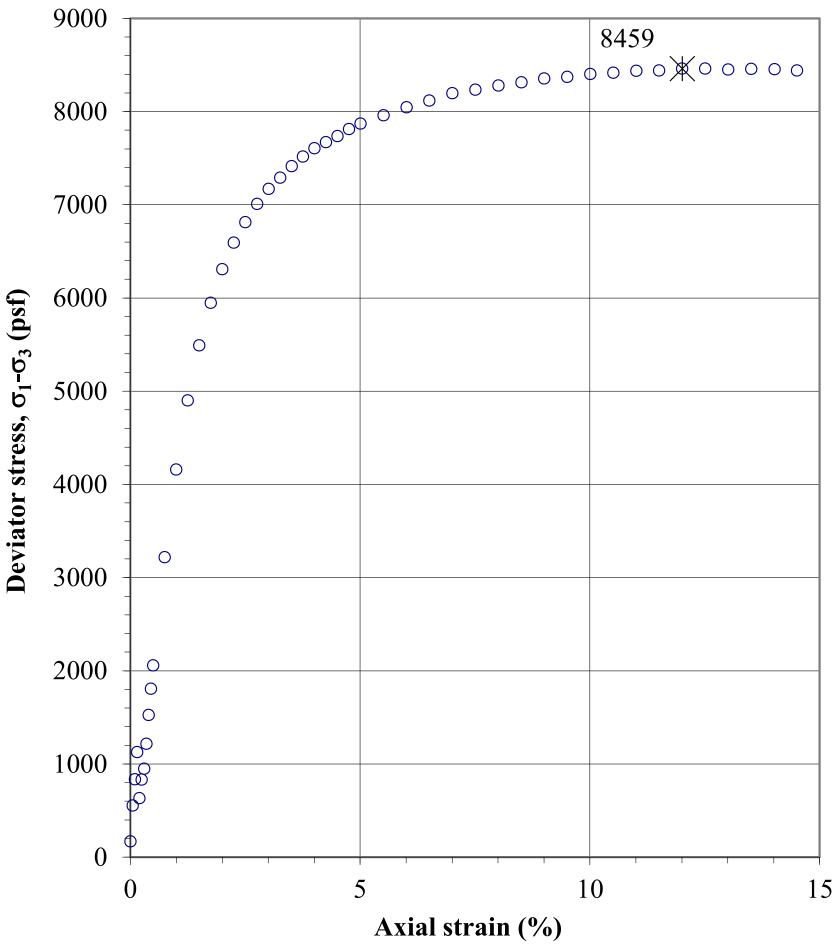
Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

Boring No.: B-02
Sample:
Depth: 40.0-42.0'
Sample Description: Brown sandy clay
Sample type: Undisturbed-trimmed from Shelby tube

Specific gravity, Gs	2.70	Assumed
Sample height, H (in.)	5.967	
Sample diameter, D (in.)	2.879	
Sample volume, V (ft^3)	0.0225	
Wt. rings + wet soil (g)	1451.94	
Wt. rings/tare (g)	281.00	
Moist soil, Ws (g)	1170.94	
Moist unit wt., γ_m (pcf)	114.8	
Dry unit wt., γ_d (pcf)	**94.8**	
Saturation (%)	72.9	
Void ratio, *e*	0.78	

Wet soil + tare (g)	638.75
Dry soil + tare (g)	549.61
Tare (g)	126.85
Water content, w (%)	**21.1**
Confining stress, σ_3 (psf)	5115
Shear rate (in/min)	0.0179
Strain at failure, ε_f (%)	12.01
Deviator stress at failure, $(\sigma_1\text{-}\sigma_3)_f$ (psf)	8459
Shear stress at failure, $q_f = (\sigma_1\text{-}\sigma_3)_f/2$ (psf)	4229

Axial Strain	σ_d $\sigma_1\text{-}\sigma_3$	Q $1/2\ \sigma_d$
0.00	164.1	82.1
0.05	550.0	275.0
0.10	830.0	415.0
0.15	1123.0	561.5
0.20	629.6	314.8
0.25	826.7	413.3
0.30	946.7	473.4
0.35	1212.8	606.4
0.40	1520.4	760.2
0.45	1805.0	902.5
0.50	2054.6	1027.3
0.75	3215.1	1607.5
1.00	4156.8	2078.4
1.25	4896.0	2448.0
1.50	5486.3	2743.2
1.75	5943.8	2971.9
2.00	6304.7	3152.3
2.25	6590.2	3295.1
2.50	6808.6	3404.3
2.76	7005.6	3502.8
3.01	7164.9	3582.5
3.26	7285.9	3642.9
3.51	7409.0	3704.5
3.76	7514.4	3757.2
4.01	7601.3	3800.6
4.26	7667.5	3833.7
4.51	7733.3	3866.7
4.76	7809.5	3904.7
5.01	7867.1	3933.6
5.51	7956.5	3978.2
6.01	8042.6	4021.3
6.51	8115.3	4057.7
7.01	8193.7	4096.9
7.51	8232.1	4116.0
8.01	8275.5	4137.8
8.51	8311.3	4155.7
9.01	8351.8	4175.9
9.51	8367.5	4183.8
10.01	8400.5	4200.3
10.51	8414.0	4207.0
11.01	8432.0	4216.0
11.51	8437.3	4218.7
12.01	8458.7	4229.3
12.51	8456.1	4228.0
13.01	8447.7	4223.9
13.51	8454.3	4227.1
14.02	8449.1	4224.6
14.51	8436.8	4218.4



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Reviewed:____________

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
(ASTM D2850)

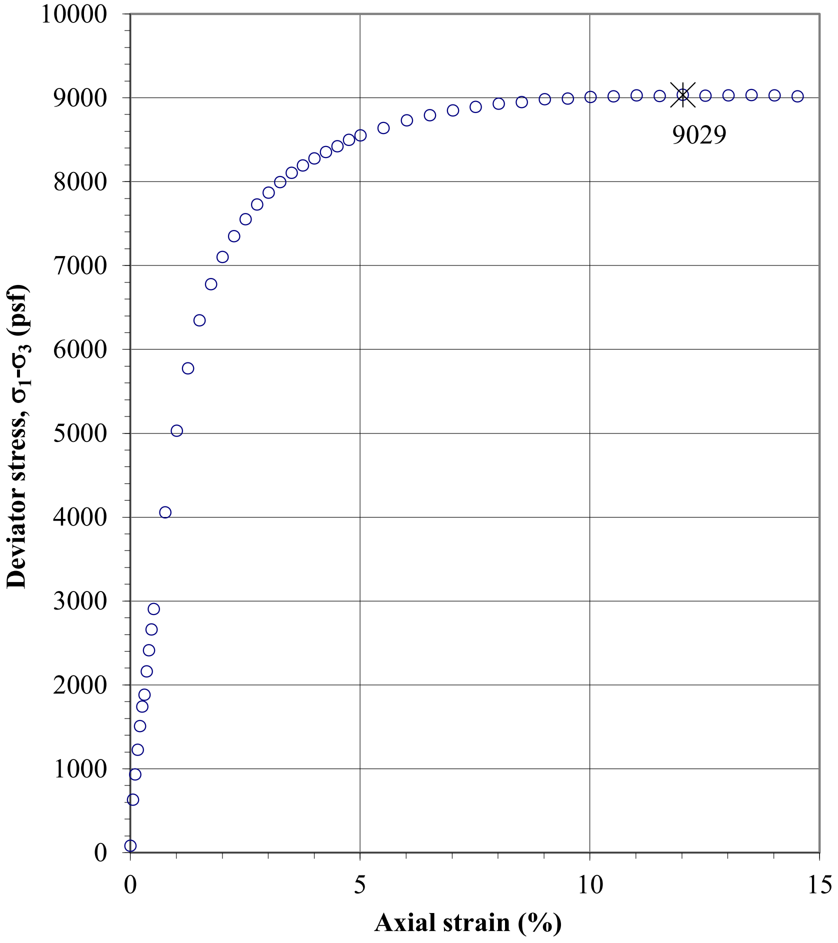
Project: **Terracon**
No: **M00385-498 (61225118)**
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

Boring No.: **B-03**
Sample:
Depth: **25.0-27.0'**
Sample Description: Brown silt
Sample type: Undisturbed-trimmed from Shelby tube

Specific gravity, Gs	2.70	Assumed
Sample height, H (in.)	5.730	
Sample diameter, D (in.)	2.861	
Sample volume, V (ft^3)	0.0213	
Wt. rings + wet soil (g)	1284.15	
Wt. rings/tare (g)	281.00	
Moist soil, Ws (g)	1003.15	
Moist unit wt., γ_m (pcf)	103.7	
Dry unit wt., γ_d (pcf)	**84.9**	
Saturation (%)	60.5	
Void ratio, *e*	0.99	

Wet soil + tare (g)	308.91
Dry soil + tare (g)	280.38
Tare (g)	151.56
Water content, w (%)	**22.1**
Confining stress, σ_3 (psf)	3587
Shear rate (in/min)	0.0172
Strain at failure, ε_f (%)	12.02
Deviator stress at failure, $(\sigma_1-\sigma_3)_f$ (psf)	9029
Shear stress at failure, $q_f = (\sigma_1-\sigma_3)_f/2$ (psf)	4515

Axial Strain	σ_d σ_1-σ_3	Q 1/2 σ_d
0.00	75.6	37.8
0.06	626.5	313.3
0.11	927.2	463.6
0.16	1222.5	611.2
0.21	1504.0	752.0
0.26	1736.8	868.4
0.31	1876.3	938.2
0.36	2155.6	1077.8
0.41	2409.5	1204.8
0.46	2657.5	1328.7
0.51	2899.1	1449.5
0.76	4051.8	2025.9
1.01	5025.6	2512.8
1.26	5769.6	2884.8
1.51	6339.9	3169.9
1.76	6771.2	3385.6
2.01	7097.5	3548.7
2.26	7344.2	3672.1
2.51	7546.7	3773.4
2.76	7721.5	3860.8
3.01	7862.0	3931.0
3.26	7989.5	3994.8
3.51	8100.3	4050.2
3.76	8189.8	4094.9
4.01	8272.9	4136.5
4.26	8349.4	4174.7
4.51	8416.4	4208.2
4.76	8492.0	4246.0
5.01	8544.9	4272.5
5.51	8632.8	4316.4
6.02	8725.9	4362.9
6.52	8788.4	4394.2
7.02	8843.0	4421.5
7.52	8885.1	4442.6
8.02	8925.5	4462.7
8.52	8944.5	4472.2
9.02	8976.2	4488.1
9.52	8983.9	4492.0
10.02	9004.2	4502.1
10.52	9010.7	4505.4
11.02	9023.0	4511.5
11.52	9014.2	4507.1
12.02	9029.3	4514.7
12.52	9021.1	4510.5
13.02	9022.0	4511.0
13.52	9028.7	4514.3
14.02	9024.5	4512.2
14.52	9012.8	4506.4



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Reviewed:____________

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

(ASTM D2850)

Project: Terracon

No: M00385-498 (61225118)

Location: Jacobs - 118th South Water Tanks

Date: 3/6/2023

By: EH

Boring No.: B-06

Sample:

Depth: 32.5-34.3'

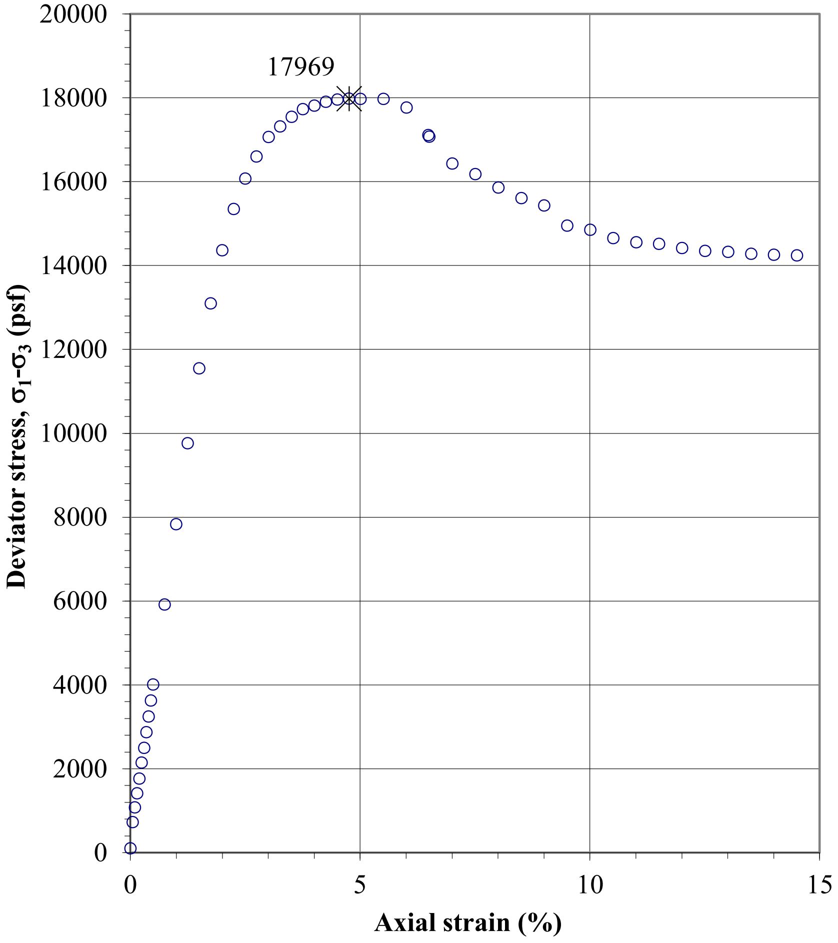
Sample Description: Brown silt with sand

Sample type: Undisturbed-trimmed from thin-wall

Specific gravity, Gs	2.70	Assumed
Sample height, H (in.)	5.639	
Sample diameter, D (in.)	2.419	
Sample volume, V (ft^3)	0.0150	
Wt. rings + wet soil (g)	1007.75	
Wt. rings/tare (g)	281.00	
Moist soil, Ws (g)	726.75	
Moist unit wt., γ_m (pcf)	106.8	
Dry unit wt., γ_d (pcf)	**86.8**	
Saturation (%)	65.8	
Void ratio, *e*	0.94	

Wet soil + tare (g)	910.37
Dry soil + tare (g)	774.65
Tare (g)	185.03
Water content, w (%)	**23.0**
Confining stress, σ_3 (psf)	3193
Shear rate (in/min)	0.0169
Strain at failure, ε_f (%)	4.76
Deviator stress at failure, $(\sigma_1\text{-}\sigma_3)_f$ (psf)	17969
Shear stress at failure, $q_f = (\sigma_1\text{-}\sigma_3)_f/2$ (psf)	8984

Axial Strain	σ_d $\sigma_1\text{-}\sigma_3$	Q 1/2 σ_d
0.00	89.8	44.9
0.05	721.6	360.8
0.10	1067.6	533.8
0.15	1406.6	703.3
0.20	1760.2	880.1
0.25	2137.6	1068.8
0.30	2489.6	1244.8
0.35	2861.2	1430.6
0.40	3235.0	1617.5
0.45	3615.3	1807.7
0.50	3997.2	1998.6
0.75	5905.3	2952.6
1.00	7824.8	3912.4
1.25	9751.1	4875.5
1.50	11541.3	5770.7
1.75	13086.2	6543.1
2.00	14355.1	7177.5
2.25	15339.0	7669.5
2.50	16063.2	8031.6
2.75	16590.8	8295.4
3.01	17055.4	8527.7
3.26	17309.4	8654.7
3.51	17534.8	8767.4
3.76	17715.5	8857.8
4.01	17799.4	8899.7
4.26	17896.0	8948.0
4.51	17948.0	8974.0
4.76	17968.9	8984.5
5.01	17961.9	8980.9
5.51	17965.4	8982.7
6.01	17756.5	8878.2
6.49	17103.7	8551.9
6.51	17066.3	8533.1
7.01	16423.8	8211.9
7.51	16167.8	8083.9
8.01	15847.4	7923.7
8.51	15595.7	7797.9
9.01	15422.6	7711.3
9.51	14942.0	7471.0
10.01	14841.4	7420.7
10.51	14640.4	7320.2
11.01	14547.5	7273.8
11.51	14508.4	7254.2
12.01	14403.7	7201.9
12.51	14342.4	7171.2
13.01	14316.1	7158.0
13.51	14272.7	7136.4
14.01	14247.0	7123.5
14.51	14232.7	7116.4



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Reviewed:____________

Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

(ASTM D2850)

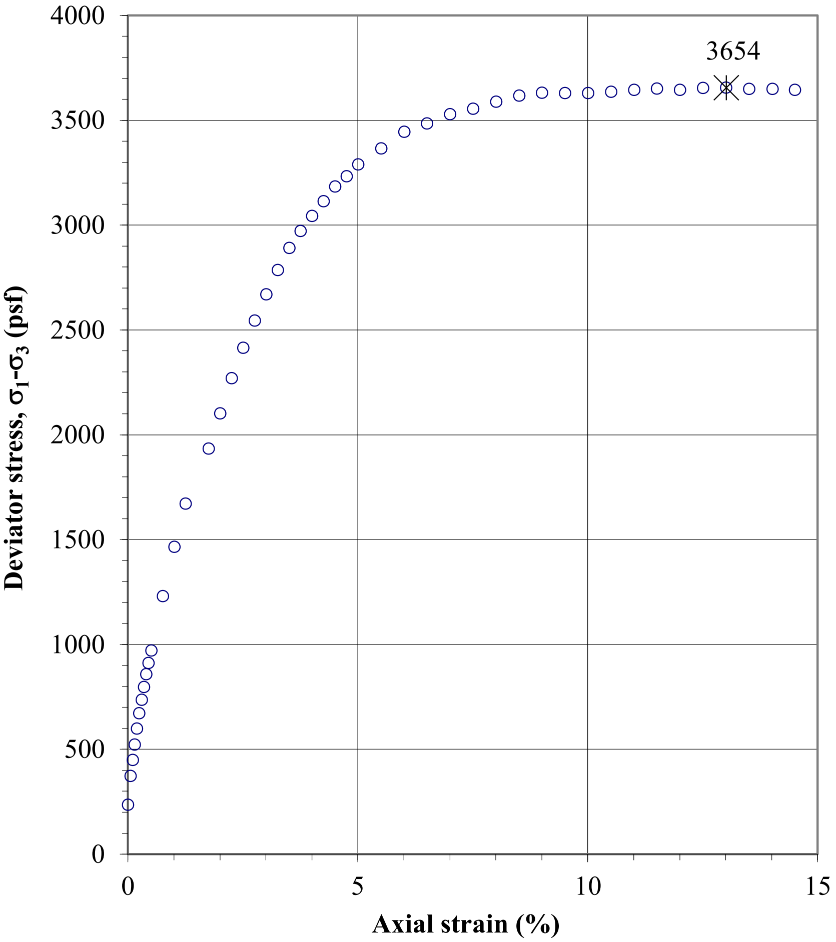
Project: **Terracon**
No: **M00385-498 (61225118)**
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

Boring No.: **B-06**
Sample:
Depth: **40.0-42.0'**
Sample Description: Brown clay with gravel
Sample type: Undisturbed-trimmed from thin-wall

Specific gravity, Gs: 2.70 Assumed
Sample height, H (in.): 5.460
Sample diameter, D (in.): 2.379
Sample volume, V (ft^3): 0.0140
Wt. rings + wet soil (g): 999.48
Wt. rings/tare (g): 281.00
Moist soil, Ws (g): 718.48
Moist unit wt., γ_m (pcf): 112.8
Dry unit wt., γ_d (pcf): **93.9**
Saturation (%): 68.1
Void ratio, *e*: 0.80

Wet soil + tare (g): 868.89
Dry soil + tare (g): 748.78
Tare (g): 152.35
Water content, w (%): **20.1**
Confining stress, σ_3 (psf): 4093
Shear rate (in/min): 0.0164
Strain at failure, ε_f (%): 13.01
Deviator stress at failure, $(\sigma_1\text{-}\sigma_3)_f$ (psf): 3654
Shear stress at failure, $q_f = (\sigma_1\text{-}\sigma_3)_f/2$ (psf): 1827

Axial Strain	σ_d σ_1-σ_3	Q 1/2 σ_d
0.00	233.1	116.5
0.06	370.4	185.2
0.11	447.1	223.5
0.15	521.0	260.5
0.20	596.3	298.2
0.25	670.2	335.1
0.30	734.5	367.2
0.35	795.0	397.5
0.40	856.9	428.5
0.45	910.3	455.2
0.51	969.4	484.7
0.76	1228.7	614.4
1.01	1464.2	732.1
1.26	1669.4	834.7
1.76	1932.8	966.4
2.01	2100.5	1050.2
2.26	2268.2	1134.1
2.51	2413.5	1206.8
2.76	2543.3	1271.7
3.01	2667.8	1333.9
3.26	2784.3	1392.1
3.51	2888.9	1444.5
3.76	2969.8	1484.9
4.01	3042.4	1521.2
4.26	3111.9	1556.0
4.51	3181.4	1590.7
4.76	3230.3	1615.2
5.01	3287.4	1643.7
5.51	3363.6	1681.8
6.01	3443.3	1721.7
6.51	3483.1	1741.5
7.01	3527.7	1763.9
7.51	3553.5	1776.8
8.01	3586.1	1793.1
8.51	3615.9	1808.0
9.01	3628.7	1814.3
9.51	3627.2	1813.6
10.01	3627.7	1813.9
10.51	3633.4	1816.7
11.01	3642.9	1821.5
11.51	3649.3	1824.7
12.01	3643.3	1821.6
12.51	3652.6	1826.3
13.01	3653.8	1826.9
13.51	3647.5	1823.7
14.02	3647.1	1823.5
14.51	3642.6	1821.3



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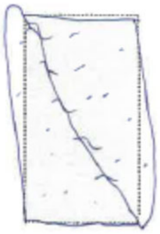
Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

(ASTM D2850)

Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

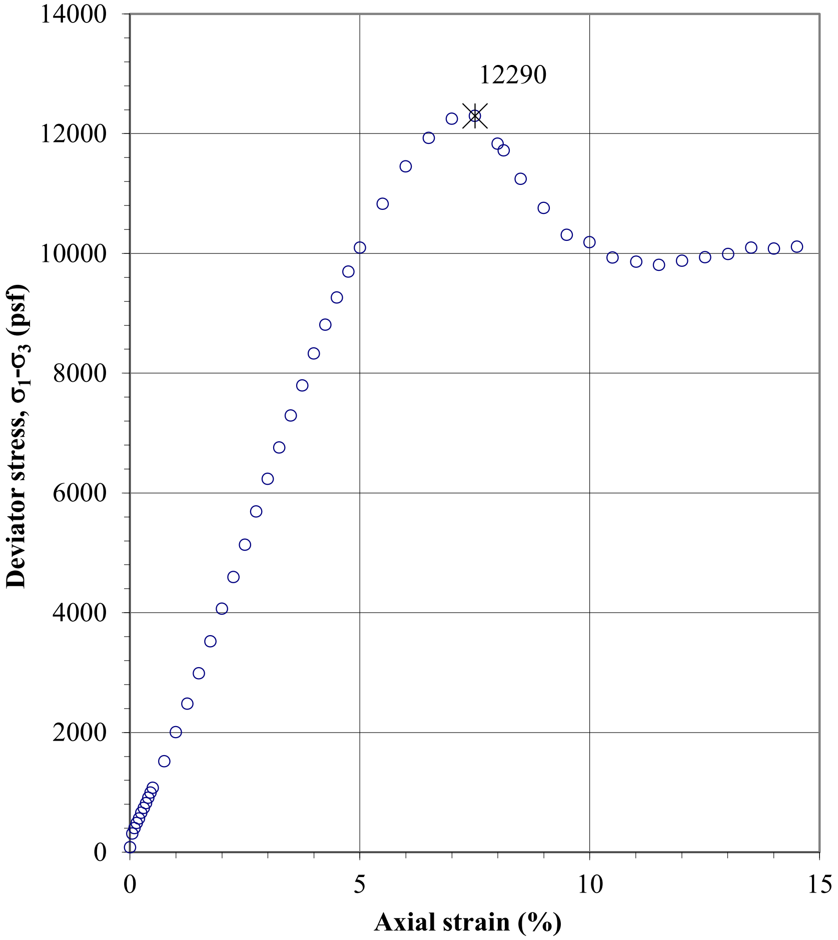
Boring No.: B-07
Sample:
Depth: 20.0-22.0'
Sample Description: Brown silt
Sample type: Undisturbed-trimmed from thin-wall

Specific gravity, Gs	2.70	Assumed
Sample height, H (in.)	5.351	
Sample diameter, D (in.)	2.403	
Sample volume, V (ft^3)	0.0140	
Wt. rings + wet soil (g)	612.10	
Wt. rings/tare (g)	0.00	
Moist soil, Ws (g)	612.10	
Moist unit wt., γ_m (pcf)	96.1	
Dry unit wt., γ_d (pcf)	**86.7**	
Saturation (%)	30.8	
Void ratio, *e*	0.95	



Wet soil + tare (g)	730.61
Dry soil + tare (g)	674.19
Tare (g)	151.13
Water content, w (%)	**10.8**
Confining stress, σ_3 (psf)	2313
Shear rate (in/min)	0.0161
Strain at failure, ε_f (%)	7.50
Deviator stress at failure, $(\sigma_1\text{-}\sigma_3)_f$ (psf)	12290
Shear stress at failure, $q_f = (\sigma_1\text{-}\sigma_3)_f/2$ (psf)	6145

Axial Strain	σ_d $\sigma_1\text{-}\sigma_3$	Q 1/2 σ_d
0.00	74.8	37.4
0.05	304.6	152.3
0.10	397.1	198.5
0.15	479.4	239.7
0.20	557.8	278.9
0.25	652.1	326.1
0.30	735.4	367.7
0.35	815.5	407.8
0.40	905.1	452.5
0.45	989.2	494.6
0.50	1069.4	534.7
0.75	1510.8	755.4
1.00	1997.0	998.5
1.25	2473.8	1236.9
1.50	2982.9	1491.5
1.75	3516.2	1758.1
2.00	4060.4	2030.2
2.25	4587.6	2293.8
2.50	5128.0	2564.0
2.75	5684.8	2842.4
3.00	6229.5	3114.7
3.25	6753.6	3376.8
3.50	7286.8	3643.4
3.75	7790.6	3895.3
4.00	8321.7	4160.8
4.25	8801.1	4400.5
4.50	9256.1	4628.1
4.75	9692.1	4846.0
5.00	10089.0	5044.5
5.50	10822.0	5411.0
6.00	11448.3	5724.2
6.50	11922.2	5961.1
7.00	12242.1	6121.1
7.50	12290.5	6145.2
8.00	11827.1	5913.5
8.13	11715.2	5857.6
8.50	11236.5	5618.2
9.00	10751.3	5375.7
9.50	10301.7	5150.9
10.00	10181.7	5090.9
10.50	9927.0	4963.5
11.01	9853.7	4926.9
11.51	9803.1	4901.6
12.01	9873.5	4936.8
12.51	9929.2	4964.6
13.01	9985.5	4992.8
13.51	10088.6	5044.3
14.01	10073.2	5036.6
14.51	10106.3	5053.2



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Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils

(ASTM D2850)

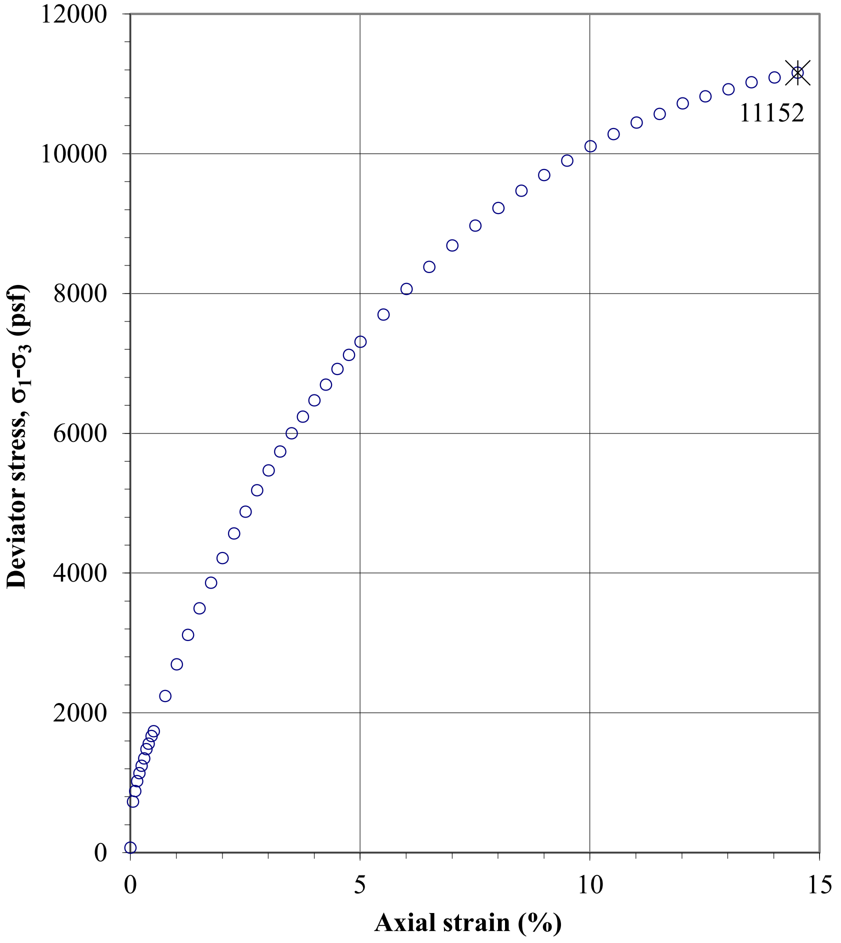
Project: Terracon
No: M00385-498 (61225118)
Location: Jacobs - 118th South Water Tanks
Date: 3/6/2023
By: EH

Boring No.: B-08
Sample:
Depth: 65.0-66.3'
Sample Description: Reddish brown sandy clay
Sample type: Undisturbed-trimmed from thin-wall

Specific gravity, Gs	2.70	Assumed
Sample height, H (in.)	4.976	
Sample diameter, D (in.)	2.373	
Sample volume, V (ft^3)	0.0127	
Wt. rings + wet soil (g)	963.72	
Wt. rings/tare (g)	281.00	
Moist soil, Ws (g)	682.72	
Moist unit wt., γ_m (pcf)	118.2	
Dry unit wt., γ_d (pcf)	**99.9**	
Saturation (%)	71.5	
Void ratio, *e*	0.69	

Wet soil + tare (g)	808.81
Dry soil + tare (g)	703.63
Tare (g)	127.97
Water content, w (%)	**18.3**
Confining stress, σ_3 (psf)	6101
Shear rate (in/min)	0.0149
Strain at failure, ε_f (%)	14.52
Deviator stress at failure, $(\sigma_1\text{-}\sigma_3)_f$ (psf)	11152
Shear stress at failure, $q_f = (\sigma_1\text{-}\sigma_3)_f/2$ (psf)	5576

Axial Strain	σ_d σ_1-σ_3	Q 1/2 σ_d
0.00	67.2	33.6
0.06	726.5	363.2
0.11	875.7	437.8
0.15	1019.1	509.5
0.20	1133.6	566.8
0.25	1239.1	619.6
0.30	1341.8	670.9
0.35	1474.8	737.4
0.40	1552.6	776.3
0.46	1662.9	831.4
0.51	1730.9	865.4
0.76	2233.9	1116.9
1.01	2688.1	1344.0
1.26	3111.0	1555.5
1.51	3489.6	1744.8
1.76	3854.0	1927.0
2.01	4209.3	2104.6
2.26	4561.4	2280.7
2.51	4873.5	2436.7
2.76	5179.1	2589.5
3.01	5462.5	2731.3
3.26	5730.9	2865.5
3.51	5992.2	2996.1
3.76	6233.5	3116.8
4.01	6465.6	3232.8
4.26	6691.3	3345.7
4.51	6916.2	3458.1
4.76	7114.9	3557.4
5.01	7305.0	3652.5
5.51	7694.1	3847.0
6.01	8056.8	4028.4
6.51	8372.7	4186.3
7.01	8680.9	4340.5
7.51	8963.9	4482.0
8.01	9218.6	4609.3
8.51	9462.0	4731.0
9.01	9689.6	4844.8
9.51	9892.4	4946.2
10.02	10102.0	5051.0
10.52	10275.6	5137.8
11.02	10438.6	5219.3
11.52	10563.2	5281.6
12.02	10713.7	5356.9
12.52	10812.5	5406.2
13.02	10914.8	5457.4
13.52	11018.1	5509.0
14.02	11082.9	5541.4
14.52	11152.2	5576.1



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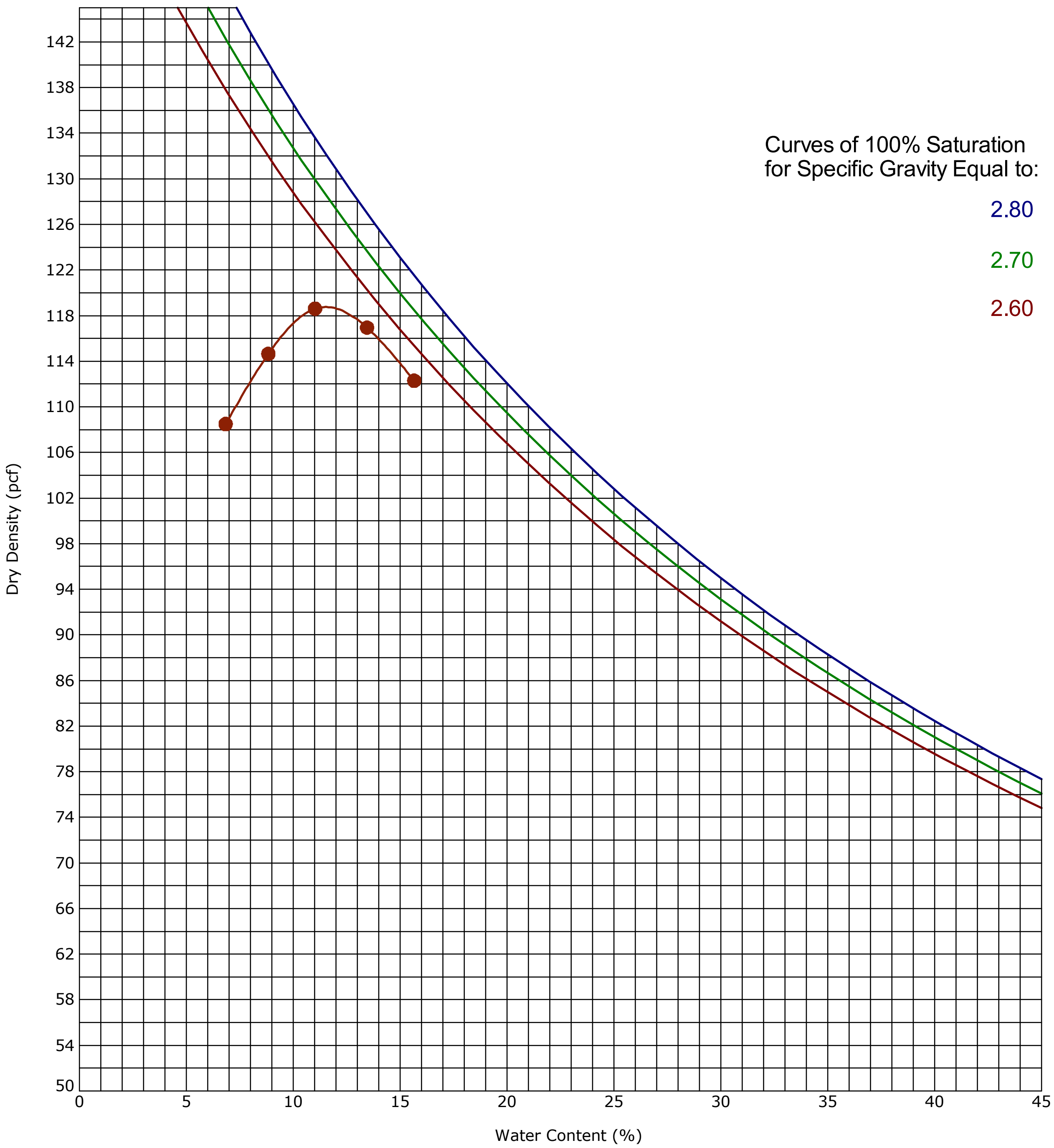
Moisture-Density Relationship

ASTM D698-Method D



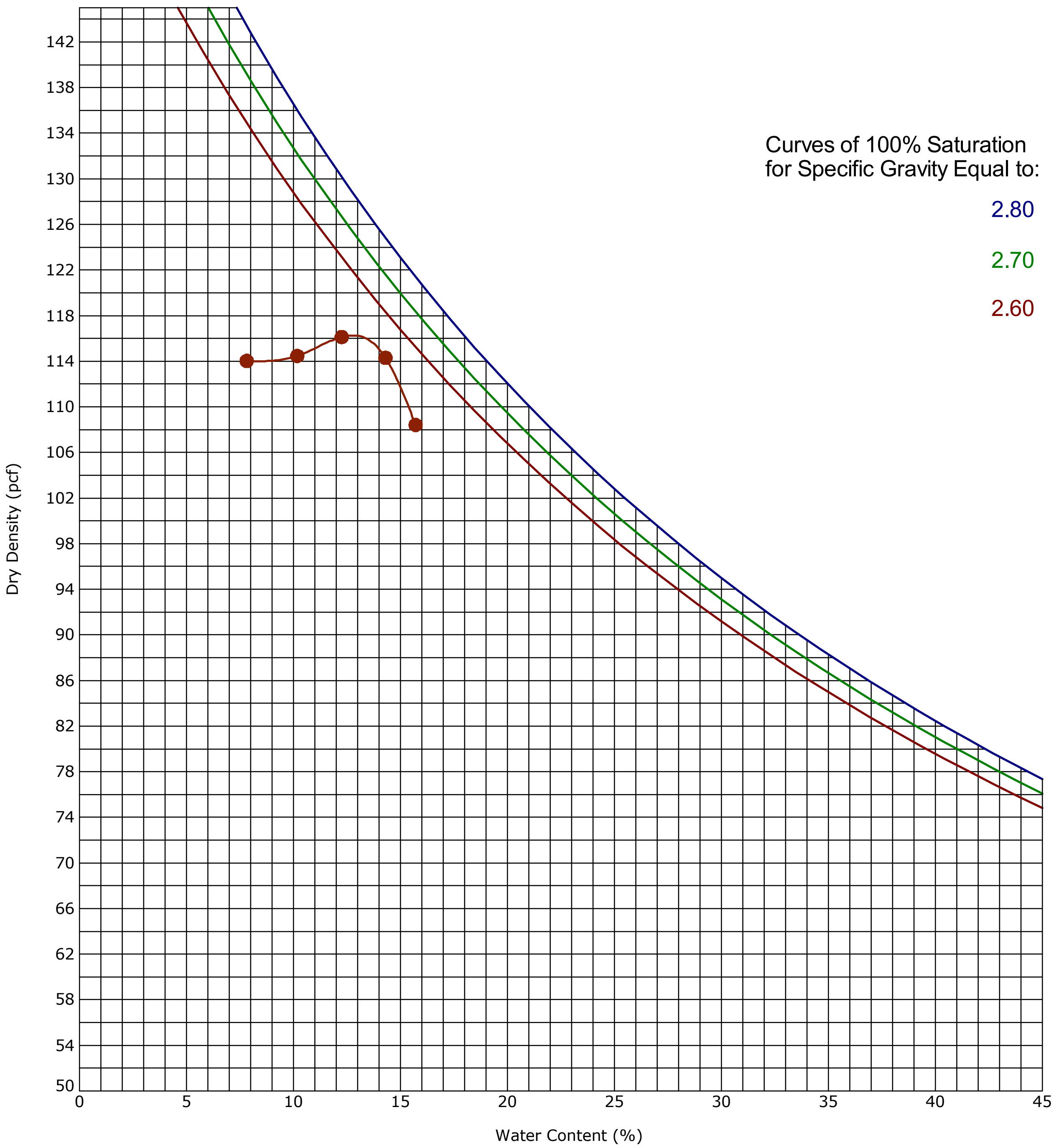
Boring ID	Depth (Ft)	Description of Materials
B-01	0.5 - 1.5	LEAN CLAY with SAND(CL)

Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
76	0.0	26	17	9	ASTM D698-Method D	118.8	11.5

6949 S High Tech Dr Ste 100
Midvale, UT

Moisture-Density Relationship

ASTM D698-Method D



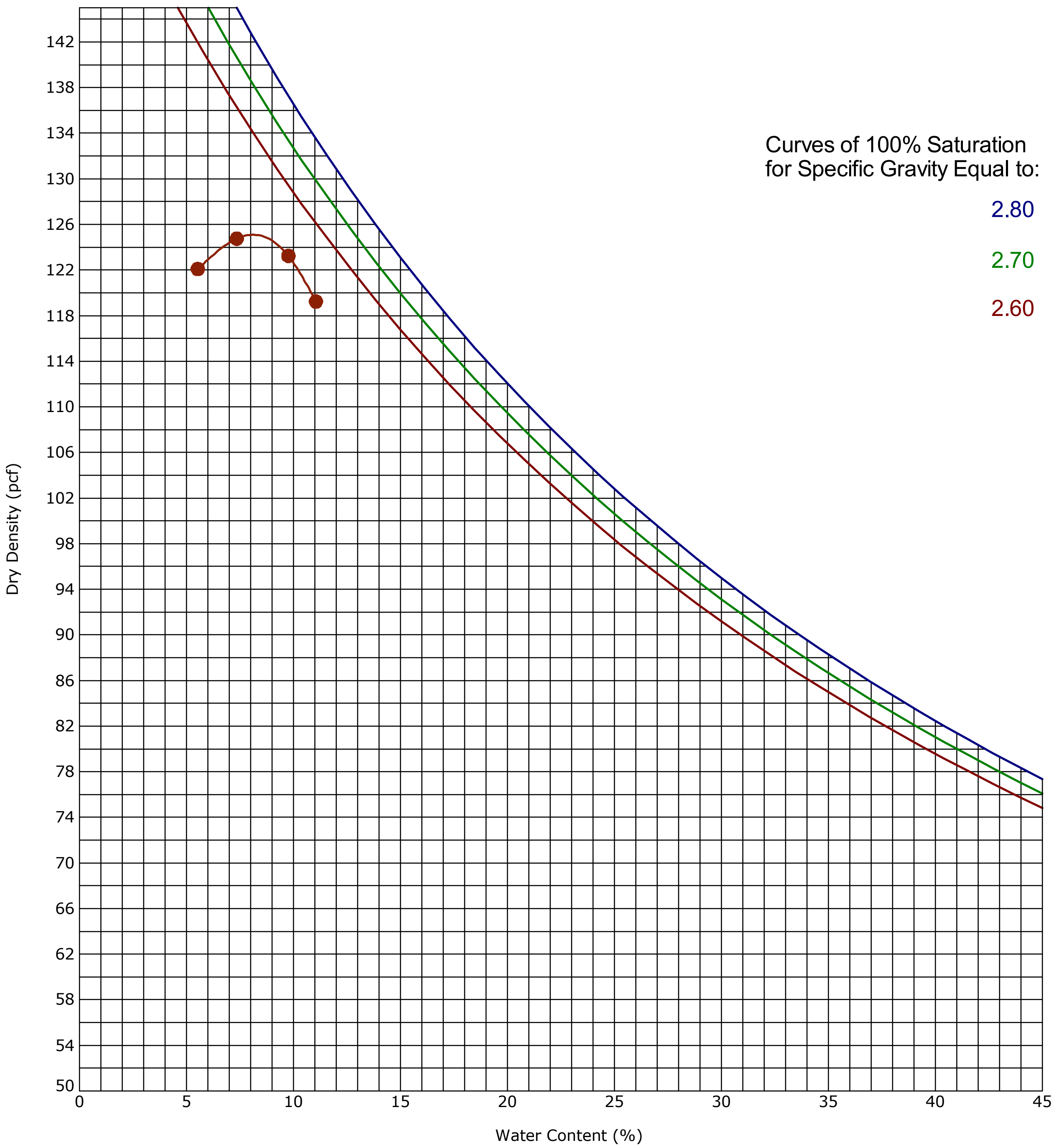
Boring ID	Depth (Ft)	Description of Materials
B-02	0.25 - 1.5	SILTY CLAY with SAND(CL-ML)

Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
72	0.0	23	18	5	ASTM D698-Method D	116.3	12.8

6949 S High Tech Dr Ste 100
Midvale, UT

Moisture-Density Relationship

ASTM D698-Method D



Boring ID	Depth (Ft)	Description of Materials
B-04	0.25 - 1	SILTY, CLAYEY SAND with GRAVEL(SC-SM)

Fines (%)	Fraction > mm size	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
48	0.0	24	17	7	ASTM D698-Method D	125.1	8.1

Client

Jacobs Engineering Group Inc
Holladay, UT

Project

Jacobs - 118th Water Tank
61225118

Date Received: 2/22/2023

Results from Corrosion Testing

Sample Location	B-01	B-01	B-02	B-04
Sample Depth (ft.)	0.5'-1.5'	15.0'-16.5'	0.3'-1.5'	0.3'-1.0'
pH Analysis, ASTM G 51	8.07	8.96	7.22	8.84
Water Soluble Sulfate (SO4), ASTM D516-07 (mg/kg)	47	1618	96	129
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil	Nil	Nil
Chlorides, APHA 4500-Cl$^-$ E, (mg/kg)	376	1180	320	219
Red-Ox, ASTM G 200, (mV)	+476	+479	+494	+460
Total Salts, AWWA 2520 B, (mg/kg)	621	3585	545	755
Resistivity (Saturated), ASTM G 57, (ohm-cm)	3300	390	3100	4000

Analyzed By: ChrisAnne Ross
Field Geologist

Client

Jacobs Engineering Group Inc
Holladay, UT

Project

Jacobs - 118th Water Tank
61225118

Date Received: 2/22/2023

Results from Corrosion Testing

Sample Location	B-06	B-08
Sample Depth (ft.)	15.0'-16.5'	25.0'-26.5'
pH Analysis, ASTM G 51	9.48	9.79
Water Soluble Sulfate (SO4), ASTM D516-07 (mg/kg)	622	332
Sulfides, AWWA 4500-S D, (mg/kg)	Nil	Nil
Chlorides, APHA 4500-Cl$^-$ E, (mg/kg)	333	292
Red-Ox, ASTM G 200, (mV)	+453	+442
Total Salts, AWWA 2520 B, (mg/kg)	1615	820
Resistivity (Saturated), ASTM G 57, (ohm-cm)	820	1300

Analyzed By: ChrisAnne Ross
Field Geologist

The tests were performed in general accordance with applicable ASTM and AWWA test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of our company. Test results transmitted herein are only applicable to the actual samples tested at the location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	**Group Name** [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	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 fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	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 above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	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:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (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% fines 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] $Cu = D_{60}/D_{10}$ $\quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[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.

[J] If Atterberg limits plot in shaded 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 soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

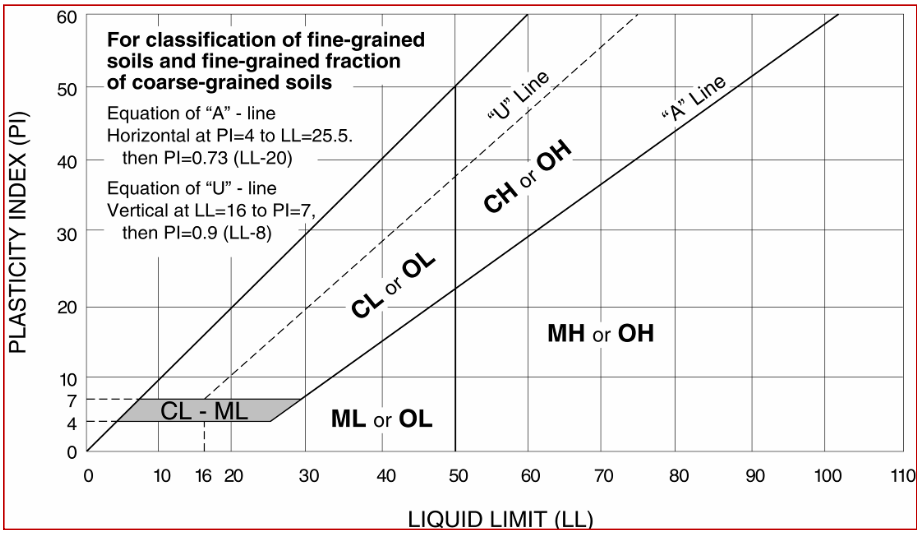
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[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.



General Notes

Sampling

⧗ Modified Dames & Moore Ring Sampler	✋ Grab Sample
■ Shelby Tube	⊠ Standard Penetration Test

Water Level

▽	Water Initially Encountered
▽	Water Level After a Specified Period of Time
▼	Water Level After a Specified Period of Time
▨	Cave In Encountered

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

Field Tests

N	Standard Penetration Test Resistance (Blows/Ft.)
(HP)	Hand Penetrometer
(T)	Torvane
(DCP)	Dynamic Cone Penetrometer
UC	Unconfined Compressive Strength
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

Descriptive Soil Classification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			**Consistency of Fine-Grained Soils** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Relative Density	**Standard Penetration or N-Value (Blows/Ft.)**	**Ring Sampler (Blows/Ft.)**	**Consistency**	**Unconfined Compressive Strength Qu (tsf)**	**Standard Penetration or N-Value (Blows/Ft.)**	**Ring Sampler (Blows/Ft.)**
Very Loose	0 - 3	0 - 6	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	0.25 to 0.50	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium Stiff	0.50 to 1.00	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	1.00 to 2.00	8 - 15	10 - 18
Very Dense	> 50	> 99	Very Stiff	2.00 to 4.00	15 - 30	19 - 42
			Hard	> 4.00	> 30	> 42

Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Intermountain GeoEnvironmental Services, Inc.
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(801) 270-9400

20 January 2023

Josh White
Terracon
6949 S High Tech Drive, Suite 100
Midvale, Utah 84047

RE: SEISMIC VELOCITY SURVEY (V_{s100}) – SOUTH JORDAN, UT

Based on the project objective and site conditions, IGES conducted a series of shear wave velocity surveys near U-111 and 11800 South, South Jordan, UT (Figure 1). The objective of the surveys is to determine the shear wave velocity profile of the near surface V_{s100} for the purpose of determining the seismic site class and ground motion studies.

Seismic Shear Wave Velocity Survey
Seismic Surface Waves methods such as MASW (Multichannel Analysis of Surface Waves), MAM (Microtremor Array Measurements), and ReMi (Refraction Microtremor) use the dispersive characteristics of surface waves to determine the variation of the seismic shear wave velocity with depth. Velocity data are derived by analyzing seismic surface waves generated by a controlled impulse or by random ambient sources and received by an array of geophones. Parameters of the survey are in Table 1.

MAM (Microtremor Array Measurements)
Figure A1 shows the dispersion curve of the data from Test 1 with phase velocity (ft/s) of the surface wave as a function of frequency (Hz). Figure A2 shows the shear wave velocity profile (a 1-D sounding of velocity as a function of depth) of Test 1 modeled from the Test 1 dispersion curve. The shear velocity of the near surface of Test 1 is calculated to be 938.5 ft/s. Figure A3 shows the dispersion curve of Test 2, and Figure A4 shows the shear wave velocity profile of Test 2. The shear velocity of the near surface of Test 2 is calculated to be 915.2 ft/s.

The ambient MAM data was supplemented with 10 minutes of hammer blows to produce a smooth broad-spectrum curve. Soundings are in Appendix A.

MASW (Multichannel Analysis of Surface Waves)
MASW data was derived by analyzing seismic surface waves generated by a controlled impulse using a 12 lb. hammer. Soundings are in Appendix B.

Figure B1 shows the dispersion curve of the MASW data from Test 1 with phase velocity (ft/s) of the surface wave as a function of frequency (Hz). Figure B2 shows the MASW shear wave velocity profile (a 1-D sounding of velocity as a function of depth) of Test 1 modeled from the Test 1 dispersion curve. The shear velocity of the near surface of Test 1 is calculated to be 978.2 ft/s. Figure B3 shows the dispersion curve of the MASW data of Test 2, and Figure B4 shows the MASW shear wave velocity profile of Test 2. The shear velocity of the near surface of Test 2 is calculated to be 960.7 ft/s.

Table 1: Test recording parameters

Test location	South Jordan, UT
Test date	01/03/2023
Recording instrument	Summit Extreme Pro
S/N	SUX1018
Geophone natural period	4.5 Hz.
Geophone/station spacing	16.4 feet
Number of channels	24
Spread length / geometry	377 feet
Sample rate	4 milliseconds
Number of samples	15,000/trace
Record length	60 seconds
Total recording time / records	30 minutes
Low pass filter	½ Nyquist
Low cut filter	1 Hz.
Seismic source	12 lb. hammer (10 minutes)
Source location	-30 foot offset
Analysis software	SurfSeis™ Geometrics, Inc.

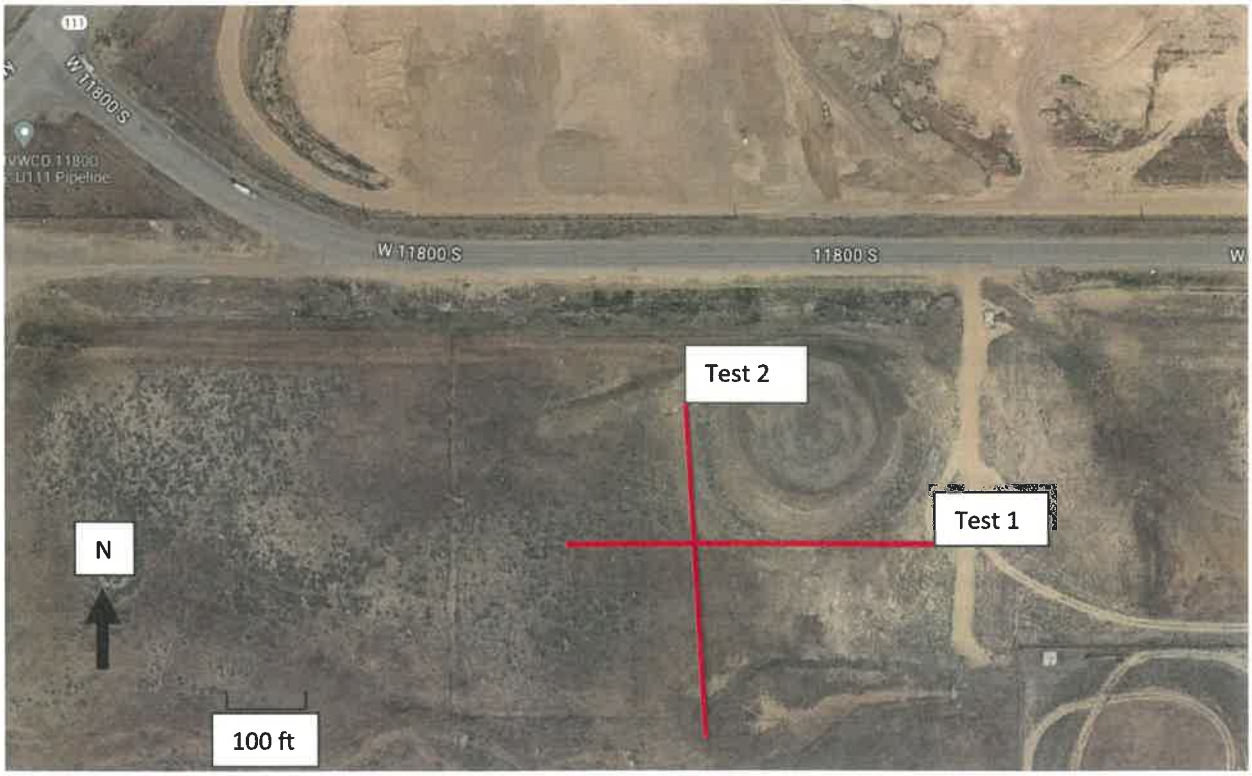

Figure 1: Area map of two shear wave velocity (V_{S100}) surveys near U-111 and 11800 South, South Jordan, UT.

Limitations

The concept of risk is a significant consideration of geophysical analyses. The analytical means and methods used in performing geophysical analyses and development of resulting data set does not constitute an exact science. Analytical tools used by geophysicists are based on limited data, empirical correlations, judgment, and experience. As such the solutions and resulting data set presented in this report cannot be considered risk-free and constitute IGES's best professional opinion based on the available data at the time they were developed. IGES has developed the preceding analyses, at a minimum, in accordance with generally accepted professional geophysical practices and care being exercised in the project area at the time our services were performed. No warrantees, guarantees or other representations are made.

The information contained in this report is based on limited field testing and understanding of the project. The data used in the preparation of this report were obtained by IGES for this project. It is very likely that variations in the soil, rock, and groundwater conditions exist between and beyond the points explored. The nature and extent of the variations may not be evident until construction occurs and/or additional explorations are completed.

This report was prepared for our client's exclusive use on the project identified in the foregoing. Use of the data contained herein for any other project described in this report is at the user's sole risk. It is the client's responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk.

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We trust you will find this report acceptable and look forward to discussing the project with you in more detail if necessary. If you have any questions regarding the work or any other aspects of our report, please contact the undersigned at your earliest convenience at (801) 270-9400.

Sincerely,
IGES, Inc.

Jacob Pratt	Megan Valdez
Geophysicist	Geophysical Engineer

Attachments:
- Appendix A
- Appendix B

APPENDIX A

Shear Wave Velocity Soundings

Microtremor Array Measurement (MAM)

(Depth is measured in feet below ground surface. Velocity is reported in feet per second.)

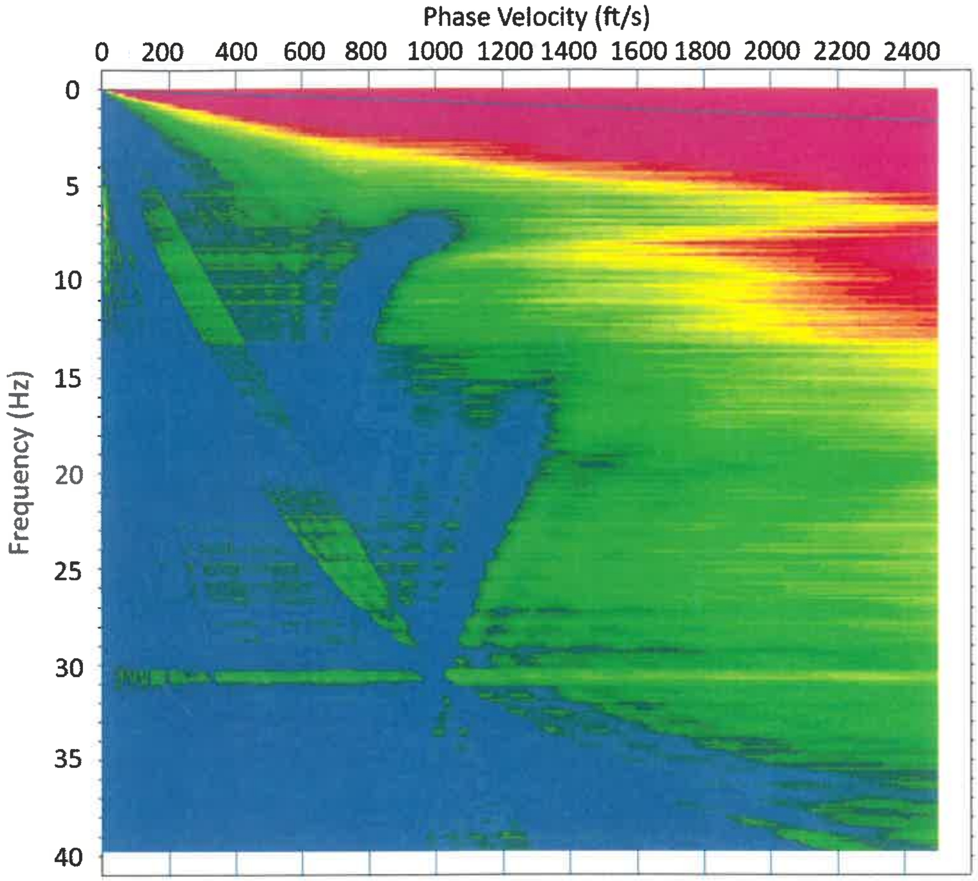

Figure A1: Dispersion curve of Test 1 showing phase velocity (ft/s) as a function of frequency (Hz)

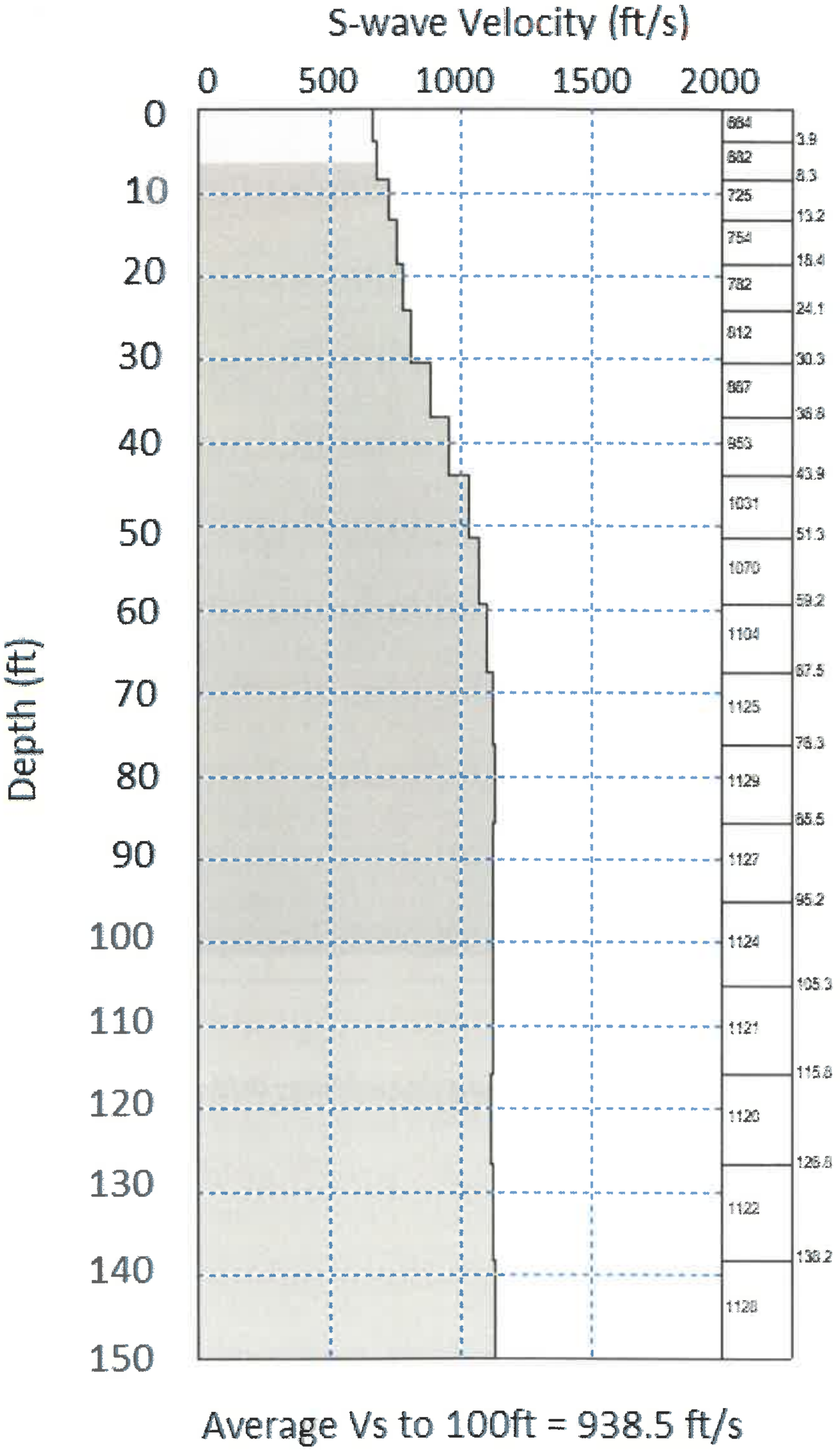

Figure A2: Shear wave velocity profile (a 1-D sounding of velocity as a function of depth) of Test 1 modeled from the Test 1 dispersion curve. The shear velocity of the near surface is calculated to be 938.5 ft/s.

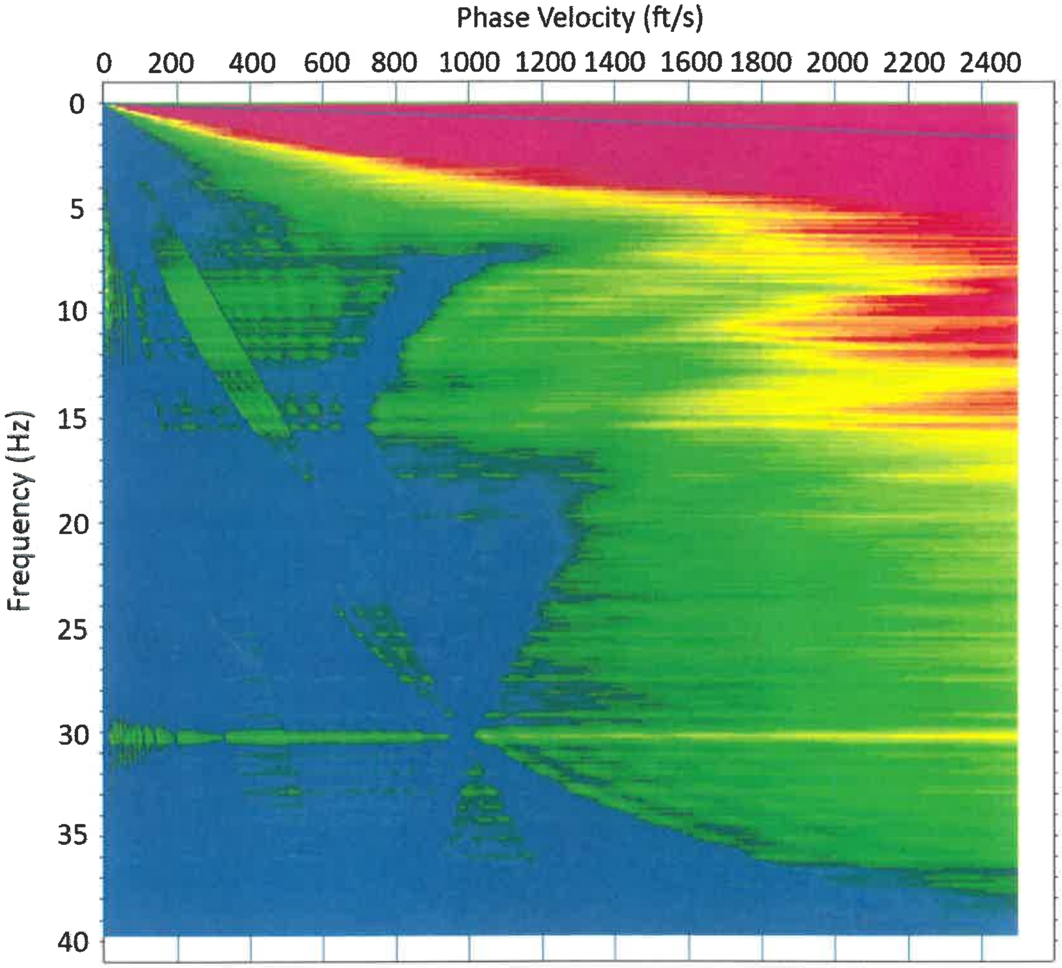

Figure A3: Dispersion curve of Test 2 showing phase velocity (ft/s) as a function of frequency (Hz).

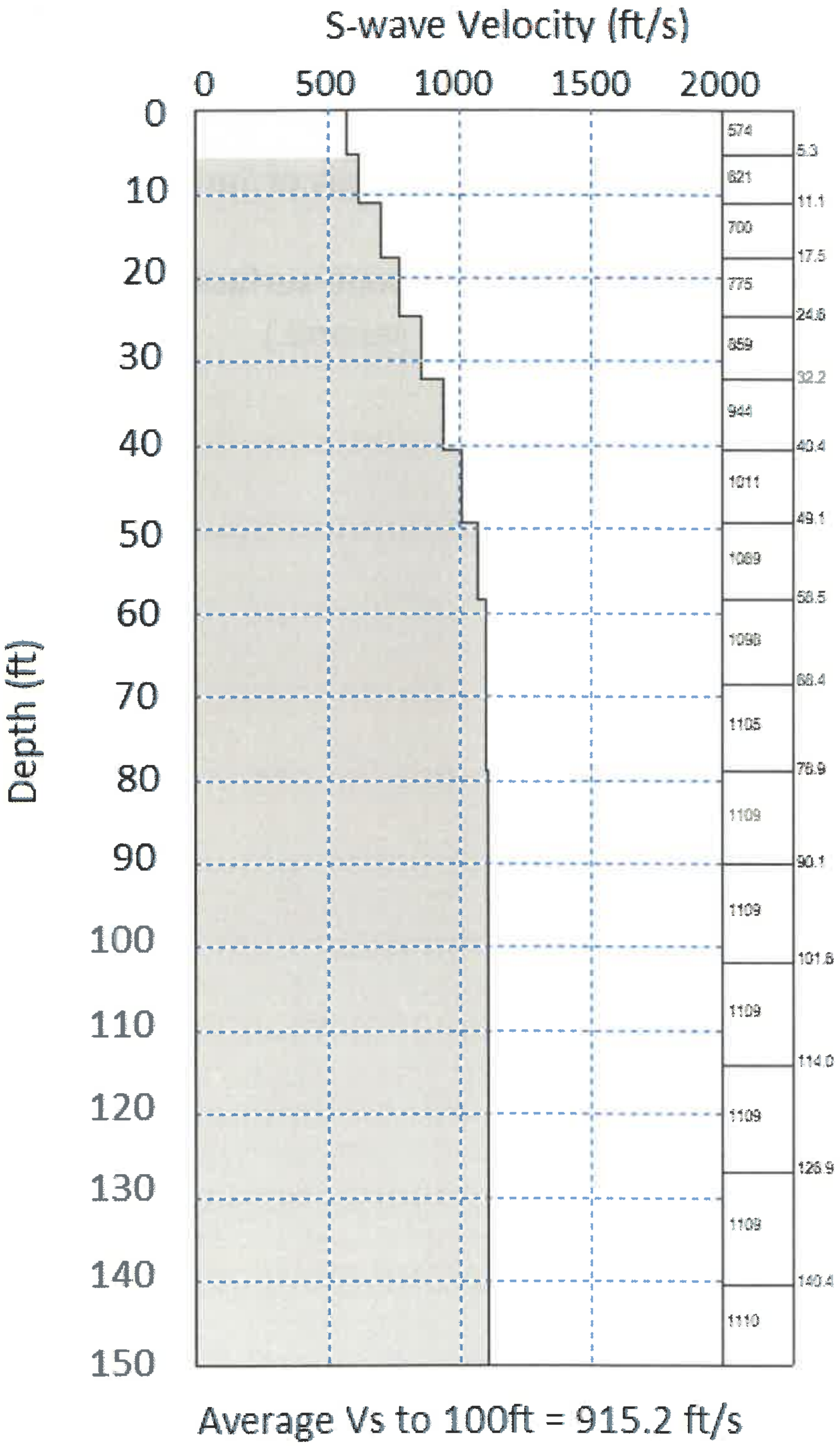

Figure A4: Shear wave velocity profile (a 1-D sounding of velocity as a function of depth) of Test 2 modeled from the Test 2 dispersion curve. The shear velocity of the near surface is calculated to be 915.2 ft/s.

APPENDIX B

Shear Wave Velocity Soundings

MASW (Multichannel Analysis of Surface Waves)

(Depth is measured in feet below ground surface. Velocity is reported in feet per second.)

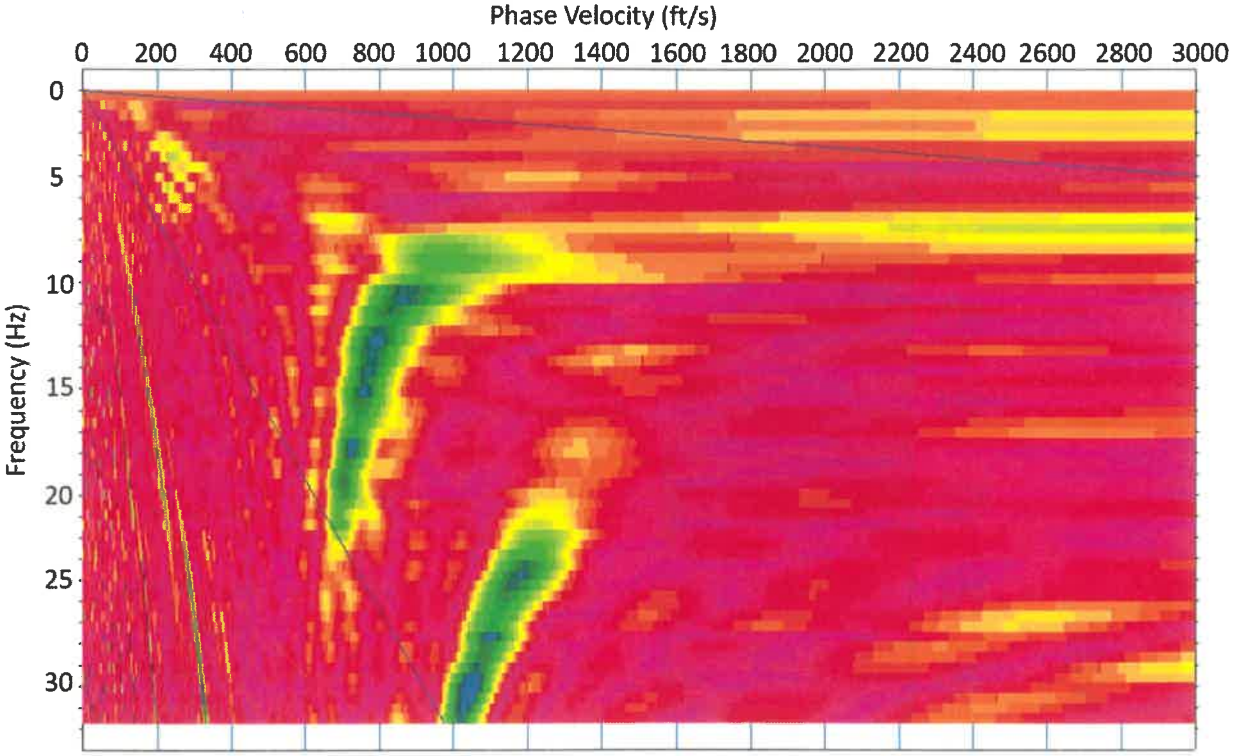

Figure B1: Dispersion curve of Test 1 MASW data showing phase velocity (ft/s) as a function of frequency (Hz).

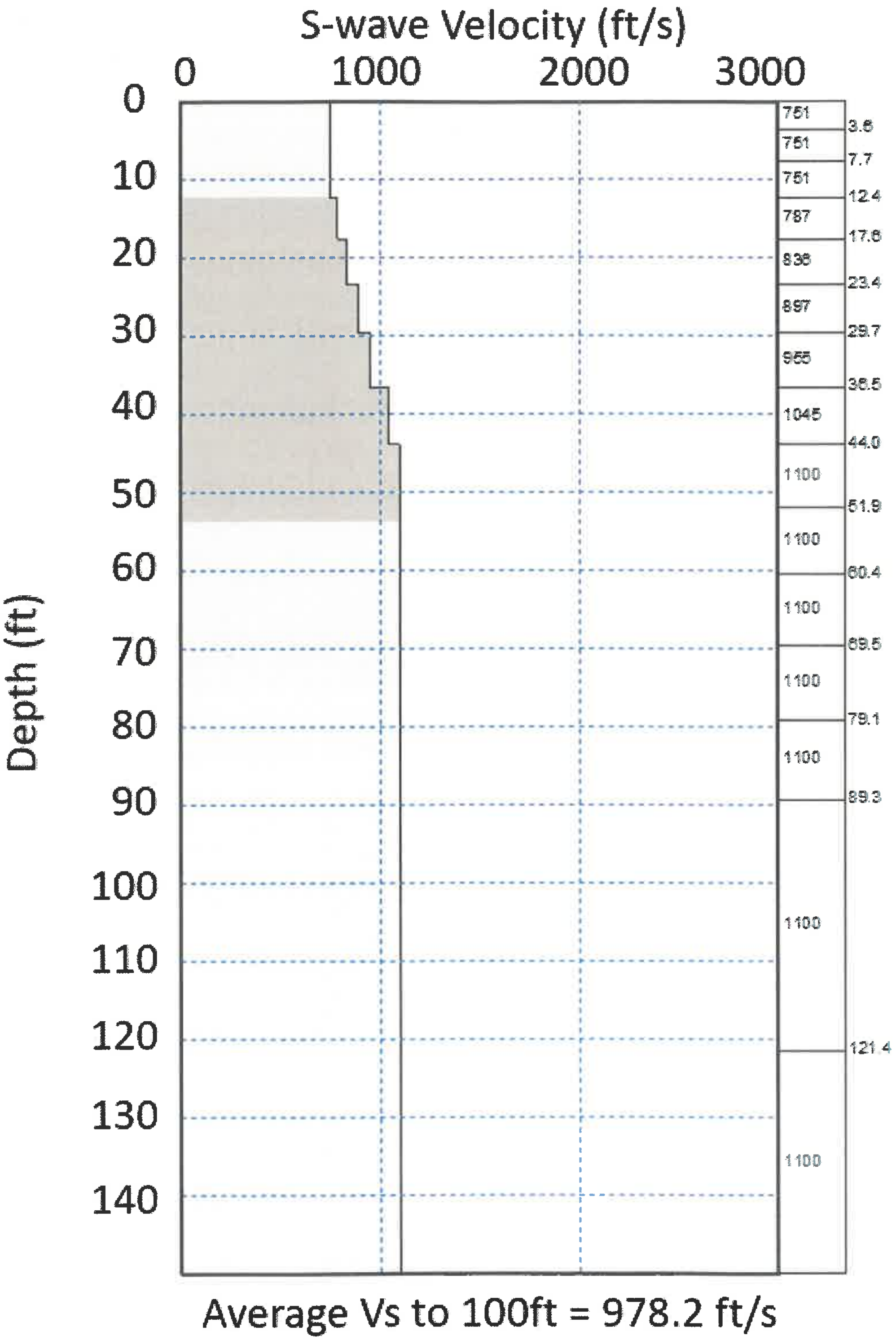

Figure B2: Shear wave velocity profile (a 1-D sounding of velocity as a function of depth) of Test 1 MASW data modeled from the Test 1 MASW dispersion curve. The shear velocity of the near surface is calculated to be 978.2 ft/s.

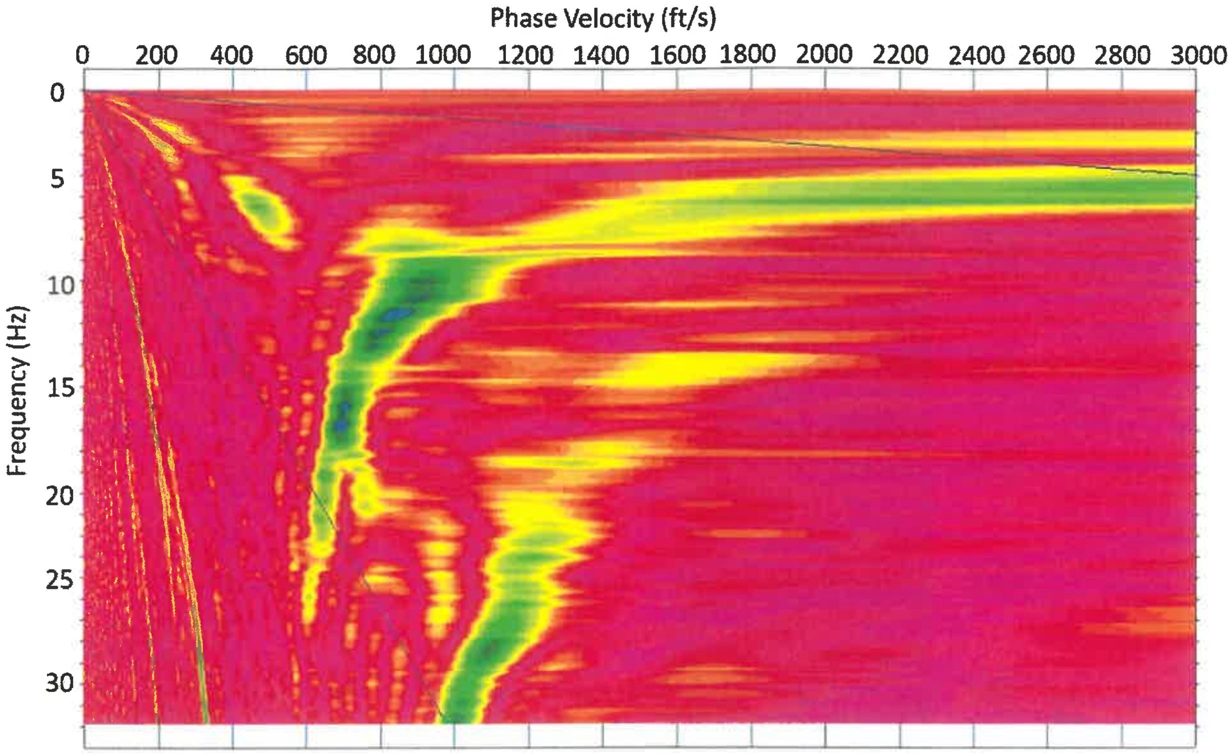

Figure B3: Dispersion curve of Test 2 MASW data showing phase velocity (ft/s) as a function of frequency (Hz).

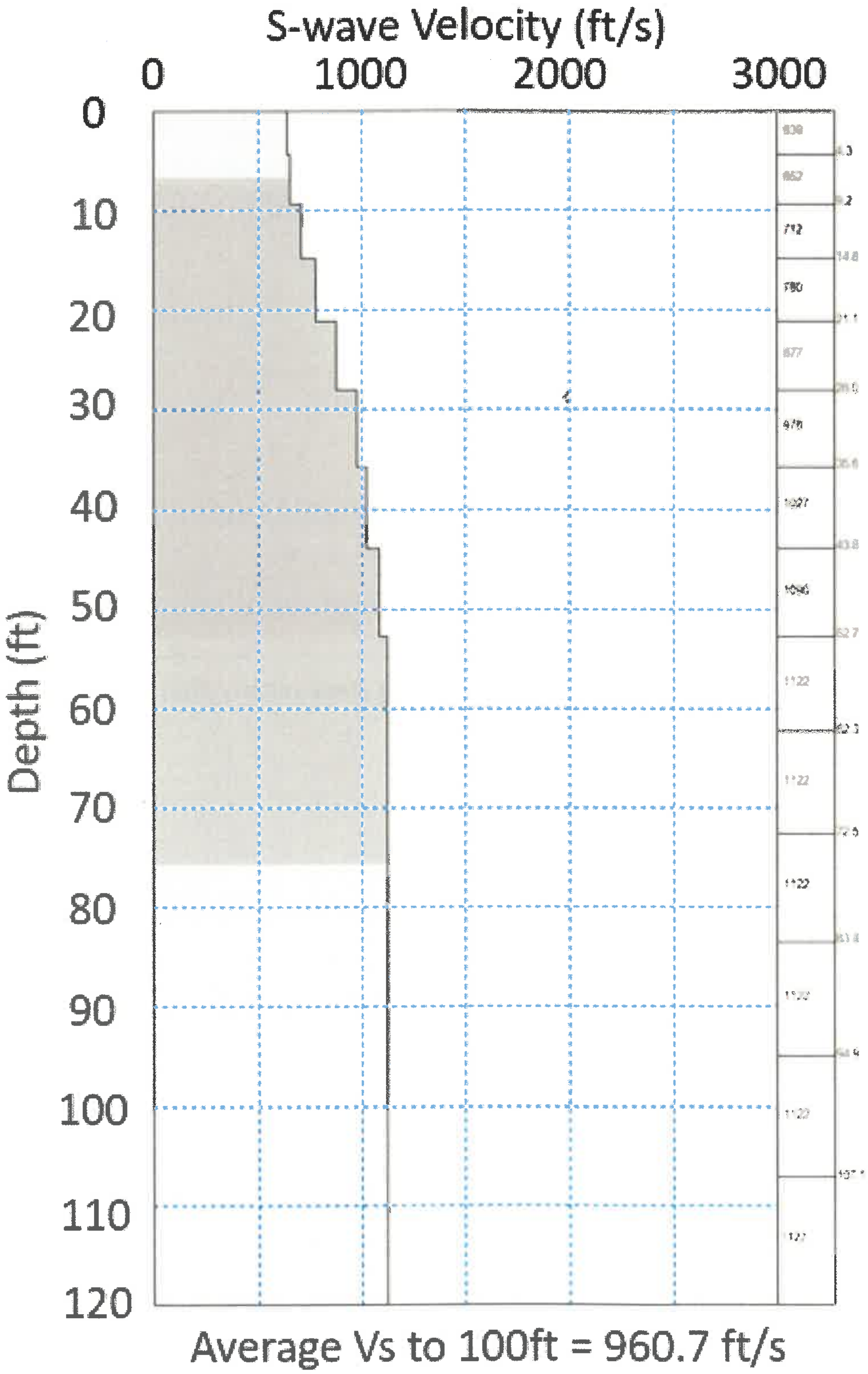

Figure B4: Shear wave velocity profile (a 1-D sounding of velocity as a function of depth) of Test 2 MASW data modeled from the Test 2 MASW dispersion curve. The shear velocity of the near surface is calculated to be 960.7 ft/s.