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GEOLOGIC HAZARDS EVALUATION AND PRELIMINARY GEOTECHNICAL INVESTIGATION

3819 JANITELL ROAD
COLORADO SPRINGS, COLORADO

Prepared for:

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Project No. CS20080-105

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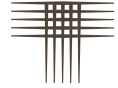


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FIG. 2 – SURFICIAL GEOLOGIC CONDITIONS

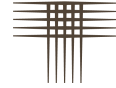
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APPENDIX B – LABORATORY TEST RESULTS

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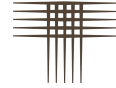
SCOPE

This report presents the results of our Geologic Hazards Evaluation and Preliminary Geotechnical Investigation for an approximately 100-acre site located at the intersection of Executive Circle and Janitell Road in Colorado Springs, Colorado (Fig. 1). The purpose of our investigation was to evaluate general geologic and subsurface conditions that influence development to assist in planning and preliminary design. This report serves as an update to a previous report prepared by our firm (CTL|T Project No. CS16646-115; report dated May 24, 2007). The scope was described in our Proposal (CS-26-0088) dated May 18, 2026. Evaluation of the property for the presence of potentially hazardous materials (Environmental Site Assessment) was not included in our scope.

This report is based on our understanding of subsurface conditions disclosed by exploratory borings, results of field and laboratory tests, engineering analysis, and our experience. It contains descriptions of the soil and bedrock conditions and groundwater levels found in our exploratory borings, and preliminary design concepts for foundations, floor systems, pavements, and surface drainage. The discussions of foundation, floor systems, and pavement are intended for planning purposes only. The geotechnical exploration and laboratory testing information contained in this report can be used as a supplement for future design-level investigations. CTL|Thompson can provide additional borings and design-level geotechnical investigation services as a separate scope of work. A brief summary of our conclusions and recommendations follows, with more detailed discussion in the report.

SUMMARY OF CONCLUSIONS

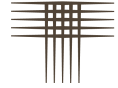
1. We did not identify conditions we believe preclude development of the site as planned. The conditions we identified that may pose hazards or constraints to development include the presence of shallow groundwater, flooding, and to a minor extent, expansive soils and bedrock.
2. Strata encountered in our exploratory borings (CTL|T Project No. CS16646-115) consisted of fill material underlain by natural sand and clay soils overlying claystone and shale bedrock. Generally, 4 or less feet of sandy clay overlie the granular soils at six boring locations. The shallower bedrock was in the southern portion of the site. Laboratory testing, and our experience, indicate the natural sand soils are generally non-expansive or exhibit low expansion potential and the natural clays exhibit low to moderate expansion potential. Layers of near surface, loose sands were encountered in five borings.



3. Free groundwater was encountered in all 13 borings at depths of 3 to 16 feet below the existing ground surface at the time of drilling. When the borings were checked several days after drilling, groundwater was measured in each of the borings at depths of 3 to 14 feet. At most locations, groundwater occurred at depths of less than 10 feet.
4. The presence of expansive soil and bedrock constitutes a geologic hazard. There is risk that the expansive material will heave and damage slabs-on-grade and foundations. We believe this condition can be mitigated with engineering design and construction methods commonly employed in this area.
5. We believe spread footing foundations or mat foundations underlain by natural sand or new moisture conditioned and densely compacted fill are appropriate for the site for light to moderately loaded structures. Heavily loaded structures may require deep foundation systems. Where expansive clay or claystone are encountered at or near shallow foundation elevations, it will be necessary to sub-excavate this material and reconstruct it as moisture conditioned, densely compacted fill prior to construction of shallow foundations. Some subgrade modification may be appropriate for slab-on-grade floors.
6. We believe site grading and utility trench excavation can be performed using conventional heavy-duty earthmoving and trenching equipment. Utility trench excavations that extend near or below groundwater levels will likely require dewatering.
7. Control of surface drainage will be critical to the performance of foundations and slabs-on-grade. Overall surface drainage should be designed to provide rapid removal of surface runoff away from the proposed residences. Conservative irrigation practices should be followed to avoid excessive wetting.
8. Design-level geotechnical investigations should be performed to further evaluate the conditions and develop specific recommendations for building foundations, floor systems, and pavements. Site grading should be observed and tested by personnel of our firm.

SITE CONDITIONS

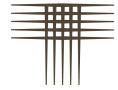
The site is an approximately 100-acre parcel of land located in the northwest 1/4 of Section 33, Township 14 South, Range 66 West of the sixth Principal Meridian, Colorado Springs, Colorado. Fountain Creek forms the eastern boundary of the site. The El Paso County Judicial Center is located directly east of the site, across Fountain Creek. Mule Ranch lies to the south of the site. An industrial building is located to the west with Janitell Road and Interstate-25 beyond. Commercial and industrial buildings and the El Pomar Youth Sports Park are located north of the site. The area to the west of Fountain Creek extending to the edge of the 100-year flood plain appears to have experienced little disturbance and contains numerous trees with some dirt paths extending through the property



The site generally slopes down to the southeast at grades of 2 to 5 percent towards Fountain Creek. The majority of the site was previously a golf course that contained manmade ponds. The golf course closed sometime between 2007 and 2011 based on aerial imagery. The following aerial images depict some of the changes that have occurred to the site. Fill was placed within the west central portion of the site at the time of construction of the existing building to the west.



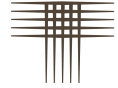
Nearmap Aerial Image of the Site – September 2016



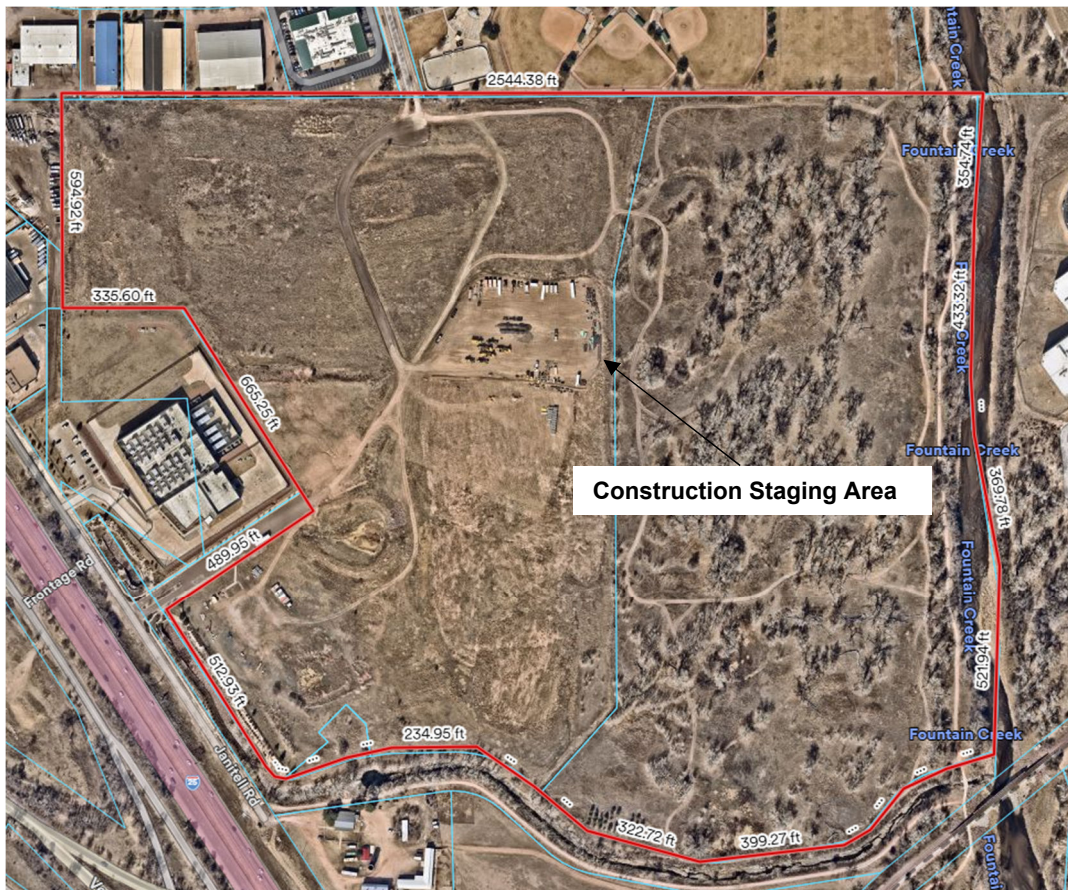
As shown below in the August 2017 aerial image, an area in the northwestern portion of the site was disturbed around the time of construction of the existing building to the west.



Nearmap Aerial Image of the Site – August 2017



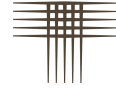
We visited the site on May 29, 2026, to observe the existing conditions. A construction staging area was present in the northern portion of the site, immediately west of the designated 100-year flood plain. Heavy equipment consisting of scrapers, excavators, etc. were parked and several storage containers were present along with various other equipment. Additionally, several small stockpiles of dirt and debris were present south of the staging area.



Nearmap Aerial Image of the Site – February 2026

PROPOSED DEVELOPMENT

A site plan prepared by Classic Consulting, dated May 12, 2026, was provided to our office. We understand the project will consist of construction of two industrial buildings and associated appurtenant equipment in the northern and central portion of the site. No structures were planned in the southern portion of the site at the time of this report. The eastern half of the site lies within a 100-year flood plain. No development is currently planned within this area.



PREVIOUS INVESTIGATION

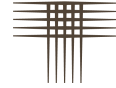
Our firm performed a Preliminary Geotechnical Investigation and Geologic Hazards Evaluation in 2007 for a 108-acres site referred to as the Vineyard Golf Course Parcels, (CTL|T Project No. CS16646-115; report dated May 24, 2007). The site included the subject site and the existing development located at 3233 Janitell Road.

We investigated the site in April 2007, by drilling ten, widely spaced, exploratory borings and three piezometers to depths between 20 to 30 feet. The approximate locations of the borings and piezometers are shown in Fig. 1. Based on the August 2017 aerial image, the piezometers were likely destroyed during construction of 3233 Janitell Road. Our representative observed the drilling operations, logged the subsurface conditions found in the borings, and obtained samples for laboratory testing. Graphical logs of the borings, including the results of field penetration resistance tests, and some laboratory test data obtained during our 2007 study are presented in Appendix A. Swell-consolidation and gradation test results from our 2007 study are presented in Appendix B. Laboratory test data are summarized in Table B-1.

SITE GEOLOGY

The site lies within the western edge of the Great Plains Physiographic adjacent to the Southern Rocky Mountains. The site was mapped by the Colorado Geological Survey (CGS) in 2000 by Carroll and Crawford; and 1979 by Trimble & Machette. Charles Robinson & Associates, Inc. mapped the area for El Paso County in 1977. The map by Carroll and Crawford shows the higher elevations as Broadway Alluvium (Qb). The lower elevation portions of the site adjacent to Fountain Creek mapped as Piney Creek Alluvium (Qp). Trimble & Machette and Charles Robinson & Associates, Inc. mapped the site similarly.

Based on subsurface information from our investigation colluvial soils overlying bedrock are present at the surface over the site. Piney Creek Alluvium was encountered in our borings on the eastern part of the site and Broadway Alluvium was encountered on the western portion. Recent alluvial deposits exist near Fountain Creek. Our interpretation of the distribution of geologic units at the site is shown on Figure 2.



Piney Creek Alluvium (Qp)

Areas mapped as Piney Creek Alluvium are associated with recent alluvium deposited by over bank and flood plain deposits. These deposits typically consist of stratified clay, silt, sand, and gravel. They exist within about 10 to 20 feet of elevation of the existing channel. This map unit includes areas of intermittent surface water flow and high ground water. Areas within this map unit may experience active depositional and erosional processes.

Broadway Alluvium

Areas mapped as Broadway Alluvium typically consist of gravelly sand and silt with cobbles and boulders in terraces west of Fountain Creek. Coarse sand in terraces along streams from the east are also characteristic of Broadway Alluvium. These deposits typically exist within about 40 feet of elevation of the existing channel.

Pierre Shale

Claystone and shale of the Pierre Shale formation was encountered in twelve of the thirteen borings drilled for this investigation. Where encountered, the depth to bedrock varied from about 8 to 26 feet. The more shallow bedrock occurs in the southeast portion of the site. The bedrock in the area dips to the northeast at less than 10 degrees.

SUBSURFACE CONDITIONS

Our borings drilled during our 2007 study encountered natural, slightly silty to silty, gravelly sands, overlying claystone and shale bedrock. A clay layer, generally four or less feet thick, occurred above the granular materials in six holes, and was 12 feet thick at one location. Bedrock was encountered in all but one of the thirteen borings at depths of 8 to 26 feet. Some of the pertinent engineering characteristics of the soil are described in the following paragraphs.

Fill

Fill was not encountered in our borings advanced in April 2007; however, aerial imagery during construction of the existing building west of the site indicates fill is present. Fill may be present in others areas of the site. Additionally, some small stockpiles of fill are also present.

Natural Clay Soils

Natural clay soil was encountered at the ground surface in seven borings. A sample tested exhibited low measured swell upon wetting (0.3 percent). Clays with higher expansion potential



have been found on sites to the north. The clay was subjected to Atterberg Limit testing and exhibited Liquid Limits of 48 percent and a Plasticity Index of 32 percent.

Natural Granular Soils

Slightly silty to silty and clayey to very clayey sand containing varying percentages of gravel was encountered at the ground surface or below the clay in all thirteen of the borings. The granular soils were generally loose to very dense. Two samples exhibited compression (0.2 and 2.4 percent) when wetted. The sand samples tested contained between 3 and 49 percent fines (silt and clay-size particles).

Bedrock

Claystone was encountered in one of our test borings. Shale was encountered in twelve of the thirteen borings, and beneath the claystone. The claystone and shale are hard to very hard, based on field penetration testing. Five samples of the shale obtained were subjected to swell-consolidation testing. The samples exhibited low to high measured swell (1.0 to 4.9 percent). The swell-consolidation testing results for the different materials are summarized in the table below.

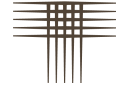
SUMMARY OF SWELL TEST RESULTS

Soil Type	Compression	Range of Measured Swell (%)*			
		Low 0 to <2	Moderate 2 to <4	High 4 to <6	Very High ≥ 6
	Number of Samples and Percent				
Clay	0	1	0	0	0
Sand	2	2	0	0	0
Shale	0	2	1	2	0
Overall Sample Number	2	5	1	2	0
Overall Percent	20%	50%	10%	20%	0%

* Swell measured after wetting under an applied pressure of about 1,000 psf.

Groundwater

Free groundwater was encountered in all thirteen borings at the time of drilling at depths of 3 to 16 feet below the existing ground surface. When the borings were checked several days after drilling, groundwater was measured in all thirteen borings at depths of 3 to 14 feet below the ground surface. Our borings were drilled in the early spring when ground water levels are typically near their seasonal lows. Seasonal variation of 3 to 5 feet should be expected during a typical



year. Flows in Fountain Creek will also impact ground water levels. The presence of shallow bedrock in portions of the site could result in formation of perched ground water after development.

POTENTIAL GEOLOGIC HAZARDS AND ENGINEERING CONSTRAINTS

We did not identify geologic hazards we believe preclude development of the site. Conditions we identified at the site that may pose constraints to development include the occurrence of shallow groundwater, flooding, and to a minor extent, undocumented fill and expansive soils and bedrock. Regional geologic conditions that may affect the site include seismicity and radioactivity (radon). We believe these conditions can be mitigated with engineering design and construction methods commonly employed in this area. The engineering conditions map presented in Fig. 3 uses a modified version of the system developed by Robinson (1977).

Assessment of the site for the potential for wildfire hazards, corrosive soils, erosion problems, or flooding is beyond the scope of this investigation. The following conditions were considered in this evaluation:

- Shallow groundwater
- Flooding and Streamside Overlay Zone
- Landfill, uncontrolled, or undocumented fill activity
- Expansive soils and expansive rock
- Seismicity
- Elevated radioactivity and Radon
- Steeply dipping bedrock
- Hillside Overlay, Potentially unstable slopes and landslide areas
- Debris flow and debris fans
- Rockfall
- Subsidence and abandoned mining activity
- Faults

Shallow Groundwater

Shallow groundwater (less than 10 feet) is likely to be encountered over the majority of the site, and adjacent to Fountain Creek. Some mitigation methods are described in the Development Considerations section. A minimum separation of 5 feet is desirable between the groundwater elevations and the lowest elevation of any structures. This can be accomplished by filling the lower elevations.

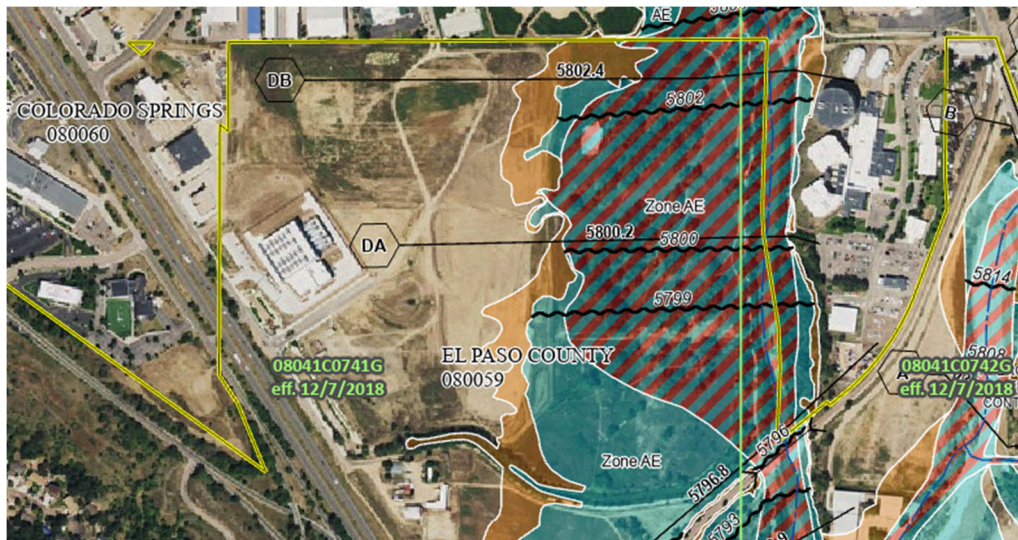


Groundwater can have a significant impact on installation of underground utilities such as sanitary sewer and water. Our experience indicates that sophisticated systems such as well points will likely be needed for excavations extending more than a few feet below the water table.

Flooding and Streamside Overlay Zone

The area of the site immediately adjacent to Fountain Creek lies within the streamside overlay as shown on zoning layers on the Springsview webpage, prepared by the GIS Division of the Planning, Development, and Finance Department of the City of Colorado Springs.

The eastern half of the site lies within Zone X and Zone AE as shown on FIRM Map Numbers 08041C0741G and 08041C0742G with an effective date of December 7, 2018. Zone X is within the 500 year flood way and the area of the 100 year flood way. The lower elevation portions of the site (below elevation 5803 feet near the northern boundary and 5797 feet near the southern boundary) adjacent to Fountain Creek lie within the mapped flood zone. An excerpt from the FEMA map is show below. Figure 2 shows the 100-year flood plain as defined in 1973 by the Corps of Engineers. The development-specific drainage report should address flooding and surface drainage.



Excerpt from FEMA Flood Map, 2018



Landfill, Uncontrolled, or Undocumented Fill Activity

Fill was not encountered in our borings advanced in April 2007; however, aerial imagery during construction of the existing building west of the site indicates fill is present. Fill may be present in others areas of the site. Portions of the site are currently being used by a construction company as a staging yard, and may contain stockpiles of a temporary nature. Due to the historic disturbance of the site and the current usage of the site, we anticipate additional fill is present. Additional fill may be identified during a design level investigation or during site earthwork activities. Site specific design-level geotechnical investigations should take into consideration proposed grading plans, including the removal of temporary stockpiles; confirm the extents of fill which may be present after grading operations; and whether the engineering characteristics of the fill are suitable to support structures. If needed, potential mitigation could consist of partial or complete removal of the fill, ground improvements, or by using appropriate foundation types.

Expansive Soils and Bedrock

The alluvial clay exhibited low swell potential. During past investigations to the north, the clays exhibited low to moderate swell. Generally, the surficial clay layer is relatively thin. The effects of expansive soils may be mitigated by sub-excavation. This ground modification alternative is discussed further in the Development Considerations section.

Expansive bedrock occurs at relatively shallow depths on the extreme eastern edge of the site. Shallow groundwater also was found at this location. Due to the depth of groundwater, we do not expect foundation elevations will extend to a depth where the swell potential of the bedrock will influence shallow foundations.

Seismicity

According to the USGS, Colorado's Front Range and eastern plains are considered low seismic hazard zones. The earthquake hazard exhibits higher risk in western Colorado compared to other parts of the state. The Denver Metropolitan area has experienced earthquakes within the past 100 years, shown to be related to deep drilling, liquid injection, and oil/gas extraction. Naturally occurring earthquakes along faults due to tectonic shifts are rare in this area.



The soil and bedrock at this site are not expected to respond unusually to seismic activity. The 2021 International Building Code (Section 1613.2.2) defers the estimation of Seismic Site Classification to ASCE 7-16, as outlined in the table below.

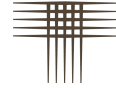
Seismic Site Class	\bar{s}_u , Average Undrained Shear Strength (lb/ft ²)	\bar{N} , Average Standard Penetration Resistance (blows/ft)	\bar{v}_s , Average Shear Wave Velocity (ft/s)
A. Hard Rock	N/A	N/A	>5,000
B. Rock	N/A	N/A	2,500 to 5,000
C. Very Dense Soil and Soft Rock	>2,000	>50 blows/ft	1,200 to 2,500
D. Stiff Soil	1,000 to 2,000	15 to 50 blows/ft	600 to 1,200
E. Very Loose Sand or Soft Clay Soil	<1,000	<15 blows/ft	<600
F. Soils requiring Site Response Analysis	See Section 20.3.1	See Section 20.3.1	See Section 20.3.1

Steeply Dipping Bedrock

We reviewed mapping of “Areas Susceptible to Differential Heave in Expansive, Steeply Dipping Bedrock, City of Colorado Springs, Colorado” (1999) by John W. Himmelreich, Jr., and David C. Noe published by the Colorado Geologic Survey. Mapping indicates the project area is outside of areas mapped as having steeply dipping bedrock and steeply dipping bedrock was not observed in our samples.

Hillside Overlay, Potentially Unstable Slopes and Landslide Areas

We reviewed mapping of “Potential Areas of Landslide Susceptibility in Colorado Springs, El Paso County, Colorado” (2003) by Jonathan L. White and T.C. Wait of the Colorado Geologic Survey. The site lies just to the south of the area mapped by the Colorado Geological Survey (CGS) for Landslide Susceptibility Areas. The site is not included within the Hillside Overlay Zone, as shown on zoning layers on the Springsview webpage, as prepared by the GIS Division of the Planning, Development, and Finance Department of the City of Colorado Springs. The site is also outside of the extents of the City of Colorado Springs Engineering Geology Study areas.



Debris Flow and Debris Fans

This site has been disturbed, and any surficial evidence of debris flows and mudflows has likely been erased from the site. The potential for sheetwash should be identified in a drainage report. The project Civil Engineer should design surface drainage.

Rockfall

The project is not located within areas mapped as rockfall susceptible, as mapped in the Colorado Geological Survey Open-File Report 06-3 (2006) by Jonathan L. White and T.C. Wait, and does not appear susceptible per our observations.

Subsidence and Abandoned Mining Activity

This project site is not included in the “Colorado Springs Subsidence Investigation” completed by Dames & Moore of the State of Colorado, Division of Mine Reclamation, dated April 1985. We observed no evidence of subsurface mining at the site. Based upon the results of the State’s investigation, the project site is not underlain by underground mine workings.

Faults

The geologic mapping does not indicate the presence of faulting on the project site. The nearest mapped fault is the Ute Pass Fault, which runs roughly north-south along the eastern flank of the Rocky Mountains. The Ute Pass Fault at its closest point to the project site, is about 3.6 miles to the west-southwest.

Elevated Radioactivity and Radon

We believe no unusual hazard exists from naturally occurring sources of radioactivity on the site. However, the materials found in this area are often associated with the production of radon gas and concentrations in excess of those currently accepted by the EPA can occur. Passive and active mitigation procedures are commonly employed in this region to effectively reduce the buildup of radon gas. Measures that can be taken after a structure is enclosed during construction include installing a blower connected to the foundation drain and sealing the joints and cracks in concrete floors and foundation walls. If the occurrence of radon is a concern, we recommend structures be tested after they are enclosed. Commonly utilized mitigation techniques may minimize risk.



SITE DEVELOPMENT CONSIDERATIONS

As the project is in the initial planning stage, grading plans were not available at the time of our investigation. Geotechnical constraints to development include: shallow groundwater and near surface layers of loose sand and to a lesser extent expansive soils and bedrock. The following sections discuss the impacts of these conditions on development of this property.

Shallow Groundwater

Groundwater will likely occur within 10 feet of the ground surface over a majority of this property. The design of foundation levels and final site grades should consider the occurrence of shallow groundwater. Cuts should be eliminated in areas of shallow groundwater and raising site grades should be considered within building areas.

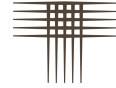
Expansive Soils and Bedrock

In the event expansive clay soils or claystone bedrock are encountered following grading or are present within about 4 feet of proposed foundations and floor slabs, sub-excavation and reworking of these materials may be warranted. The depth of sub-excavation may increase, depending on the proposed site grading, future testing, and building tolerances.

Site Grading

Organic materials, undocumented fill, and debris/trash should be removed from the ground surface of areas to be filled. Soft or loose soils, if encountered, should be stabilized or removed to expose stable material prior to placement of fill. The ground surface in areas to receive fill should be scarified deeply, moisture conditioned and compacted to a high density to establish a stable subgrade for fill placement.

The properties of the fill will affect the performance of foundations, slabs-on-grade, and pavements. The onsite materials may be suitable for use as grading fill, and excavation backfill, provided they are free of debris, vegetation/organics, and other deleterious materials. If the existing stockpiles are being considered for use as fill, it should be free of debris, vegetation/organics, and other deleterious materials, and should be properly moisture treated and processed.



Detailed recommendations for moisture conditioning, placement, and compaction of grading fill are set forth in Appendix C. Placement and compaction of the grading fill should be periodically observed and tested by our representative during construction.

Buried Utilities

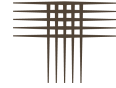
Based on the subsurface conditions encountered in our exploratory borings, we anticipate the materials encountered during utility trench excavation will consist of predominantly clayey sands and sandy clays, and possibly claystone bedrock. Utility trench excavation can likely be accomplished using heavy-duty track hoes.

Excavations for utilities should be braced or sloped to maintain stability and should meet applicable local, state, and federal safety regulations. The contractor should identify the soils and bedrock encountered in trench excavations and refer to Occupational Safety and Health Administration (OSHA) standards to determine appropriate slopes. We anticipate the near-surface sand and clay soils will classify as Type C and B soils, respectively. Temporary excavations in Type C and B materials require maximum slope inclinations of 1.5:1 (horizontal to vertical) and 1:1, respectively, in the absence of groundwater, unless the excavation is shored or braced. Where excavations extend into sound bedrock, these materials will classify as Type A requiring maximum slope inclinations of 0.75:1. Excavations deeper than 20 feet should be designed by a professional engineer.

Water and sewer lines are usually constructed beneath paved areas. Compaction of trench backfill will have a significant effect on the life and serviceability of pavements. We recommend trench backfill be moisture conditioned and compacted in accordance with the recommendations set forth in Appendix C. Personnel from our firm should periodically observe and test the placement and compaction of the trench backfill during construction.

FOUNDATION AND FLOOR SYSTEM CONCEPTS

We recommend design-level geotechnical investigations for any proposed buildings to develop specific foundation recommendations for the design and construction of foundations and floor systems. The foundation type should be chosen based on the building type, building loads, subsurface conditions, tolerance for settlement, and other factors. Selection of floor system alternatives should consider risk of movement associated with slab-on-grade floors.



Based on the data from our exploratory borings advanced during our 2007 study, subsurface conditions across the site will likely consist of natural sands and clays, and grading fills of similar materials. We expect spread footing and mat foundations will be the preferred foundation type for the anticipated industrial development. Use of a spread footing foundation will likely be appropriate for light to moderate loads; however, localized areas of loose sands near the surface and shallow groundwater are expected to result in cost impacts to development of this site. Mat foundations are anticipated for the proposed ancillary structures/equipment.

For preliminary planning purposes, mat or spread footing foundations with a maximum allowable soil pressure of 2,000 to 3,000 psf are anticipated. Heavily loaded structures may require deep foundation systems bearing in the underlying shale bedrock.

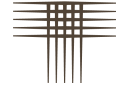
The preliminary data suggest areas of expansive clay are present near the ground surface across portions of the site. There is risk of poor slab performance for slabs-on-grade and flatwork supported on the expansive soils. If sub-excavation and placement of a layer of moisture conditioned, densely compacted fill is performed on the site, slab-on-grade floors and flatwork will likely have a low risk of poor slab performance.

PAVEMENTS

Pavement recommendations can be provided at the time of the design-level investigation, after grading plans have been developed. The surficial materials will exhibit variable subgrade support for pavements. Based on our experience, we believe a preliminary Hveem stabilometer ("R") value of 15 would be appropriate for estimating purposes. On a preliminary basis, we suggest budgeting for section of 4 to 5 inches of asphalt over 6 inches of aggregate base course. Heavy-duty traffic areas are expected to require at least 5 inches of asphalt over 8 to 9 inches of aggregate base course.

CONCRETE

Concrete in contact with soil can be subject to sulfate attack. We measured water-soluble sulfate concentrations of less than 0.1 percent in two samples. As indicated in our tests and ACI 318-19, the sulfate exposure class is *Not Applicable* or *S0*. Deviations from the exposure class may occur with additional sampling and testing performed during design-level investigations.



SULFATE EXPOSURE CLASSES PER ACI 318-19

Exposure Classes		Water-Soluble Sulfate (SO ₄) in Soil ^A (%)
Not Applicable	S0	< 0.10
Moderate	S1	0.10 to <0.20
Severe	S2	0.20 to 2.00
Very Severe	S3	> 2.00

A) Percent sulfate by mass in soil determined by ASTM C1580

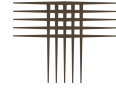
For this level of sulfate concentration, ACI 318-19, *Building Code Requirements for Structural Concrete*, indicates there are no special cement type requirements for sulfate resistance as indicated in the table below.

CONCRETE DESIGN REQUIREMENTS FOR SULFATE EXPOSURE PER ACI 318-19

Exposure Class	Maximum Water/Cement Ratio	Minimum Compressive Strength (psi)	Cementitious Material Types ^A			Calcium Chloride Admixtures
			ASTM C150/C150M	ASTM C595/C595M	ASTM C1157/C1157M	
S0	N/A	2500	No Type Restrictions	No Type Restrictions	No Type Restrictions	No Restrictions
S1	0.50	4000	II ^B	Type with (MS) Designation	MS	No Restrictions
S2	0.45	4500	V ^B	Type with (HS) Designation	HS	Not Permitted
S3	Option 1	4500	V + Pozzolan or Slag Cement ^C	Type with (HS) Designation plus Pozzolan or Slag Cement ^C	HS + Pozzolan or Slag Cement ^C	Not Permitted
S3	Option 2	5000	V ^D	Type with (HS) Designation	HS	Not Permitted

- A) Alternate combinations of cementitious materials shall be permitted when tested for sulfate resistance meeting the criteria in section 26.4.2.2(c).
- B) Other available types of cement such as Type III or Type I are permitted in Exposure Classes S1 or S2 if the C3A contents are less than 8 or 5 percent, respectively.
- C) The amount of the specific source of pozzolan or slag to be used shall not be less than the amount that has been determined by service record to improve sulfate resistance when used in concrete containing Type V cement. Alternatively, the amount of the specific source of the pozzolan or slag to be used shall not be less than the amount tested in accordance with ASTM C1012 and meeting the criteria in section 26.4.2.2(c) of ACI 318.
- D) If Type V cement is used as the sole cementitious material, the optional sulfate resistance requirement of 0.040 percent maximum expansion in ASTM C150 shall be specified.

Superficial damage may occur to the exposed surfaces of highly permeable concrete. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious materials ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist due to surface drainage or high-water tables. Concrete should have a total air content of 6 percent ± 1.5 percent. We advocate damp-proofing of all foundation walls and grade beams in contact with the subsoils.



SURFACE DRAINAGE

The performance of structures, flatwork, and pavements will be influenced by surface drainage. When developing an overall drainage scheme, consideration should be given to drainage around each structure and on pavement areas. Drainage should be planned such that surface runoff is directed away from foundations and is not allowed to pond adjacent to foundations or over pavements. The ground surface around the buildings should be sloped to provide positive drainage away from the foundations. We recommend a slope of at least 5 percent for the first 10 feet surrounding each building in landscaped areas. In flatwork areas adjacent to buildings, the slope may be reduced to grades that comply with ADA requirements. A minimum slope of 2 percent is suggested. More slope is desirable. Concrete curbs and sidewalks may “dam” surface runoff adjacent to the buildings and disrupt proper flow. Use of “chase” drains or weep holes at low points in the curb should be considered to proper drainage. Roof downspouts and other water collection systems should discharge beyond the limits of backfill around structures.

RECOMMENDED FUTURE INVESTIGATIONS

Based on the results of this study, we recommend the following additional investigations and services be provided by our firm:

- After site development plans have been formalized, we recommend a design-level geotechnical investigation be completed. Such investigations will be required to determine the appropriate foundation and floor systems for the buildings based upon the over-lot grading and building finished floor elevations.
- Subgrade Investigation and Pavement Design for on-site pavements.
- Construction materials testing and observation services during site development and construction.

GEOTECHNICAL RISK

The concept of risk is an important aspect with any geotechnical evaluation primarily because the methods used to develop geotechnical recommendations do not comprise an exact science. We never have complete knowledge of subsurface conditions. Our analysis must be tempered with engineering judgment and experience. Therefore, the recommendations presented in any geotechnical evaluation should not be considered risk-free. Our



recommendations represent our judgment of those measures that are necessary to increase the chances that structures will perform satisfactorily.

LIMITATIONS

The information, and conclusions presented herein are based upon consideration of many factors including, but not limited to, the geologic setting, and the subsurface conditions expected. The conclusions contained in the report are not valid for use by others. If the project is not constructed within about three years, we should be contacted to determine if we should update this report.

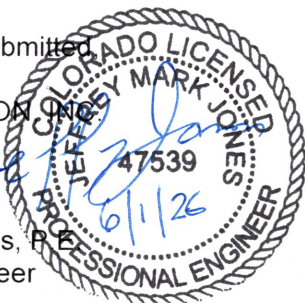
Our borings were widely spaced to provide a general picture of subsurface conditions for preliminary planning of the proposed construction. Variations from our borings should be anticipated. We believe this investigation was conducted in a manner consistent with that level of care and skill ordinarily used by geotechnical engineers practicing under similar conditions. No warranty, express or implied, is made.

If we can be of further service in discussing the contents of this report or analysis of the influence of subsurface conditions on the project, please call.

Respectfully submitted,

CTL|THOMPSON INC.

Jeffrey M. Jones, P.E.
Principal Engineer

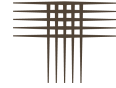


Reviewed by:

Gwen Eberhart, P.E.
Senior Associate Engineer

JMJ:GE

Via e-mail: csumter@emergentdatacenters.com; mitchell.hess@kimley-horn.com



REFERENCES

Geologic Mapping

Carroll, C.J., and Crawford, T.A., 2000, Geologic Map of the Colorado Springs Quadrangle, El Paso County, Colorado Springs, Colorado: Colorado Geological Survey Open-File Map 00-3, scale 1:24,000.

Geologic Hazards References

Colorado Geological Survey. (2003). Potential Areas of Landslide Susceptibility in Colorado Springs, El Paso County, Colorado, Map Series 42.

Colorado Geological Survey. (1991). Results of the 1987-88 EPA Supported Radon Study in Colorado, with a Discussion on Geology, Colorado Geological Survey Open File Report 91-4.

Dames & Moore. (1985). State of Colorado, Colorado Springs Subsidence Investigation Mapping.

Federal Emergency Management Agency, Flood Insurance Rate Map, Map Number 08041C0741G and 08041C0742G, December 7, 2018.

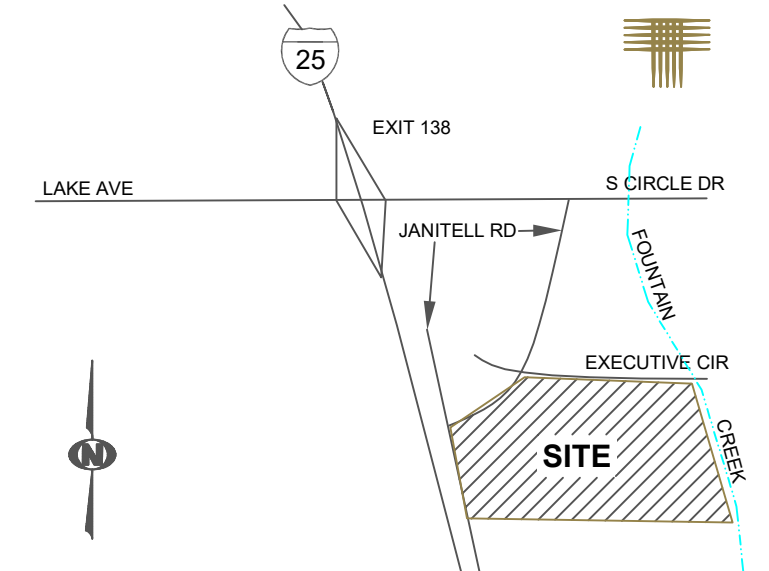
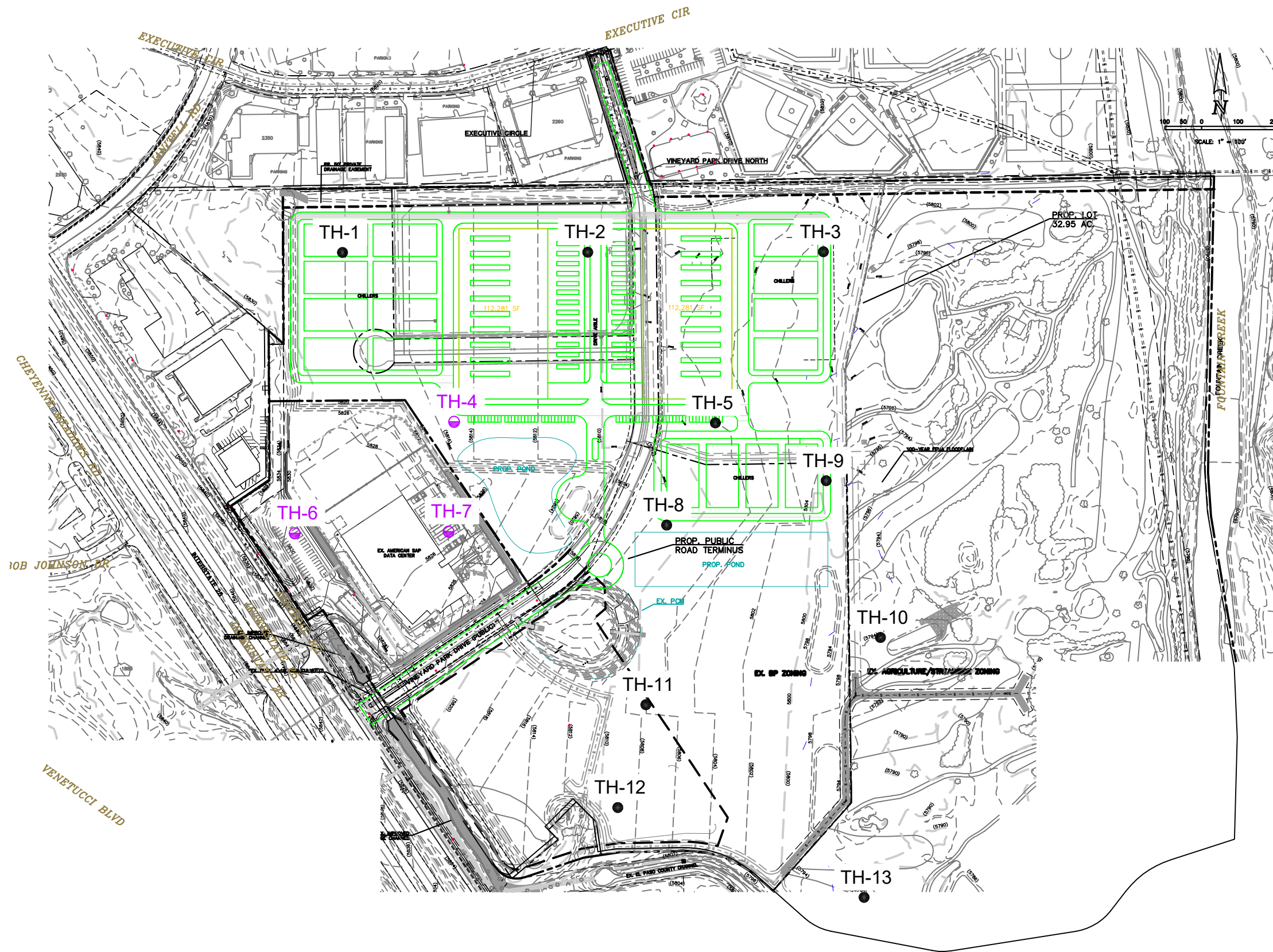
Himmelreich, John W., Jr., and Noe, David C. (1999). Areas Susceptible to Differential Heave in Expansive, Steeply Dipping Bedrock, City of Colorado Springs, Colorado. Colorado Geologic Survey, Map Series 32.

Kirkham, R.M. & Rogers, W.P. (1981). Earthquake Potential in Colorado. Colorado Geological Survey, Bulletin 43.

Robinson and Associates, Inc. (1977). El Paso County, Colorado Potential Geologic Hazards and Surficial Deposits, Environmental and Engineering Geologic Maps and Tables for Land Use.

White, Jonathan L. and Wait, T.C. (2003). Potential Areas of Landslide Susceptibility in Colorado Springs, El Paso County, Colorado. Colorado Geological Survey, Map Series 42, Plate 3 of 3.

Wait, TC, and White, Jonathan L. (2006). Rockfall Hazard Susceptibility in Colorado Springs, El Paso County, Colorado, Colorado Geological Survey, Open-File Report 06-03.



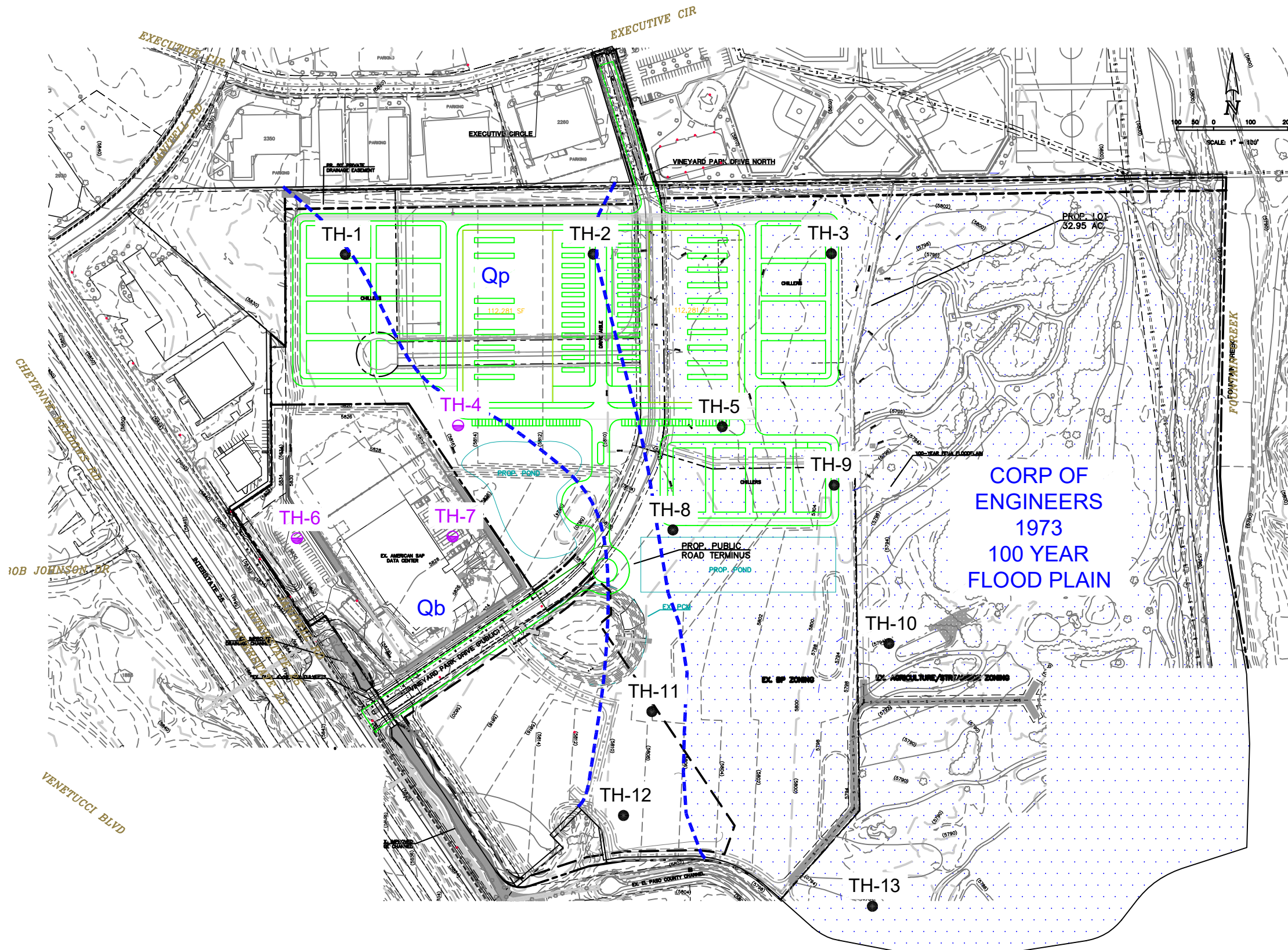
VICINITY MAP
(NO SCALE)

LEGEND:

- TH-1 INDICATES APPROXIMATE LOCATION OF EXPLORATORY BORING (CTL PROJECT NO. CS16646-115, 2007).
- TH-4 INDICATES APPROXIMATE LOCATION OF PIEZOMETER (CTL PROJECT NO. CS16646-115, 2007).
- INDICATES EXISTING TOPOGRAPHY.

NOTE:

1. BASE DRAWING WAS PROVIDED BY CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC., RECEIVED MAY 3, 2007.



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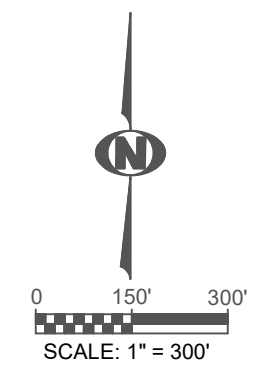
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- INDICATES EXISTING TOPOGRAPHY.

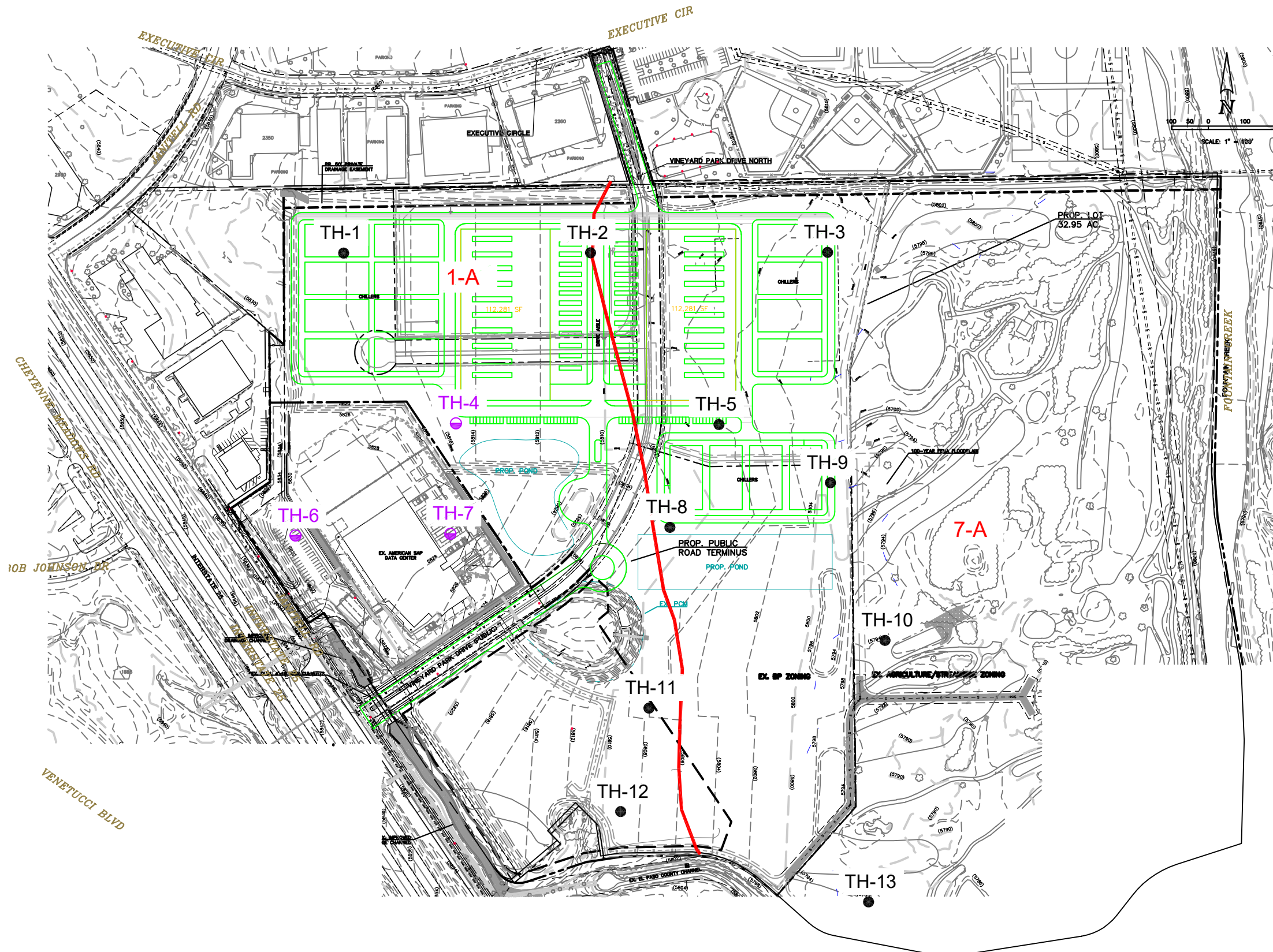
GEOLOGIC UNITS AND (MODIFIERS)

- Qb** BROADWAY ALLUVIUM - GRAVELLY SAND AND SILT WITH COBBLES AND BOULDERS IN TERRACES WEST OF FOUNTAIN CREEK, AND COARSE SAND IN TERRACES ALONG STREAMS FROM THE EAST. TOP OF TERRACES ABOUT 40 FEET ABOVE MAJOR STREAMS.
- Qp** PINEY CREEK ALLUVIUM - ORGANIC RICH CLAYEY SILT, AND SAND IN TERRACES ALONG MANY PRESENT STREAMS. TOP OF TERRACES ABOUT 20 FEET ABOVE STREAM LEVEL.
- SURFICIAL GEOLOGIC CONTACTS
- INDICATES 100 YEAR FLOOD PLAIN.

NOTE:

BASE DRAWING WAS PROVIDED BY CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC., RECEIVED MAY 3, 2007.





LEGEND:

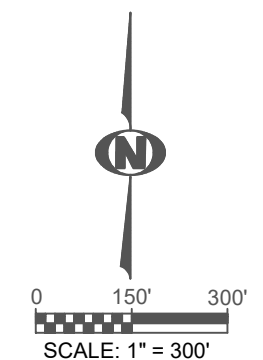
- TH-1 INDICATES APPROXIMATE LOCATION OF EXPLORATORY BORING (CTL PROJECT NO. CS16646-115, 2007).
- INDICATES EXISTING TOPOGRAPHY.

ENGINEERING UNITS AND (MODIFIERS)

- 1-A** STABLE ALLUVIUM AND COLLUVIUM ON FLAT TO GENTLE SLOPE (0-5%). EMPHASIS ON SURFACE AND SUBSURFACE DRAINAGE, DEPTH TO BEDROCK, COLLAPSE POTENTIAL AND EROSION CONTROL.
- 7-A** PHYSIOGRAPHIC FLOODPLAIN WHERE EROSION AND DEPOSITION PRESENTLY OCCUR AND IS GENERALLY SUBJECT TO RECURRENT FLOODING. EMPHASIS ON FREQUENCY, DEPTH AND CONTROL.
- ~ ENGINEERING CONTACTS

NOTE:

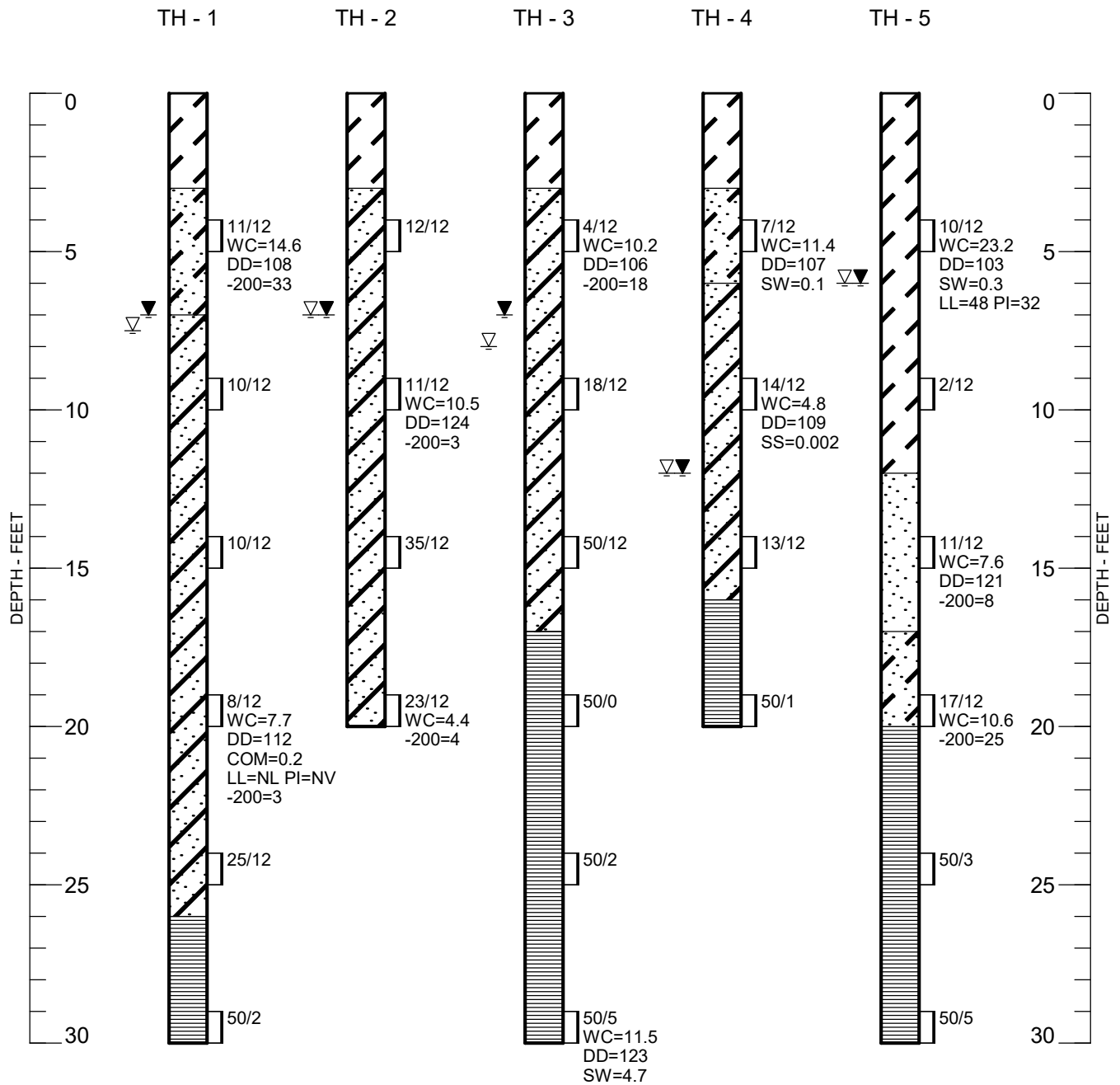
1. MAP LEGEND IS MODIFIED FROM CHARLES S. ROBINSON & ASSOCIATES, INC. GOLDEN, COLORADO, 1977.
2. BASE DRAWING WAS PROVIDED BY CLASSIC CONSULTING ENGINEERS AND SURVEYORS, LLC., RECEIVED MAY 3, 2007.

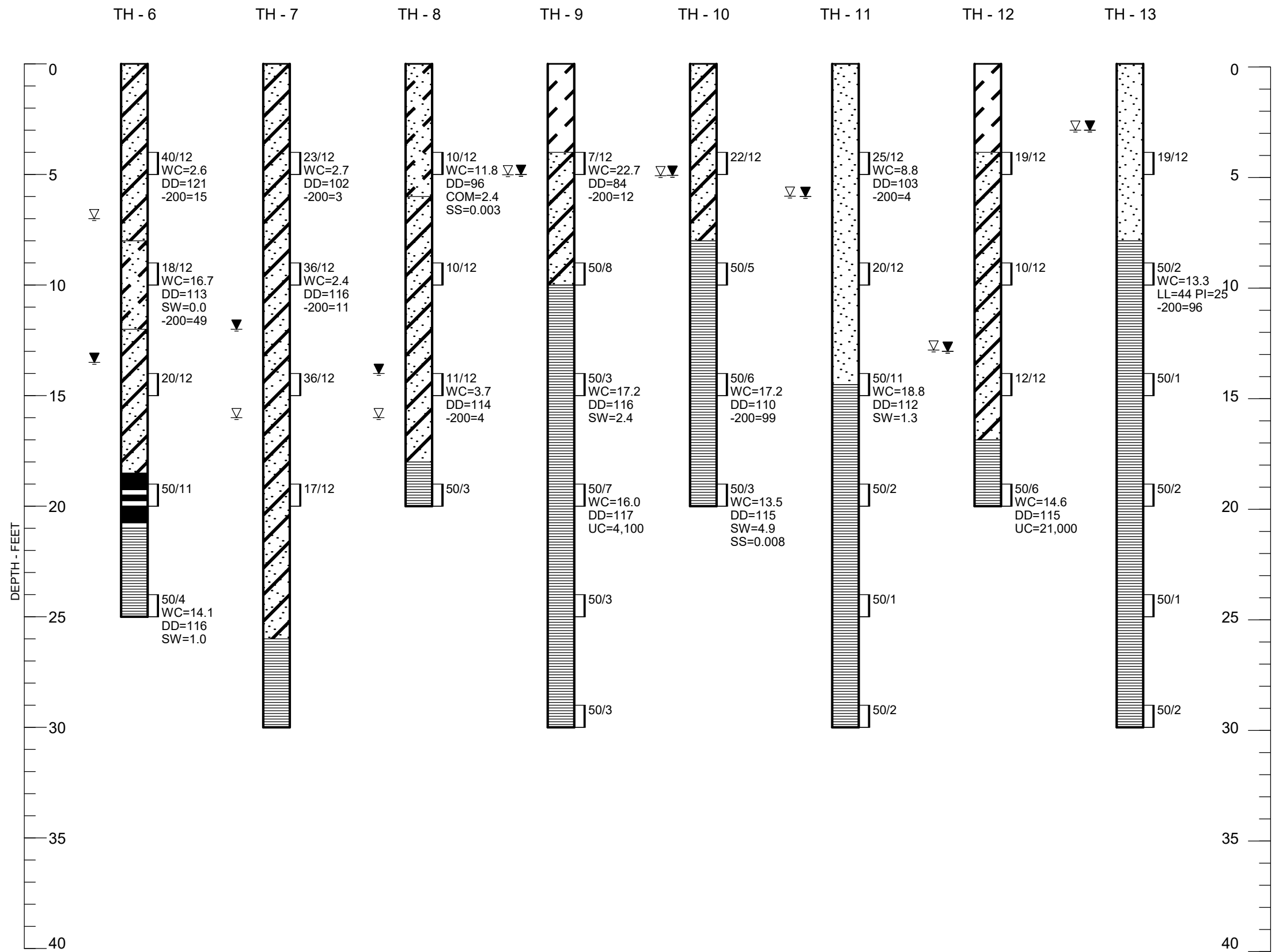




APPENDIX A

SUMMARY LOGS OF EXPLORATORY BORINGS





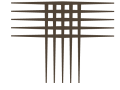
LEGEND:

- CLAY, VERY SOFT TO STIFF, MOIST, DARK BROWN. (CL)
- SAND, GRAVEL, MEDIUM DENSE, MOIST TO WET, DARK BROWN. (SP)
- SAND, SLIGHTLY SILTY TO SILTY, OCASSIONAL GRAVEL, LOOSE TO VERY DENSE, MOIST TO WET, DARK BROWN. (SM, SP-SM, SW-SM)
- SAND, CLAYEY, LOOSE TO MEDIUM DENSE, MOIST, DARK BROWN. (SC)
- BEDROCK. CLAYSTONE, HARD, MOIST DARK GRAY.
- SHALE, HARD TO VERY HARD, MOIST, DARK GRAY.
- DRIVE SAMPLE. THE SYMBOL 11/12 INDICATES 11 BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- WATER LEVEL MEASURED AT TIME OF DRILLING.
- WATER LEVEL MEASURED ONE TO THREE DAYS AFTER DRILLING.

NOTES:

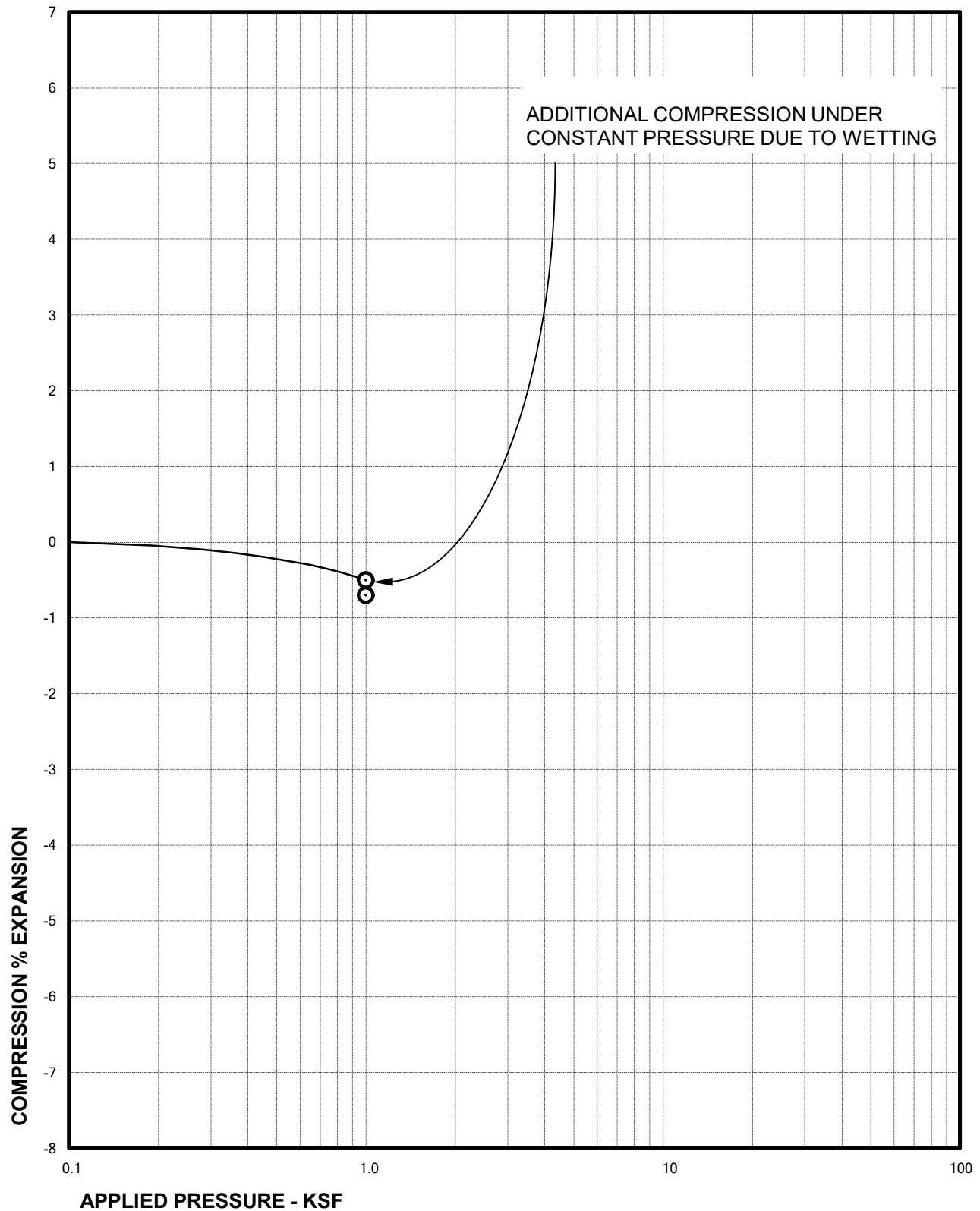
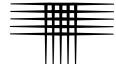
1. THE BORINGS WERE DRILLED APRIL 25, 26, & 27, 2007 USING A 4-INCH DIAMETER, CONTINUOUS-FLIGHT AUGER AND A TRUCK-MOUNTED DRILL RIG.
2. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS, AND CONCLUSIONS AS CONTAINED IN THIS REPORT.
3. WC - INDICATES MOISTURE CONTENT. (%)
 DD - INDICATES DRY DENSITY. (PCF)
 SW - INDICATES SWELL WHEN WETTED UNDER 1 KSF LOAD. (%)
 COM - INDICATES COMPRESSION WHEN WETTED UNDER 1 KSF LOAD. (%)
 LL - INDICATES LIQUID LIMIT. (%)
 (NL : NON-LIQUID)
 PI - INDICATES PLASTICITY INDEX. (%)
 (NV : NO VALUE)
 -200 - INDICATES PASSING NO. 200 SIEVE. (%)
 SS - INDICATES WATER-SOLUBLE SULFATE CONTENT. (%)
 UC - INDICATES UNCONFINED COMPRESSIVE STRENGTH. (PSF)

Summary Logs of Exploratory Borings



APPENDIX B

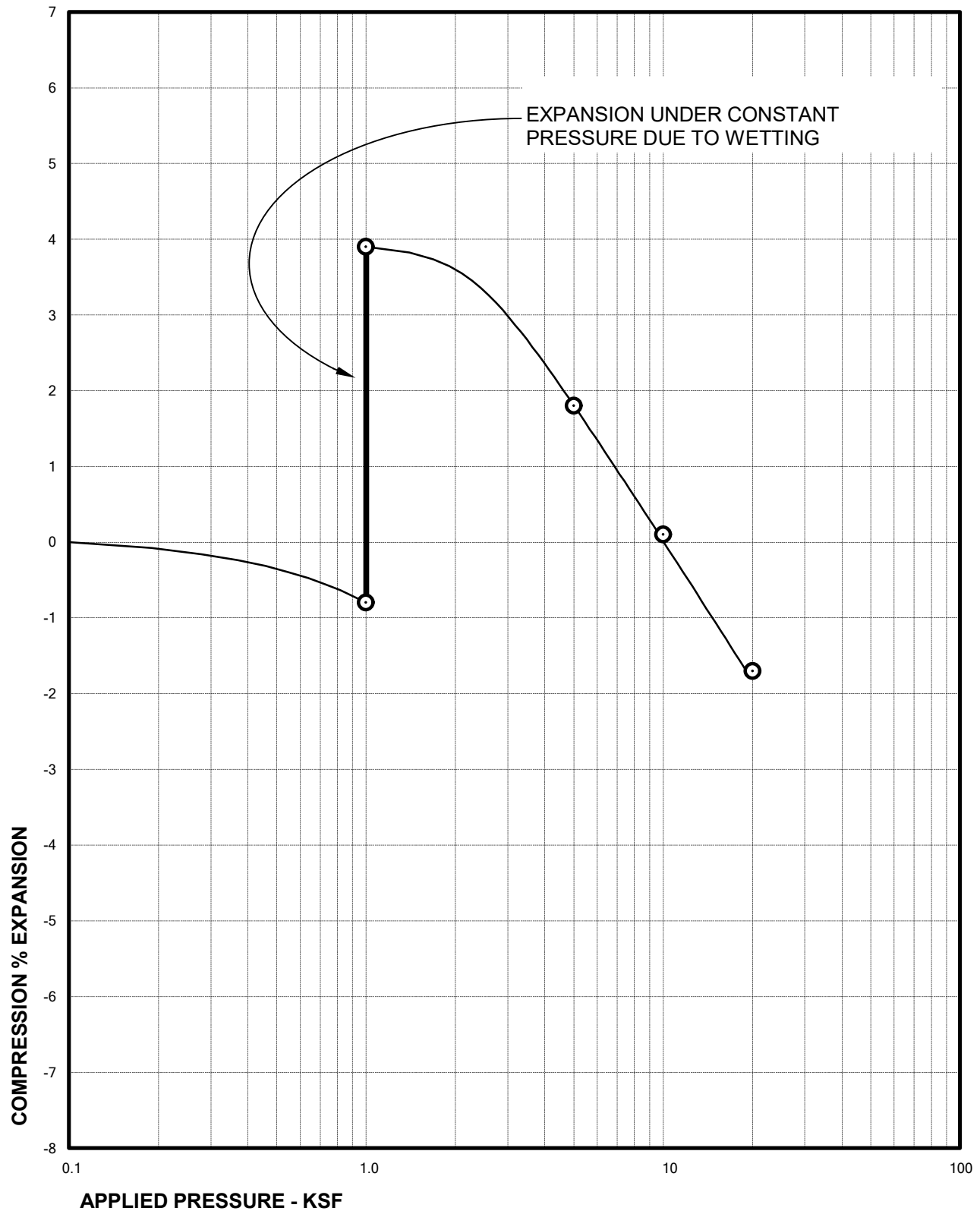
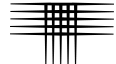
LABORATORY TEST RESULTS TABLE B-1



Sample of SAND, SILTY (SM)
From TH-1 AT 19 FEET

DRY UNIT WEIGHT= 112 PCF
MOISTURE CONTENT= 7.7 %

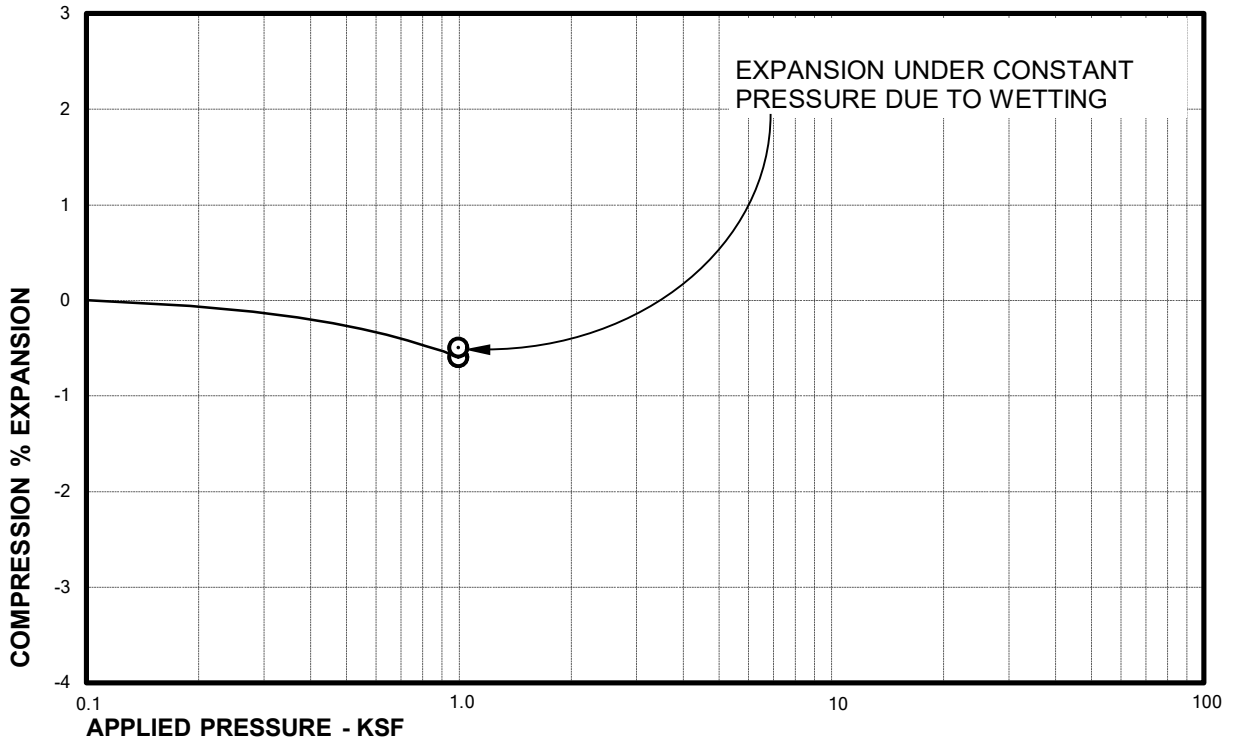
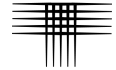
Swell Consolidation Test Results



Sample of SHALE
From TH-3 AT 29 FEET

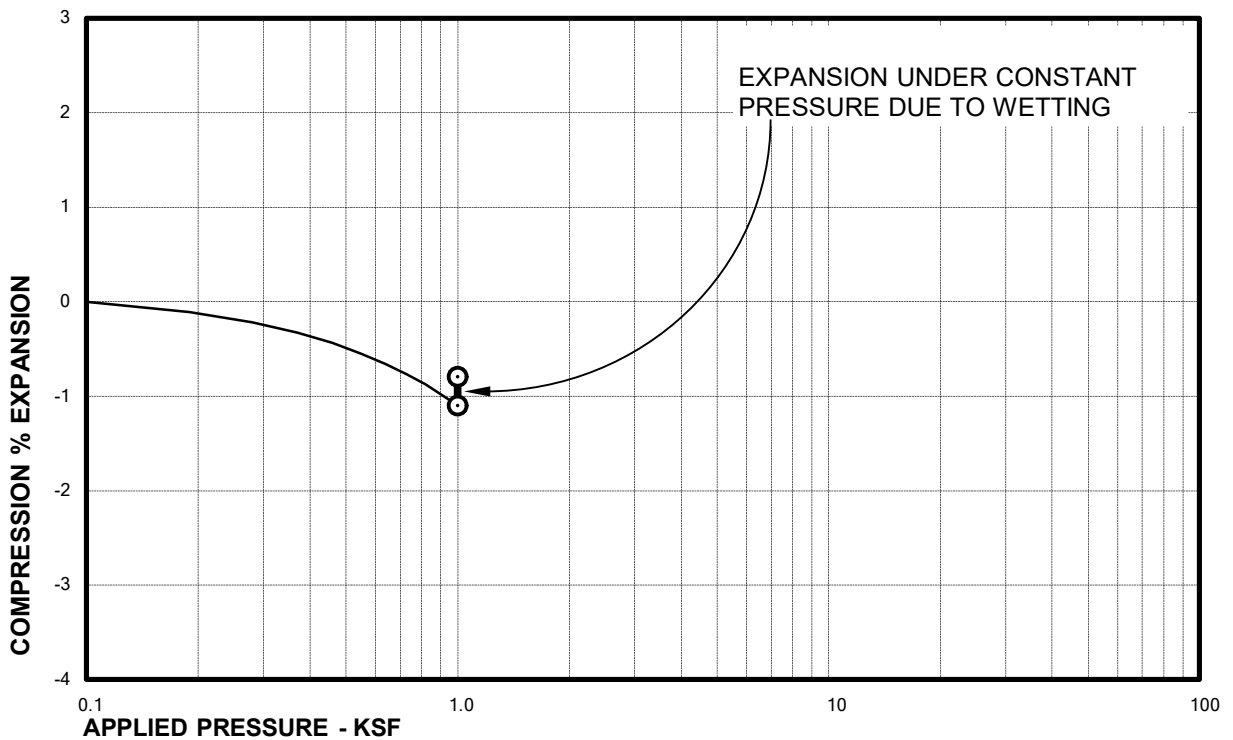
DRY UNIT WEIGHT= 123 PCF
MOISTURE CONTENT= 11.5 %

Swell Consolidation Test Results



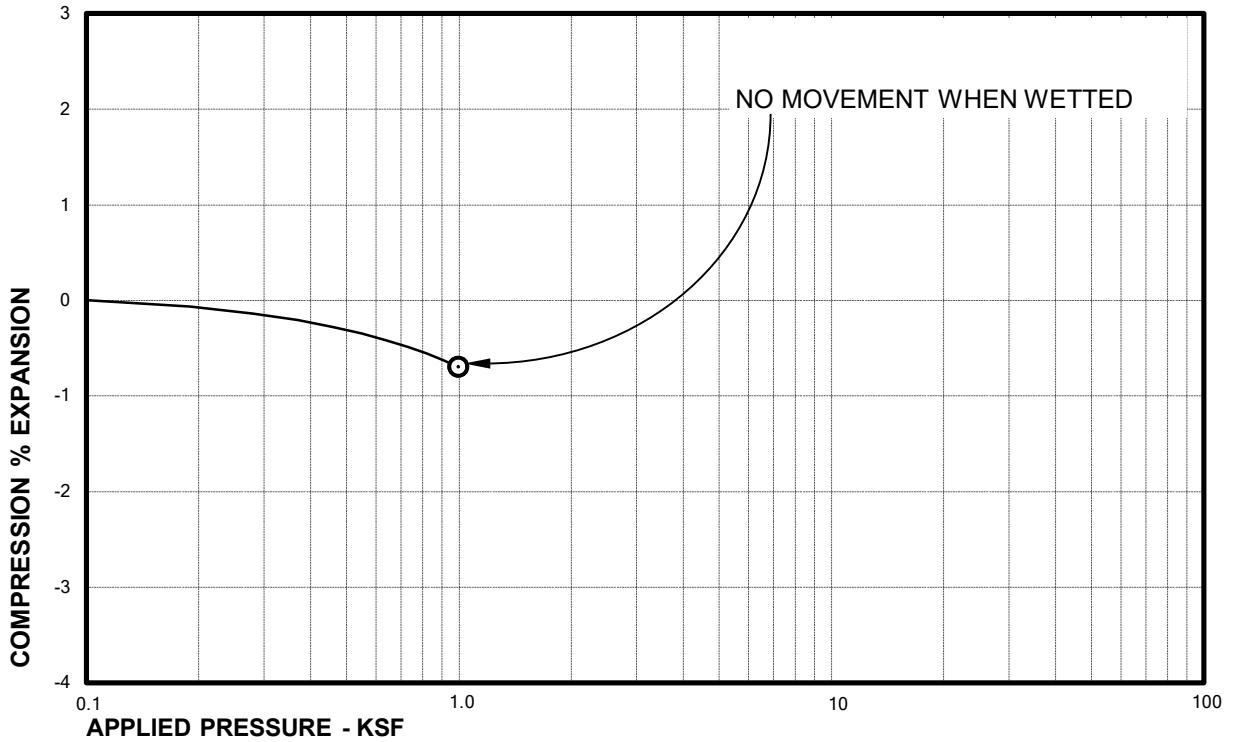
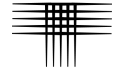
Sample of SAND, CLAYEY (SC)
From TH-4 AT 4 FEET

DRY UNIT WEIGHT= 107 PCF
MOISTURE CONTENT= 11.4 %



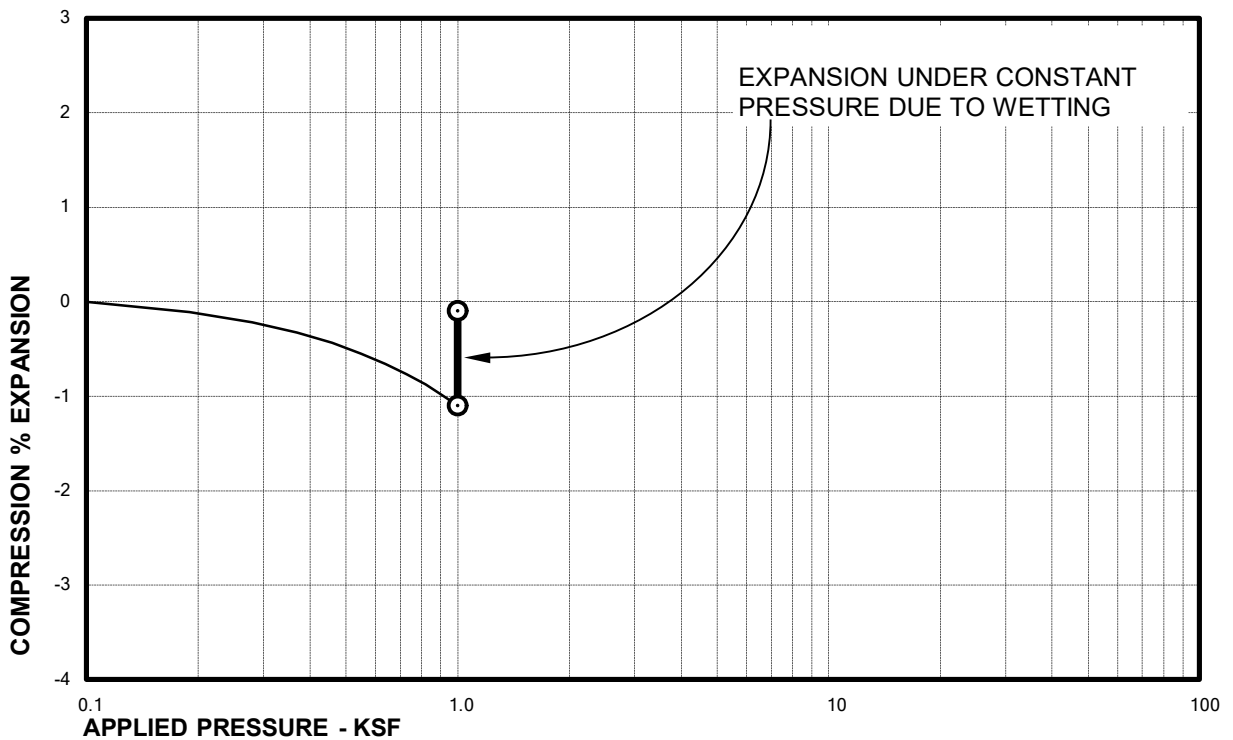
Sample of CLAY (CL)
From TH-5 AT 4 FEET

DRY UNIT WEIGHT= 103 PCF
MOISTURE CONTENT= 23.2 %



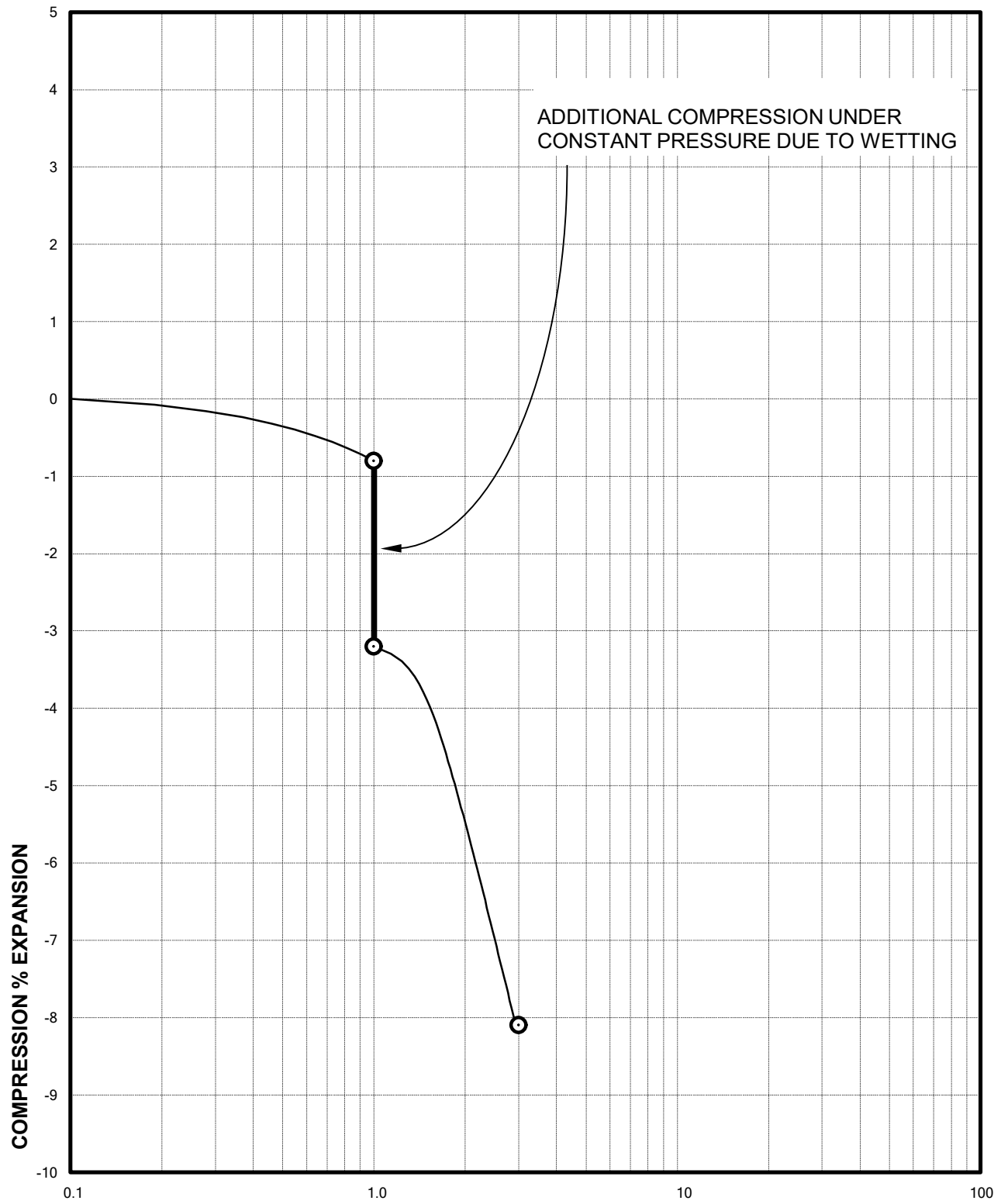
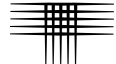
Sample of SAND, VERY CLAYEY (SC)
From TH-6 AT 9 FEET

DRY UNIT WEIGHT= 113 PCF
MOISTURE CONTENT= 16.7 %



Sample of SHALE
From TH-6 AT 24 FEET

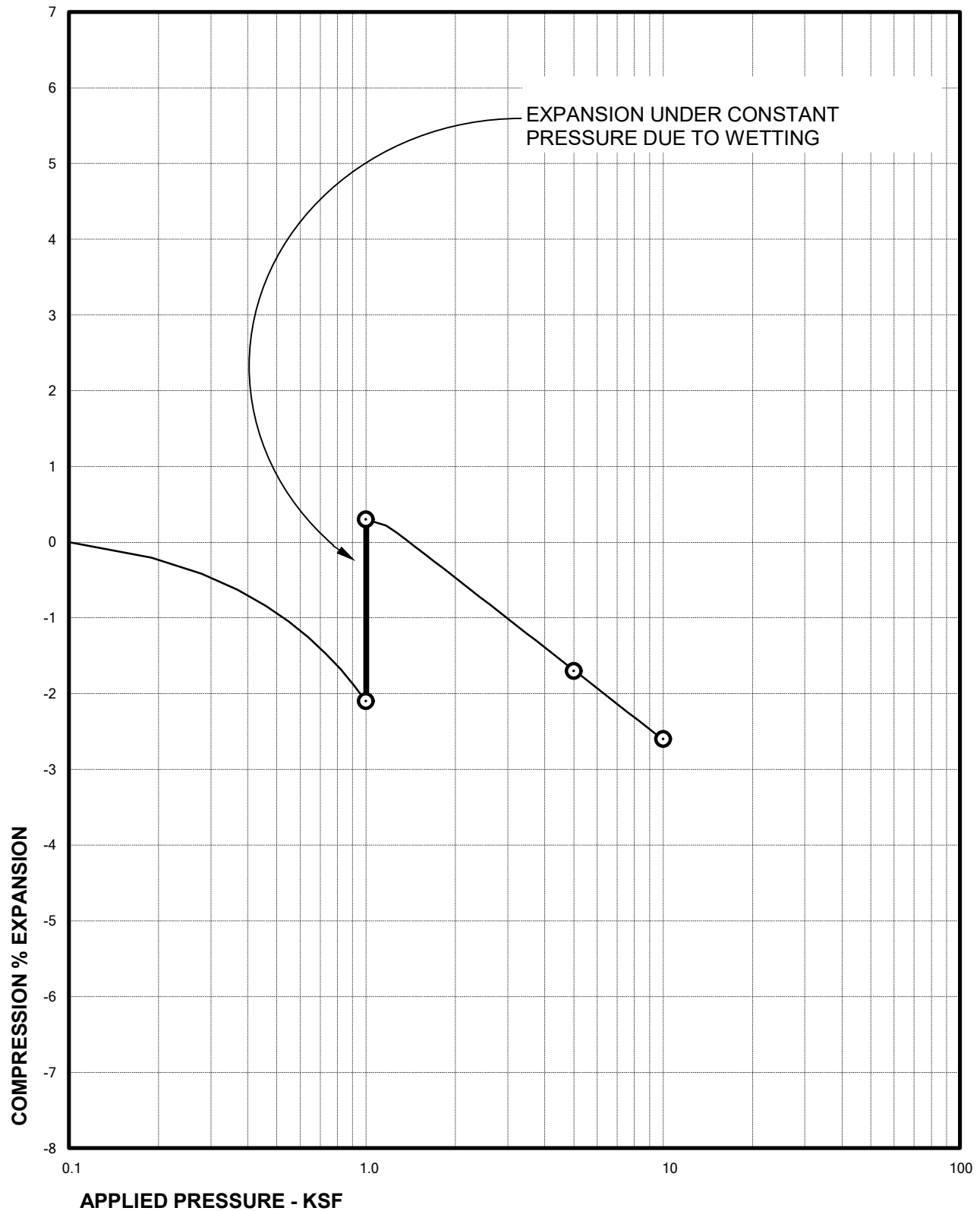
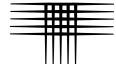
DRY UNIT WEIGHT= 116 PCF
MOISTURE CONTENT= 14.1 %



APPLIED PRESSURE - KSF
Sample of SAND, CLAYEY (SC)
From TH-8 AT 4 FEET

DRY UNIT WEIGHT= 96 PCF
MOISTURE CONTENT= 11.8 %

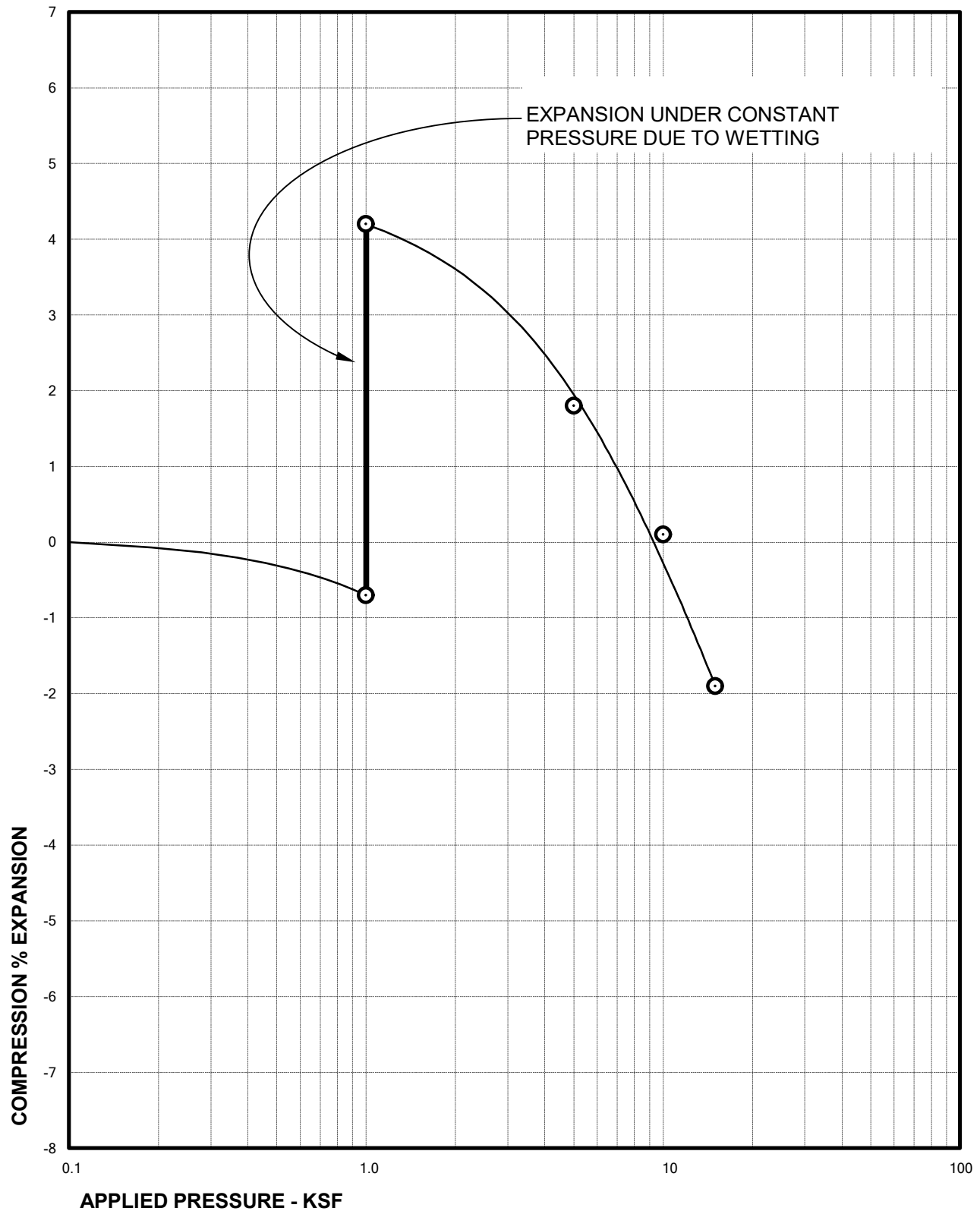
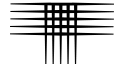
Swell Consolidation Test Results



Sample of SHALE
From TH-9 AT 14 FEET

DRY UNIT WEIGHT= 116 PCF
MOISTURE CONTENT= 17.2 %

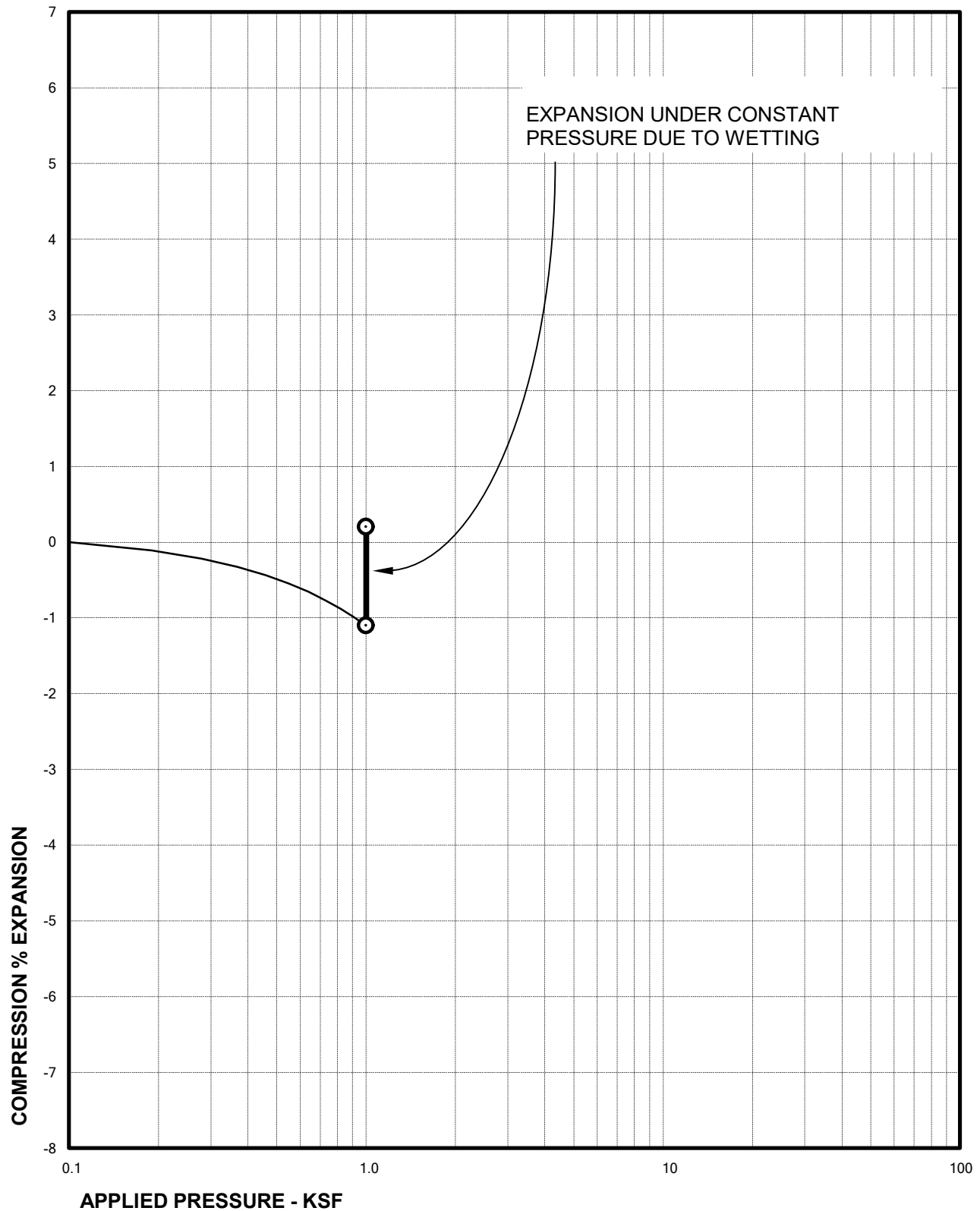
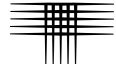
Swell Consolidation Test Results



Sample of SHALE
From TH-10 AT 19 FEET

DRY UNIT WEIGHT= 115 PCF
MOISTURE CONTENT= 17.5 %

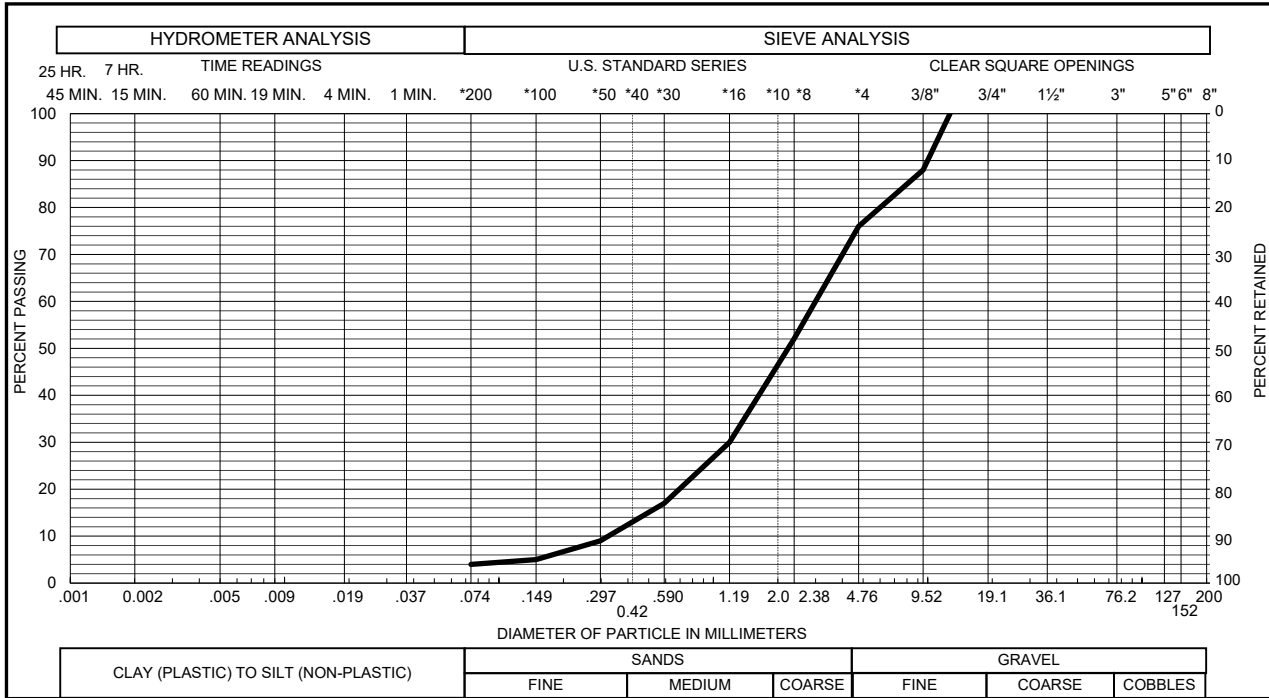
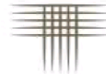
Swell Consolidation Test Results



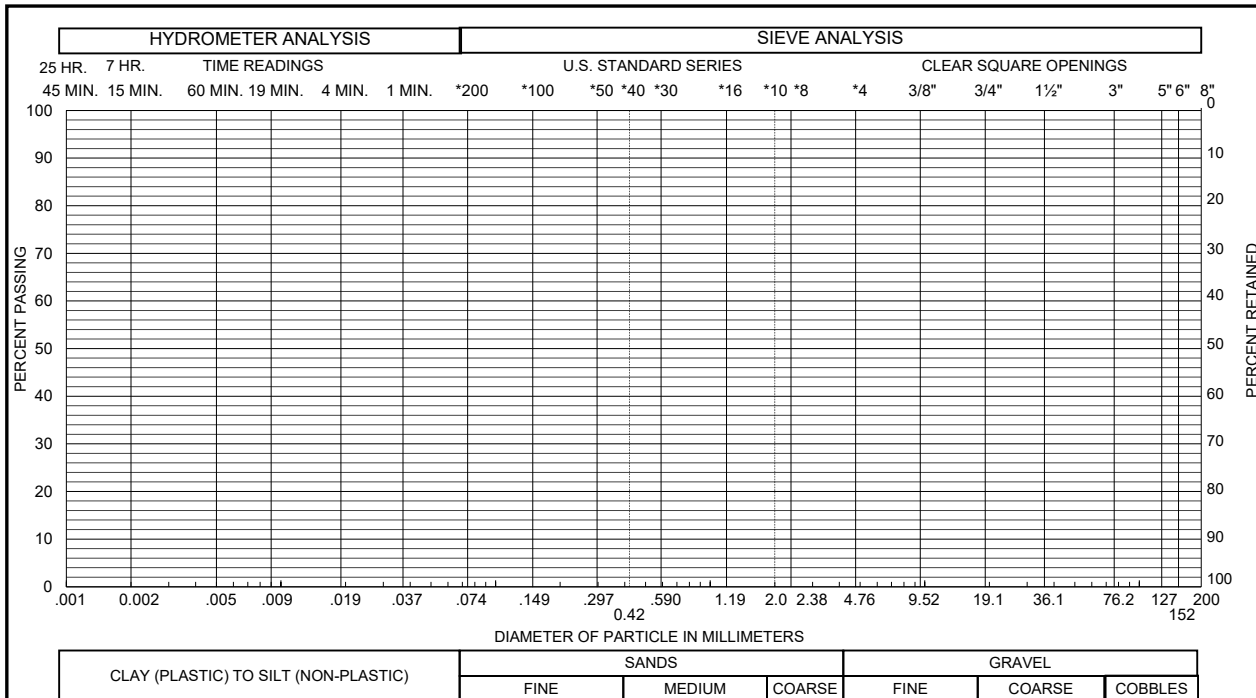
Sample of SHALE
From TH-11 AT 14 FEET

DRY UNIT WEIGHT= 112 PCF
MOISTURE CONTENT= 18.8 %

Swell Consolidation Test Results



Sample of SAND, SLIGHTLY SILTY (SW-SM) GRAVEL 24 % SAND 72 %
 From TH - 11 AT 4 FEET SILT & CLAY 4 % LIQUID LIMIT _____ %
 PLASTICITY INDEX _____ %



Sample of _____ GRAVEL _____ % SAND _____ %
 From _____ SILT & CLAY _____ % LIQUID LIMIT _____ %
 PLASTICITY INDEX _____ %

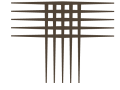
TABLE B-I

**SUMMARY OF LABORATORY TESTING
PROJECT NO. CS20080-105**



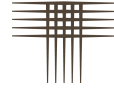
BORING	DEPTH (FEET)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	ATTERBERG LIMITS		SWELL TEST RESULTS*		UNCONFINED COMPRESSION (PSF)	PASSING NO. 200 SIEVE (%)	SOLUBLE SULFATES (%)	DESCRIPTION
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)	SWELL (%)	SWELL PRESSURE (PSF)				
TH-1	4	14.6	108						33		SAND, SILTY (SM)
TH-1	19	7.7	112	NL	NV	-0.2			3		SAND (SP)
TH-2	9	10.5	124						3		SAND (SP)
TH-2	19	4.4							4		SAND (SP)
TH-3	4	10.2	106						18		SAND, SILTY (SM)
TH-3	29	11.5	123			4.7					SHALE
TH-4	4	11.4	107			0.1					SAND, CLAYEY (SC)
TH-4	9	4.8	109							0.002	SAND, SILTY (SM)
TH-5	4	23.2	103	48	32	0.3					CLAY, SANDY (CL)
TH-5	14	7.6	121						8		SAND, SLIGHTLY SILTY (SP-SM)
TH-5	19	10.6							25		SAND, CLAYEY (SC)
TH-6	4	2.6	121						15		SAND, SILTY (SM)
TH-6	9	16.7	113			0.0			49		SAND, VERY CLAYEY (SC)
TH-6	24	14.1	116			1.0					SHALE
TH-7	4	2.7	102						3		SAND (SP)
TH-7	9	2.4	116						11		SAND, SLIGHTLY SILTY (SP-SM)
TH-8	4	11.8	96			-2.4				0.003	SAND, CLAYEY (SC)
TH-8	14	3.7	114						4		SAND (SP)
TH-9	4	22.7	84						12		SAND, SLIGHTLY SILTY (SP-SM)
TH-9	14	17.2	116			2.4					SHALE
TH-9	19	16.0	117					4,100			SHALE
TH-10	14	17.2	110						99		SHALE
TH-10	19	13.5	115			4.9				0.008	SHALE
TH-11	4	8.8	103						4		SAND (SP)
TH-11	14	18.8	112			1.3					SHALE
TH-12	19	14.6	115					21,000			SHALE
TH-13	9	13.3		44	25				96		SHALE

* SWELL MEASURED WITH 1000 PSF APPLIED PRESSURE, OR ESTIMATED IN-SITU OVERBURDEN PRESSURE.
NEGATIVE VALUE INDICATES COMPRESSION.



APPENDIX C

**GUIDELINE SITE GRADING SPECIFICATIONS
3819 JANITELL ROAD
COLORADO SPRINGS, COLORADO**



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1. DESCRIPTION

This item consists of the excavation, transportation, placement and compaction of materials from locations indicated on the plans, or staked by the Engineer, as necessary to achieve preliminary pavement and building pad elevations. These specifications also apply to compaction of materials that may be placed outside of the project.

2. GENERAL

The Soils Engineer will be the Owner's representative. The Soils Engineer will approve fill materials, method of placement, moisture contents and percent compaction.

3. CLEARING JOB SITE

The Contractor shall remove all trees, brush and rubbish before excavation or fill placement is begun. The Contractor shall dispose of the cleared material to provide the Owner with a clean, neat appearing job site. Cleared material shall not be placed in areas to receive fill or where the material will support structures of any kind.

4. SCARIFYING AREA TO BE FILLED

All topsoil, vegetable matter, and existing fill shall be removed from the ground surface upon which fill is to be placed. The surface shall then be plowed or scarified until the surface is free from ruts, hummocks or other uneven features that would prevent uniform compaction by the equipment to be used.

5. PLACEMENT OF FILL ON NATURAL SLOPES

Where natural slopes are steeper than 20 percent (5:1, horizontal to vertical) and fill placement is required, horizontal benches shall be cut into the hillside. The benches shall be at least 12 feet wide or 1-1/2 times the width of the compaction equipment and be provided at a vertical spacing of not more than 5 feet (minimum of two benches). Larger bench widths may be required by the Engineer. Fill shall be placed on completed benches as outlined within this specification.

6. COMPACTING AREA TO BE FILLED

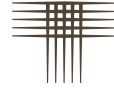
After the foundation for the fill has been cleared and scarified, it shall be disced or bladed until it is free from large clods, brought to a workable moisture content and compacted.

7. FILL MATERIALS

Fill soils shall be free from vegetable matter or other deleterious substances and shall not contain rocks or lumps having a diameter greater than six (6) inches. Fill materials shall be obtained from cut areas shown on the plans or staked in the field by the Engineer or imported to the site.

8. MOISTURE CONTENT

For fill material classifying as CH or CL, the fill shall be moisture treated to between 1 and 4 percent above optimum moisture content as determined by ASTM D 698, if it is to



be placed within 15 feet of the final grade. For deep cohesive fill (greater than 15 feet below final grade), it shall be moisture conditioned to within ± 2 percent of optimum. Soils classifying as SM, SC, SW, SP, GP, GC and GM shall be moisture treated to within 2 percent of optimum moisture content as determined by ASTM D 1557. Sufficient laboratory compaction tests shall be made to determine the optimum moisture content for the various soils encountered in borrow areas.

The Contractor may be required to add moisture to the excavation materials in the borrow area if, in the opinion of the Soils Engineer, it is not possible to obtain uniform moisture content by adding water on the fill surface. The Contractor may be required to rake or disc the fill soils to provide uniform moisture content throughout the soils.

The application of water to embankment materials shall be made with any type of watering equipment approved by the Soils Engineer, which will give the desired results. Water jets from the spreader shall not be directed at the embankment with such force that fill materials are washed out.

Should too much water be added to any part of the fill, such that the material is too wet to permit the desired compaction to be obtained, all work on that section of the fill shall be delayed until the material has been allowed to dry to the required moisture content. The Contractor will be permitted to rework wet material in an approved manner to hasten its drying.

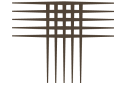
9. COMPACTION OF FILL AREAS

Selected fill material shall be placed and mixed in evenly spread layers. After each fill layer has been placed, it shall be uniformly compacted to not less than the specified percentage of maximum density. Granular fill placed less than 15 feet below final grade shall be compacted to at least 95 percent of maximum dry density as determined in accordance with ASTM D 1557. Cohesive fills placed less than 15 feet below final grade shall be compacted to at least 95 percent of maximum dry density as determined in accordance with ASTM D 698. For deep, cohesive fill (to be placed 15 feet or deeper below final grade), the material shall be compacted to at least 98 percent of maximum standard Proctor dry density (ASTM D 698). Granular fill placed more than 15 feet below final grade shall be compacted to at least 95 percent of maximum modified Proctor dry density (ASTM D 1557). Deep fills shall be placed within 2 percent of optimum moisture content. Fill materials shall be placed such that the thickness of loose materials does not exceed 10 inches and the compacted lift thickness does not exceed 6 inches.

Compaction, as specified above, shall be obtained by the use of sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other equipment approved by the Soils Engineer for soils classifying as claystone, CL, CH or SC. Granular fill shall be compacted using vibratory equipment or other equipment approved by the Soils Engineer. Compaction shall be accomplished while the fill material is at the specified moisture content. Compaction of each layer shall be continuous over the entire area. Compaction equipment shall make sufficient trips to ensure that the required density is obtained.

10. COMPACTION OF SLOPES

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction operations shall be continued until slopes are stable, but not too dense for planting, and there is no appreciable amount of loose soil on the slopes. Compaction of slopes may be done progressively in increments of 3 to 5 feet in height or



after the fill is brought to its total height. Permanent fill slopes shall not exceed 3:1 (horizontal to vertical).

11. DENSITY TESTS

Field density tests will be made by the Soils Engineer at locations and depths of his/her choosing. Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several inches. Density tests will be taken in compacted material below the disturbed surface. When density tests indicate the density or moisture content of any layer of fill or portion thereof is below that required, the particular layer or portion shall be reworked until the required density or moisture content has been achieved. The criteria for acceptance of fill shall be:

A. Moisture

The allowable ranges for moisture content of the fill materials specified above in "Moisture Content" are based on design considerations. The moisture shall be controlled by the Contractor so that moisture content of the compacted earth fill, as determined by tests performed by the Soils Engineer, shall be within the limits given. The Soils Engineer will inform the Contractor when the placement moisture is less than or exceeds the limits specified above and the Contractor shall immediately make adjustments in procedures as necessary to maintain placement moisture content within the specified limits.

B. Density

1. The average dry density of all material shall not be less than the dry density specified.
2. No more than 20 percent of the material represented by the samples tested shall be at dry densities less than the dry density specified.
3. Material represented by samples tested having a dry density more than 2 percent below the specified dry density will be rejected. Such rejected materials shall be reworked until a dry density equal to or greater than the specified dry density is obtained.

12. SEASONAL LIMITS

No fill material shall be placed, spread or rolled while it is frozen, thawing, or during unfavorable weather conditions. When work is interrupted by heavy precipitation, fill operations shall not be resumed until the Soils Engineer indicates the moisture content and density of previously placed materials are as specified.

13. NOTICE REGARDING START OF GRADING

The Contractor shall submit notification to the Soils Engineer and owner advising them of the start of grading operations at least three (3) days in advance of the starting date. Notification shall also be submitted at least three days in advance of any resumption dates when grading operations have been stopped for any reason other than adverse weather conditions.

14. REPORTING OF FIELD DENSITY TESTS

Density tests made by the Soils Engineer, as specified under "Density Tests" above, will be submitted progressively to the Owner. Dry density, moisture content and percent compaction will be reported for each test taken.