ENTECH
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COLORADO SPRINGS, CO 80907
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FAX (719) 531-5238

February 2, 2022

4-Way Joint Venture, LLC
c/o Peter Martz
P.O. Box 50223
Colorado Springs, Colorado 80949

Attn: Peter Martz

Re: Soil, Geology and Geologic Hazard Addendum
Waterbury, Filings 1 and 2
PUD Amendment and Preliminary Plan
El Paso County, Colorado

Dear Mr. Martz:

A Soil, Geology, Geologic Hazard and Preliminary Subsurface Soil Investigation was previously prepared by Entech Engineering, Inc., revised October 18, 2021 for the above referenced site (Reference 1). This addendum addresses updates made to the development plan. The revised Development Plan is presented in Figure 1. One-hundred and ninety-eight lots are proposed for the filings.

The site was revisited by personnel of Entech Engineering, Inc., December 6, 2021. The site is relatively unchanged from the conditions observed at the time of the original Soil, Geology and Geologic Hazard Study. Recent site photographs, taken December 6, 2021 are included in Appendix A. The original Soil, Geology, Geologic Hazard Study, and Preliminary Subsurface Soil Investigation is included in Appendix B (Reference 1). The summary of depth to bedrock and groundwater of test borings and profile holes located within/adjacent to Waterbury Filings 1 and 2 is presented in Table 1. As noted in Table 1 the test borings with shallow water are in fill areas or off the proposed building areas.

Current site conditions in the area of the proposed structure are consistent with what is described in the original Geologic Hazard Study by Entech (Reference 1, Appendix B). The grading and topography in the area of the proposed site appears to be relatively unchanged. The *Geologic Map of the Falcon Quadrangle* distributed by the Colorado Geological Survey in 2012, is presented in (Reference 2, Figure 2). Site-specific geologic mapping was performed as a part of the Geologic Hazard Study by Entech (Reference 1) and revised based off recent mapping by the Colorado Geological Survey (Reference 2, Figure 2). The site is mapped as Qal: Recent Alluvium of Quaternary Age along the drainages and Qa_3: Alluvium Three of Quaternary Age which consists of stream terrace deposits. The bedrock underlying the site is the Dawson Formation of Tertiary to Cretaceous Age (References 1 through 3). The updated Geology/Engineering Geology Map is presented in Figure 3.

The geologic hazards identified on this site include physiographic floodplains, seasonal and potentially seasonal shallow groundwater areas. **Lots that are affected by the potential shallow groundwater conditions in Filings 1 and 2 are: Lots 12, 13, 32 – 35, 43 – 49, 75, 88 – 90, 93 – 95, 107 – 112, and 115 – 118.** These hazards and recommended mitigation have been addressed in the Geologic Hazard Investigation, Appendix B and are briefly discussed below. These areas can be either avoided or mitigated through grading and proper design and construction practices.

According to the proposed grading plan, Figure 1, fill depths of 2 to 10 feet are proposed on the site with approximately 4 feet of fill proposed across the majority of the site. Drainages along the eastern and western portions of the site are to be contained in drainage tracts. A minor drainage that enters the site below an earthen dam immediately north of the site will be regraded during future filings. The drainage area from where it enters the subject site (Filing 2) is to be regraded and water collected and directed via storm sewer. A detention basin is proposed in the southwest corner of the site. Additionally, areas of seasonal shallow groundwater have been mapped in the southern portion of the site that are to be regraded with 4 to 10 feet of fill to be placed. The drainage areas along the eastern and western side of the site have been mapped as physiographic floodplains. These are to be avoided by development or modified with minor grading. Proposed site grading will further raise foundation above the groundwater level. Any fill placed on the site should be compacted at a minimum of 95% of its maximum Modified Proctor Dry Density ASTM D-1557. Where structures encroach on these areas, drains may be necessary to help prevent the intrusion of water into areas below grade. Recommendations and drain details have been provided in the Soil, Geology, and Geologic Hazard Investigation (Reference 1, Appendix B) and remain valid.

The proposed building areas of the site are not mapped in any floodplain zones according to the FEMA Map No. 08041CO552G, December 7, 2018 (Reference 4, Figure 4). A drainage located along the western side of the site has been mapped in a floodplain zone that will be avoided by building sites. Lots adjacent to the floodplains may require drains to mitigate the potential for shallow groundwater during periods of high runoff. Finished floor must be a minimum of one foot above floodplain levels. Exact floodplain locations and drainage studies are beyond the scope of this report. Specific recommendations have been made in the Soil, Geology and Geologic Hazard Investigation (Reference 1, Appendix B).

A detention pond is proposed in the southwestern portion of the site. The soils encountered in the area of the proposed detention pond consisted of silty to slightly silty sand overlying clayey sandstone bedrock at 14 feet (Test Boring No. 300, Reference 1, Appendix B). Groundwater was encountered at 6.5 feet in the test boring. In general, the site soils encountered in the test borings are suitable for the proposed detention pond. Groundwater may be encountered in the deeper cuts. Dewatering of the area may be required during site grading and embankment construction. Saturated unstable soil conditions may be encountered during construction of the basin and embankment. Excavation of saturated soils will be difficult with rubber-tired equipment. Stabilization using shot rock or geogrids may be necessary in areas where groundwater is approached or encountered.

Any areas to receive new fill should have all topsoil, organic material or debris removed. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1 or flatter. The subgrade should be scarified and moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill. Areas receiving fill may require stabilization with shotrock or fabric if water is encountered or approached. Any soft/loose areas should be removed and recompacted.

New fill should be placed in lifts not to exceed 6 inches after compaction while maintaining at least 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. These materials should be placed at a moisture content conducive to compaction, usually ±2% of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction/grading. Entech should approve any import materials prior to hauling them to the site.

Minor unstable slope areas have been mapped along a drainage immediately southeast of the site. A building setback of 20 feet from the unstable slopes was recommended. According to the proposed development plan, it appears there is sufficient distance to allow for the building setback. Additional foundation reinforcement may be necessary should the foundations encroach on this area. Specific recommendations have been made in the Soil, Geology and Geologic Hazard Investigation (Reference 1, Appendix B) and remain valid.

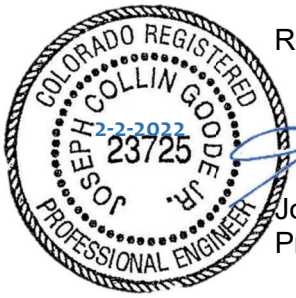
It is our opinion the conclusions and recommendations in the Soil, Geology, Geologic Hazard and Preliminary Subsurface Soil Investigation remain valid and the report may be used for the proposed development. Additional soils investigation is recommended after site grading to provide foundation recommendations.

We trust that this has provided you with the information you required. If you have any questions or need further information, please do not hesitate to contact us.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist



Reviewed by:

Joseph C. Goode, Jr., P.E.
President

LLL

Encl.
Entech Job No. 212803
AA Projects/2021/212803 geohaz addendum

BIBLIOGRAPHY

1. Entech Engineering, Inc. revised October 18, 2021. *Soil, Geology, Geologic Hazard and Preliminary Subsurface Soil Investigation, Waterbury, Phase 1, El Paso County, Colorado*. Entech Job No. 130377 (212803).

2. Morgan, ML and White, JL. 2012. *Geologic Map of the Falcon Quadrangle, El Paso County, Colorado.* Colorado Geological Survey. Open-File Report 12-05.

3. Trimble, Donald E. and Machette. Michael N., 1979. *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado.* U.S. Geological Survey. Map I-847-F.

4. Federal Emergency Management Agency, December 7, 2018. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041CO552G.

TABLE

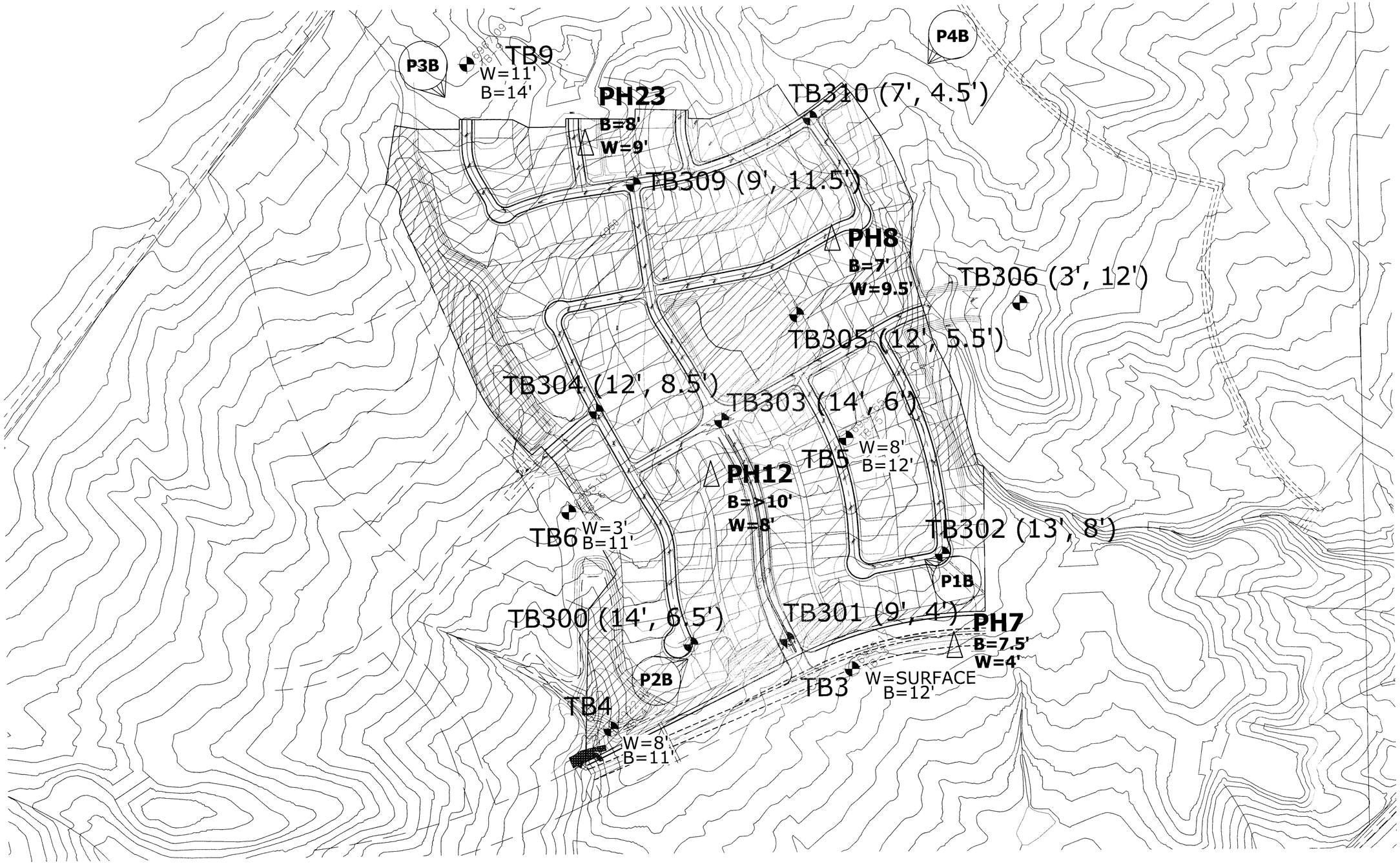
Table 1: Summary of Depth to Bedrock and Groundwater of Test Borings and Profile Holes Located Within/Adjacent to Filings 1 & 2

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)	Date of Groundwater Measurement
300	14	6.5	7/6/2012
301[1]	9	4	7/6/2012
302	13	8	7/6/2012
303	14	6	7/6/2012
304	12	8.5	7/6/2012
305	12	5.5	7/6/2012
306	3	12	7/6/2012
309	9	11.5	7/6/2012
310[1]	7	4.5	7/6/2012
3[2]	12	Surface	9/13/2002
4	11	8	9/13/2002
5	12	8	9/13/2002
6[3]	11	3	9/13/2002
9	14	11	9/13/2002
PH7[2]	7.5	4	11/8/2003
PH8	7	9.5	11/12/2003
PH12	>10	8	11/12/2003
PH23	8	9	11/25/2003

1- Fill Area

2- Off of the subject site

3- Drainage



TB (14', 6.5') - INDICATES APPROXIMATE TEST BORING LOCATION & NUMBER (DEPTH TO BEDROCK, DEPTH TO GROUNDWATER)

PH (4',>10') - INDICATES APPROXIMATE PERCOLATION TEST LOCATION & NUMBER (DEPTH TO BEDROCK, DEPTH TO GROUNDWATER)

P1B - INDICATES APPROXIMATE PHOTOGRPH LOCATION & DIRECTION TAKEN MARCH 15, 2013

NORTH

REVISION	BY:

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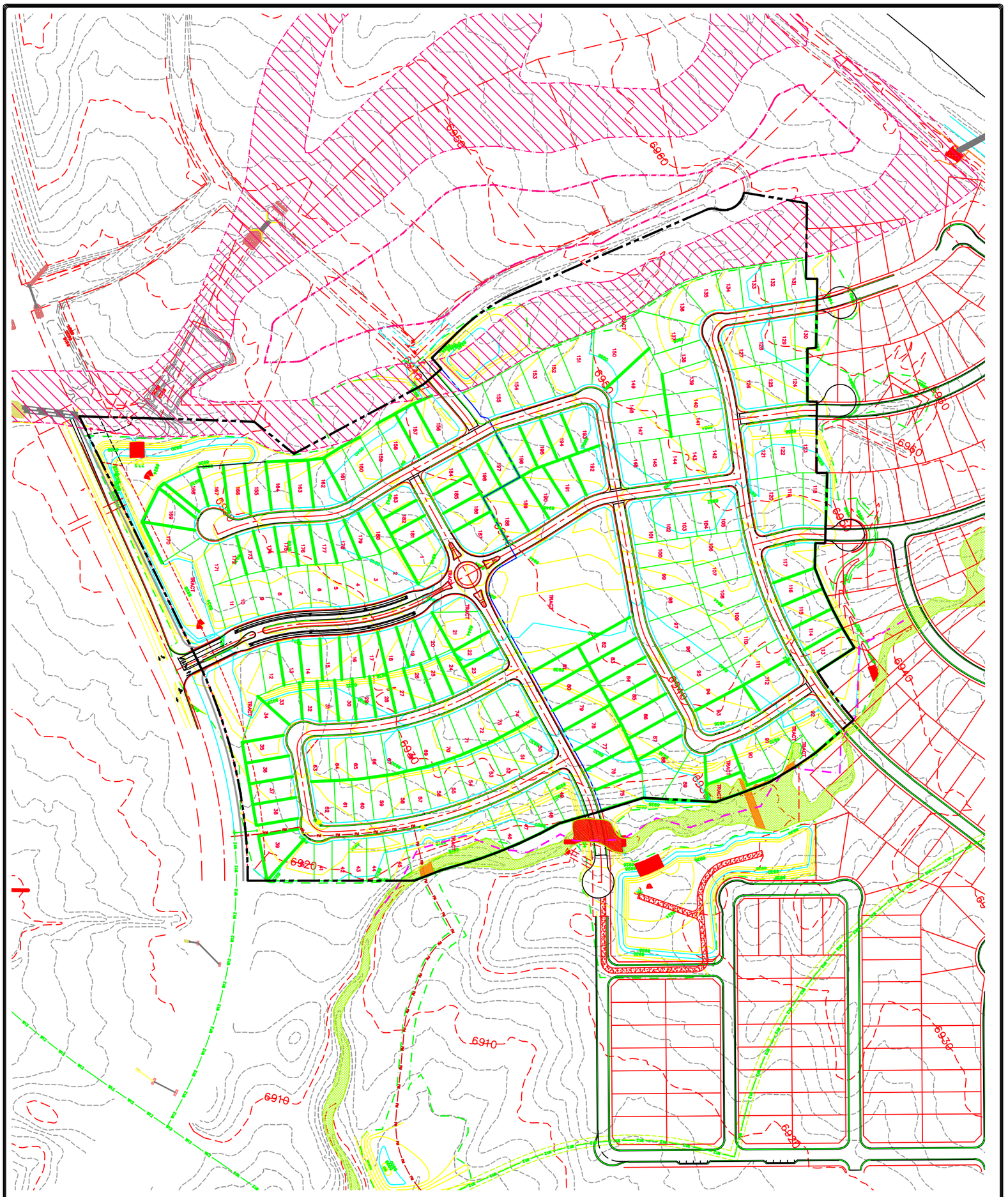
TEST BORING/ PERCOLATION TEST
LOCATION PLAN
4 - WAY JOINT VENTURE
WATERBURY PHASE 1
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

DRAWN BY:	R. MCBRIDE
DESIGNED BY:	KAH
CHECKED BY:	
DATE:	03/20/13
SCALE:	1" = 150'
JOB NO.:	130377
FIGURE NO.:	3

FIGURES



DRAWN	TLT	
CHECKED		
DATE	1/27/22	
SCALE	AS SHOWN	
JOB NO.	212803	
FIGURE No.	1	

SITE DEVELOPMENT/GRADING PLAN
WATERBURY PUD FILING 1 & 2
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

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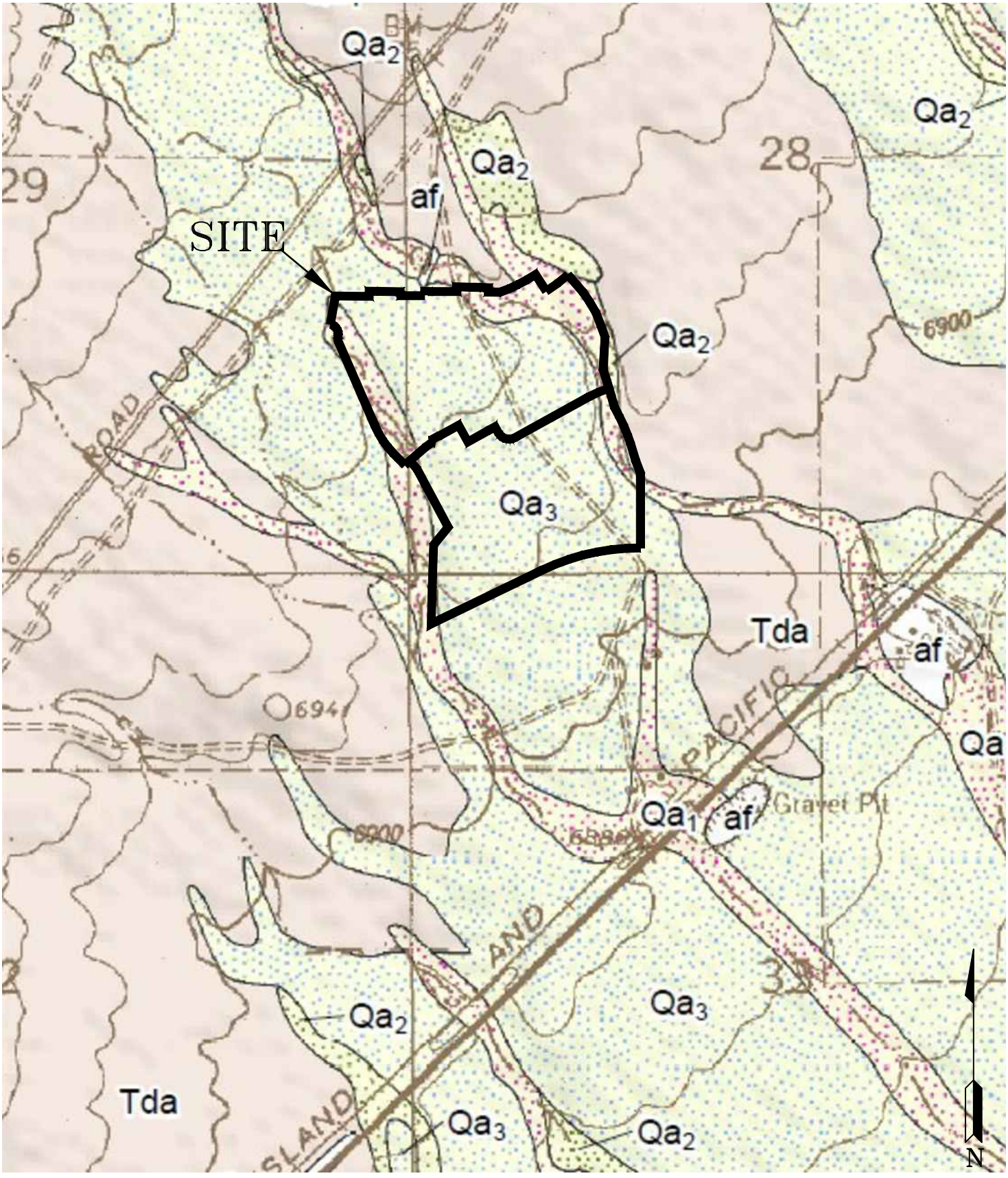
REVISION	BY



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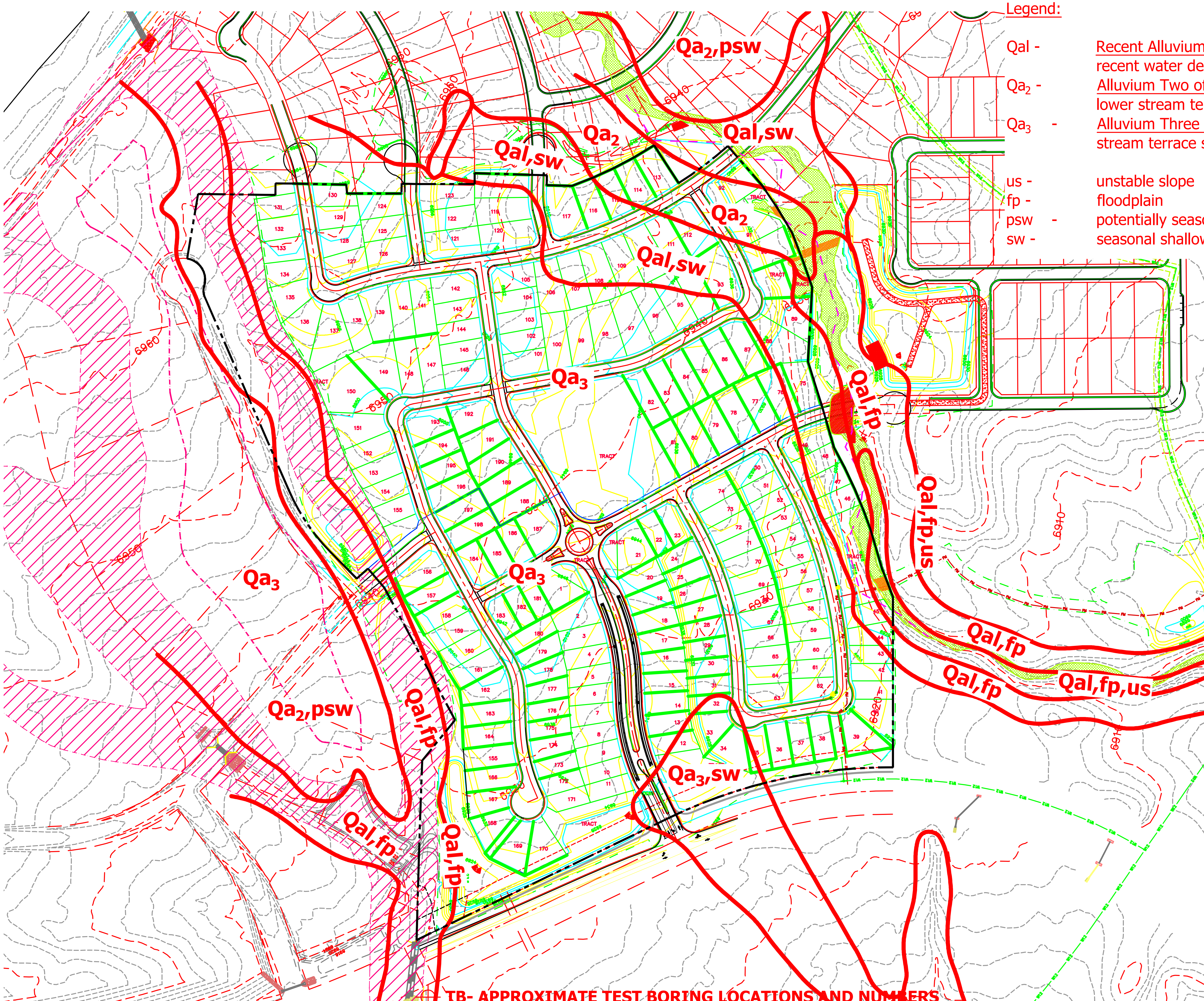
FALCON QUADRANGLE GEOLOGY MAP
WATERBURY PUD FILING 1 & 2
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

DRAWN:	DATE:	CHECKED:	DATE:
LLL	1/27/22		

JOB NO.: 212803

FIG NO.: 2



Legend:

Qal -	Recent Alluvium of Quaternary Age: recent water deposits
Qa_2 -	Alluvium Two of Quaternaray Age: lower stream terrace sands
Qa_3 -	Alluvium Three of Quaternaray Age: stream terrace sands
us -	unstable slope
fp -	floodplain
psw -	potentially seasoned shallow groundwater area
sw -	seasonal shallow groundwater area

REVISION	BY

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GEOLOGY/ENGINEERING GEOLOGY MAP
WATERBURY PUD FILING 1 & 2
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

DRAWN LLL
CHECKED
DATE 1/27/22
SCALE AS SHOWN
JOB NO. 212803
FIGURE No. 3

N

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FLOODPLAIN MAP
WATERBURY PUD FILING 1 & 2
COLORADO SPRINGS, CO
FOR: 4-WAY JOINT VENTURE

DRAWN:	DATE:	CHECKED:	DATE:
LLL	1/27/22		

JOB NO.: 212803

FIG NO.: 4

APPENDIX A: Site Photographs

1

Looking west from the south-central side of the site.

December 6, 2021

2

Looking north from the south-central side of the site.

December 6, 2021

Job No. 212803

APPENDIX B: Entech Engineering, Inc., Soil, Geology, Geologic Hazard, and Preliminary Subsurface Soil Investigation Entech Job No. 130377 (212803)

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SOIL, GEOLOGY, GEOLOGIC HAZARD AND PRELIMINARY SUBSURFACE SOIL INEVSTIGATION WATERBURY, PHASE I EL PASO COUNTY, COLORADO

Prepared for

4 Way Joint Venture, LLC
c/o Peter Martz
P.O. Box 50223
Colorado Springs, Colorado 80949

Attn: Peter Martz

March 22, 2013
Revised October 18, 2021

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford
Geologist

COLORADO REGISTERED
JOSEPH COLLIN GOODE JR.
10-18-2021
23725
PROFESSIONAL ENGINEER

Reviewed by:

Joseph C. Goode, Jr., P.E.
President

KAH/am

Encl.

Entech Job No. 130377 (212803)
2MSW/rep/GeoRep/2021/130377 (212803)/soil/geo/geo haz

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TABLES

FIGURES

1.0 SUMMARY

Project Location:

The project lies in portions of Sections 28, 29, 32 and 33, Township 12 South, Range 64 West of the 6th Principal Meridian. The site is located north of Highway 24, approximately 3 miles northeast of Falcon, Colorado, in El Paso County.

Project Description:

Total acreage involved in the project is approximately 62 acres. The proposed site development is to consist of single-family residential development with areas of open space and park areas. The development will utilize central water and sewer.

Scope of Report:

The report presents the results of our geologic investigation and treatment of engineering geologic hazards. This report is the result of our geologic reconnaissance, a review of available maps, aerial photographs and our conclusions with respect to the impacts of the geologic conditions on development. Preliminary foundation recommendations are also included.

Land Use and Engineering Geology:

This site was found to be suitable for the proposed development. Geologic conditions will impose some constraints on this phase of the development. These include areas of seasonal shallow groundwater, areas where there is a potential for ponded water, floodplains, unstable slopes, artificial fill, the potential for shallow bedrock, loose soils, and expansive soils. Based on the proposed development plan, it appears that these areas will have some impact on the development. Site conditions will be discussed in greater detail in this report.

In general, it is our opinion that the development can be achieved if the observed geologic conditions on site are either avoided or properly mitigated. All recommendations are subject to the limitations discussed in the report.

2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site lies in portions of Sections 28, 29, 32 and 33, Township 12 South, Range 64 West of the 6th Principal Meridian, in El Paso County, Colorado. The site is located north of Highway 24, approximately 3 miles northeast of Falcon, Colorado. The location of the site is shown on the Vicinity Map, Figure 1.

The topography of the site is gently to moderately generally sloping to the southeast. Several drainages exist on the site that flow in southeasterly directions. The area of the site is indicated on the USGS Map, Figure 2. The site contains primarily low field grasses and weeds. Past uses have included grazing and pasture land. Site photographs are included in Appendix A. The locations and directions of the photographs are indicated on Figure 3.

Total acreage involved in the proposed development is approximately 62 acres. The proposed development is to consist of 201 single-family residential lots ranging from 5,020 to 8,000 square feet and areas of open space and parks. The Development Plan is shown on Figures 3, 9 and 15.

3.0 SCOPE OF THE REPORT

The scope of this report will include the following:

- A general geologic analysis of the site utilizing published geologic data, and subsurface soils information.
- Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions, geologic hazards, and their effects on development of the property.
- Recommended mitigation of geologic hazards/constraints where they affect development.
- Preliminary recommendations pertaining to foundations, floor slabs and concrete, and land use.

4.0 FIELD INVESTIGATION

The site was previously investigated in a *Soil, Geology, Geologic Hazard and Wastewater Study and Preliminary Subsurface Soil Investigation* by Entech Engineering, Inc. January 22, 2004 (Entech Job No. 61992, Reference 1). The previous investigation addressed the entire 558 acre 4-Way Ranch parcel and included a wastewater study for individual water treatment systems. The southwestern portion of 4-Way Ranch has been platted and several single-family residential structures have been constructed. Three addendums were written by Entech Engineering, Inc. May 18, 2004 (Reference 2), June 25, 2004 (Reference 3) and January 26, 2009 (Reference 4). The third addendum (Reference 4) addressed the southern portion of the 558-acre site (south of Stapleton Road) where commercial and multi-family residential development was proposed. At the time of this investigation Stapleton Road had been constructed, paved and curb and gutter installed.

A *Soil, Geology, Geologic Hazard and Preliminary Subsurface Soil Investigation Report* addressing the Waterbury PUD development proposed for the area north of Stapleton Road, north of the proposed commercial and multi-family area and east of the platted single-family residential areas was prepared by Entech Engineering, Inc. May 16, 2012, Entech Job No. 121481, Reference 5. The investigation for the entire 558-acre parcel was used in evaluation of the Waterbury PUD site. Additionally, *A Subsurface Soil Investigation/Bedrock/Groundwater Investigation* was conducted on the site July 18, 2012. (Entech Job No. 120675, Reference 6). The investigation consisted of drilling an additional 19 test borings on the Waterbury PUD site to evaluate soil, bedrock and groundwater conditions where utilities are proposed. This report is for Phase I of the Waterbury PUD. Information from these reports was used in evaluating the site. Site photographs are included in Appendix A.

Twenty-five (25) test borings were drilled as a part of a preliminary subsurface soil investigation for the entire site (Reference 1). Five (5) of these test borings were drilled on or immediately adjacent to this Phase of the development. The borings were drilled with a power-driven continuous flight auger drill rig to depths ranging from 10 to 20 feet. Samples were obtained during drilling using the Standard Penetration Test, ASTM D-1586, utilizing a 2-inch O.D. Split Barrel Sampler. Results of the penetration tests are shown on the drilling logs to the right of the sampling point. The locations of the test borings are included on the Test Boring Location Plan, Figure 3. The drilling logs are included in Appendix B. Profile holes from previous percolation

tests were also used in evaluating the site. The locations of these profile holes are shown on Figure 3. The profile hole logs are included in Appendix C.

Laboratory testing was performed to classify and determine the soils engineering characteristic. Laboratory tests included moisture content, ASTM D-2216, grain size analysis, ASTM D-422 and Atterberg Limits, ASTM D-4318. Swell tests included both FHA and Denver Swell/Consolidation Testing. Results of the laboratory testing are included in Appendix D. A Summary of Laboratory Test Results is presented in Table 1.

Nineteen test borings were drilled on the Waterbury PUD site as a part of a *Subsurface Soil Investigation/Bedrock/Groundwater Investigation* (Reference 6). Seven (7) of these test borings were drilled on Phase I of the development. The locations of these test borings are indicated on the Test Boring Location Map, Figure 3. The Test Boring Logs and Laboratory Test Results are included in Appendix E. A Summary of Laboratory Test Results is presented in Table 2.

The geologic analysis was performed using information from the preliminary subsurface soil investigations (References 1 and 6), site-specific mapping and published sources including the *Geologic Map of the Pueblo 1º x 2º Quadrangle, South-Central Colorado* distributed by the U.S. Geological Survey (Reference 7) and a study performed by Charles S. Robinson and Associates, Inc. for El Paso County Planning Department (References 8,9). The Soil Conservation Service (SCS) Survey was also reviewed to evaluate the site.

5.0 SOIL, GEOLOGY AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 17 miles to the west is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northerly direction (Reference 10). The rocks in the area of the site are sedimentary in nature, and typically Tertiary to Cretaceous in age. The bedrock underlying the

site itself is the Dawson Formation. Overlying the Dawson are unconsolidated deposits of alluvial and residual soils. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Service

The Soil Conservation Service (Reference 11) has mapped two soil types on the site (Figure 4). In general, the soils consist of gravelly sandy loam over a yellowish and pale brown gravelly, loamy sand subsoil. Soils are described as follows:

Type	Description
19	Columbine gravelly sandy loam, 0-3% slopes
83	Stapleton sandy loam, 3-8% slopes

Complete descriptions of the soils are presented in Figures 5 and 6. The soils have been described to have very rapid to rapid permeabilities. Limitations for development on Soil Type 83 include frost action potential and soil blowing as described by the Soil Conservation Service. Special design for roadways may be necessary due to frost heave. Limitations on Soil Type 19 include the hazard of flooding in some areas. Cut banks in excavations are susceptible to caving as described in Table 8 from the Soil Survey (Reference 11). The soil blowing hazard is severe if vegetation is removed. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards.

5.3 Site Stratigraphy

The Colorado Geologic Map showing the location of the site is presented in Figure 7 (Reference 7). The Geology Map prepared for the Falcon Quadrangle by Charles S. Robinson and Associates, Inc. for the El Paso County Planning Department (Reference 8) showing the location of the site is presented in Figure 8. The Geology Map prepared for the site is presented in Figure 9. Four mappable units were identified on this site which are discussed as follows:

- **Qaf** **Artificial Fill of Quaternary Age:** These are man-made deposits associated with earthen dams on site.

- **Qal** **Recent Alluvium of Quaternary Age:** These are recent water deposited soils associated with the bed of streams and along valley floors. The soils consist of silt, clay, and sands.

- **Qp** **Piney Creek Alluvium of Quaternary Age:** These are water deposited terraces along the present streams. The material generally consists of silty sand and may be highly stratified, containing lenses of silt, clay or gravel.

The bedrock underlying the site is Dawson Formation of Tertiary to Cretaceous Age. This formation consists of coarse grained arkosic sandstone with interbedded claystone and siltstone. Typically overlying the Dawson in many areas is a layer of residual soil derived from the in-situ weathering of the bedrock materials on-site.

The soils listed above were mapped from the Robinson Study for El Paso County Planning Department (Figure 8, Reference 8), the *Geologic Map of the Pueblo 1° x 2° Quadrangle* (Figure 7, Reference 7), and site-specific mapping of the site. The test borings and profile holes of the percolation tests were also used in evaluating the site and are included in Appendices A, C and E. A summary of the geologic units mapped on this site by Charles Robinson and Associates, Inc. is included on Table 4 (Reference 12).

5.4 Soil Conditions

The soils encountered in the test borings and profile holes for the entire site can be grouped into six general soil types. The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 consists of slightly silty and silty sands (SW-SM, SP-SM). Areas of clayey sands (SC) were also encountered in the test borings. The sands were encountered in the upper soil profile of most of the test borings and profile holes. These soils were encountered at loose to dense states and dry to wet conditions. Soil Type 1 has 6 to 25 percent passing the No. 200 sieve. The soils tested in the test borings and profile holes are non-expansive and generally non-plastic. An FHA Swell pressure of 290 psf was obtained on a sample of silty sand (Reference 6, Appendix E) indicating the sand has low swell potential.

Soil Type 2 consists of silty to sandy clay (CL). The clays were encountered in the upper soil profile in two of the test borings. The clays were encountered at very stiff consistencies and at moist conditions. The samples tested have 76 and 95 percent passing the No. 200 sieve. An FHA Swell pressure of 1470 psf was measured on the clays. A swell of 1.5% was measured on the clays in the Swell/Consolidation Test. These swells are in the moderate expansion range.

Soil Type 3 consists of clayey silts (ML). The silts were encountered in two of the test borings at stiff consistencies and moist conditions. The silts generally have low plasticity and low swelling properties.

Soil Type 4 consists of clayey, very silty to slightly silty and slightly clayey sandstone bedrock (SC, SM, SM-SW, SW-SC). The sandstone was encountered in most of the test borings and many of the profile holes at depths ranging from the surface to 18 feet below the surface. The sandstones were encountered at very dense states and at moist to wet conditions. The samples tested have 7 and 48 percent passing the No. 200 sieve. FHA Swell pressures of 350 psf and 860 psf were measured on the slightly clayey and clayey sandstones. These swells are in the low expansion range. The silty sandstones are non-plastic and non-expansive. A consolidation of 0.3 % was measured in the Swell/Consolidation Test on the sandstone, indicating low potential for consolidation.

Soil Type 5 consists of silty and sandy claystone (CL). The claystones were encountered in 21 of the test borings at depths ranging from 3 to 14 feet below the surface. The claystones were encountered at hard consistencies and at moist conditions. The samples tested have 56 to 93 percent passing the No. 200 sieve. FHA Swell pressures of 1015 psf to 1470 psf were measured on the claystones. These swells are in the moderate expansion range. Swells of 0.6% and 1.7% were measured in the Swell/Consolidation Test on the claystone (Reference 6, Appendix E). These swells are in the low to moderate expansion range.

Soil Type 6 consists of clayey and sandy siltstone (ML). The siltstones were encountered in 5 of the test borings at depths ranging from 0 to 12 feet below the surface. The siltstones were encountered at hard consistencies and at moist conditions. The samples tested have 62 and 82 percent passing the No. 200 sieve and generally are non-plastic. FHA Swell pressures of 1150 psf and 1818 psf and a Denver swell of 3.8% were measured on the siltstones. These swell

pressures are in the moderate to high expansion range.

The laboratory results are summarized in Tables 1 and 2. Laboratory results are included in Appendices D and E. A summary of depth to bedrock for the test borings from Entech Job No. 120675 (Reference 6) is shown in Table 3. The depth to bedrock from Entech Job No. 61992 (Reference 1) are summarized in Tables included in Appendices B and C.

5.5 Groundwater

Groundwater was encountered in all of the test borings drilled on or immediately adjacent Phase I of the development, as a part of the Subsurface Soil Investigation/Bedrock/Groundwater Investigation (Figure 3, Reference 6) at depths ranging from 4 to 11.5 feet. A summary of groundwater depths is presented in Table 3 and included in Appendix E.

Groundwater was encountered in all of the test borings drilled on or immediately adjacent Phase I, ranging from the surface to 8 feet below the surface (Figure 3, Reference 1). A summary of groundwater depths for all of the test borings drilled on the entire development is included in Appendix B. Groundwater was also encountered in profile holes drilled on or immediately adjacent to Phase I of the development, at depths ranging from 4 to 9.5 feet below the surface (Figure 3, Reference 1).

Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Isolated sand layers within the variable soil profile, sometimes only a few feet in thickness and width, can carry water in the subsurface. Water may also flow on top of the bedrock. Contractors should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site.

6.0 ENGINEERING GEOLOGY

The Engineering Geology Map of the Falcon Quadrangle as mapped by Charles Robinson and Associates, Inc. for El Paso County Planning Department is presented in Figure 10 (Reference 9). The Robinson Study map and site-specific mapping were utilized to produce an Engineering Geology Map, Figure 9. This map shows the location of various geologic conditions of which the developers and planners should be cognizant during the planning, design and construction stages of the project. The hazards/constraints identified on this site include floodplains, seasonally shallow groundwater areas, potentially seasonal shallow groundwater areas, areas of seepage or springs, area of ponded water, unstable slopes, artificial fill, loose soils, and expansive soils. These hazards and the recommended mitigation techniques are as follows:

Expansive Soils - constraint

The clays, silts and some of the bedrock encountered in the test borings are expansive. While the majority of the upper sandy soils on the site are non-expansive, expansive clays will likely be encountered in building excavations. These clays, if encountered beneath foundations, can cause differential movement in the structure foundation. Due to the sporadic nature of these occurrences, none have been indicated on the maps. These occurrences should be identified and mitigated on an individual basis.

Mitigation: Should expansive soils be encountered beneath the foundation, mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation which is common in the area. The use of drilled pier foundation systems is another option on highly expansive soils. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be determined after additional investigation of each building site.

Slope Stability and Landslide Hazard

The majority of the slopes observed on the site are gently to moderately sloping. Small areas of unstable slopes were identified along a few of the drainages on site. These areas

are subject to failure due to erosion by the creeks. These areas lie east of Phase I. According to the grading plan (Figure 9), much of this area is to be filled and the drainage rerouted through a drainage easement. No known past landslides have been mapped on the site (References 7, 8, 9).

Mitigation: Due to the location of these slopes associated with the floodplains and a drainage easement, these areas are avoided by development. A minimum setback of 20 feet should be maintained between buildings and the crest of any remaining unstable slopes. Other options to stabilize the slopes include regrading to no steeper than 3:1 or the use of engineer designed retaining walls. According to the development plan, there appears to be sufficient room on the affected lots to allow building areas outside the recommended setback limits. Site grading will mitigate the slopes in many of these areas as well. Some erosion protection may be necessary in order to prevent further erosion by the creeks during high water.

Groundwater and Floodplain Areas - constraints

Groundwater was encountered at depths ranging from the surface to 11.5 feet in the test borings and profile holes drilled on Phase I of the development. Areas were observed on the site that will experience shallow groundwater on a seasonal basis. Additionally, areas where ponded water could accumulate, and floodplain areas exist on this site. These areas are discussed as follows:

sw - Seasonal shallow groundwater areas: In these areas, we anticipate the potential for periodically high subsurface moisture conditions, frost heave potential, and highly organic soils. The majority of these areas are to be filled and regraded or designated as open space according to the grading plan, Figure 9. Three to nine feet of fill is proposed in these areas. Construction in these areas, should follow these precautions:

Mitigation: In these locations, foundations are subject to severe frost heave and should penetrate to a sufficient depth so as to discourage the formation of ice lenses beneath foundations. At this location and elevation, a foundation depth for frost protection of 3 feet is recommended. In areas where high subsurface moisture conditions are anticipated periodically, a subsurface perimeter drain will be necessary to help prevent the seepage of water into areas below grade. A typical perimeter drain detail is presented in Figure 12.

Any grading in these areas should be done in a manner that directs surface flow around construction to avoid areas of ponded water. Areas of organic material will require removal prior to any fill placement. Unstable soil conditions should be expected in areas of shallow groundwater. Where foundations approach the groundwater level, stabilization of the excavations utilizing shot rock may be necessary. Underslab drains or capillary breaks, and interceptor drains may be necessary to prevent the intrusion of water into areas below grade. Typical drain details are presented in Figures 13 and 14.

w - Areas of ponded water: These are areas where water could potentially pond behind existing earthen dams. According to the grading plan, Figure 9, this area is to be regraded and the dam removed. All soft and organic soils should be removed prior to fill placement. All uncontrolled fill associated with the dams should be recompacted at a minimum of 95% of its maximum Modified Dry Density ASTM D-1557.

fp - Floodplain: Areas of the site have been mapped as floodplains according to the FEMA Map No. 08041CO575F (Figure 11, Reference 13). The physiographic floodplains on site have been mapped on the Engineering Geology Map (Figure 9). Areas of flowing water, not identified as floodplains on the FEMA map (Figure 11) have been mapped as a physiographic floodplain hazard on Figure 9. It is our understanding a Letter of Map Revision (LOMR) has been submitted for the site and that some drainage improvements and channelization are proposed. A Conditional Letter of Map Revision (CLOMR) is to be submitted for the proposed drainage improvements. The exact floodplain locations should be determined in a drainage study. It should be possible to avoid the floodplain areas with structures on most of the site. The majority of the floodplain areas have been designated as open space. Those areas that currently lie within the FEMA floodplain area will require approval of the Drainage Report. Finished floor levels should be a minimum of one foot above the floodplain level. Structures should not block drainages. Specific floodplain locations and drainage studies are beyond the scope of this report.

Artificial Fill - constraint

Areas of artificial fill may be encountered on site associated with the small earthen dams observed on site. These areas are limited and it is anticipated they will be either avoided by development or removed during site grading. Any uncontrolled fill encountered beneath

foundation will require removal and recompaction at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Collapsible Soils - constraint

Areas of loose soils and possible collapsible soils were encountered in two of the test borings drilled on the entire development. These soils are subject to settlement if encountered beneath foundations.

Mitigation: Should loose or collapsible soils be encountered beneath foundations, removal and recompaction with thorough moisture conditioning at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 will be necessary. Specific recommendations should be made after additional investigation of each building site.

7.0 RADIOACTIVITY

Radon levels for the area have been reported by the Colorado Geologic Survey in the Open-File, Report No. 91-4 (Reference 14). Radon levels ranging from 0 to 20 pci/l have been measured in the area. Only one reading had been taken in the area and it is between 4 and 10 pci/l. The minimal information from this report is not sufficient to determine if radon levels are higher for this site. Occurrences of radioactive minerals have been identified 11 miles east and 10 miles west of the site (Reference 15). This occurrence to the west is associated with a limonite deposit in the Dawson Formation. The occurrence to the east is in a carbonaceous clay in the Ogallala Formation. No known occurrences exist on the site.

While it is anticipated that radon levels for the site would not be considered excessive, the potential exists for radon gas to build up in areas of the site. Build-ups of radon gas can be mitigated by providing increased ventilation of basements and crawlspaces and sealing of joints. Specific requirements for mitigation, if any, should be based on site specific testing after the site is constructed.

8.0 EROSION CONTROL

The soil types observed on the site are mildly to moderately susceptible to wind erosion, and moderately to highly susceptible to water erosion. A minor wind erosion and dust problem may be created for a short time during and immediately after construction. Should the problem be considered severe enough during this time, watering of the cut areas or the use of chemical palliative may be required to control dust. However, once construction has been completed, and vegetation reestablished, the potential for wind erosion should be considerably reduced. With regard to water erosion, loosely compacted soils will be the most susceptible to water erosion, residually weathered soils and weathered bedrock materials become increasingly less susceptible to water erosion. For the typical soils observed on site, allowable velocities or unvegetated and unlined earth channels would be on the order of 3 to 4 feet/second, depending upon the sediment load carried by the water. Permissible velocities may be increased through the use of vegetation to something on the order of 4 to 7 feet/second, depending upon the type of vegetation established. Should the anticipated velocities exceed these values, some form of channel lining material may be required to reduce erosion potential. These might consist of some of the synthetic channel lining materials on the market or conventional riprap.

In cases where ditch-lining materials are still insufficient to control erosion, small check dams or sediment traps may be required. The check dams will serve to reduce flow velocities, as well as provide small traps for containing sediment. The determination of the amount, location and placement of ditch linings, check dams and of the special erosion control features should be performed by or in conjunction with the drainage engineer who is more familiar with the flow quantities and velocities.

Cut and fill slope areas will be subjected primarily to sheetwash and rill erosion. Unchecked rill erosion can eventually lead to concentrated flows of water and gully erosion. The best means to combat this type of erosion is, where possible, the adequate re-vegetation of cut and fill slopes. Cut and fill slopes having gradients more than three (3) horizontal to one (1) vertical become increasingly more difficult to re-vegetate successfully. Therefore, recommendations pertaining to the vegetation of the cut and fill slopes may require input from a qualified landscape architect and/or The Natural Resource Conservation Service (previously the Soil Conservation Service).

9.0 ECONOMIC MINERAL RESOURCES

Some of the sandy materials on-site could be considered a low-grade sand resource. According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 16), the area is mapped as upland deposits. According to the Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties distributed by the Colorado Geological Survey (Reference 17), areas of the site are mapped as U4 - Upland deposits: probably aggregate resource and A3 – Alluvial fan: sand resource. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 18), the area of the site has been mapped as "Good" for industrial minerals. Several mines exist in the area of the site for sand and gravel. A gravel quarry is located immediately south of the site. Considering the silty to clayey nature of much of these materials and abundance of similar materials through the region, they would be considered to have little significance as an economic resource.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 18), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as "Poor" for coal resources. No active or inactive mines have been mapped in the area of the site. The *El Paso County Aggregate Resource Map* (Reference 16) has mapped coal resources in the Falcon area, 1 mile south of the site; however, none are mapped on the site itself. No metallic mineral resources have been mapped on the site (Reference 18).

The site has been mapped as "Fair" for oil and gas resources (Reference 18). No oil or gas fields have been discovered in the area of the site. An exploratory well was drilled northeast of the site to 8,263 feet deep in 1955. The sedimentary rocks in the area lacked the essential elements for oil or gas; therefore, the well was plugged and abandoned.

10.0 RELEVANCE OF GEOLOGIC AND SITE CONDITIONS TO LAND USE PLANNING

Site Conditions and Development Considerations

It is our opinion that the existing anticipated geologic and engineering geologic conditions will impose some constraints on the proposed development and construction. The most significant problem affecting development will be that of shallow groundwater, potentially shallow bedrock, and floodplains. Other anticipated constraints such as expansive soils can be mitigated through proper engineering design and construction. Geologic conditions and land use considerations are presented in Table 4 (Reference 12).

The upper soils are typically at loose to very dense states. Expansive layers may be encountered. Expansive soils, if encountered, will require special foundation design and/or overexcavation and replacement with non-expansive material compacted at 95% of its maximum Modified Proctor Dry Density ASTM D-1557. These soils will not prohibit development. Loose or collapsible soils, if encountered, may also require recompaction at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Small earthen dams observed on site can be avoided by development or regraded. Small erosion berms can be penetrated by foundations or regraded. Should any uncontrolled fill be encountered beneath foundations, it will require recompaction at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557.

Areas of shallow groundwater and floodplains exist on this site. The floodplains are to be either avoided by development or channelized and preserved as open space in drainage easements. Some areas will require approval of the Drainage Report that excludes them from the FEMA floodplain prior to construction. Finished floor levels must be a minimum of one foot above the floodplain level. Exact floodplain locations are beyond the scope of this report. The majority of the floodplain areas are in proposed open space areas. According to the grading plan (Figure 9), the minor drainages are to be filled and will mitigate the hazard. Areas of perched groundwater were encountered on this site. Shallow groundwater was encountered in the area of Test Boring Nos. 301, 303, and 305 and Profile Hole No. 7. According to the grading plan, 3 to 9 feet of fill is proposed in these areas. It is anticipated the majority of the areas where shallow groundwater exists on the site will be mitigated with the proposed grading. Subsurface

drains may be necessary in some areas to prevent the intrusion of water below grade. Dewatering systems may be necessary in some areas where seepage and perched water occurs. Unstable conditions should be expected where excavations approach the groundwater level. Stabilization using geofabric or shot rock may be necessary.

Shallow bedrock will be encountered on portions of this site where the overlying alluvial materials are thinner. Bedrock depths encountered in the test borings and profile holes are indicated on the Bedrock Map, Figure 15. Depths of bedrock are also shown on Figure 3. Higher bearing capacities for foundations can be expected in areas of shallow bedrock. Difficult excavation can be expected in areas of shallow bedrock. The use of track mounted equipment may be necessary in areas of shallow bedrock. Rubber tired equipment can be used where bedrock is not encountered.

Preliminary Foundation Recommendations

Shallow foundations are anticipated for the structures on this site including standard spread footing/stemwall systems in conjunction with recompaction of loose soils or overexcavation of expansive soils where encountered. Reinforcing for foundations should be designed to span a minimum of 10 feet under the design load and should extend a minimum of 30 inches below finished grade for frost protection. Interior support columns may be supported by isolated concrete pads. Bearing capacities of 2000 to 2400 psf are anticipated for foundations bearing on native granular soils. A bearing capacity of 2400 to 2800 psf is anticipated for foundation members bearing on compacted structural fill. Bearing capacities of 3000 to 4000 psf are anticipated for foundations on shallow sandstone. Actual bearing capacities should be determined after additional investigation of the site after grading and at the time of the excavation observations.

Foundation walls should be designed to resist lateral pressures generated by the soils on this site. An equivalent hydrostatic fluid pressure (in the active state) of 40 pcf is anticipated for the granular soils and 50 for the clayey soils.

It should be noted that these values apply to level backfill conditions. Pressures will increase substantially depending on the conditions adjacent to the walls. Surcharge loading should be considered in wall designs. Equivalent fluid pressures for sloping conditions should be

determined on an individual basis.

Additional Investigation and Foundation Excavation Observation

Additional investigation of building sites is required to provide foundation recommendations. During construction, the open foundation excavation should also be observed prior to construction of the foundation in order to verify that no anomalies are present, that materials at the proper design bearing capacity have been encountered, and that no soft spots or debris are present in the foundation area. Areas requiring overexcavation should also be determined during the excavation observation of each lot. Final drainage recommendations should also be determined at the time of the observation.

Floor Slabs

The medium dense to dense granular soils will provide adequate support for floor slabs. Removal and replacement of loose soils is recommended to minimize slab movement. Floor slabs placed on expansive clays should be expected to experience movement. Floor slabs should be separated from structure components to allow for vertical movement. Control joints in concrete slabs are recommended at 10 to 15 feet spacing each direction.

Surface and Subsurface Drainage

Positive surface drainage must be maintained around all structures to minimize infiltration of surface water. A minimum gradient of 10% in the first 10 feet adjacent to foundation walls is recommended. The use of drainage swales may be required on the upslope of the structures. All downspouts should be extended to discharge well beyond the backfill zone of the structures.

Subsurface perimeter drains are recommended for useable space below finished ground surfaces or are required around the entire structure if expansive soils are encountered. Subdrains are not required for slab-on-grade construction. Drains should consist of a perforated drainpipe, gravel collector and approved filter fabric. Any drains should be provided with a free gravity outlet. If such an outlet is not available, a sump and pump will be required. A typical perimeter drain detail is presented in Figure 12. In areas that approach groundwater level, underslab drains will be necessary to prevent the intrusion of water into areas below grade. A typical underslab drain detail is presented in Figure 13. In areas of seepage or directional flows,

interceptor drains may be necessary for dewatering. A typical interceptor drain detail is presented in Figure 14.

Concrete

Type II cement is typically recommended for all concrete in the vicinity on this site. Additional testing is recommended to evaluate the soils corrosive characteristics prior to construction. Concrete should not be placed on frozen or wet ground. If concrete is placed during periods of cold temperatures, the concrete must be kept from freezing. This may require covering the concrete with insulated blankets and heating the concrete to prohibit freezing.

Backfill

Backfill placed around the foundations and in utility trenches should be compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. Material should be placed in lifts having a compacted thickness of six inches or less and a moisture content conducive to adequate compaction, usually ±2% of optimum Proctor moisture content. Mechanical methods should be used in placement of backfill; however, heavy equipment should be kept away from foundation walls. No water flooding techniques of any type should be used in compaction of backfill on the site.

Trench backfill should be performed in accordance with City of Colorado Springs specifications. All excavating should be performed in accordance with OSHA guidelines.

Structural Fill

Any areas to receive fill should have all topsoil, organic material, or debris removed. Any uncontrolled fill should be recompacted prior to placing new fill. The surface should be scarified and moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill. New fill should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. Fill material should be free of vegetation or other unsuitable material and shall not contain rocks or pieces greater than six (6) inches. Topsoil and strippings should not be mixed in the structural fill. Fill material should be placed at a moisture content conducive to compaction, usually ±2% of Proctor optimum moisture content. The placement and compaction of fill should be observed

and tested by the Soils Engineer during construction. Any import materials should be approved by the Soils Engineer prior to hauling to the site.

11.0 ROADWAY AND EMBANKMENT CONSTRUCTION RECOMMENDATIONS

In general, the site soils are suitable for the proposed roadways and embankments. Groundwater should be expected to be encountered in deeper cuts and along drainage areas. If excavations encroach on the groundwater level unstable soil conditions may be encountered. Excavation of saturated soils will be difficult with rubber-tired equipment. Stabilization using shot rock or geogrids may be necessary.

Test Boring No. 4 was drilled in the detention pond embankment, located at the southwest portion of the site. The sandy soils will provide adequate bearing for the embankment fill. Loose soils will require recompaction.

Any areas to receive fill should have all topsoil, organic material or debris removed. Prior to fill placement Entech should observe the subgrade. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1. The subgrade should be scarified and moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if shallow groundwater conditions are encountered.

New fill placed in roads/overlot or pond embankments should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 for granular soils. Clay soils should be compacted to 95% of maximum Standard Proctor Dry Density, ASTM D-698. These materials should be placed at a moisture content conducive to compaction, usually 0 to ±2% of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction. Entech should approve any import materials prior to placing or hauling them to the site. Additional investigation will be required for pavement designs once overlot/roadway grading is completed and utilities are installed.

12.0 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose minimal constraints on development and construction of the site. The proposed development is consistent with the geologic and engineering conditions observed on the site.

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Reporting such discrepancies to Entech Engineering, Inc. soon after they are discovered would be greatly appreciated and could possibly help avoid construction and development problems. Individual investigations of building sites are required prior to construction. Planning and design personnel should be made familiar with the contents of this report.

This report has been prepared for Four Way Joint Venture, LLC. for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.

We trust this report has provided you with all the information you required. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

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TABLES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

from Entech Job No. 61992 (Reference 1)

CLIENT LAND RESOURCE GROUP, INC.
PROJECT 4-WAY RANCH
JOB NO. 61992

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	PH-6	5-10'	15.3%	19	3			SM	SAND, SILTY, GRAVELLY
1	TB1	2-3'	9.7%					SW-SM	SAND, SLIGHTLY SILTY
1	TB11	2-3'	25.0%					SM	SAND, SILTY
1	TB4	2-5'	9.4%	NV	NP			SW-SM	SAND, SLIGHTLY SILTY
2	TB23	2-3'	76.5%			1467		CL	CLAY, SILTY
3	TB4	10'		32	1			ML	SILT, CLAYEY
4	PH-1	10'				861		SC	SANDSTONE, CLAYEY
4	PH-2	5-10'	17.3%	28	13			SC	SANDSTONE, CLAYEY
4	TB11	10'	48.0%	NV	NP			SM	SANDSTONE, VERY SILTY
4	TB11	10'					0.0%	SM	SANDSTONE, VERY SILTY
4	TB16	5'	11.2%			351		SW-SC	SANDSTONE, SLIGHTLY CLAYEY
5	PH-9	10'	56.4%			1014		CL	CLAYSTONE, VERY SANDY
5	PH-8	10'	68.3%	39	23			CL	CLAYSTONE, SANDY
5	TB6	15'	92.9%			1467		CL	CLAYSTONE, SILTY
6	PH-7	10'	62.5%	27	2	1818		ML	SILTSTONE, SANDY
6	TB14	2-3'				1150		ML	SILTSTONE, CLAYEY
6	TB2	10'					3.8%	ML	SILTSTONE, CLAYEY
6	TB2	10'	82.1%	29	0			ML	SILTSTONE, CLAYEY

TABLE 2

SUMMARY OF LABORATORY TEST RESULTS

from Entech Job No. 120675 (Reference 6)

CLIENT 4 WAY JOINT VENTURE
PROJECT FOUR WAY RANCH
JOB NO. 120675

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	301	2-3			6.2			0.01			SM-SW	SAND, SLIGHTLY SILTY
1	305	5			7.7						SM-SW	SAND, SLIGHTLY SILTY
1	305	10			18.9	NV	NP		290		SM	SAND, SILTY
1	311	5			10.9						SM-SW	SAND, SLIGHTLY SILTY
1	317	5			5.6						SM-SW	SAND, SLIGHTLY SILTY
2	312	5	16.4	107.5	94.7					1.5	CL	CLAY, SANDY
3	318	10	12.8	119.4	28.9	NV	NP	0.00		-0.3	SM	SANDSTONE, SILTY
3	303	15			6.6	NV	NP				SM-SW	SANDSTONE, SLIGHTLY SILTY
3	307	5			34.4	NV	NP	0.00			SM	SANDSTONE, SILTY
3	308	5			18.7						SM	SANDSTONE, SILTY
3	312	10			19.1						SM	SANDSTONE, SILTY
4	302	15				40	15	0.02			CL	CLAYSTONE, SANDY
4	308	10	16.4	115.5	61.0					0.6	CL	CLAYSTONE, VERY SANDY
4	314	10			56.6	35	17		1360		CL	CLAYSTONE, VERY SANDY
4	315	10	15.8	116.5	77.1					1.7	CL	CLAYSTONE, SANDY
4	316	15			66.0						CL	CLAYSTONE, SANDY

TABLE 3

Depth to Bedrock and Groundwater
FROM ENTECH JOB NO. 120675 (REFERENCE 6)

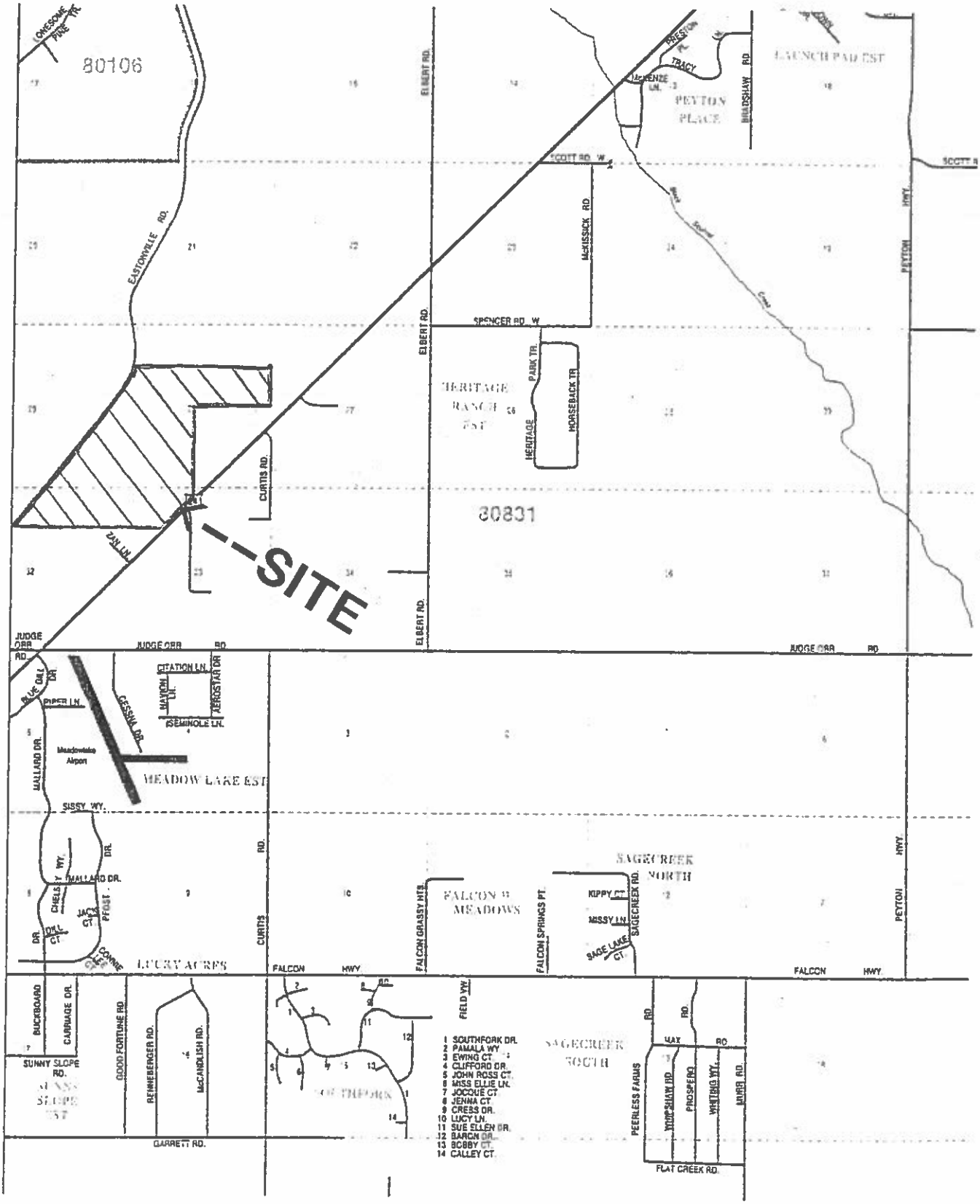
Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
300	14	6.5
301	9	4
302	13	8
303	14	6
304	12	8.5
305	12	5.5
306	3	12
307	4	4
308	3	>15
309	9	11.5
310	7	4.5
311	8	5.5
312	7	14.5
313	3	5.5
314	4	13
315	7	24.5
316	4	14
317	11	8.5
318	9	4.5

Table 4: Summary of Geologic Units/ Land Use Considerations

Map Symbol	Map Unit, description	Workability	Surface drainage, erodibility, groundwater	Suitability for waste disposal	Foundation stability	Potential Geologic hazards	Geologic resources
al	ALLUVIUM: Silt, sand, gravel and boulders in the bed of streams, on valley floors and in the lowest terraces along streams.	Excavation and compaction easy except where bouldery.	Infiltration: Medium to high. Runoff: Moderate. Subject to stream scour and stream bank erosion. Water table may be permanently or seasonally within a few feet of the surface.	Septic Systems: Unsatisfactory, generally within or adjacent to waterway and in area of seasonal high ground water. Dump sites: Unsatisfactory because of high ground water or seasonal flooding.	Poor; loose and erodible materials.	Deposits are subject to annual or periodic flooding. Low terrace banks may be undercut by stream erosion.	Source of sand and gravel.
Qp	PINEY CREEK ALLUVIUM: Organic rich clayey silt and sand with gravel, cobbles and boulders in terraces along most of the present streams. Locally alluvium, derived from expansive bedrock will have a low to high potential for swelling. Top of terraces is about 20 feet above stream level.	Excavation and compaction easy.	Infiltration: Medium to low. Runoff: Moderate to rapid. Locally water may stand in flat areas for several days following heavy precipitation. Moderately resistant to erosion. Water table may be permanently or seasonally within a few feet of the surface. Yield to wells range 1 to 100 gallons per minute. Along Fountain Creek south of Colorado Springs yield in excess of 1000 gallons per minute.	Septic Systems: Excellent to poor. In some areas ground water table may be too high.	Good to poor. May have expansive clay or high ground water in some areas.	Locally expansive soils; low areas may be subject to flooding. Steep slopes along stream channels may be unstable or undercut by stream erosion.	Source of sand and gravel.

Map Symbol	Map Unit, description	Workability	Surface drainage, erodibility, groundwater	Suitability for waste disposal	Foundation stability	Potential Geologic hazards	Geologic resources
Tkd	COLLUVIUM DAWSON FORMATION (upper part) (includes areas of bedrock): Coarse-grained and pebbly arkosic sand, clay and silty derived from arkosic sandstone, claystone and shale. Claystone and shale may be expansive. Lowest unit of sandstone forms cliffs at Austin Bluffs, Pulpit Rock and Palmer Park.	Excavation and compaction moderately difficult to difficult in cliff forming units.	Infiltration: Medium to high. Runoff: Low to high in clays and shales. Highly erodible by gullying and slope wash. Yield to wells ranges from 4 to 500 gallons per minute.	Septic Systems: Excellent to poor, depending on percolation. Dump Sites: Unsuitable because of potential of polluting major ground water aquifers.	Fair to excellent. Clay and claystone may be expansive.	Expansive clay. Talus deposits form at base of cliffs and steep slopes may be unstable.	Locally may contain seams of lignite.

FIGURES



ENTECH
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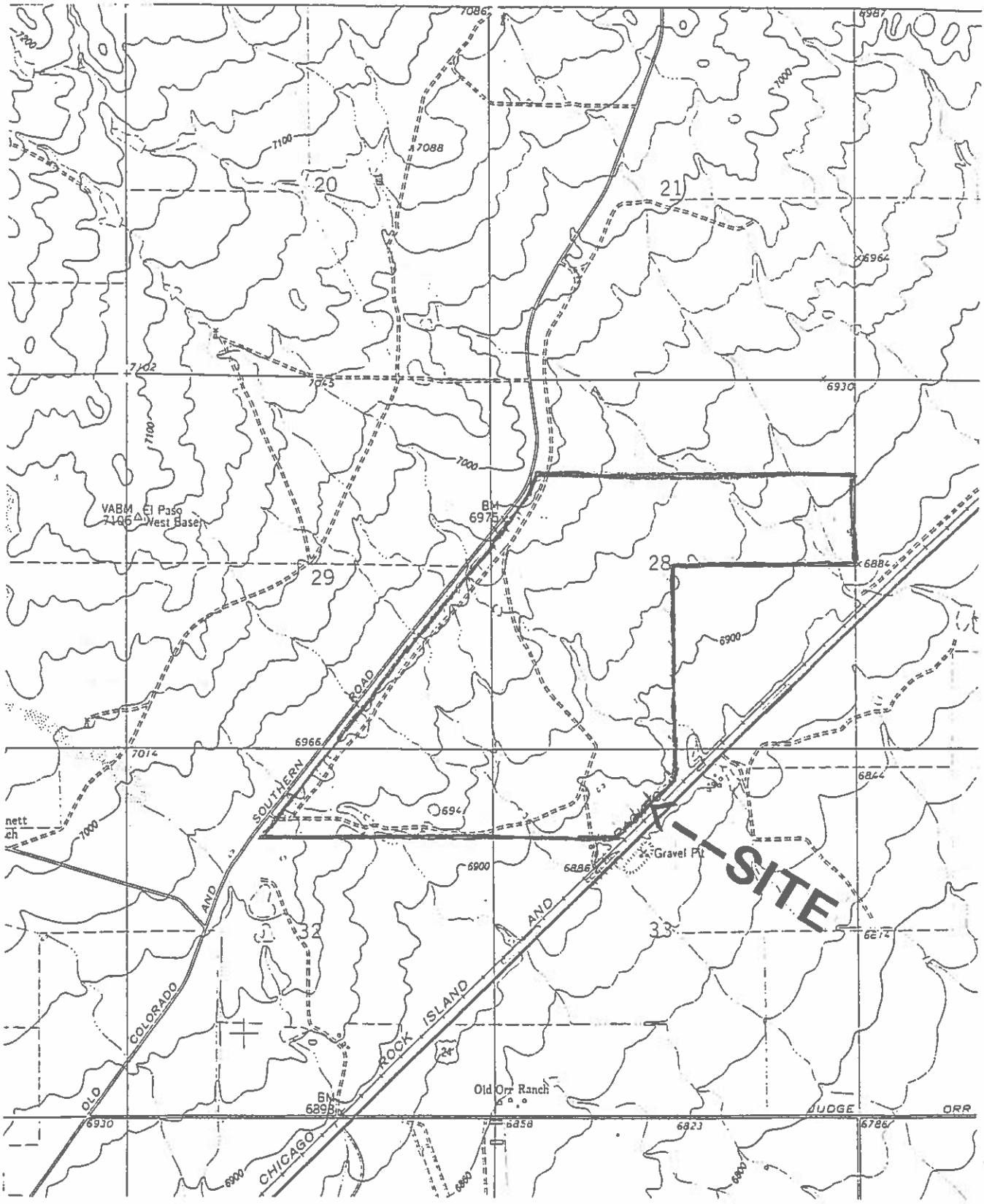
VICINITY MAP
WATERBURY PH1
FOR: LAND RESOURCE CORP.

DRAWN:	DATE:	CHECKED:	DATE:
RJO	10CT02	KAH	12/1/03

JOB NO.: 130377

FIG NO.: 1



ENTECH
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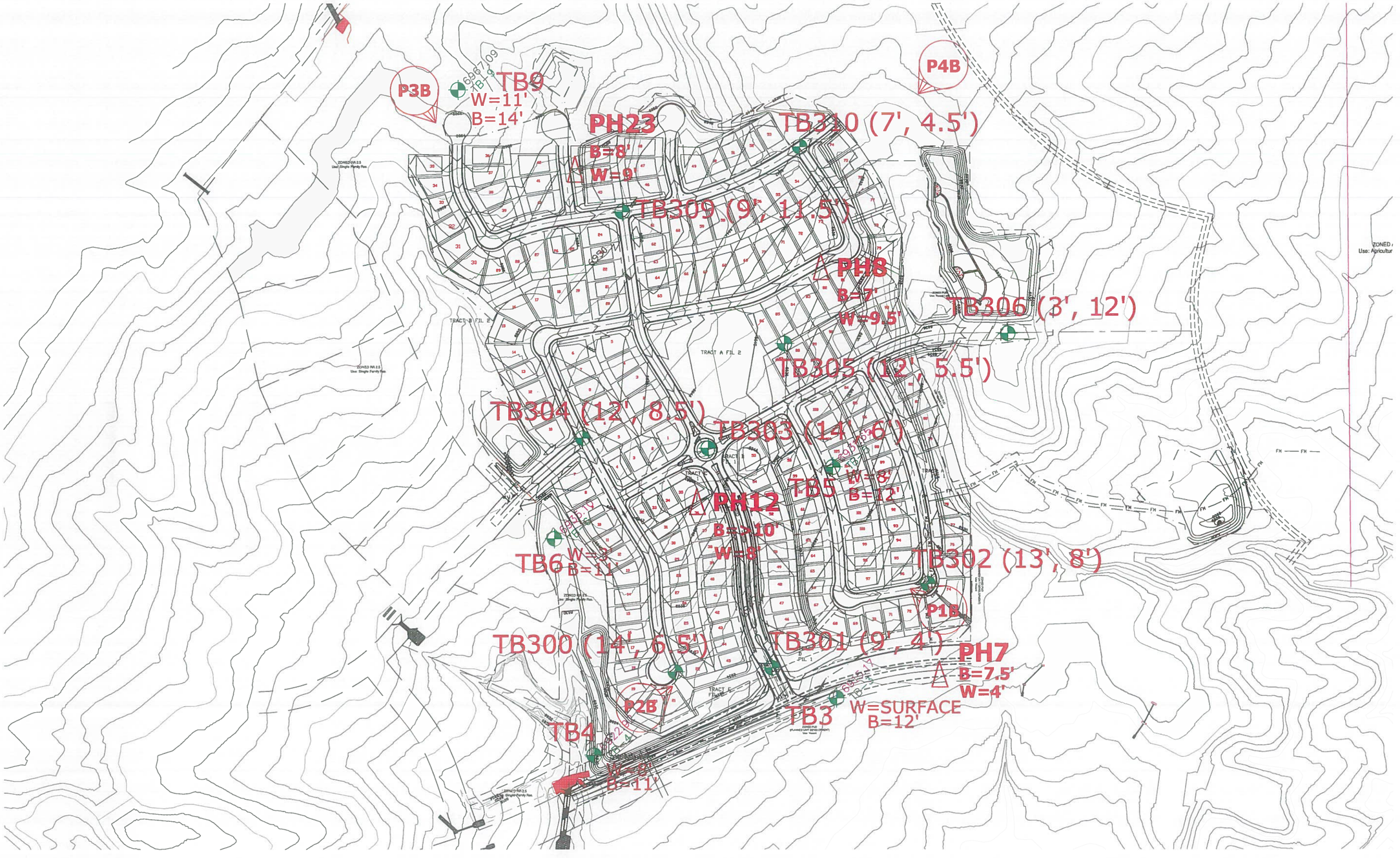
USGS MAP
WATERBURY PH1
FOR: LAND RESOURCE CORP.

DRAWN:	DATE:	CHECKED:	DATE:
RJO	10CT02	KAH	12/1/03

JOB NO.: 130377

FIG NO.: 2



TB (14', 6.5') - INDICATES APPROXIMATE TEST BORING LOCATION & NUMBER (DEPTH TO BEDROCK, DEPTH TO GROUNDWATER)

PH (4',>10') - INDICATES APPROXIMATE PERCOLATION TEST LOCATION & NUMBER (DEPTH TO BEDROCK, DEPTH TO GROUNDWATER)

P1B - INDICATES APPROXIMATE PHOTOGRPH LOCATION & DIRECTION TAKEN MARCH 15, 2013

NORTH

REVISION	BY:

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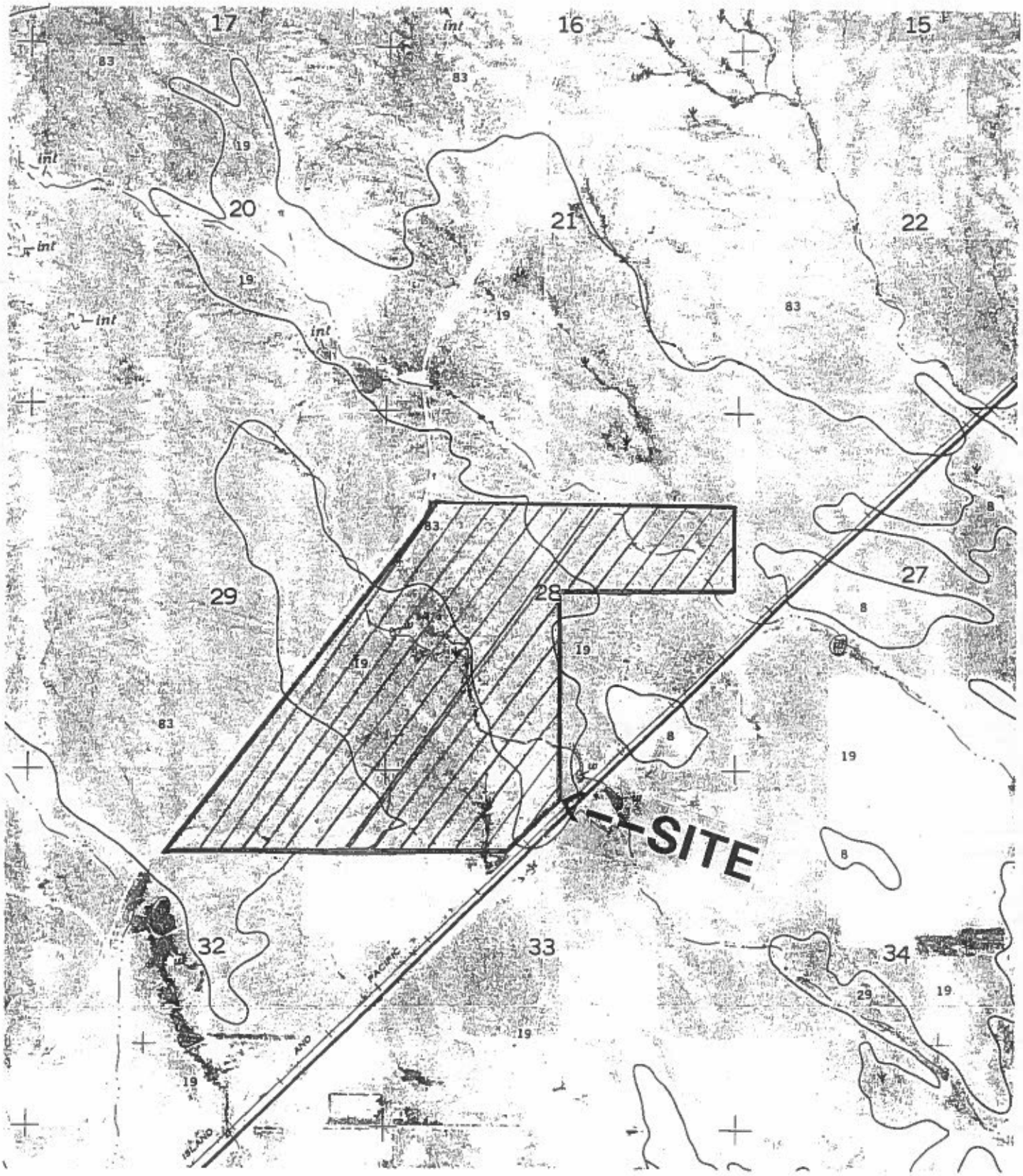
COLORADO SPRINGS, CO. 80907

TEST BORING/ PERCOLATION TEST
LOCATION PLAN
4 - WAY JOINT VENTURE
WATERBURY PHASE 1
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

DRAWN BY:	R. MCBRIDE
DESIGNED BY:	KAH
CHECKED BY:	
DATE:	10/19/21
SCALE:	AS SHOWN
JOB NO.:	130377
FIGURE NO.:	3



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COLORADO SPRINGS, CO. 80907 (719) 531-5599

SCS MAP
WATERBURY PH 1
FOR: LAND RESOURCE CORP.

DRAWN:	DATE:	CHECKED:	DATE:
RJO	10CT02	KAH	12/1/05

JOB NO.: 130517

FIG NO.: 4

19—Columbine gravelly sandy loam, 0 to 3 percent slopes. This deep, well drained to excessively drained soil formed in coarse textured material on alluvial terraces and fans and on flood plains. Elevation ranges from 6,500 to 7,300 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown gravelly sandy loam about 14 inches thick. The underlying material is light yellowish brown very gravelly loamy sand.

Included with this soil in mapping are small areas of Stapleton sandy loam, 3 to 8 percent slopes; Blendon sandy loam, 0 to 3 percent slopes; Louviers silty clay loam, 3 to 18 percent slopes; and Fluvaquentic Haplaquolls, nearly level. In places the parent arkose beds of sandstone or shale are at a depth of 0 to 40 inches.

Permeability of this Columbine soil is very rapid. Effective rooting depth is 60 inches or more. Available water capacity is low to moderate. Surface runoff is slow, and the hazard of erosion is slight to moderate.

This soil is used mainly for grazing livestock and for wildlife habitat. It is also used for homesites.

Native vegetation is mainly western wheatgrass, sideoats grama, needleandthread, and little bluestem. The main shrub is true mountainmahogany.

Proper location of livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are fairly well suited to this soil. Blowing sand and low available water capacity are the principal limitations to the establishment of trees and shrubs. The soil is so loose that trees need to be planted in the rows. Supplemental irrigation may be needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

Rangeland wildlife, such as pronghorn antelope, cottontail, coyote, and scaled quail, is best adapted to life on this droughty soil. Forage production is typically loam, and proper livestock grazing management is necessary if wildlife and livestock share the range. Livestock watering developments are also important and are used by various wildlife species.

The main limitation of this soil for urban development is a hazard of flooding in some areas. Care must be taken when locating septic tank absorption fields because of possible pollution as a result of the very rapid permeability of this soil. Capability subclass VIe.

83—Stapleton sandy loam, 3 to 8 percent slopes. This deep, noncalcareous, well drained soil formed in sandy alluvium derived from arkosic bedrock on uplands. Elevation ranges from 6,500 to 7,300 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 11 inches thick. The subsoil is grayish brown gravelly sandy loam about 6 inches thick. The substratum extends to a depth of 60 inches or more. It is pale brown gravelly sandy loam in the upper part and grades to gravelly loamy sand in the lower part.

Included with this soil in mapping are small areas of Louviers silty clay loam, 3 to 18 percent slopes; Blakeland loamy sand, 1 to 9 percent slopes; Columbine gravelly sandy loam, 0 to 3 percent slopes; and Fluvaquentic Haplaquolls, nearly level. Also included are areas where arkose beds of sandstone and shale are at a depth of 0 to 40 inches. Included areas make up about 20 percent of the mapped acreage.

Permeability of this Stapleton soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, and the hazards of erosion and soil blowing are moderate.

This soil is used as rangeland, for wildlife habitat, and as homesites.

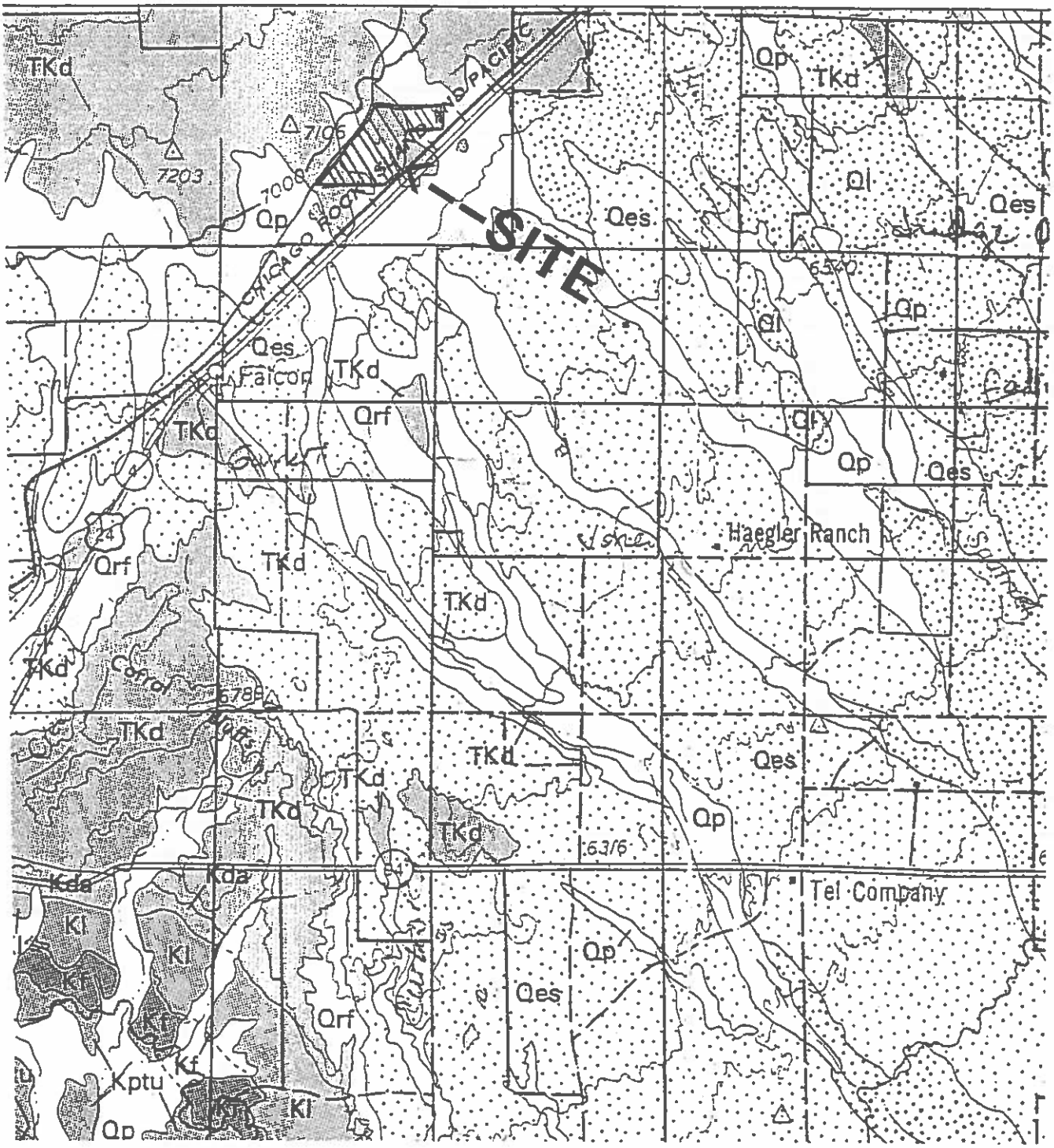
Native vegetation is mainly western wheatgrass, sideoats grama, needleandthread, and little bluestem. The predominant shrub on this soil is true mountainmahogany. Yucca occurs in some areas.

Deferred grazing late in summer and in fall improves the condition of the range. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are generally suited to this soil. Soil blowing is the principal limitation for the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to habitat for openland and rangeland wildlife. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

The main limitation of this soil for urban use is frost-action potential. Special design of roads and streets is necessary to minimize frost heave damage. Special practices must be provided to minimize water erosion and soil blowing on construction sites where vegetation has been removed. Access roads must have adequate cut-slope grade and be provided with drains to control surface runoff. Capability subclass IVe.



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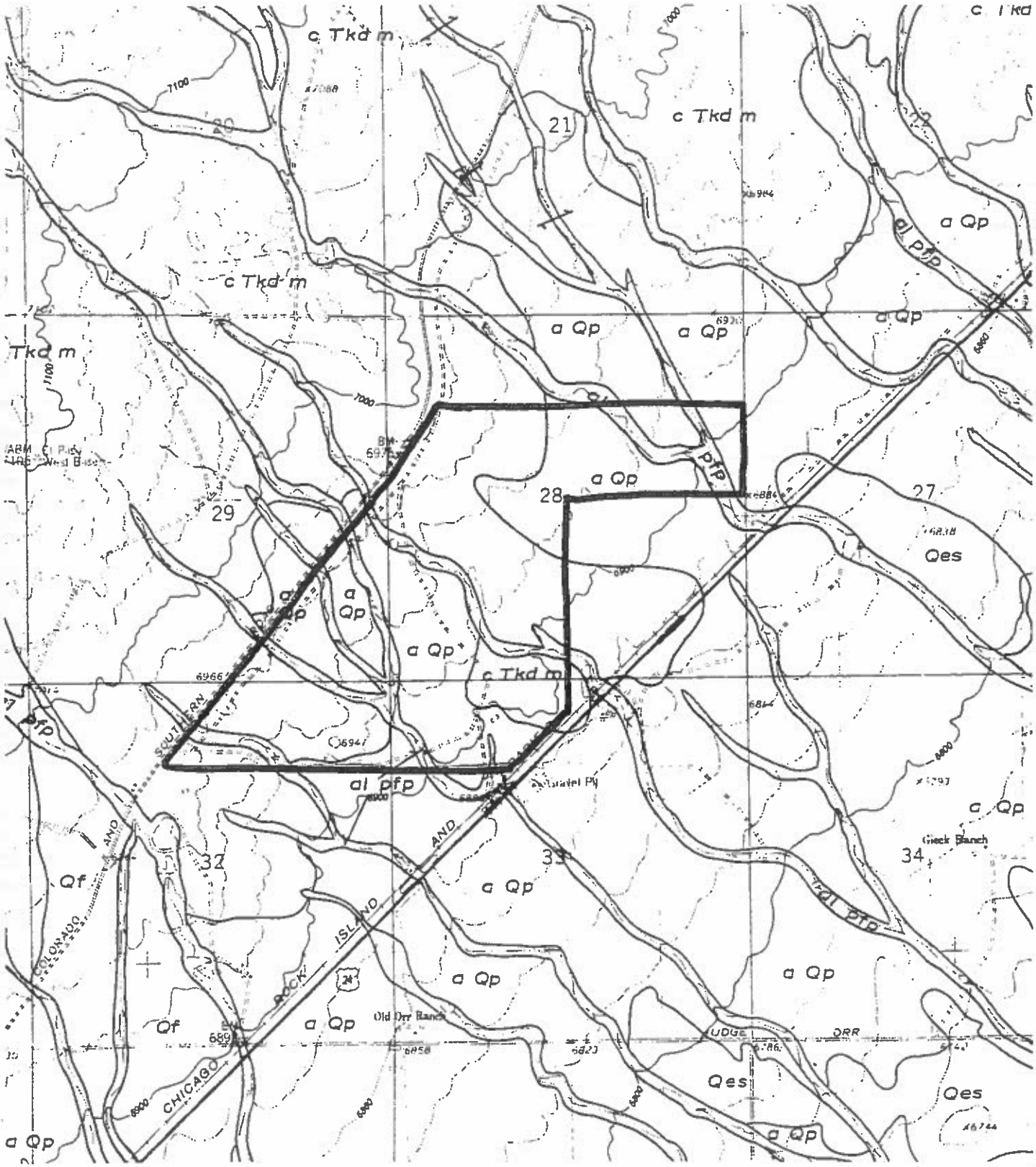
COLORADO GEOLOGY MAP
WATERBURY PH1
FOR: LAND RESOURCE CORP.

DRAWN:	DATE:	CHECKED:	DATE:
RJO	10CT02	[illegible]	12/1/03

JOB NO.: 130377

FIG NO.: 7



LEGEND
al : ALLUVUIM
fp : FLOODPLAIN
Qp : PINEY CREEK ALLUVUIM OF QUATERNARY AGE.
Tkd : DAWSON FORMATION OF TERTIARY TO CRETACEOUS AGE

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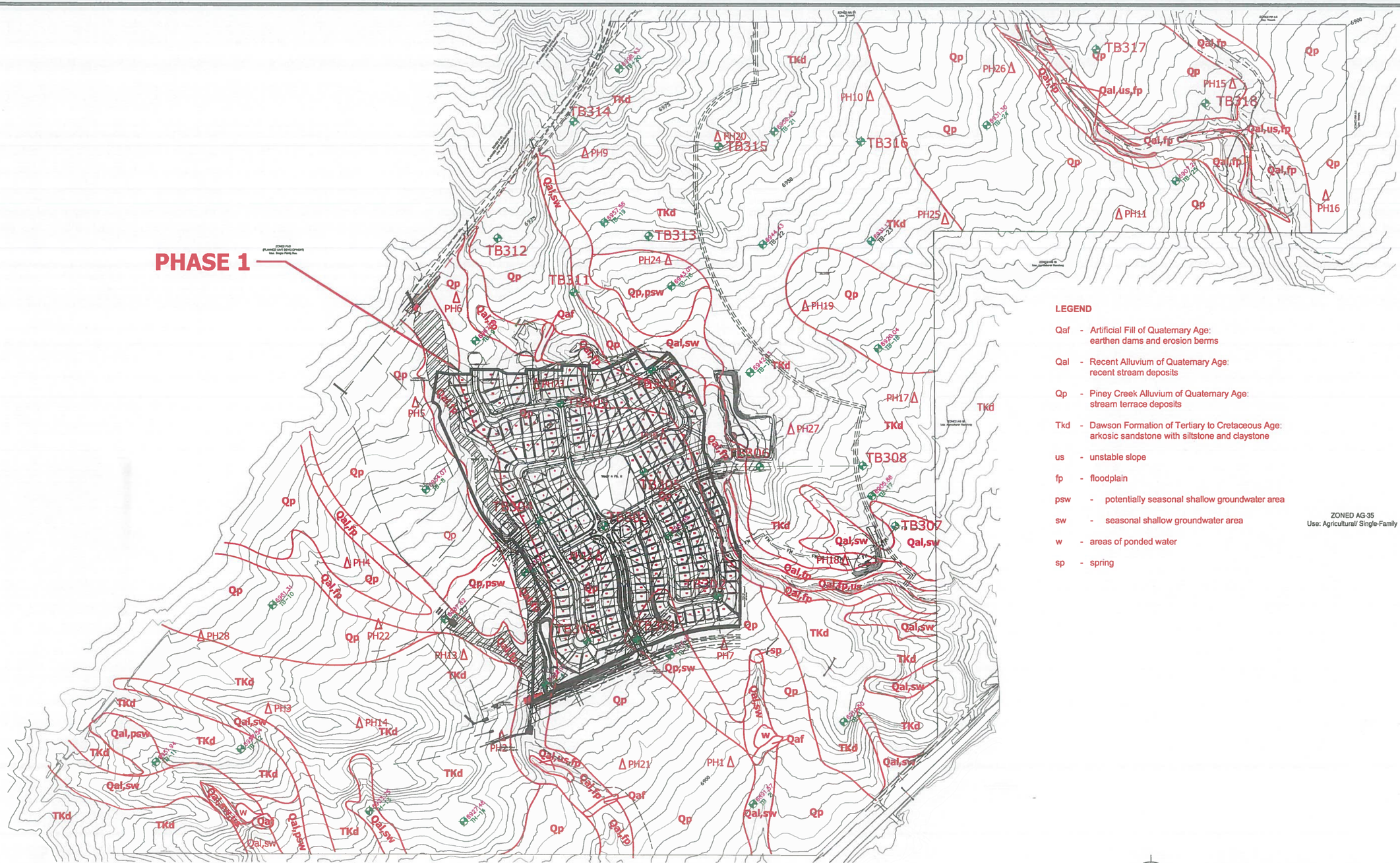
FALCON GEOLOGY MAP
WATERBURY PH I
EL PASO COUNTY, CO.
FOR: LAND RESOURCE GROUP

DRAWN:	DATE:	CHECKED:	DATE:
RJO	27OCT03	KAH	12/1/05

JOB NO.: 130377
FIG NO.: 8



LEGEND

Qaf - Artificial Fill of Quaternary Age: earthen dams and erosion berms

Qal - Recent Alluvium of Quaternary Age: recent stream deposits

Qp - Piney Creek Alluvium of Quaternary Age: stream terrace deposits

Tkd - Dawson Formation of Tertiary to Cretaceous Age: arkosic sandstone with siltstone and claystone

us - unstable slope

fp - floodplain

psw - potentially seasonal shallow groundwater area

sw - seasonal shallow groundwater area

w - areas of ponded water

sp - spring

TB - INDICATES APPROXIMATE TEST BORING LOCATION & NUMBER

PH - INDICATES APPROXIMATE PERCOLATION TEST LOCATION & NUMBER

REVISION	BY:

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COLORADO SPRINGS, CO. 80907

GEOLOGY/ ENGINEERING GEOLOGY MAP
4 - WAY JOINT VENTURE
WATERBURY PHASE 1
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

DRAWN BY:	R. MCBRIDE
DESIGNED BY:	KAH
CHECKED BY:	
DATE:	10/19/21
SCALE:	1" = 300'
JOB NO.:	130377
FIGURE NO.:	9

LEGEND

Qaf - Artificial Fill of Quaternary Age:
earthen dams and erosion berms

Qal - Recent Alluvium of Quaternary Age:
recent stream deposits

Qp - Piney Creek Alluvium of Quaternary Age:
stream terrace deposits

Tkd - Dawson Formation of Tertiary to Cretaceous Age:
arkosic sandstone with siltstone and claystone

us - unstable slope

fp - floodplain

psw - potentially seasonal shallow groundwater area

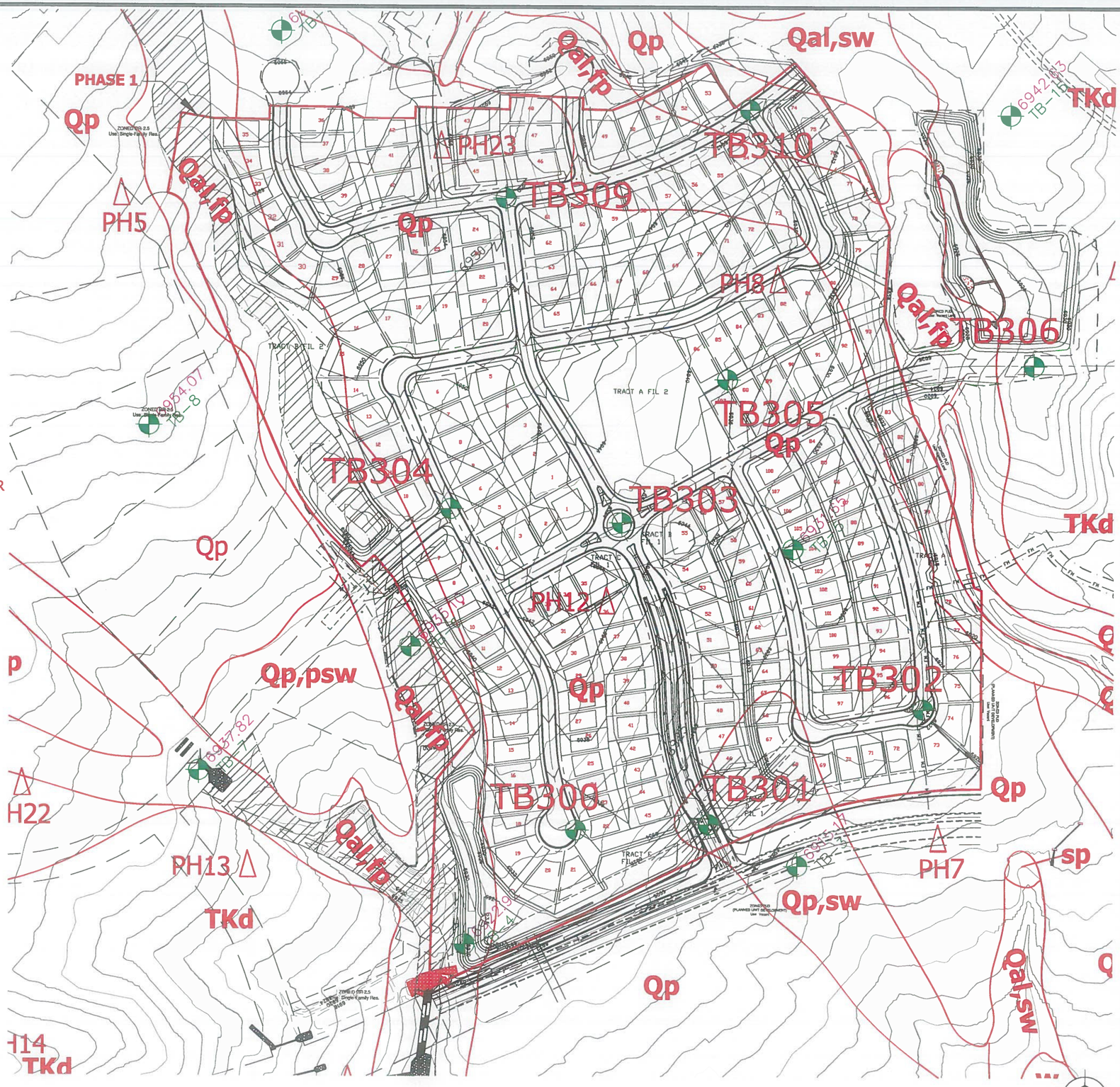
sw - seasonal shallow groundwater area

w - areas of ponded water

sp - spring

⊕ TB - INDICATES APPROXIMATE TEST BORING LOCATION & NUMBER

△ PH - INDICATES APPROXIMATE PERCOLATION TEST LOCATION & NUMBER



REVISION	BY:

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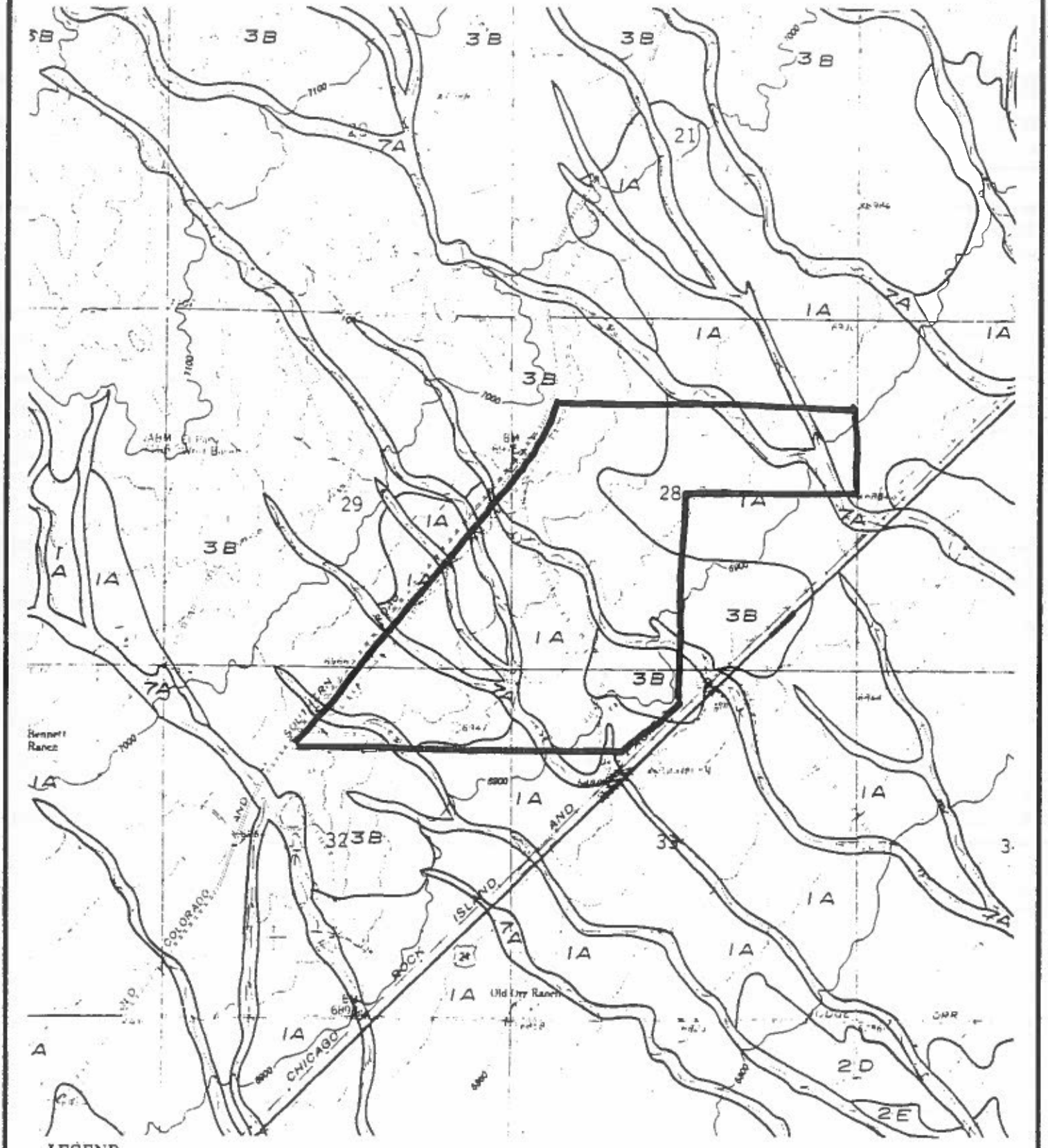
COLORADO SPRINGS, CO. 80907

GEOLOGY/ ENGINEERING GEOLOGY MAP
4 - WAY JOINT VENTURE
WATERBURY PHASE 1
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

DRAWN BY:	R. MCBRIDE
DESIGNED BY:	KAH
CHECKED BY:	
DATE:	10/19/21
SCALE:	N.T.S.
JOB NO.:	130377
FIGURE NO.:	9A



LEGEND
1A: STABLE ALLUVUIM
3B: EXPANSIVE SOIL AND BEDROCK ON FLAT TO MODERATE SLOPES(0% - 12%)
7A: PHYSIOGRAPHIC FLOODPLAIN. INCLUDES 100 YEAR FLOODPLAIN

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FALCON ENGINEERING GEOLOGY MAP
WATER BURY PH1
EL PASO COUNTY, CO.
FOR: LAND RESOURCE GROUP

DRAWN:	DATE:	CHECKED:	DATE:
RJO	27OCT03	KAH	11/1/03

JOB NO.: 130377
FIG NO.: 10

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

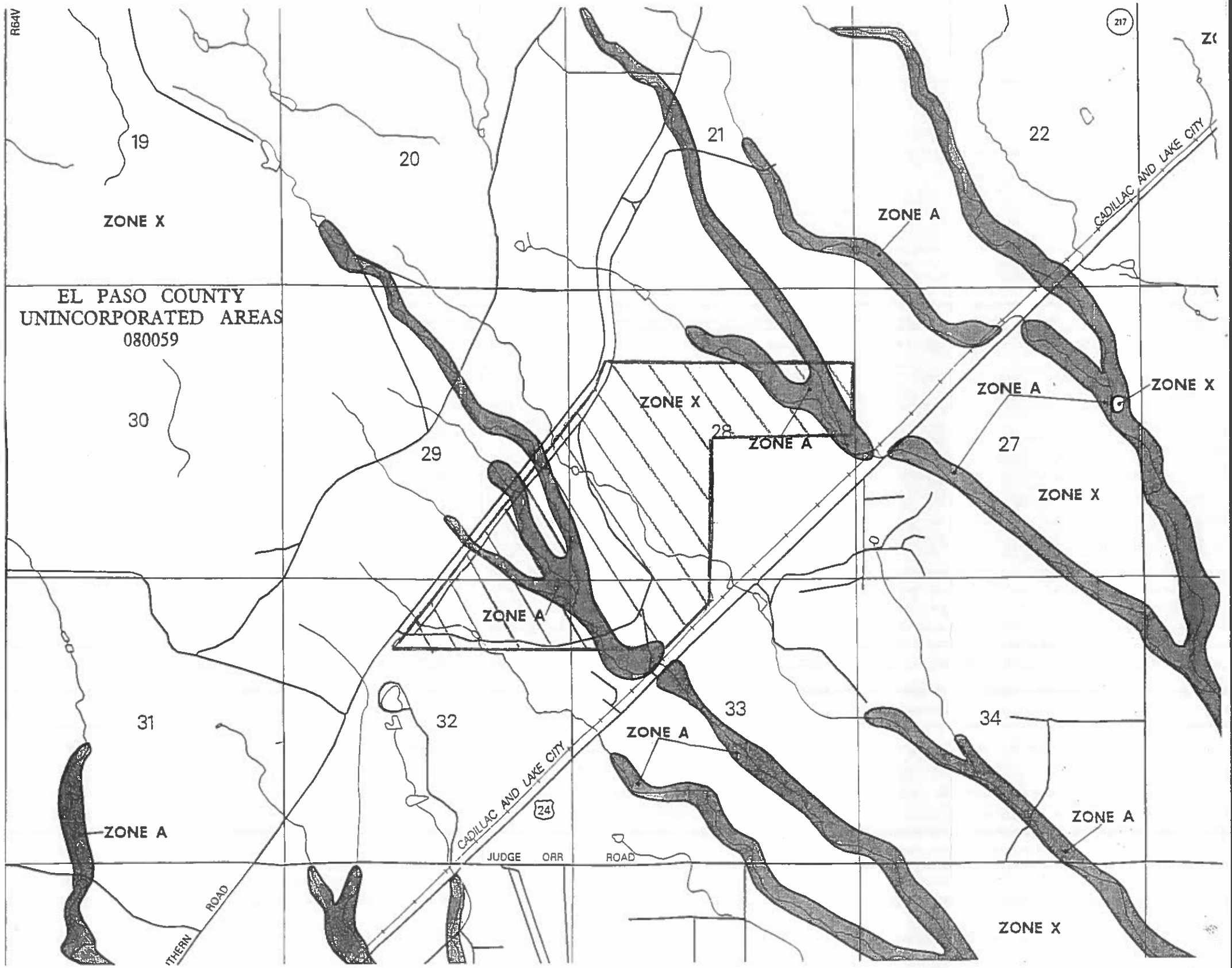
D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 × — Elevation Reference Mark

● M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.



REVISION	BY

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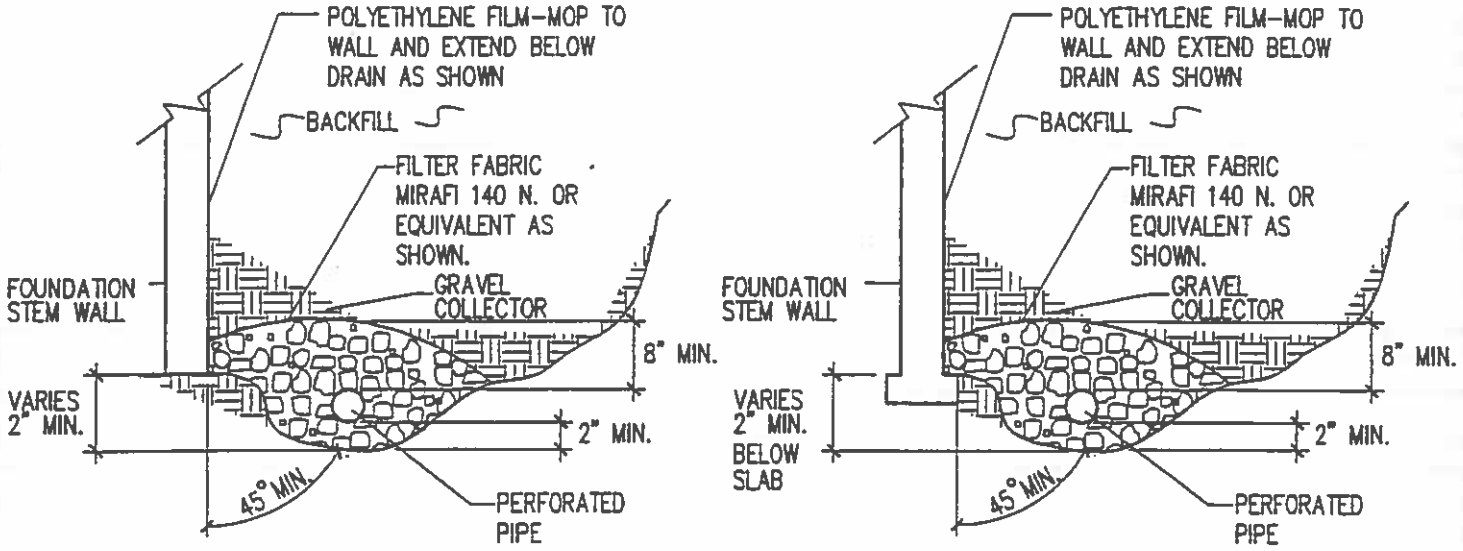
COLORADO SPRINGS, CO. 80907
(719) 531-5599

FLOODPLAIN MAP
WATER BURY
FOR: LAND RESOURCE CORP.

DRAWN	R.J.OLSON
CHECKED	ICAM
DATE	10CT02
SCALE	AS SHOWN
JOB NO.	130377



NOTES:

–GRAVEL SIZE IS RELATED TO DIAMETER OF PIPE PERFORATIONS–85% GRAVEL GREATER THAN 2x PERFORATION DIAMETER.

–PIPE DIAMETER DEPENDS UPON EXPECTED SEEPAGE. 4–INCH DIAMETER IS MOST OFTEN USED.

–ALL PIPE SHALL BE PERFORATED PLASTIC. THE DISCHARGE PORTION OF THE PIPE SHOULD BE NON–PERFORATED PIPE.

–FLEXIBLE PIPE MAY BE USED UP TO 8 FEET IN DEPTH, IF SUCH PIPE IS DESIGNED TO WITHSTAND THE PRESSURES. RIGID PLASTIC PIPE WOULD OTHERWISE BE REQUIRED.

–MINIMUM GRADE FOR DRAIN PIPE TO BE 1% OR 3 INCHES OF FALL IN 25 FEET.

–DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

CHECKED	EAH
DATE	12/1/05
SCALE	NTS
JOB NO.	101492
FIG. NO.	12

PERIMETER DRAIN DETAILS

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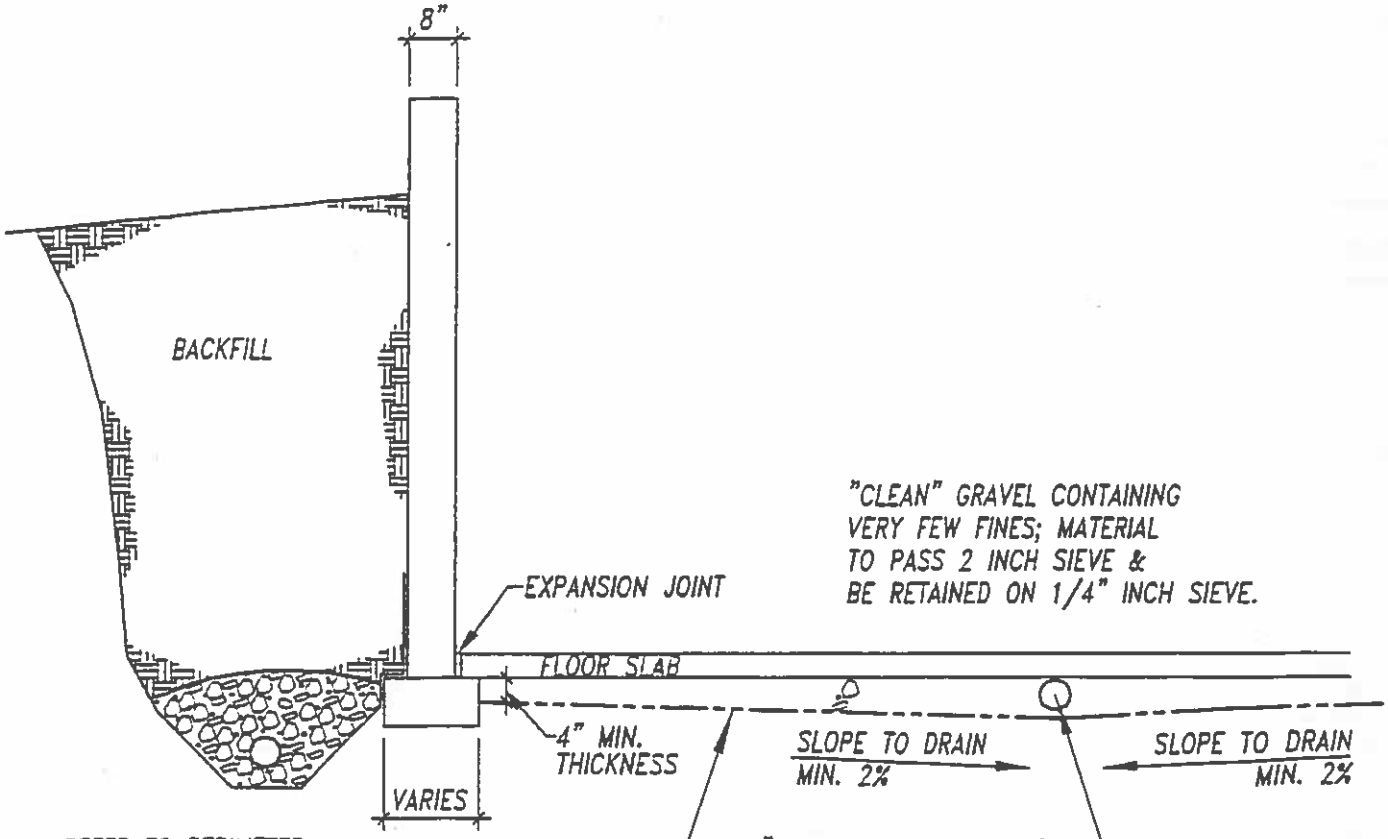
REVISION	BY

FIG. 12



D1-G:\DETAILS\DETAIL 11

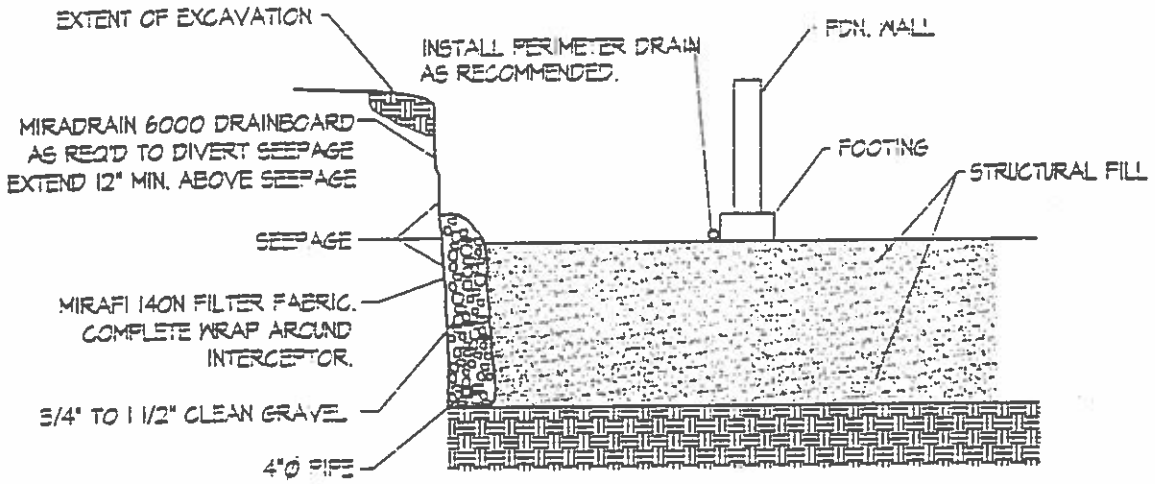
DRAWN	C. WALTON
CHECKED	ICMS
DATE	12/1/03
SCALE	NTS
JOB NO.	61492
SHEET	13

TYP. UNDERSLAB DRAINAGE
LAYER (CAPILLARY BREAK)

ENTECH
ENGINEERING, INC.
395 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

REVISION	BY

FIG 12



NOTE:
EXTEND INTERCEPTOR DRAIN TO DAYLIGHT

INTERCEPTOR DRAIN DETAIL

N.T.S.

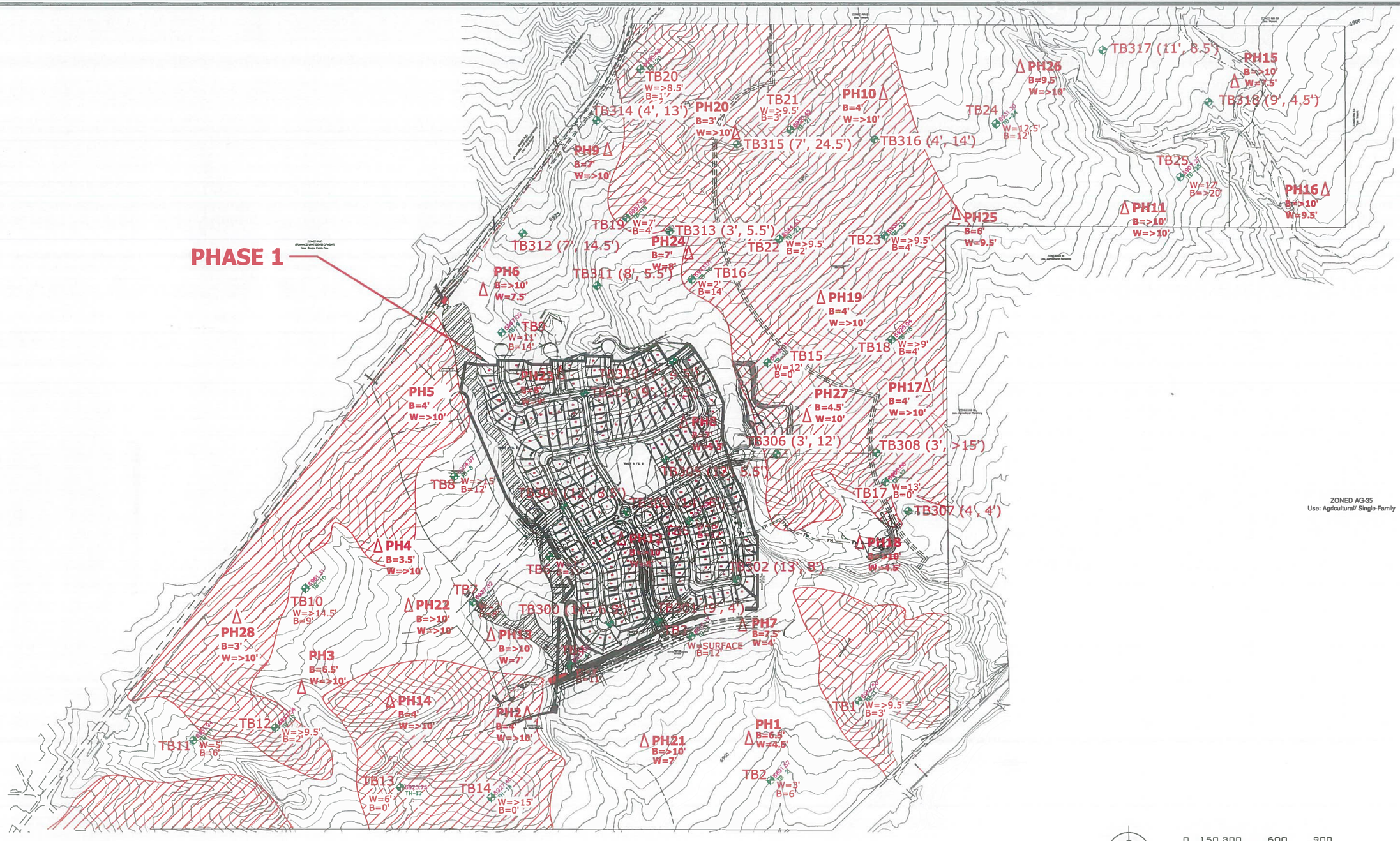
DRAWN	N.TETI
CHECKED	KAH
DATE	12/11/02
SCALE	NTS
JOB NO.	61992
SHEET OF	14 SHEETS

INTERCEPTOR DRAIN DETAIL

ENTECH ENGINEERING, INC.
333 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

REVISION	BY

FIG. 14



NORTH

0 150 300 600 900

SCALE 1"=300'

▨ - CROSSHATCHED AREAS INDICATE AREAS OF POTENTIAL SHALLOW BEDROCK (<6 FT.)

TB (14', 6.5') - INDICATES APPROXIMATE TEST BORING LOCATION & NUMBER (DEPTH TO BEDROCK, DEPTH TO GROUNDWATER)

PH (4', >10') - INDICATES APPROXIMATE PERCOLATION TEST LOCATION & NUMBER (DEPTH TO BEDROCK, DEPTH TO GROUNDWATER)

REVISION	BY:

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505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

POTENTIAL SHALLOW BEDROCK MAP
4 - WAY JOINT VENTURE
WATERBURY PHASE 1
EL PASO COUNTY, CO
FOR: 4-WAY JOINT VENTURE

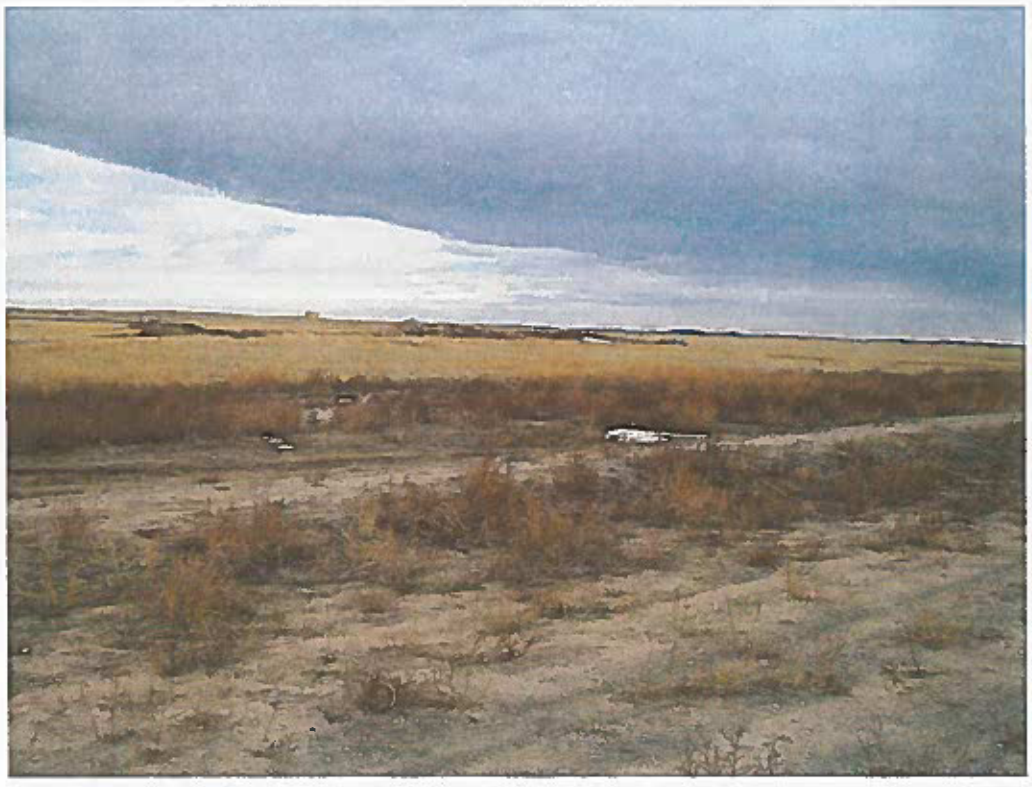
DRAWN BY:	R. MCBRIDE
DESIGNED BY:	KAH
CHECKED BY:	
DATE:	10/19/21
SCALE:	1" - 300'
JOB NO.:	130377
FIGURE NO.:	15

APPENDIX A: Site Photographs

1B

Looking northwest from the southeast portion of the site.

March 15, 2013



2B

Looking northeast from the southwest portion of the site.

March 15, 2013

Job No. 130377

3B

Looking southeast from the northwest portion of the site.

March 15, 2013

4B

Looking southwest from the northeast portion of the site.

March 15, 2013

Job No. 130377

APPENDIX B: Test Boring Logs

Table 2
Summary of Depth to Bedrock and Groundwater

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
1	3	>9.5
2	6	3
3	12	0 (surface)
4	11	8
5	12	8
6	11	2.5
7	8	3
8	12	>15
9	14	11
10	9	>14.5
11	6	5
12	2	>9.5
13	0 (surface)	6
14	0 (surface)	>14
15	0 (surface)	12
16	4	2
17	0 (surface)	13
18	4	>9
19	4	7
20	1	>8.5
21	3	>9.5
22	2	>9.5
23	4	>9.5
24	12	12.5
25	>20	12

TEST BORING NO. 1
DATE DRILLED 9/11/02
Job # 61992

REMARKS

DRY TO 9.5', 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			39	3.8	1
5			50/7"	8.7	4
10			50/5"	9.2	4
15					
20					

SAND, SLIGHTLY SILTY, MEDIUM GRAINED, TAN, DENSE, MOIST

SANDSTONE, CLAYEY, COARSE GRAINED, OLIVE TAN, VERY DENSE, MOIST

TEST BORING NO. 2
DATE DRILLED 9/11/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

WATER AT 3', 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			18	13.9	1
5			14	15.3	1
10			50/9"	16.8	6
15			50/5"	15.1	4
20					

SAND, CLAYEY, COARSE TO FINE GRAINED, BROWN TO GRAY, MEDIUM DENSE, MOIST TO WET

SILTSTONE, CLAYEY, LIGHT BLUE, HARD, MOIST

SANDSTONE, CLAYEY, MEDIUM GRAINED, OLIVE, VERY DENSE, MOIST

ENTECH
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305 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/1/02

JOB NO.: 61992
FIG NO.: B-1

TEST BORING NO. 3
DATE DRILLED 9/11/02
Job # 61992

REMARKS

WATER AT SURFACE, 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			22	19.2	1
5			12	19.2	1
10			43	14.9	1
15			50/5"	13.1	4
20					

SAND, CLAYEY, GRAYISH BROWN, COARSE GRAINED, MEDIUM DENSE TO DENSE, WET

SANDSTONE, CLAYEY, LIGHT BLUE-GRAY, VERY DENSE, MOIST

TEST BORING NO. 4
DATE DRILLED 9/11/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

WATER AT 8', 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			42	2.6	1
5			22	13.2	1
10			25	21.3	3
15			50/6"	20.4	5
20					

SAND, SLIGHTLY SILTY, TAN TO BROWN, DENSE TO MEDIUM DENSE, MOIST TO VERY MOIST

SILT, CLAYEY, DARK BROWN, STIFF, MOIST

CLAYSTONE, SILTY, GRAY, HARD, MOIST

ENTECH ENGINEERING, INC.
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COLORADO SPRINGS, CO. 80907 (719) 531-5599

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAbt	10/1/02

JOB NO.: 61992
FIG NO.: B-2

TEST BORING NO. 5
DATE DRILLED 9/11/02
Job # 61992

REMARKS

WATER AT 8', 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			34	1.6	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST
5			20	2.7	1	
						SAND, CLAYEY, COARSE TO FINE GRAINED, GRAY, MEDIUM DENSE, WET
10			14	15.3	1	
						CLAYSTONE, LIGHT BLUISH GRAY, HARD, MOIST
15			50/5"	23.1	5	
20						

TEST BORING NO. 6
DATE DRILLED 9/11/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

WATER AT 2.5', 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			12	17.1	1	SAND, SLIGHTLY CLAYEY, COARSE TO MEDIUM GRAINED, LIGHT BLUE TO LIGHT BROWN, MEDIUM DENSE TO DENSE, WET
5			24	15.3	1	
10			32	12.5	1	
						CLAYSTONE, SILTY, LIGHT BLUE, HARD, MOIST
15			50/6"	14.0	5	
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/1/02

JOB NO.: 61992
FIG NO.: B-3

TEST BORING NO. 7
DATE DRILLED 9/11/02
Job # 61992

REMARKS

WATER AT 3', 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, CLAYEY, BLUE-GRAY, MEDIUM DENSE, VERY MOIST TO WET			16	12.5	1
5			12	15.6	1
CLAYSTONE, SANDY, BLUE, HARD, MOIST					
10			50/3"	20.2	5
15					
20					

TEST BORING NO. 8
DATE DRILLED 9/11/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

DRY TO 15', 09/13/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SLIGHTLY SILTY, CLAYEY, FINE GRAINED, TAN, MEDIUM DENSE, MOIST			19	1.7	1
5 SAND, VERY SILTY, FINE GRAINED, TAN, MEDIUM DENSE, MOIST			14	5.3	1
SAND, CLAYEY, MEDIUM					
10 GRAINED, GRAY, MEDIUM DENSE, VERY MOIST			24	11.2	1
SANDSTONE, CLAYEY, COARSE GRAINED, BROWN,					
15 VERY DENSE, MOIST			50/6"	10.1	4
20					

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TEST BORING LOG

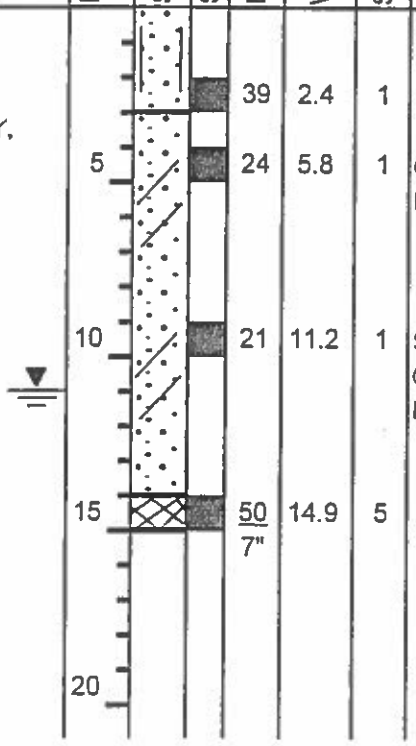
DRAWN:	DATE:	CHECKED:	DATE:
		MH	10/1/02

JOB NO.: 61992
FIG NO.: B-4

TEST BORING NO. 9
DATE DRILLED 9/12/02
Job # 61992

REMARKS

WATER AT 11', 09/13/02

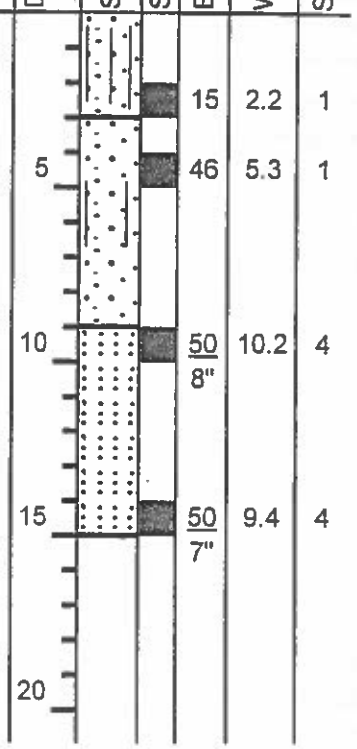


Depth (ft)	Description	Blows per foot	Watercontent %	Soil Type
	SAND, SLIGHTLY SILTY, COARSE GRAINED, BROWN, DENSE, DRY	39	2.4	1
5	SAND, SLIGHTLY CLAYEY, COARSE GRAINED, BROWN TO GRAY, MEDIUM DENSE, MOIST TO VERY MOIST	24	5.8	1
10		21	11.2	1
15	CLAYSTONE, SILTY, GRAY, HARD, MOIST	50/7"	14.9	5
20				

TEST BORING NO. 10
DATE DRILLED 9/13/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

DRY TO 14.5', 09/16/02



Depth (ft)	Description	Blows per foot	Watercontent %	Soil Type
	SAND, VERY SILTY, FINE GRAINED, BROWN, MEDIUM DENSE TO DRY	15	2.2	1
5	SAND, SILTY, MEDIUM GRAINED, GRAY, DENSE, MOIST	46	5.3	1
10	SANDSTONE, CLAYEY, GRAY TO TAN, VERY DENSE, MOIST	50/8"	10.2	4
15		50/7"	9.4	4
20				

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/1/02

JOB NO.: 61992
FIG NO.: B-5

TEST BORING NO. 11
DATE DRILLED 9/13/02
Job # 61992

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER AT 5', 09/16/02						
SAND, SILTY, FINE GRAINED, DARK BROWN TO BLUE, MEDIUM DENSE, MOIST TO VERY MOIST				18	3.3	1
	5			17	26.5	1
SANDSTONE, VERY SILTY, FINE GRAINED, BLUE TO TAN, VERY DENSE, WET	10			50/9"	20.7	4
	15			50/9"	21.7	4
SANDSTONE, CLAYEY, COARSE GRAINED, BLUE, VERY DENSE, WET	20			50/11"	15.1	4

TEST BORING NO. 12
DATE DRILLED 9/13/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 9.5', 09/16/02						
SAND, SILTY, BROWN						1
SANDSTONE, SILTY, MEDIUM TO COARSE GRAINED, TAN TO BLUE VERY DENSE, DRY TO MOIST				50/11"	1.7	4
	5			50/8"	11.9	4
	10			50/6"	5.7	4
	15					
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/1/02

JOB NO.: 61992
FIG NO.: B-6

TEST BORING NO. 13
DATE DRILLED 9/16/02
Job # 61992

REMARKS

WATER AT 6', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			50 / 8"	8.4	4
5			50 / 8"	11.8	4
10			50 / 7"	12.1	4
15					
20					

SANDSTONE, SILTY, COARSE GRAINED, GRAY, VERY DENSE, MOIST

SANDSTONE, VERY SILTY, VERY FINE GRAINED, OLIVE, VERY DENSE, MOIST

SANDSTONE, CLAYEY, FINE GRAINED, BLUE-GRAY, VERY DENSE, MOIST

TEST BORING NO. 14
DATE DRILLED 9/16/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

DRY TO 14', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			50 / 8"	12.4	6
5			50 / 8"	14.3	6
10			50 / 8"	9.7	4
15			50 / 5"	17.4	5
20					

SILTSTONE, CLAYEY, OLIVE BROWN, HARD, MOIST

SANDSTONE, SILTY, BROWN, VERY DENSE, MOIST

CLAYSTONE, SILTY, BROWN, HARD, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KrH	10/1/02

JOB NO.: 61992
FIG NO.: B-7

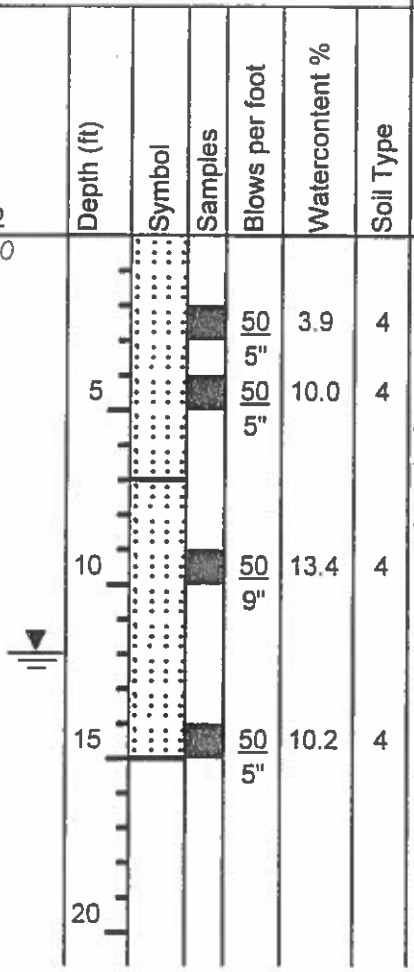
TEST BORING NO. 15
DATE DRILLED 9/16/02
Job # 61992

REMARKS

WATER AT 12', 09/27/02

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST

SANDSTONE, CLAYEY, MEDIUM GRAINED, BROWN TO OLIVE BROWN, VERY DENSE, MOIST



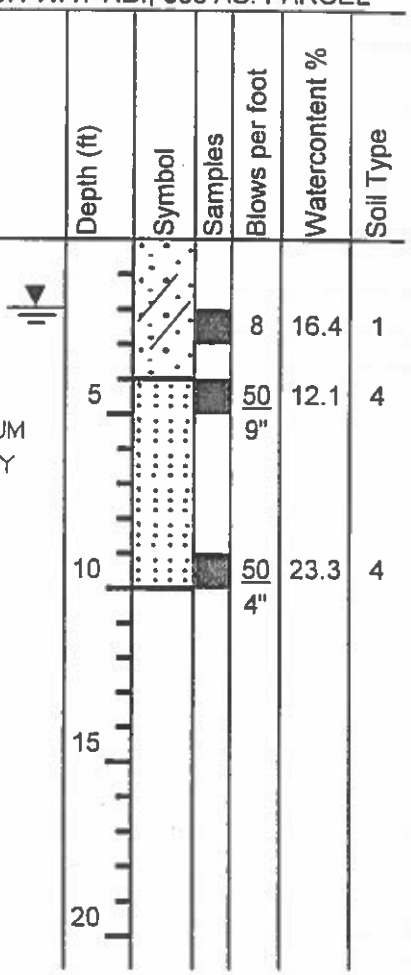
TEST BORING NO. 16
DATE DRILLED 9/16/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

WATER AT 2', 09/27/02

SAND, CLAYEY, FINE TO COARSE GRAINED, OLIVE BROWN, LOOSE, WET

SANDSTONE, SLIGHTLY CLAYEY TO CLAYEY, MEDIUM GRAINED, BLUE-GRAY, VERY DENSE, VERY MOIST TO WET



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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/1/02

JOB NO.: 61992
FIG NO.: B-8

TEST BORING NO. 17
DATE DRILLED 9/16/02
Job # 61992

REMARKS

WATER AT 13', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			50/9"	2.5	4	SANDSTONE, SILTY, FINE TO COARSE GRAINED, VERY DENSE, DRY
5			50/10"	11.8	4	SANDSTOEN, SLIGHTLY CLAYEY TO CLAYEY, FINE TO COARSE GRAINED, VERY DENSE, MOIST TO WET
10			50/8"	16.6	4	
15			50/4"	20.7	4	
20						

TEST BORING NO. 18
DATE DRILLED 9/16/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

DRY TO 9', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			41	2.0	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, LIGHT BROWN, DENSE, DRY
5			50	13.0	5	CLAYSTONE, SILTY, OLIVE BROWN, HARD, MOIST
10			50/2"	8.0	4	SANDSTONE, VERY SILTY, FINE GRAINED, LIGHT BROWN, VERY DENSE, MOIST
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/1/02

JOB NO.: 61992
FIG NO.: B-9

TEST BORING NO. 19
DATE DRILLED 9/16/02
Job # 61992

REMARKS

WATER AT 7', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			38	8.8	1
			50 9"	9.9	4
			50 6"	15.8	4

SAND, CLAYEY, FINE TO COARSE GRAINED, OLIVE BROWN, DENSE, MOIST

SANDSTONE, CLAYEY TO SILTY, OLIVE BROWN TO TAN, VERY DENSE, MOIST

TEST BORING NO. 20
DATE DRILLED 9/20/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

DRY TO 8.5', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50 6"	3.5	4
			50 8"	9.9	4
			50 3"	11.8	4

SAND, SILTY, BROWN SANDSTONE, SILTY TO CLAYEY, MEDIUM TO COARSE GRAINED, TAN TO OLIVE, VERY DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		V+A	10/1/02

JOB NO.: 61992
FIG NO.: B-10

TEST BORING NO. 21
DATE DRILLED 9/20/02
Job # 61992

REMARKS

DRY TO 9.5', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			26	2.0	1
5			50/9"	15.5	5
10			50/4"	10.3	4
15					
20					

SAND, SLIGHTLY SILTY, TAN, MEDIUM DENSE, DRY

CLAYSTONE, SILTY, OLIVE, HARD, MOIST

SANDSTONE, CLAYEY, COARSE GRAINED, TAN, VERY DENSE, MOIST

TEST BORING NO. 22
DATE DRILLED 9/20/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

DRY TO 9.5', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					3
			50/10"	9.8	6
5			50/7"	8.1	4
10			50/5"	12.4	4
15					
20					

SILT, CLAYEY, LIGHT BROWN

SILTSTONE, CLAYEY, LIGHT OLIVE, HARD, MOIST

SANDSTONE, VERY SILTY, FINE GRAINED, LIGHT GRAY, VERY DENSE, MOIST

SANDSTONE, CLAYEY, COARSE GRAINED, OLIVE, VERY DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED: KAH	DATE: 10/1/02

JOB NO.: 61992
FIG NO.: B-11

TEST BORING NO. 23
DATE DRILLED 9/20/02
Job # 61992

REMARKS

DRY TO 9.5', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			38	12.1	2
5			50 9"	12.5	5
10			50 5"	12.4	6
15					
20					

CLAY, SILTY, OLIVE, VERY STIFF, MOIST

CLAYSTONE, SILTY, OLIVE, HARD, MOIST

SILTSTONE, SANDY, CLAYEY, RUST, HARD, MOIST

TEST BORING NO. 24
DATE DRILLED 9/20/02
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

WATER AT 12.5', 09/27/02

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			9	2.1	1
5			20	3.8	1
10			14	6.1	1
15			50 6"	12.3	6
20					

SAND, SILTY TO SLIGHTLY CLAYEY, MEDIUM TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, MOIST

SILTSTONE, SANDY, OLIVE, HARD, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/1/02

JOB NO.: 61992
FIG NO.: B-12

TEST BORING NO. 25
DATE DRILLED 9/20/02
Job # 61992

TEST BORING NO.
DATE DRILLED
CLIENT LAND RESOURCES
LOCATION FOUR WAY RD., 558 AC. PARCEL

REMARKS

WATER AT 12', 09/27/02

REMARKS

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			19	1.7	1	SAND, SLIGHTLY SILTY TO SLIGHTLY CLAYEY, MEDIUM TO COARSE GRAINED, TAN TO GRAY, MEDIUM DENSE TO DENSE, MOIST TO WET
5			13	2.3	1	
10			25	11.6	1	
15			21	16.9	1	
20			41	14.0	1	

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	10/11/02

JOB NO.: 61992
FIG NO.: B-13

APPENDIX C: Profile Hole Logs

Table 3
Summary of Bedrock/Groundwater Depths in Profile Borings

Boring Profile No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
1	6.5	4.5
2	4	>10
3	6.5	>10
4	3.5	>10
5	4	>10
6	>10	7.5
7	7.5	4
8	7	9.5
9	7	>10
10	4	>10
11	>10	>10
12	>10	8
13	>10	7
14	4	>10
15	>10	7.5
16	>10	9.5
17	4	>10
18	>10	4.5
19	4	>10
20	3	>10
21	>10	7
22	>10	>10
23	8	9
24	7	8
25	6	9.5
26	9.5	>10
27	4.5	>10
28	3	>10

PROFILE HOLE NO 1
DATE DRILLED 11/6/2003
Job # 120481

REMARKS

WATER @ 4.5', 11/8/03

SAND, SILTY, DARK BROWN

SAND, GRAVELLY, SILTY, TAN

SANDSTONE, CLAYEY, GRAY BROWN

Depth (ft)	Blows per foot	Watercontent %	Soil Type
5	18		
10	50/10"		
15			
20			

PROFILE HOLE NO 2
DATE DRILLED 11/6/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

DRY TO 10', 11/7/03

SAND, SILTY, TAN

SANDSTONE, CLAYEY, GRAY BROWN

Depth (ft)	Blows per foot	Watercontent %	Soil Type
5	50/9"		
10	50/7"		
15			
20			

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PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-1

PROFILE HOLE NO 3
DATE DRILLED 11/6/2003
Job # 120481

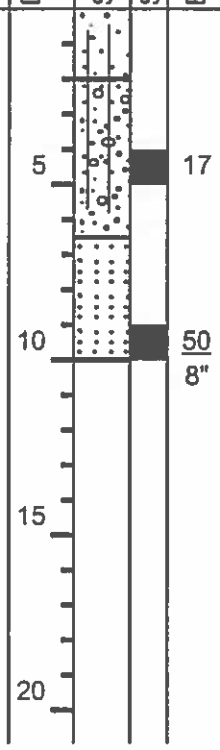
REMARKS

DRY TO 10', 11/7/03

SAND, SILTY, LIGHT BROWN

SAND, GRAVELLY, SILTY, TAN

SANDSTONE, SILTY, TAN



PROFILE HOLE NO 4
DATE DRILLED 11/6/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

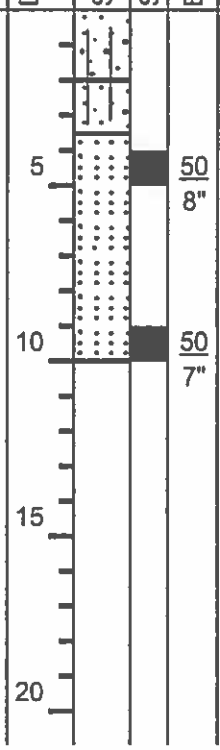
REMARKS

DRY TO 10', 11/7/03

SAND, SILTY, LIGHT BROWN

SAND, SILTY, TAN

SANDSTONE, SILTY, TAN TO LIGHT GREEN



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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO: 61992
FIG NO: C-2

PROFILE HOLE NO 5
DATE DRILLED 11/6/2003
Job # 120481

REMARKS

DRY TO 10', 11/7/03

SAND, SILTY, LIGHT BROWN

SAND, TAN

SANDSTONE, SILTY, TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50 / 11"		
10			50 / 9"		
15					
20					

PROFILE HOLE NO 6
DATE DRILLED 11/6/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

WATER @ 7.5', 11/8/03

SAND, SILTY, BROWN TO LIGHT BROWN

SAND, SILTY, GRAVELLY, TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			35		
10			41		
15					
20					

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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE.	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-3

PROFILE HOLE NO 7
DATE DRILLED 11/6/2003
Job # 120481

REMARKS

WATER @ 4', 11/8/03

SAND, SILTY, BROWN TO LIGHT BROWN

SAND, GRAVELLY, TAN

WEATHERED SILTSTONE, SANDY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			25		
10			46		
15					
20					

PROFILE HOLE NO 8
DATE DRILLED 11/11/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

WATER @ 9.5', 11/12/03

SAND, SILTY, LIGHT BROWN

SAND, GRAVELLY, SILTY, TAN

CLAYSTONE, SILTY, GREENISH BROWN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			25		
10			50/10"		
15					
20					

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		K	5/11/12

JOB NO.: 61992
FIG NO.: C-4

PROFILE HOLE NO 9
DATE DRILLED 11/11/2003
Job # 120481

REMARKS

DRY TO 10', 11/12/03

SAND, SILTY, LIGHT BROWN

CLAY, SANDY, DARK GREEN BROWN

CLAYSTONE, VERY SANDY, GREENISH BROWN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			21		
10			50/11"		
15					
20					

PROFILE HOLE NO 10
DATE DRILLED 11/11/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

DRY TO 10', 11/12/03

SAND, SILTY, BROWN

SAND, SILTY TO GRAVELLY, LIGHT BROWN

SANDSTONE, LIGHT BROWN TO TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50/11"		
10			50/6"		
15					
20					

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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE.	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-5

PROFILE HOLE NO 11
DATE DRILLED 11/11/2003
Job # 120481

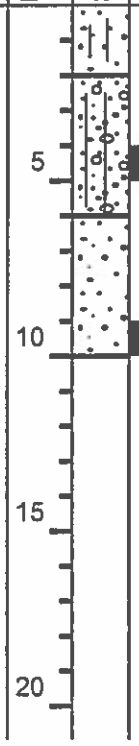
REMARKS

DRY TO 10', 11/12/03

SAND, SILTY, BROWN

SAND, SILTY TO GRAVELLY, LIGHT BROWN

SAND, LIGHT BROWN, COARSE GRAINED



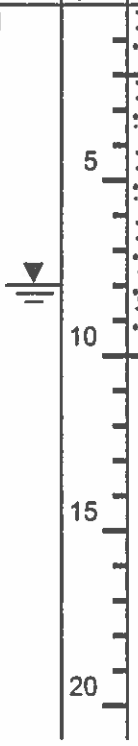
PROFILE HOLE NO 12
DATE DRILLED 11/11/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

WATER @ 8', 11/12/03

SAND, SILTY, LIGHT BROWN

SAND, GRAVELLY, TAN



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-6

PROFILE HOLE NO 13
DATE DRILLED 11/13/2003
Job # 120481

REMARKS

WATER @ 7', 11/14/03

SAND, SILTY, LIGHT BROWN

SAND, GRAVELLY, TAN

SAND, GRAVELLY, CLAYEY, GREENISH BROWN TO TAN

CLAY, SILTY, GRAY

Depth (ft)	Blows per foot	Watercontent %	Soil Type
5	20		
10	21		
15			
20			

PROFILE HOLE NO 14
DATE DRILLED 11/13/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

DRY TO 10', 11/14/03

SAND, SILTY, LIGHT BROWN

SAND, GRAVELLY, TAN

SANDSTONE, TAN

Depth (ft)	Blows per foot	Watercontent %	Soil Type
5	50/10"		
10	50/10"		
15			
20			

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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		a	5/11/12

JOB NO.: 61992
FIG NO.: C-7

PROFILE HOLE NO 15
DATE DRILLED 11/19/2003
Job # 120481

REMARKS

WATER @ 7.5', 11/20/03

SAND, SILTY, BROWN

SAND, GRAVELLY, TAN

SAND, SILTY TO GRAVELLY, LIGHT GRAYISH TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			21		
10			20		
15					
20					

PROFILE HOLE NO 16
DATE DRILLED 11/19/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

WATER @ 9.5', 11/20/03

SAND, SILTY, BROWN

SAND, SILTY, TAN

SAND, GRAVELLY, TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			5		
10			20		
15					
20					

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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-8

PROFILE HOLE NO 17
DATE DRILLED 11/19/2012
Job # 120481

REMARKS

DRY TO 10', 11/20/03

SAND, SILTY, BROWN

SAND, LIGHT BROWN

SANDSTONE, SILTY TO GRAVELLY, TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50 / 10"		
10			50 / 10"		
15					
20					

PROFILE HOLE NO 18
DATE DRILLED 11/19/2012
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

WATER @ 4.5', 11/20/03

SAND, SILTY, BROWN

SAND, GRAVELLY, TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50 / 11"		
10			50 / 6"		
15					
20					

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-9

PROFILE HOLE NO 19
DATE DRILLED 11/19/2012
Job # 120481

REMARKS

DRY TO 10', 11/20/03

SAND, SILTY, BROWN

SAND, GRAVELLY, LIGHT BROWN-TAN

SANDSTONE, LIGHT BROWN TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50 / 11"		
10			50 / 4"		
15					
20					

PROFILE HOLE NO 20
DATE DRILLED 11/19/2012
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

DRY TO 10', 11/20/03

SAND, SILTY, GRAVELLY, BROWN

SANDSTONE, LIGHT GREENISH TAN

CLAYSTONE, TAN-BROWN

SANDSTONE, TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50 / 5"		
10			50 / 3"		
15					
20					

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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-10

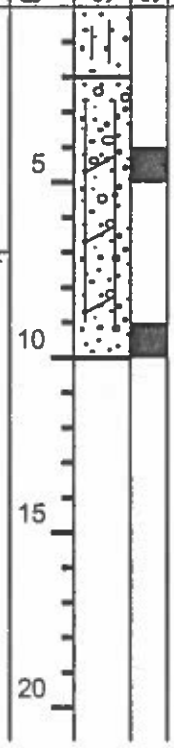
PROFILE HOLE NO 21
DATE DRILLED 11/24/2003
Job # 120481

REMARKS

WATER @ 7', 11/25/03

SAND, SILTY, LIGHT BROWN

SAND, GRAVELLY, SILTY WITH CLAYEY LENSES, TAN



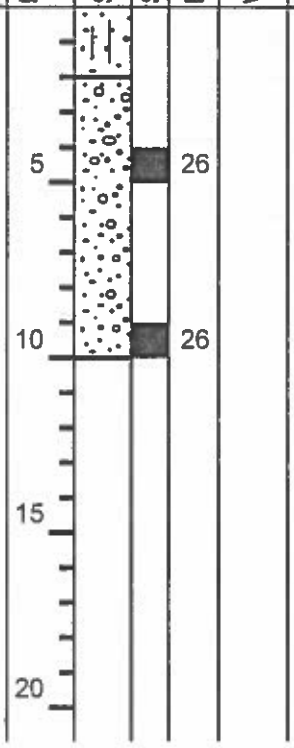
PROFILE HOLE NO 22
DATE DRILLED 11/24/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

DRY TO 10', 11/14/03

SAND, SILTY, BROWN

SAND, GRAVELLY, LIGHT BROWN, TAN



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-11

PROFILE HOLE NO 23
DATE DRILLED 11/24/2003
Job # 120481

REMARKS

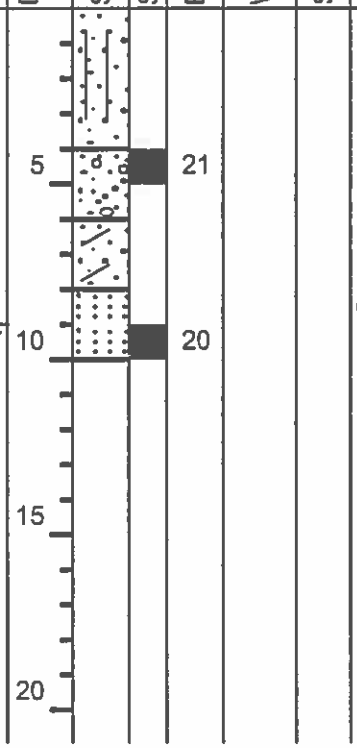
WATER @ 9', 11/25/03

SAND, SILTY, BROWN

SAND, GRAVELLY, TAN

SAND, CLAYEY, TAN

SANDSTONE, GRAVELLY, TAN



PROFILE HOLE NO 24
DATE DRILLED 11/24/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

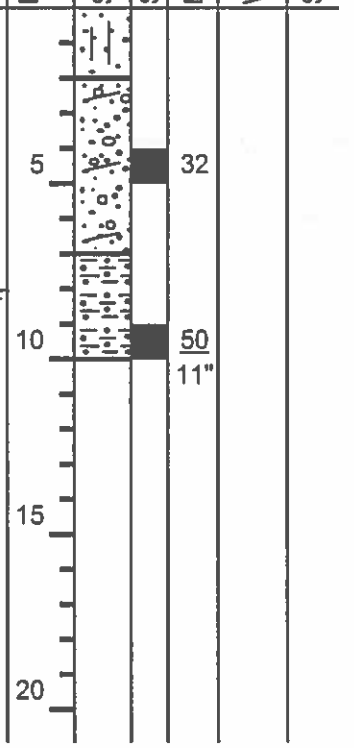
REMARKS

WATER @ 8', 11/25/03

SAND, SILTY, BROWN

SAND, CLAYEY, GRAVELLY, LIGHT GREENISH BROWN

SILTSTONE/CLAYSTONE, GRAY



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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-12

PROFILE HOLE NO 25
DATE DRILLED 11/24/2012
Job # 120481

REMARKS

WATER @ 9.5', 11/25/03

SAND, SILTY, BROWN

SAND, SILTY, LIGHT BROWN

SAND, GRAVELLY, TAN

SANDSTONE, TAN

Depth (ft)	Blows per foot
5	35
10	50 / 10"
15	
20	

PROFILE HOLE NO 26
DATE DRILLED 11/25/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

DRY TO 10', 11/26/03

SAND, SILTY, BROWN

SAND, GRAVELLY, TAN

SAND, CLAYEY, BROWN
WEATHERED SANDSTONE, TAN

Depth (ft)	Blows per foot
5	19
10	36
15	
20	

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COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		a	5/11/12

JOB NO.: 61992
FIG NO.: C-13

PROFILE HOLE NO 27
DATE DRILLED 11/25/2003
Job # 120481

REMARKS

DRY TO 10', 11/26/03

SAND, SILTY, BROWN

SANDSTONE, SILTY, TAN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50		
10			50 / 8"		
15					
20					

PROFILE HOLE NO 28
DATE DRILLED 11/25/2003
CLIENT 4-WAY JOINT VENTURES
LOCATION 4-WAY RANCH

REMARKS

DRY TO 10', 11/26/03

SAND, SILTY, BROWN

SAND, SILTY, LIGHT BROWN

SANDSTONE, LIGHT BROWN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50 / 9"		
10			50 / 8"		
15					
20					

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

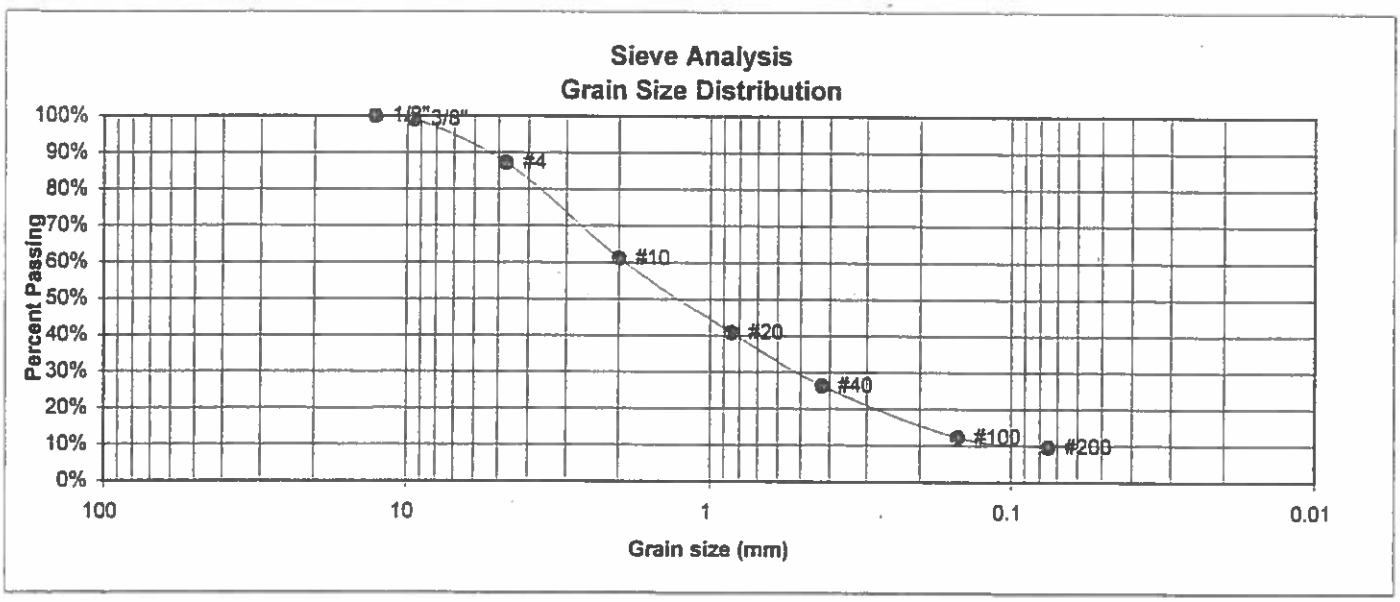
PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5/11/12

JOB NO.: 61992
FIG NO.: C-14

APPENDIX D: Laboratory Test Results

UNIFIED CLASSIFICATION	SW-SM	CLIENT	LAND RESOURCES
SOIL TYPE #	1	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB1	JOB NO.	61992
DEPTH	2-3'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	99.1%
4	87.2%
10	61.2%
20	40.8%
40	26.4%
100	12.3%
200	9.7%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

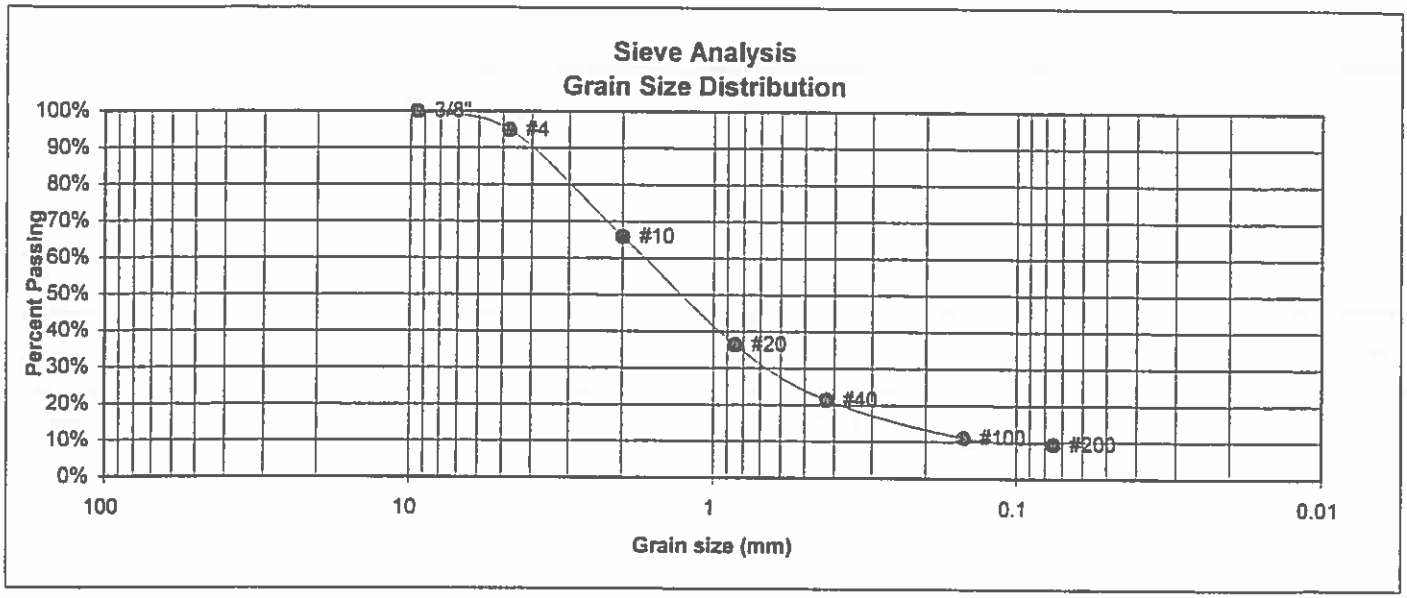
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/27/02

JOB NO.: 61992
FIG NO.: D-1

UNIFIED CLASSIFICATION	SW-SM	CLIENT	LAND RESOURCES
SOIL TYPE #	1	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB4	JOB NO.	61992
DEPTH	2-5'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.0%
10	65.9%
20	36.4%
40	21.4%
100	11.2%
200	9.4%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

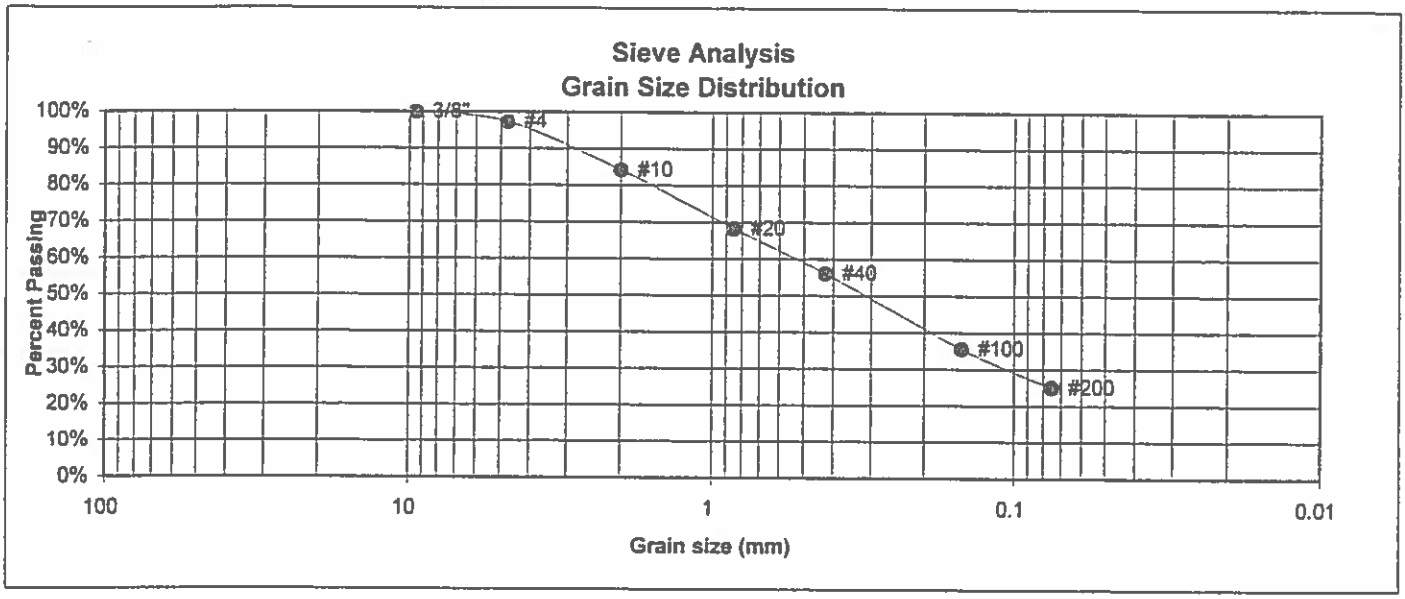
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/27/02

JOB NO.: 61992

FIG NO.: D-2

UNIFIED CLASSIFICATION	SM	CLIENT	LAND RESOURCES
SOIL TYPE #	I	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB11	JOB NO.	61992
DEPTH	2-3'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.3%
10	84.2%
20	68.2%
40	56.1%
100	35.5%
200	25.0%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

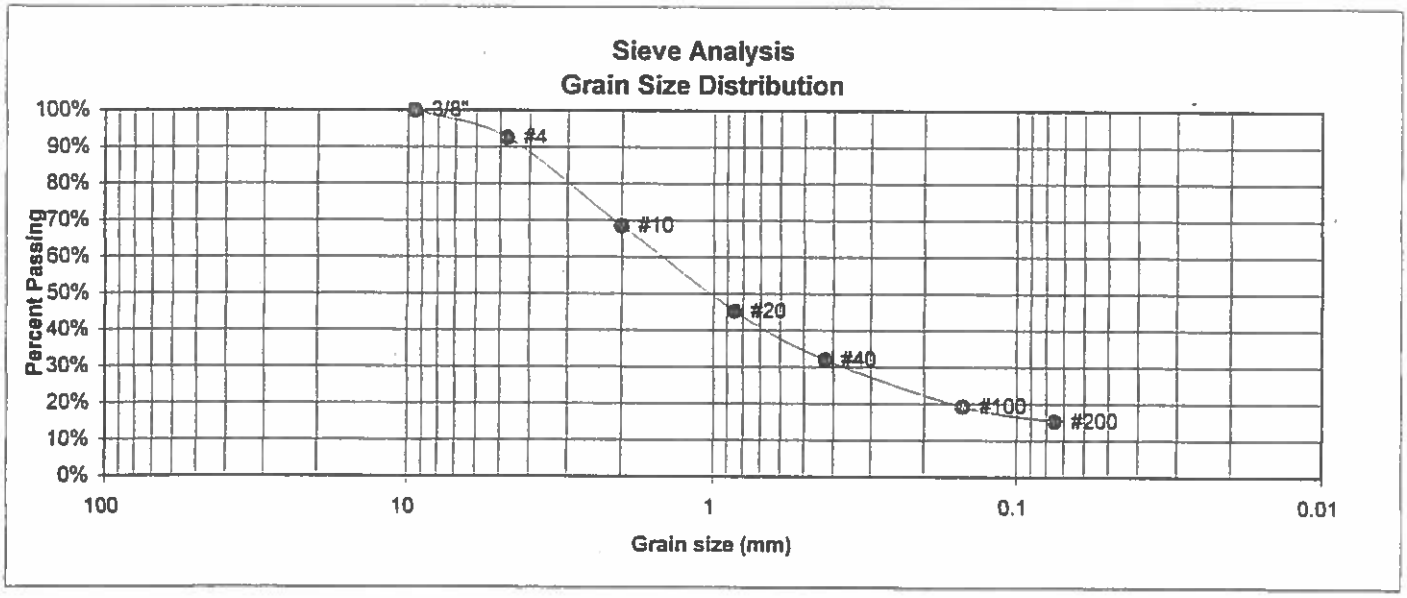
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/27/02

JOB NO.: 61992
FIG NO.: D-3

UNIFIED CLASSIFICATION	SM	CLIENT	LAND RESOURCE GROUP, INC.
SOIL TYPE #	1	PROJECT	FOUR WAY RD.
TEST BORING #	PH-6	JOB NO.	61992
DEPTH	5-10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.5%
10	68.6%
20	45.3%
40	32.0%
100	19.3%
200	15.3%

Atterberg Limits	
Plastic Limit	16
Liquid Limit	19
Plastic Index	3

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

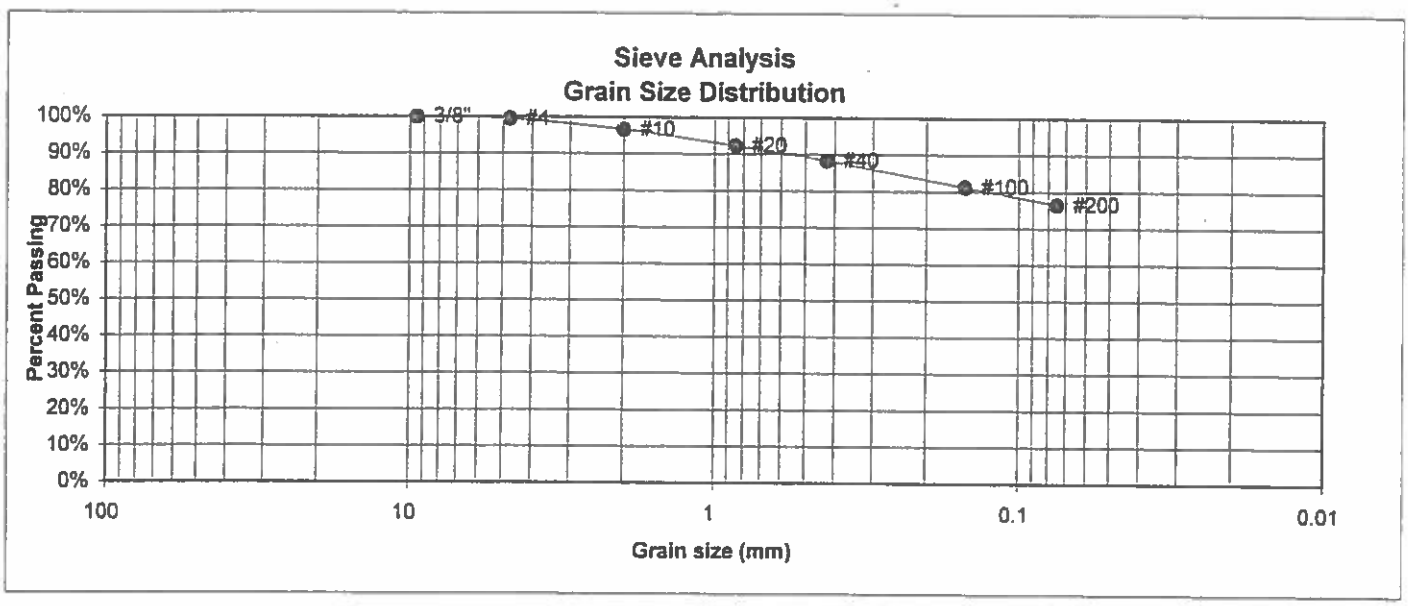
ENTECH ENGINEERING, INC.
565 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	12/1/03

JOB NO.: 61992
FIG NO.: D-4

UNIFIED CLASSIFICATION	CL	CLIENT	LAND RESOURCES
SOIL TYPE #	2	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB23	JOB NO.	61992
DEPTH	2-3'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.5%
10	96.6%
20	92.3%
40	88.4%
100	81.2%
200	76.5%

Atterberg Limits	
Plastic Limit	
Liquid Limit	
Plastic Index	
Swell	
Moisture at start	11.8%
Moisture at finish	25.0%
Moisture increase	13.1%
Initial dry density (pcf)	99
Swell (psf)	1467

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

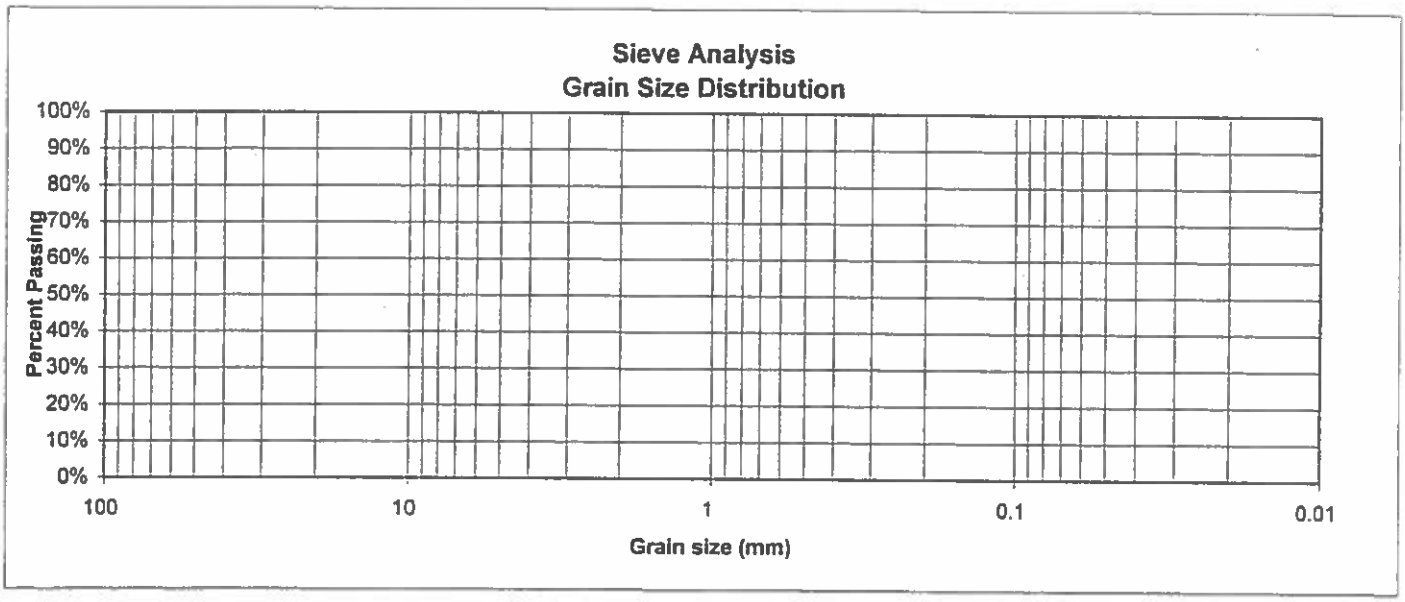
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			9/27/02

JOB NO.: 61992

FIG NO.: D-5

UNIFIED CLASSIFICATION	ML	CLIENT	LAND RESOURCES
SOIL TYPE #	3	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB4	JOB NO.	61992
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	
200	

Atterberg Limits

Plastic Limit	31
Liquid Limit	32
Plastic Index	1

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

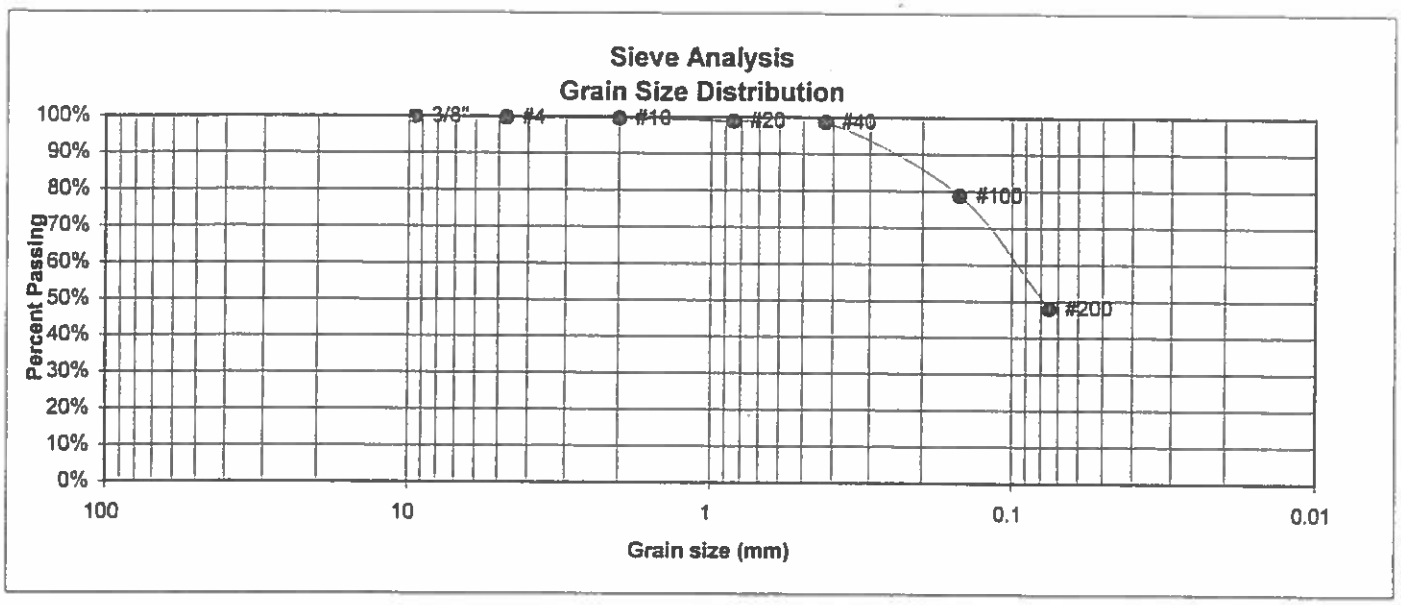
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/27/02

JOB NO.: 61992

FIG NO.: D-6

UNIFIED CLASSIFICATION	SM	CLIENT	LAND RESOURCES
SOIL TYPE #	4	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB11	JOB NO.	61992
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.6%
10	99.6%
20	99.0%
40	98.7%
100	78.8%
200	48.0%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

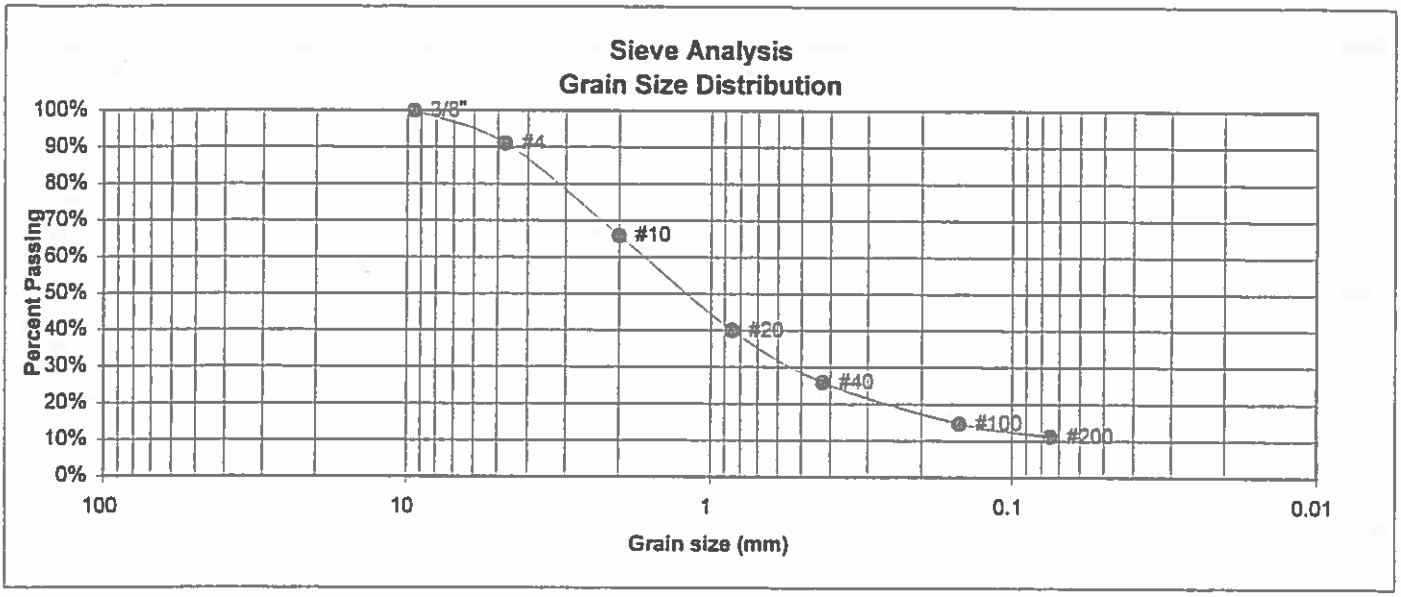
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/22/00

JOB NO.: 61992

FIG NO.: D-7

UNIFIED CLASSIFICATION	SW-SC	CLIENT	LAND RESOURCES
SOIL TYPE #	4	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB16	JOB NO.	61992
DEPTH	5'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.1%
10	65.9%
20	40.0%
40	25.9%
100	14.7%
200	11.2%

Atterberg Limits

Plastic Limit

Liquid Limit

Plastic Index

Swell

Moisture at start	6.2%
Moisture at finish	21.6%
Moisture increase	15.5%
Initial dry density (pcf)	100
Swell (psf)	351

ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907 (719) 531-5599

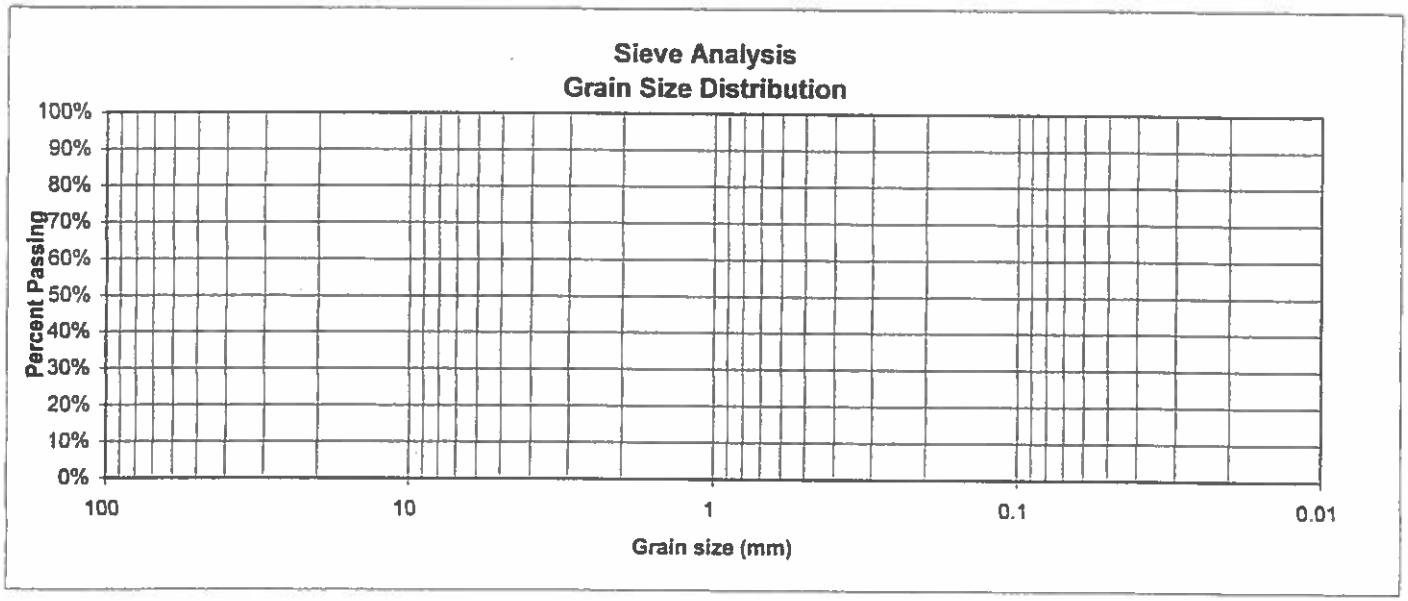
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAG	9/30/02

JOB NO.: 61992

FIG NO.: D-8

UNIFIED CLASSIFICATION	SC	CLIENT	LAND RESOURCE GROUP, INC.
SOIL TYPE #	4	PROJECT	FOUR WAY RD.
TEST BORING #	PH-1	JOB NO.	61992
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	
200	

Atterberg Limits

Plastic Limit	
Liquid Limit	
Plastic Index	

Swell

Moisture at start	9.5%
Moisture at finish	18.5%
Moisture increase	9.0%
Initial dry density (pcf)	106
Swell (psf)	861

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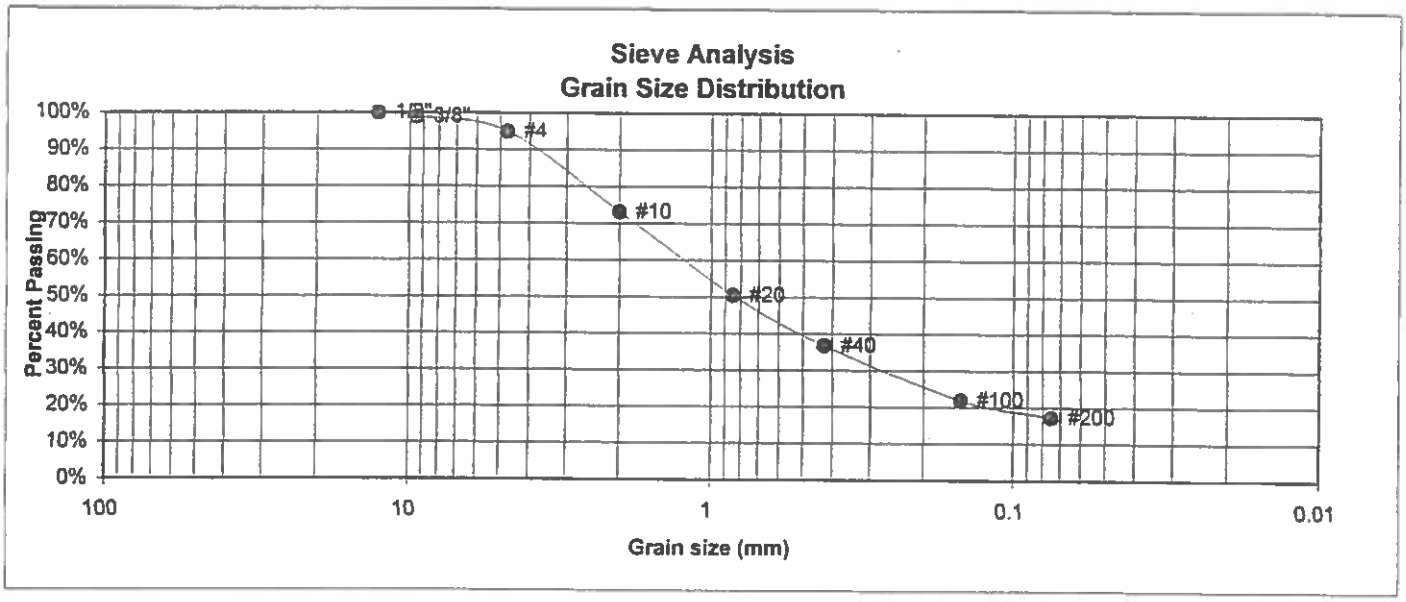
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	12/1/03

JOB NO.: 61992
FIG NO.: D-9

UNIFIED CLASSIFICATION	SC	CLIENT	LAND RESOURCE GROUP, INC.
SOIL TYPE #	4	PROJECT	FOUR WAY RD.
TEST BORING #	PH-2	JOB NO.	61992
DEPTH	5-10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.9%
4	94.9%
10	73.2%
20	50.5%
40	36.9%
100	21.9%
200	17.3%

Atterberg Limits

Plastic Limit	15
Liquid Limit	28
Plastic Index	13

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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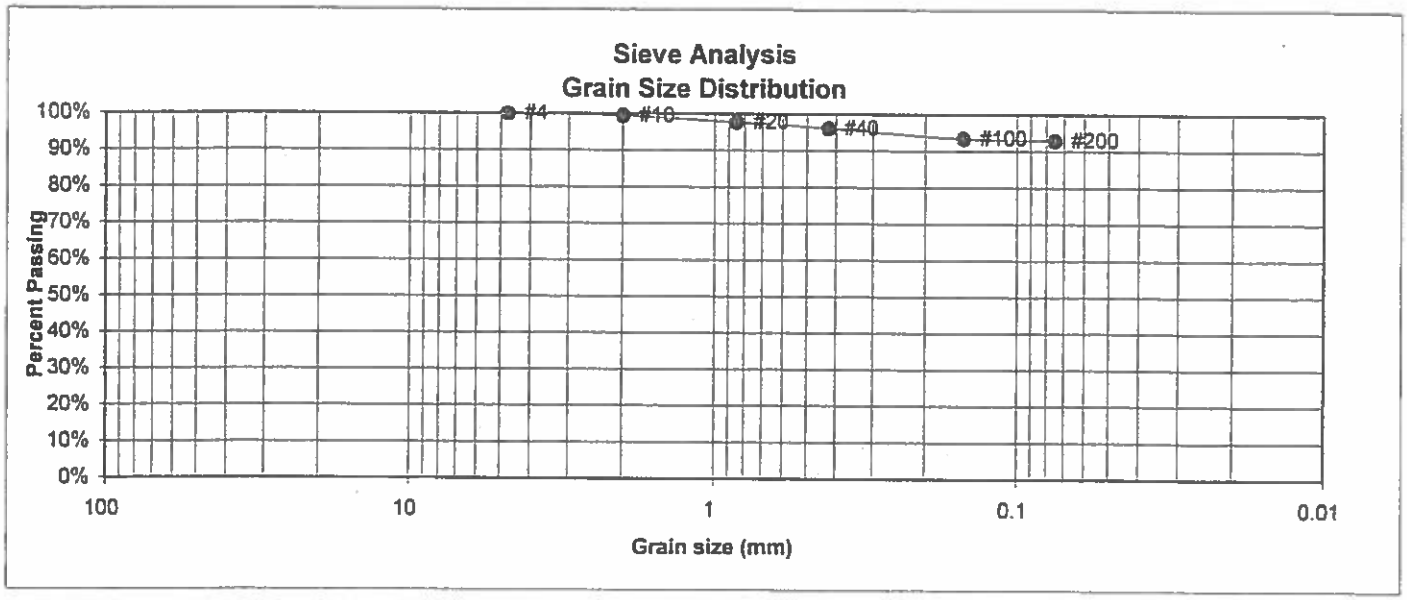
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	12/1/03

JOB NO.: 61992
FIG NO.: D-10

UNIFIED CLASSIFICATION	CL	CLIENT	LAND RESOURCES
SOIL TYPE #	5	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB6	JOB NO.	61992
DEPTH	15'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.4%
20	97.7%
40	96.1%
100	93.4%
200	92.9%

Atterberg Limits	
Plastic Limit	
Liquid Limit	
Plastic Index	
Swell	
Moisture at start	12.1%
Moisture at finish	23.3%
Moisture increase	11.2%
Initial dry density (pcf)	99
Swell (psf)	1467

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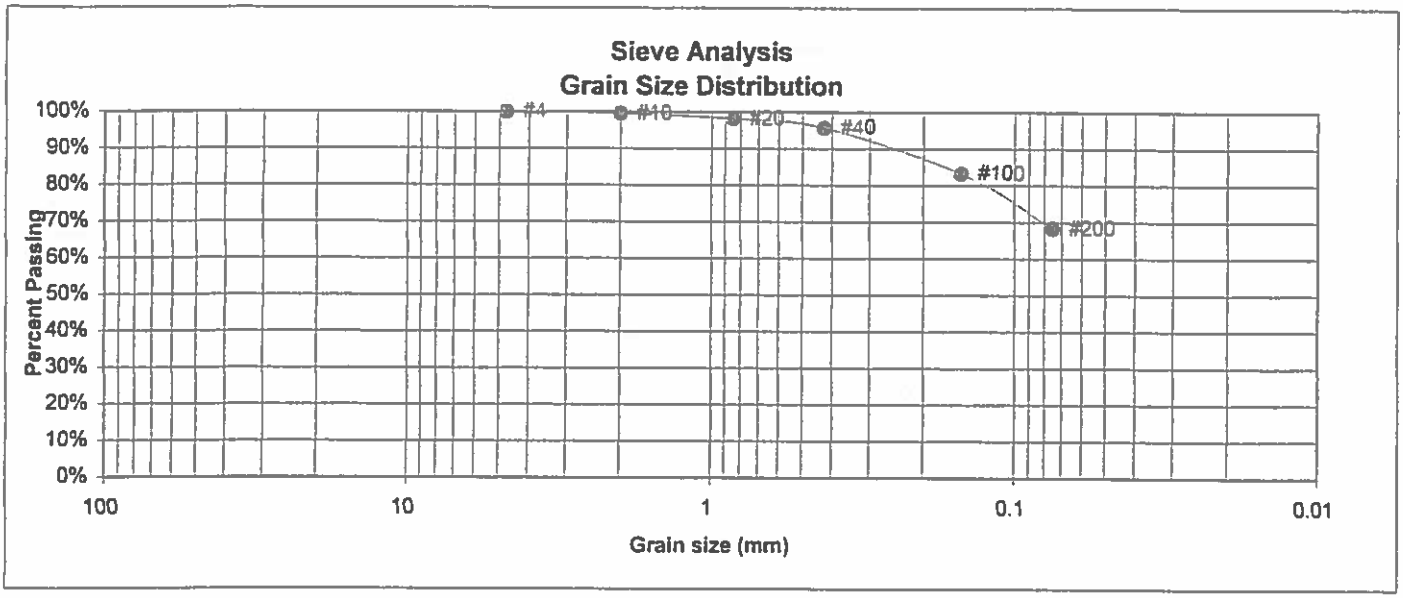
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/27/16

JOB NO.: 61992

FIG NO.: D-11

UNIFIED CLASSIFICATION	CL	CLIENT	LAND RESOURCE GROUP, INC.
SOIL TYPE #	5	PROJECT	FOUR WAY RD.
TEST BORING #	PH-8	JOB NO.	61992
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.6%
20	98.1%
40	95.7%
100	83.3%
200	68.3%

Atterberg Limits	
Plastic Limit	16
Liquid Limit	39
Plastic Index	23

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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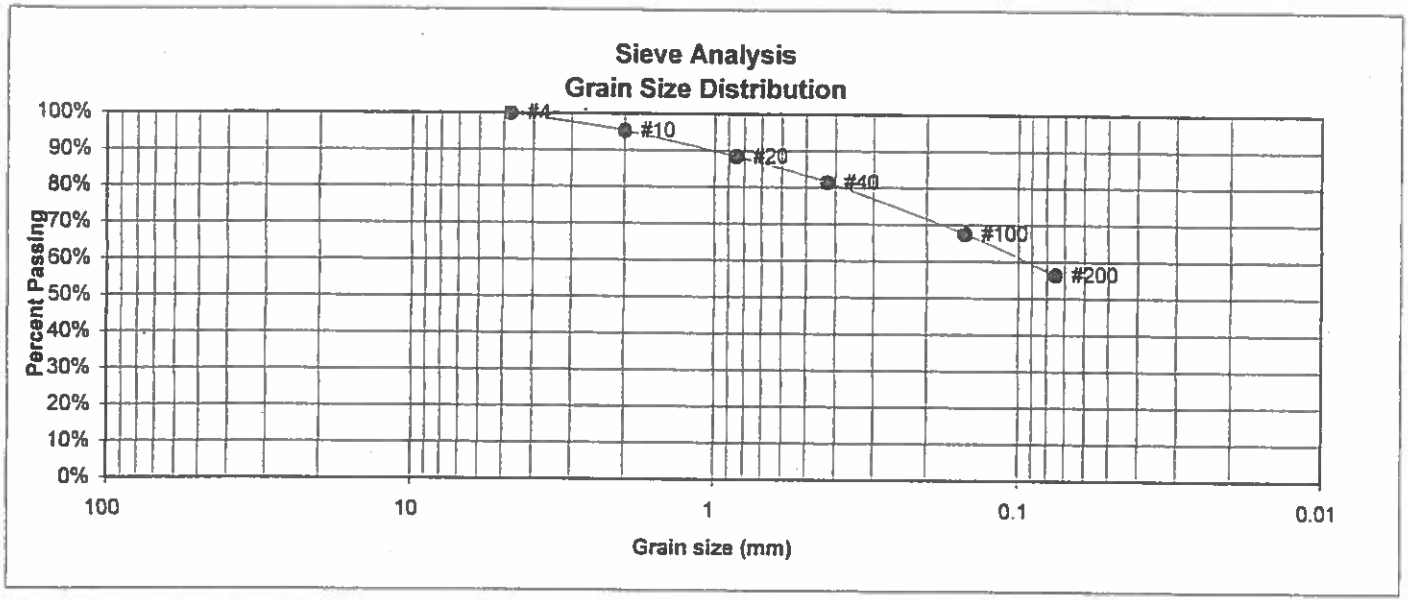
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	12/1/03

JOB NO.: 61992

FIG NO.: D-12

UNIFIED CLASSIFICATION	CL	CLIENT	LAND RESOURCE GROUP, INC.
SOIL TYPE #	5	PROJECT	FOUR WAY RD.
TEST BORING #	PH-9	JOB NO.	61992
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	95.3%
20	88.4%
40	81.4%
100	67.5%
200	56.4%

Atterberg Limits	
Plastic Limit	
Liquid Limit	
Plastic Index	
Swell	
Moisture at start	14.9%
Moisture at finish	19.0%
Moisture increase	4.2%
Initial dry density (pcf)	109
Swell (psf)	1014

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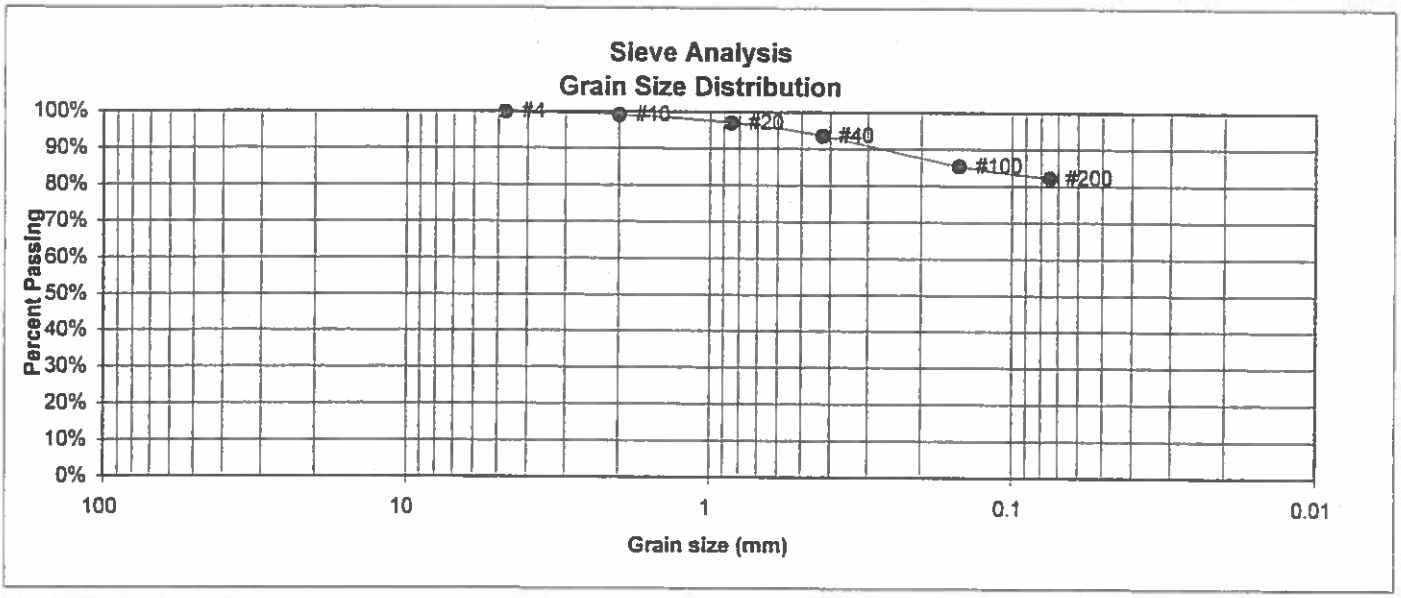
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	12/1/03

JOB NO.: 61992
FIG NO.: D-13

UNIFIED CLASSIFICATION	ML	CLIENT	LAND RESOURCES
SOIL TYPE #	6	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB2	JOB NO.	61992
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.2%
20	97.1%
40	93.6%
100	85.5%
200	82.1%

Atterberg Limits	
Plastic Limit	29
Liquid Limit	29
Plastic Index	0

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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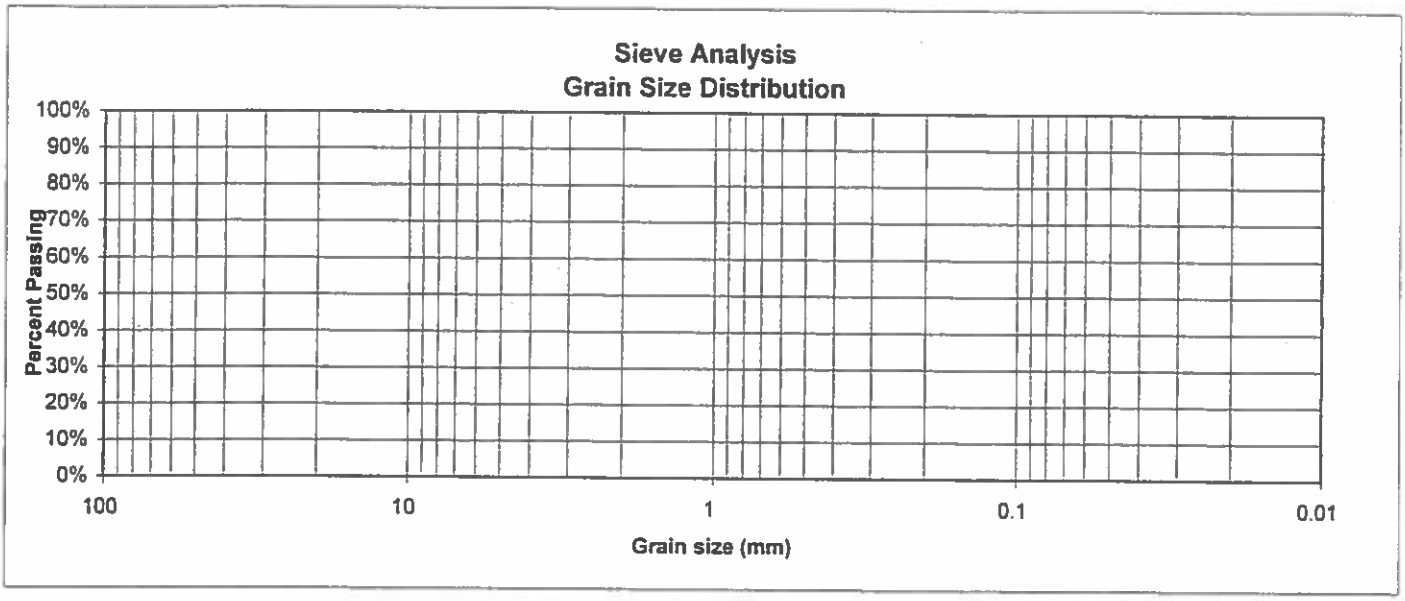
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/27/02

JOB NO.: 61992

FIG NO.: D-14

UNIFIED CLASSIFICATION	ML	CLIENT	LAND RESOURCES
SOIL TYPE #	6	PROJECT	FOUR WAY RD., 558 AC. PARCEL
TEST BORING #	TB14	JOB NO.	61992
DEPTH	2-3'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	
200	

Atterberg Limits

Plastic Limit	
Liquid Limit	
Plastic Index	

Swell

Moisture at start	9.5%
Moisture at finish	22.6%
Moisture increase	13.1%
Initial dry density (pcf)	103
Swell (psf)	1150

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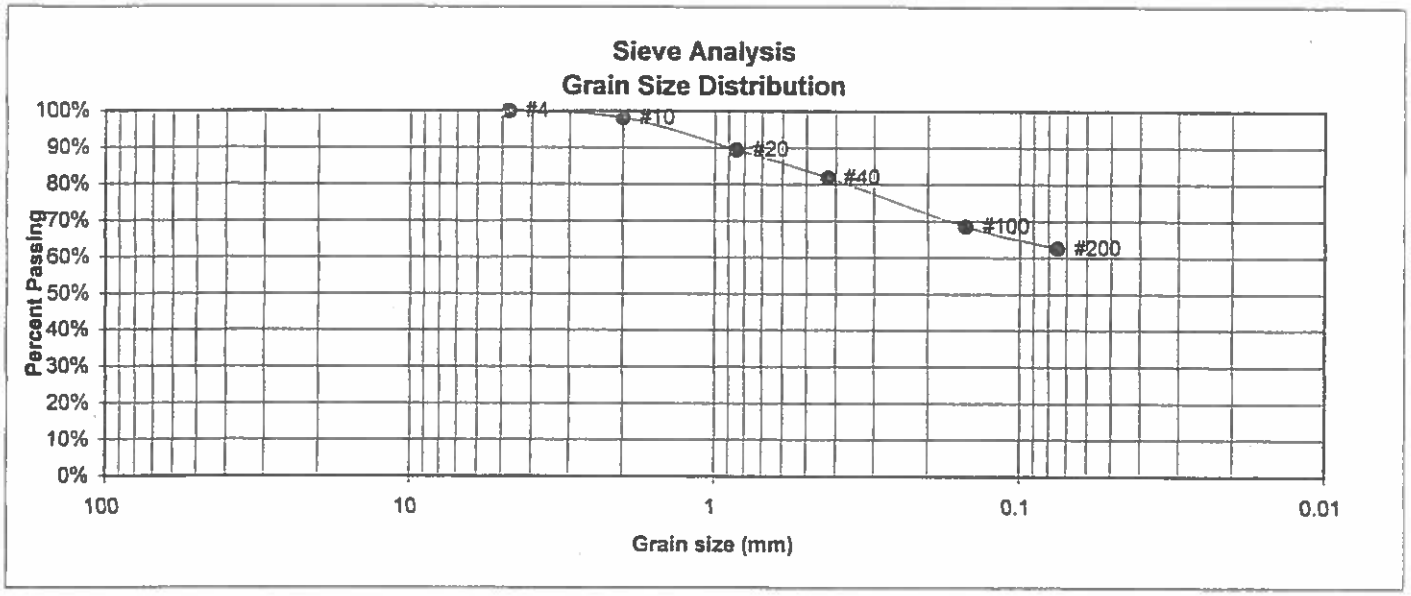
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		RLH	9/30/02

JOB NO.: 61992

FIG NO.: D-15

UNIFIED CLASSIFICATION	ML	CLIENT	LAND RESOURCE GROUP, INC.
SOIL TYPE #	6	PROJECT	FOUR WAY RD.
TEST BORING #	PH-7	JOB NO.	61992
DEPTH	10'	TEST BY	DG



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.2%
20	89.4%
40	81.8%
100	68.6%
200	62.5%

Atterberg Limits	
Plastic Limit	25
Liquid Limit	27
Plastic Index	2

Swell	
Moisture at start	11.0%
Moisture at finish	20.5%
Moisture increase	9.6%
Initial dry density (pcf)	105
Swell (psf)	1818

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LABORATORY TEST RESULTS

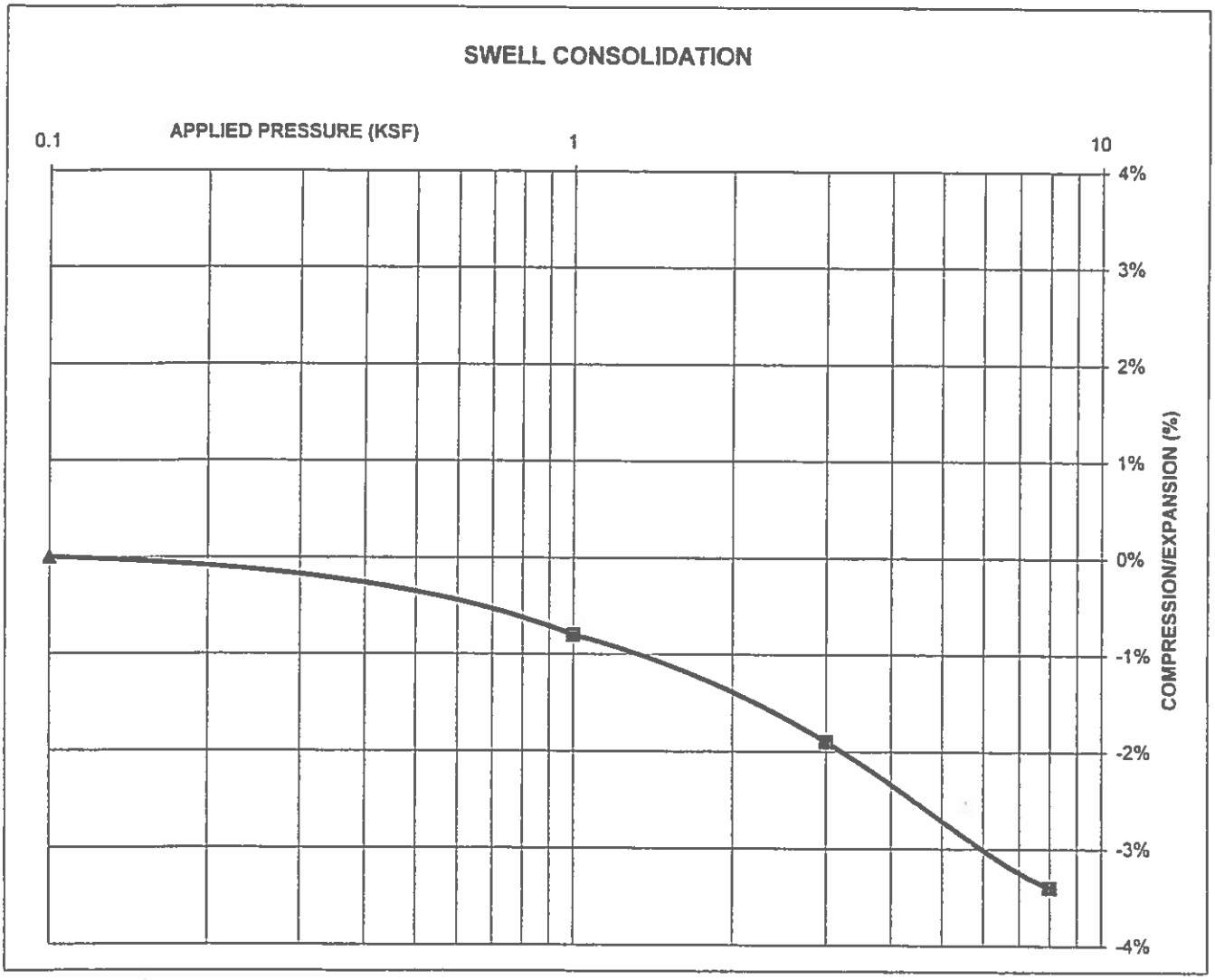
DRAWN:	DATE:	CHECKED:	DATE:
		KAH	12/1/03

JOB NO.: 61992
FIG NO.: D-16

CONSOLIDATION TEST RESULTS

SAMPLE FROM:	TB11	AT DEPTH	10'
DESCRIPTION	SM	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			107
NATURAL MOISTURE CONTENT			20.7%
SWELL/CONSOLIDATION (%)			0.0%

JOB NO. 61992
CLIENT LAND RESOURCES
PROJECT FOUR WAY RD., 558 AC. PARCEL



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SWELL CONSOLIDATION
TEST RESULTS

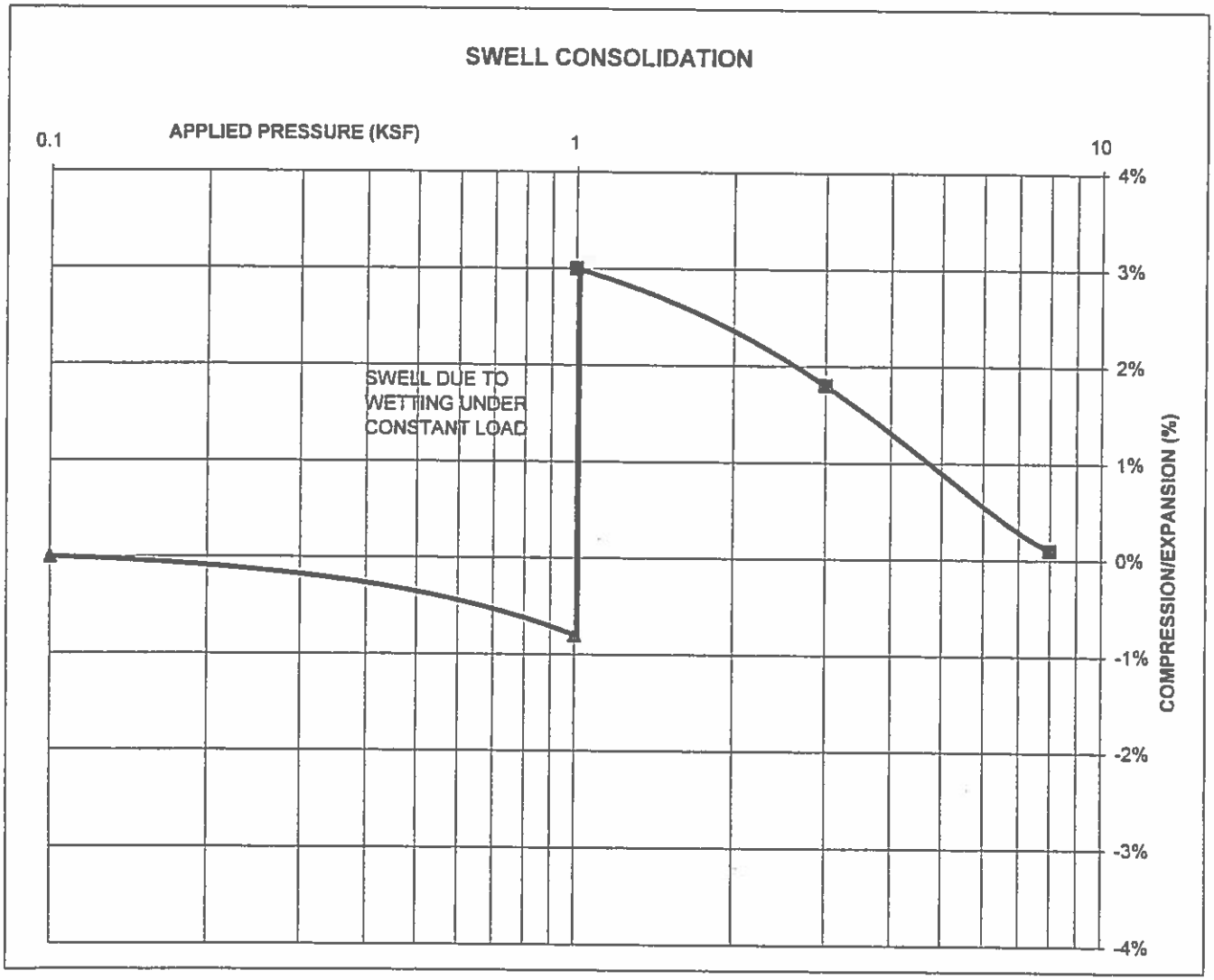
DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/27/06

JOB NO.: 61992
FIG NO.: D-17

CONSOLIDATION TEST RESULTS

SAMPLE FROM:	TB2	AT DEPTH	10'
DESCRIPTION	ML	SOIL TYPE	6
NATURAL UNIT DRY WEIGHT (PCF)			111
NATURAL MOISTURE CONTENT			19.3%
SWELL/CONSOLIDATION (%)			3.8%

JOB NO. 61992
CLIENT LAND RESOURCES
PROJECT FOUR WAY RD., 558 AC. PARCEL



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SWELL CONSOLIDATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/30/02

JOB NO.: 61992
FIG NO.: D-18

APPENDIX E: Test Boring Logs and Laboratory Test Results from Entech Job No. 120675

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT 4 WAY JOINT VENTURE
PROJECT FOUR WAY RANCH
JOB NO. 120675

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	301	2-3			6.2			0.01			SM-SW	SAND, SLIGHTLY SILTY
1	305	5			7.7						SM-SW	SAND, SLIGHTLY SILTY
1	305	10			18.9	NV	NP		290		SM	SAND, SILTY
1	311	5			10.9						SM-SW	SAND, SLIGHTLY SILTY
1	317	5			5.6						SM-SW	SAND, SLIGHTLY SILTY
2	312	5	16.4	107.5	94.7					1.5	CL	CLAY, SANDY
3	318	10	12.8	119.4	28.9	NV	NP	0.00		-0.3	SM	SANDSTONE, SILTY
3	303	15			6.6	NV	NP				SM-SW	SANDSTONE, SLIGHTLY SILTY
3	307	5			34.4	NV	NP	0.00			SM	SANDSTONE, SILTY
3	308	5			18.7						SM	SANDSTONE, SILTY
3	312	10			19.1						SM	SANDSTONE, SILTY
4	302	15				40	15	0.02			CL	CLAYSTONE, SANDY
4	308	10	16.4	115.5	61.0					0.6	CL	CLAYSTONE, VERY SANDY
4	314	10			56.6	35	17		1360		CL	CLAYSTONE, VERY SANDY
4	315	10	15.8	116.5	77.1					1.7	CL	CLAYSTONE, SANDY
4	316	15			66.0						CL	CLAYSTONE, SANDY

Fig No. E-1

TABLE 2

Depth to Bedrock and Groundwater
4- WAY RANCH
120675

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
300	14	6.5
301	9	4
302	13	8
303	14	6
304	12	8.5
305	12	5.5
306	3	12
307	4	4
308	3	>15
309	9	11.5
310	7	4.5
311	8	5.5
312	7	14.5
313	3	5.5
314	4	13
315	7	24.5
316	4	14
317	11	8.5
318	9	4.5

FIG NO. E-2

TEST BORING NO. 300
DATE DRILLED 6/21/2012
Job # 120675

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 6.5', 7/6/12						
SAND, SILTY TO SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO DENSE, DRY TO WET				*	1.2	1
	5			21	6.1	1
	10			30	11.0	1
SANDSTONE, CLAYEY, FINE TO MEDIUM GRAINED, GRAY BROWN, VERY DENSE, MOIST	15			50/6"	13.7	3
* - BULK SAMPLE TAKEN	20					

TEST BORING NO. 301
DATE DRILLED 6/21/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 4', 7/6/12						
SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST TO WET				10	7.4	1
	5			14	11.2	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	10			50/11"	9.2	4
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, WET	15			50/5"	12.8	3
	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.:

TEST BORING NO. 302
DATE DRILLED 6/21/2012
Job # 120675

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 8', 7/6/12						
SAND, SILTY, FINE TO COARSE GRAINED, TAN TO BROWN, MEDIUM DENSE, DRY TO WET				19	2.1	1
	5			21	6.6	1
	10			15	16.0	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	15			50/7"	12.4	4
	20					

TEST BORING NO. 303
DATE DRILLED 6/21/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 6', 7/6/12						
SAND, SILTY, FINE TO COARSE GRAINED, LIGHT BROWN, MEDIUM DENSE TO DENSE, DRY TO WET				*	2.3	1
	5			22	5.0	1
	10			39	13.9	1
SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, VERY MOIST	15			50/8"	15.1	3
* - BULK SAMPLE TAKEN	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO. 120675
FIG NO. E-3

TEST BORING NO. 304
DATE DRILLED 6/21/2012
Job # 120675

REMARKS

WATER @ 8.5', 7/6/12

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			*	1.8	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, DRY TO WET
5			23	6.3	1	
10			33	13.5	1	
15			50/6"	10.5	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, WET
20						

* - BULK SAMPLE TAKEN

TEST BORING NO. 305
DATE DRILLED 6/21/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS

WATER @ 5.5', 7/6/12

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			*	1.1	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, LIGHT BROWN TO BROWN, MEDIUM DENSE TO DENSE,
5			26	2.1	1	DRY
						SAND, SILTY, FINE GRAINED,
10			34	23.5	1	GRAY, DENSE, WET
15			50/6"	11.4	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, VERY MOIST
20						

* - BULK SAMPLE TAKEN

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-4

TEST BORING NO. 306
DATE DRILLED 6/26/2012
Job # 120675

REMARKS

WATER @ 12', 7/6/12

SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, VERY DENSE, MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			*	3.9	1
5			50/7"	8.8	3
10			50/6"	8.7	3
15			50/6"	14.1	3
20					

TEST BORING NO. 307
DATE DRILLED 6/26/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS

WATER @ 4', 7/6/12

SAND, CLAYEY, FINE GRAINED, DARK BROWN, MOIST

SANDSTONE, SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			*	13.0	1
5			50	16.8	3
10			50/6"	15.1	3
15			50/8"	15.8	3
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-5

TEST BORING NO. 308
DATE DRILLED 6/26/2012
Job # 120675

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 15', 7/6/12						
SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MOIST				*	5.6	1
SANDSTONE, SILTY, FINE GRAINED, BROWN, VERY DENSE, MOIST	5			50/6"	8.5	3
CLAYSTONE, VERY SANDY, BROWN, HARD, MOIST	10			50/8"	15.3	4
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	15			50/5"	9.1	3
* - BULK SAMPLE TAKEN	20					

TEST BORING NO. 309
DATE DRILLED 6/21/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 11.5', 7/6/12						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST				*	1.3	1
	5			24	3.8	1
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, OLIVE BROWN, VERY DENSE, MOIST ▼	10			50/9"	8.8	3
* - BULK SAMPLE TAKEN	15			50/8"	12.6	3
	20					

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-6

TEST BORING NO. 310
DATE DRILLED 6/21/2012
Job # 120675

REMARKS

WATER @ 4.5', 7/6/12

SAND, CLAYEY, FINE GRAINED, DARK BROWN TO GRAY, MEDIUM DENSE, MOIST TO WET

SANDSTONE, CLAYEY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			*	14.9	1
5			15	15.7	1
10			50/7"	8.0	3
15			50/2"	10.5	4
20					

TEST BORING NO. 311
DATE DRILLED 6/21/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS

WATER @ 5.5', 7/6/12

SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, DENSE, DRY TO WET

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST TO VERY MOIST

* - BULK SAMPLE TAKEN

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			*	1.9	1
5			38	12.4	1
10			50/7"	11.7	3
15			50/10"	10.5	3
20					

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TEST BORING LOG

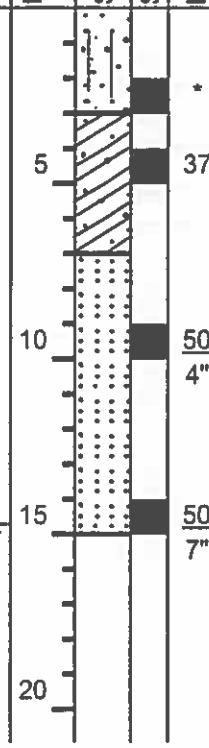
DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO: 120675
FIG NO: E-7

TEST BORING NO. 312
DATE DRILLED 6/21/2012
Job # 120675

REMARKS

WATER @ 14.5', 7/6/12



SAND, SILTY, FINE GRAINED, TAN

CLAY, SANDY, TAN, VERY STIFF, MOIST

SANDSTONE, SILTY, FINE TO MEDIUM GRAINED, BUFF TO OLIVE BROWN, VERY DENSE, MOIST

* - BULK SAMPLE TAKEN

Blows per foot	Watercontent %	Soil Type
*	2.6	1
37	8.3	2
50 4"	8.5	3
50 7"	9.3	3

TEST BORING NO. 313
DATE DRILLED 6/26/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS

WATER @ 5.5', 7/6/12

SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST TO WET

CLAYSTONE, SANDY, BLUE GRAY, HARD, MOIST

* - BULK SAMPLE TAKEN

Blows per foot	Watercontent %	Soil Type
*	3.1	1
50 8"	10.5	3
50 9"	17.0	4
50 8"	13.1	4

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/16/12

JOB NO.: 120675
FIG NO.: E-8

TEST BORING NO. 314
DATE DRILLED 6/26/2012
Job # 120675

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, FINE TO COARSE GRAINED, BROWN, DRY				*	1.5	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	5			50/11"	8.0	3
CLAYSTONE, VERY SANDY, BROWN, HARD, MOIST	10			50/8"	12.8	4
WATER @ 13', 7/6/12						
SANDSTONE, CLAYEY, FINE GRAINED, BROWN, VERY DENSE, MOIST	15			50/7"	11.1	3
* - BULK SAMPLE TAKEN	20					

TEST BORING NO. 315
DATE DRILLED 6/26/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE, DRY TO MOIST				*	2.3	1
	5			41	7.7	1
CLAYSTONE, SANDY, BROWN, HARD, MOIST	10			50/9"	15.3	4
	15			50/8"	11.3	4
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BLUE GRAY, VERY DENSE, MOIST	20			50/7"	9.5	3
WATER @ 24.5', 7/6/12						
* - BULK SAMPLE TAKEN	25			50/6"	8.7	3

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TEST BORING LOG

DRAWN:	DATE.	CHECKED:	DATE:
			7/18/12

JOB NO. 120675
FIG NO. E-9

TEST BORING NO. 316
DATE DRILLED 6/26/2012
Job # 120675

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, FINE TO COARSE GRAINED, TAN, DRY				*	1.7	1
SANDSTONE, SILTY, FINE GRAINED, TAN, VERY DENSE, MOIST	5			50/11"	14.3	3
SANDSTONE, SILTY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST	10			50/8"	9.2	3
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	15			50/6"	12.9	4
* - BULK SAMPLE TAKEN	20					

WATER @ 14', 7/6/12

TEST BORING NO. 317
DATE DRILLED 6/26/2012
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY TO SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO DENSE, DRY TO WET				*	1.8	1
	5			20	5.9	1
	10			33	14.6	1
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BLUE GRAY, VERY DENSE, MOIST	15			50/6"	8.0	3
* - BULK SAMPLE TAKEN	20					

WATER @ 8.5', 7/6/12

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-10

TEST BORING NO. 318
DATE DRILLED 6/26/2012
Job # 120675

TEST BORING NO.
DATE DRILLED
CLIENT 4 WAY JOINT VENTURE
LOCATION FOUR WAY RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 4.5', 7/6/12						
SAND, SILTY TO CLAYEY, FINE TO MEDIUM GRAINED, BROWN, MOIST TO WET				*	4.7	1
	5			10	12.8	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	10			50/9"	11.7	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	15			50/6"	11.3	3
* - BULK SAMPLE TAKEN	20					

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	5					
	10					
	15					
	20					

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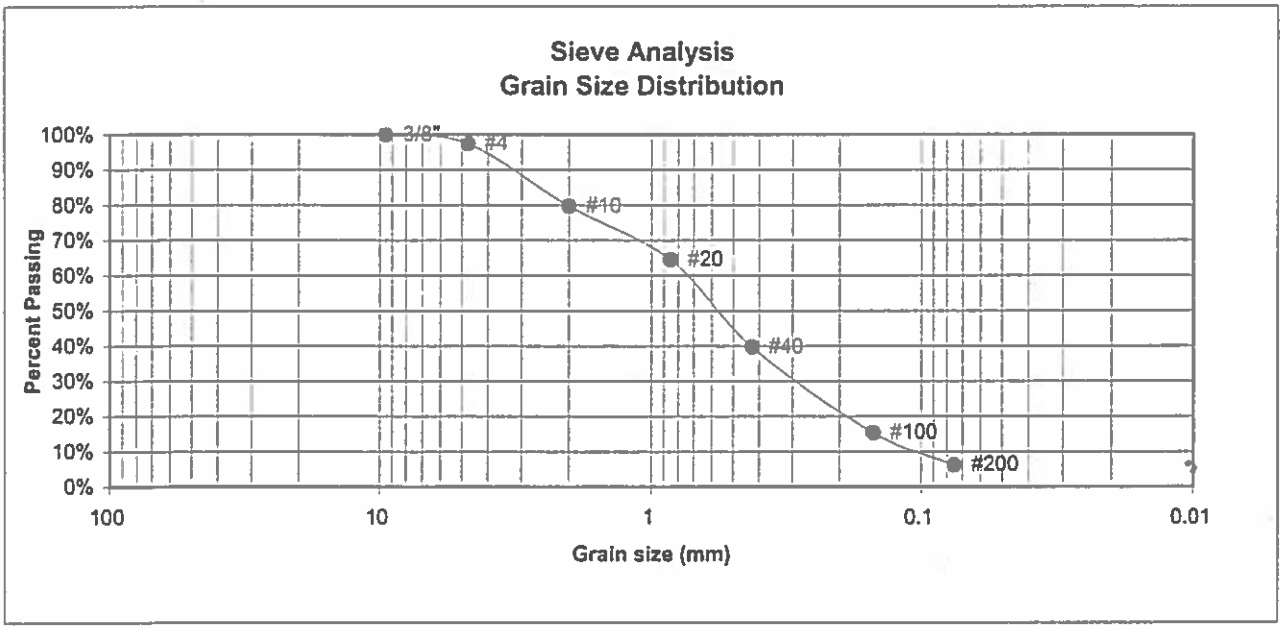
TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		dc	7/18/12

JOB NO.: 120675
FIG NO.: E-11

UNIFIED CLASSIFICATION	SM-SW	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	1	PROJECT	FOUR WAY RANCH
TEST BORING #	301	JOB NO.	120675
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.5%
10	79.7%
20	64.5%
40	39.7%
100	15.4%
200	6.2%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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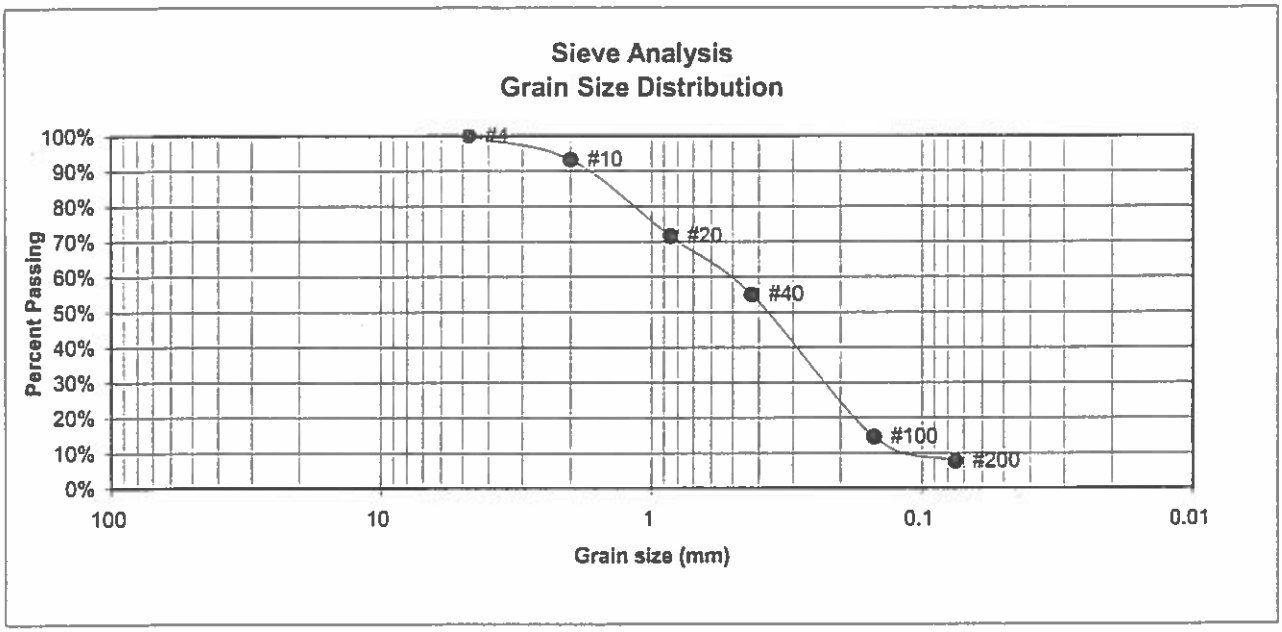
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-12

UNIFIED CLASSIFICATION	SM-SW	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	1	PROJECT	FOUR WAY RANCH
TEST BORING #	305	JOB NO.	120675
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	93.2%
20	71.5%
40	55.0%
100	14.6%
200	7.7%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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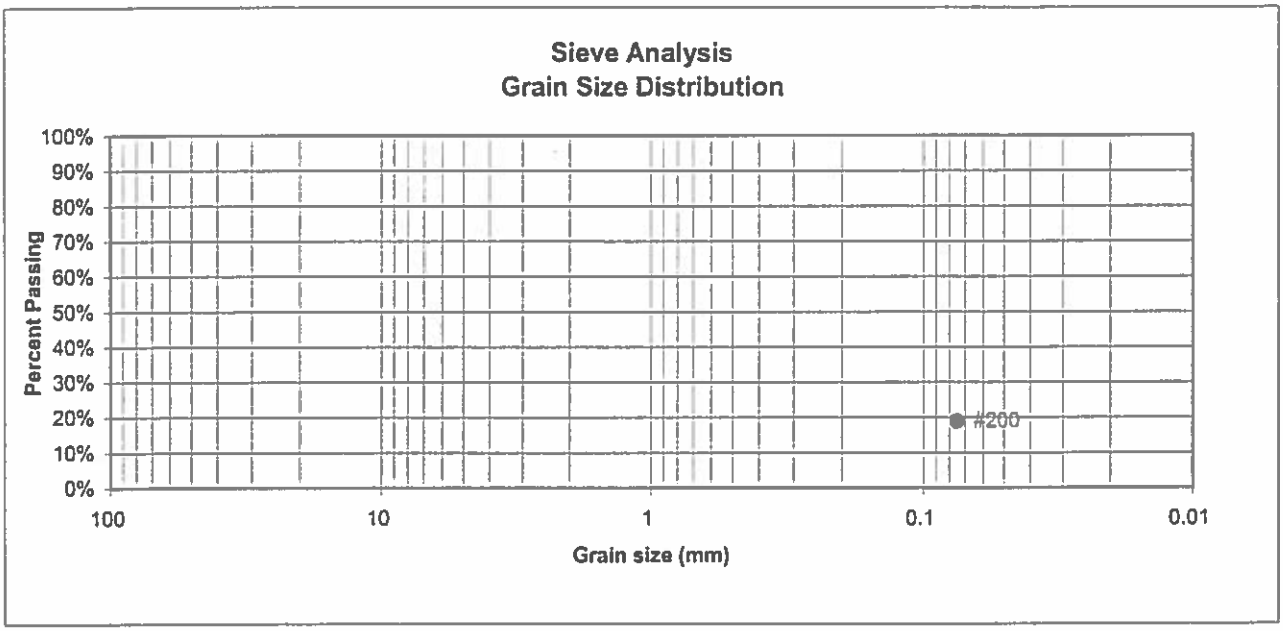
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LE	7/18/12

JOB NO.: 120675
FIG NO.: E-13

UNIFIED CLASSIFICATION	SM	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	1	PROJECT	FOUR WAY RANCH
TEST BORING #	305	JOB NO.	120675
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	
200	18.9%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	11.1%
Moisture at finish	20.8%
Moisture increase	9.7%
Initial dry density (pcf)	102
Swell (psf)	290

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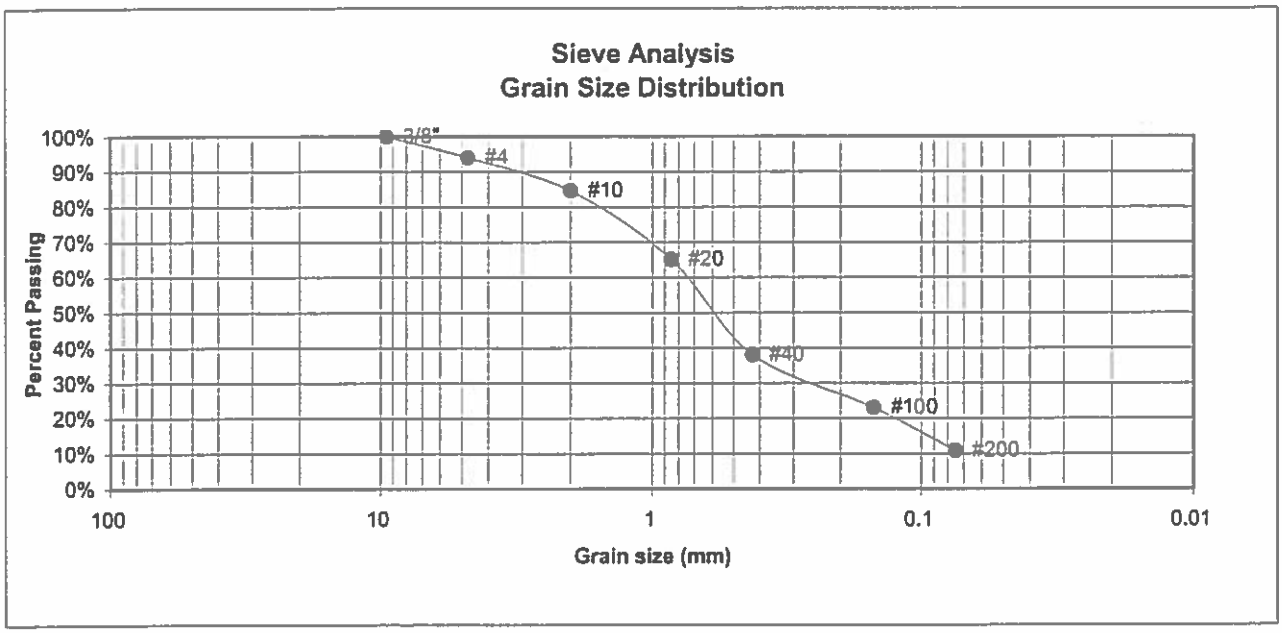
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		DL	7/18/12

JOB NO.: 120675
FIG NO.: E-14

UNIFIED CLASSIFICATION	SM-SW	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	1	PROJECT	FOUR WAY RANCH
TEST BORING #	311	JOB NO.	120675
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.0%
10	84.6%
20	65.1%
40	38.0%
100	23.1%
200	10.9%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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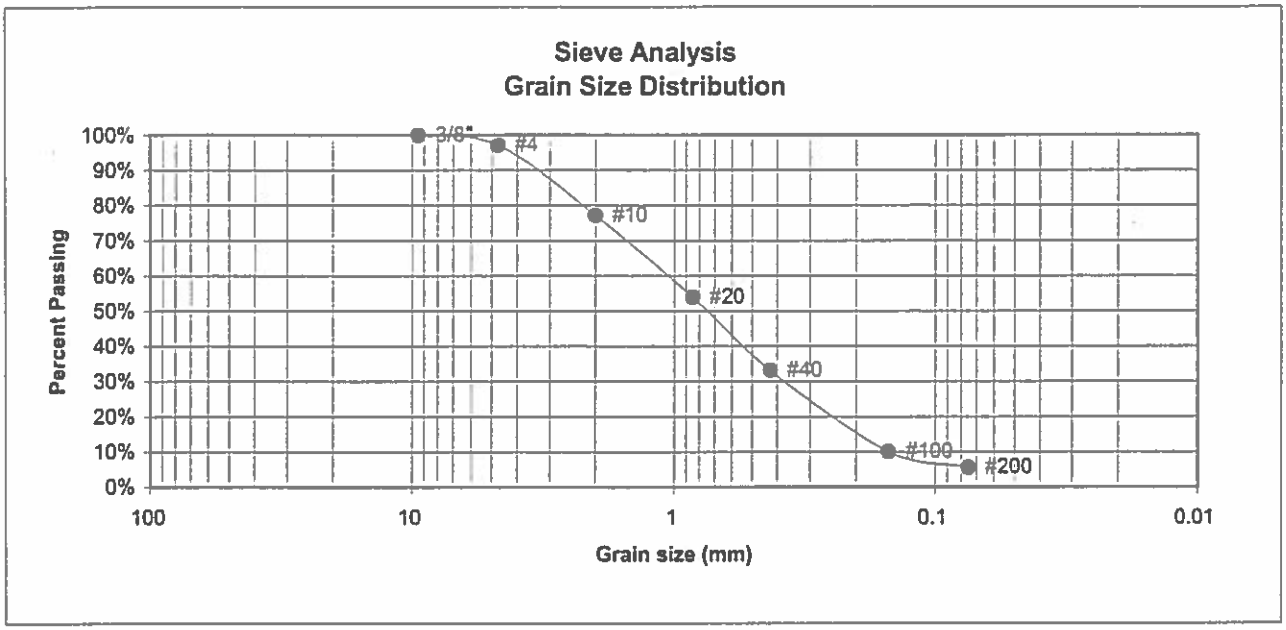
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		h	7/18/12

JOB NO.: 120675
FIG NO.: E-15

UNIFIED CLASSIFICATION	SM-SW	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	1	PROJECT	FOUR WAY RANCH
TEST BORING #	317	JOB NO.	120675
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.2%
10	77.2%
20	53.9%
40	33.1%
100	10.0%
200	5.6%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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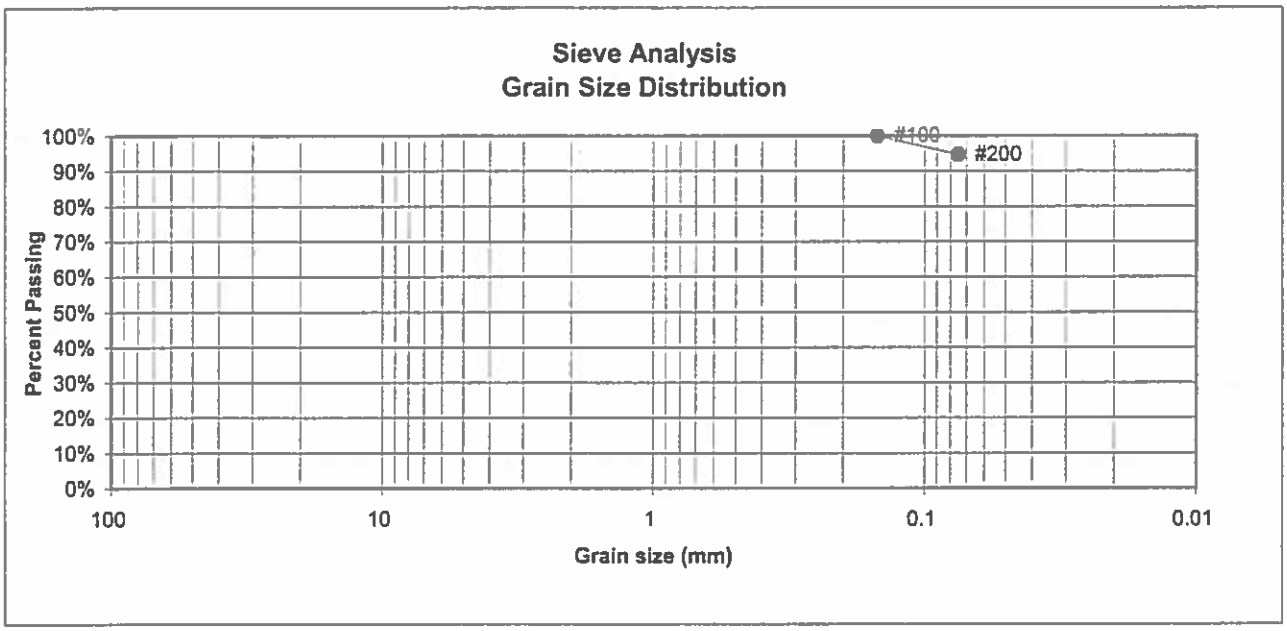
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-16

UNIFIED CLASSIFICATION	CL	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	2	PROJECT	FOUR WAY RANCH
TEST BORING #	312	JOB NO.	120675
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer	Atterberg Limits
3"		Plastic Limit
1 1/2"		Liquid Limit
3/4"		Plastic Index
1/2"		
3/8"		
4		Swell
10		Moisture at start
20		Moisture at finish
40		Moisture increase
100	100.0%	Initial dry density (pcf)
200	94.7%	Swell (psf)

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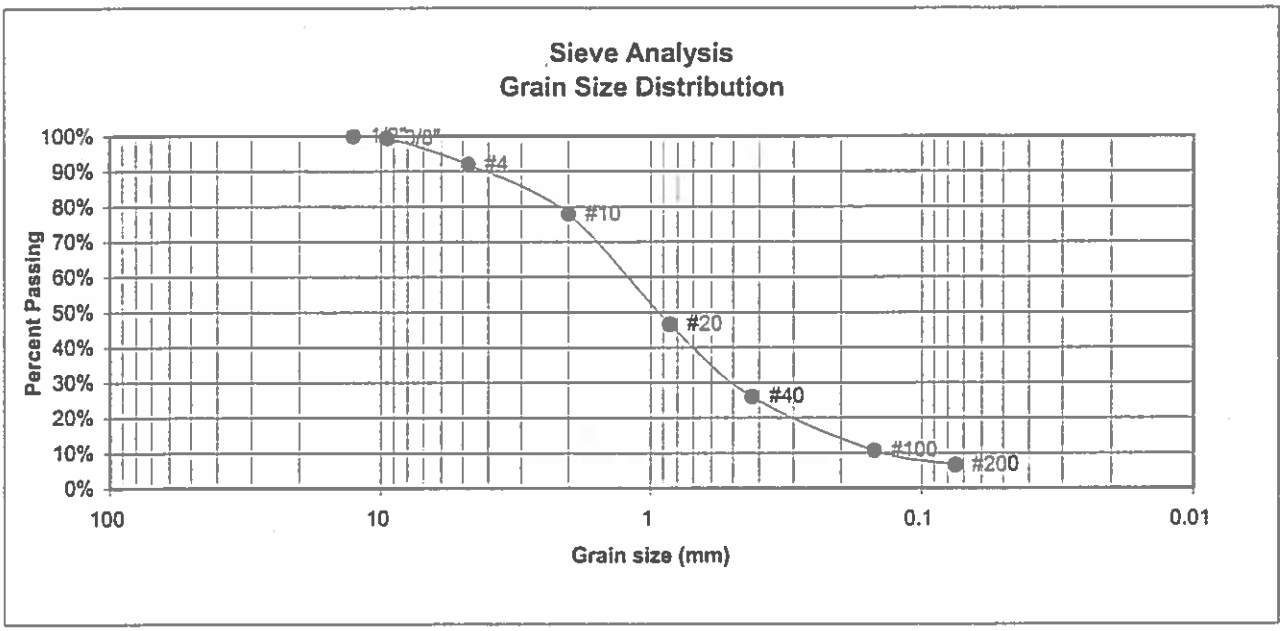
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-17

UNIFIED CLASSIFICATION	SM-SW	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	3	PROJECT	FOUR WAY RANCH
TEST BORING #	303	JOB NO.	120675
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	99.5%
4	92.0%
10	77.9%
20	46.5%
40	26.0%
100	10.7%
200	6.6%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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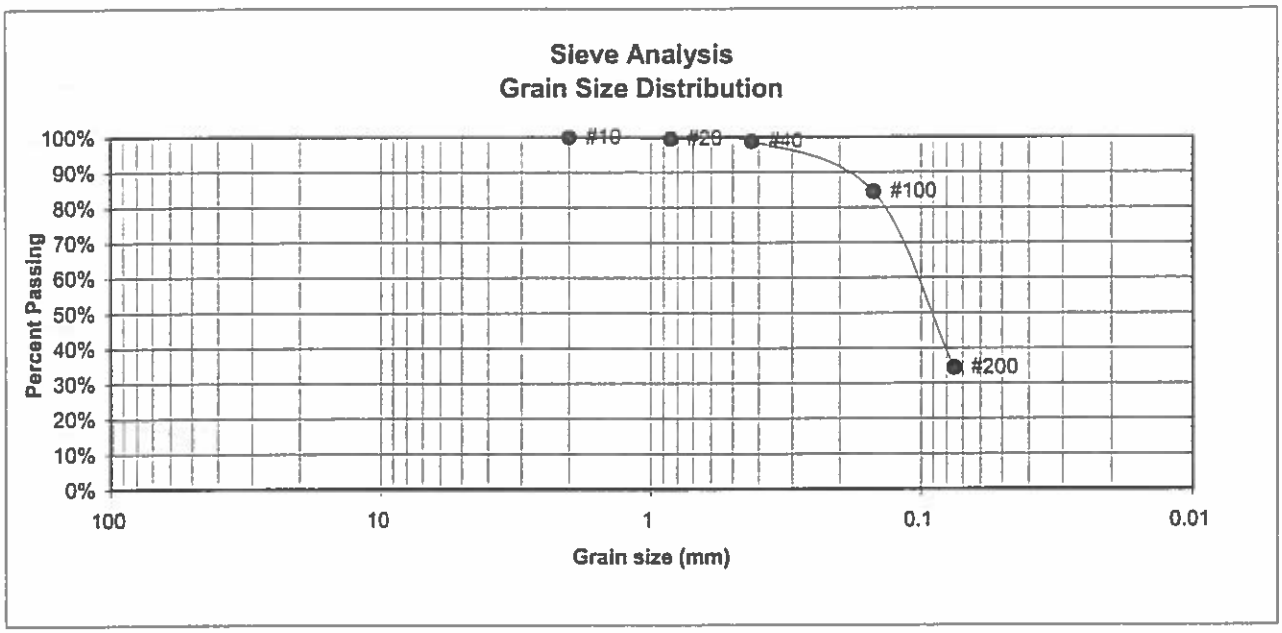
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-18

UNIFIED CLASSIFICATION	SM	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	3	PROJECT	FOUR WAY RANCH
TEST BORING #	307	JOB NO.	120675
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.5%
40	98.8%
100	84.4%
200	34.4%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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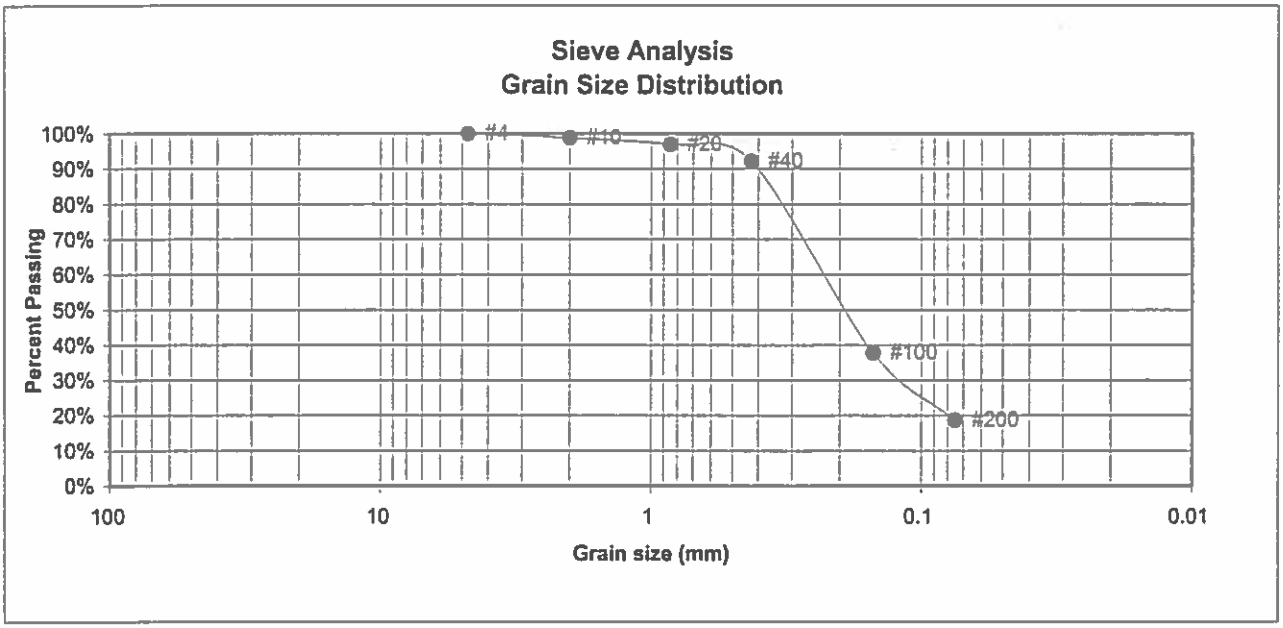
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-19

UNIFIED CLASSIFICATION	SM	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	3	PROJECT	FOUR WAY RANCH
TEST BORING #	308	JOB NO.	120675
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.8%
20	97.0%
40	92.1%
100	37.8%
200	18.7%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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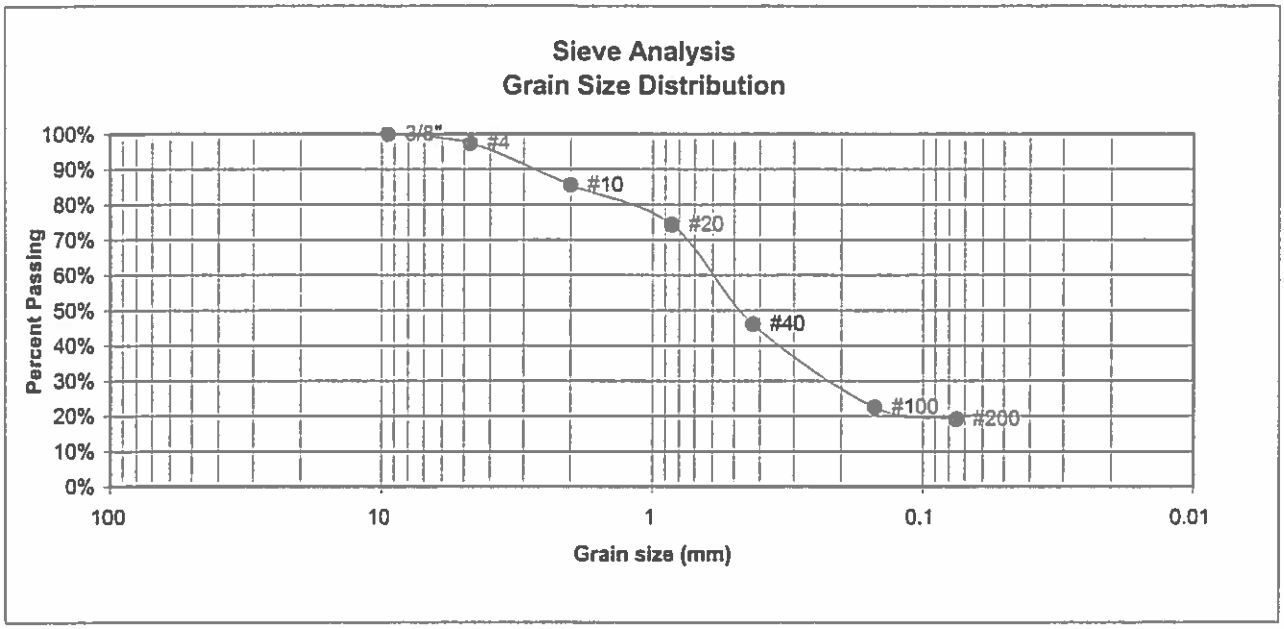
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-20

UNIFIED CLASSIFICATION	SM	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	3	PROJECT	FOUR WAY RANCH
TEST BORING #	312	JOB NO.	120675
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.4%
10	85.6%
20	74.3%
40	46.1%
100	22.5%
200	19.1%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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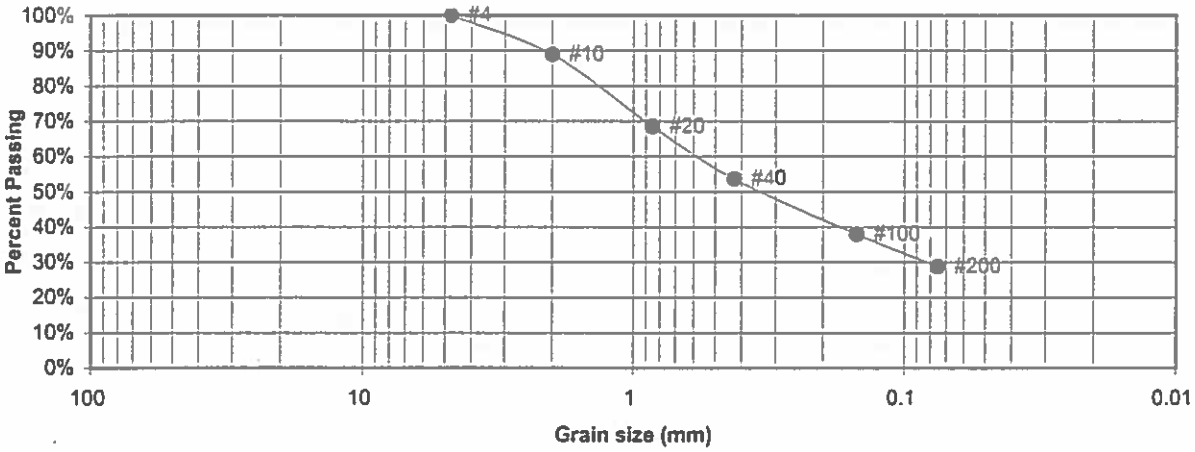
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-21

UNIFIED CLASSIFICATION	SM	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	3	PROJECT	FOUR WAY RANCH
TEST BORING #	318	JOB NO.	120675
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	89.0%
20	68.6%
40	53.6%
100	38.0%
200	28.9%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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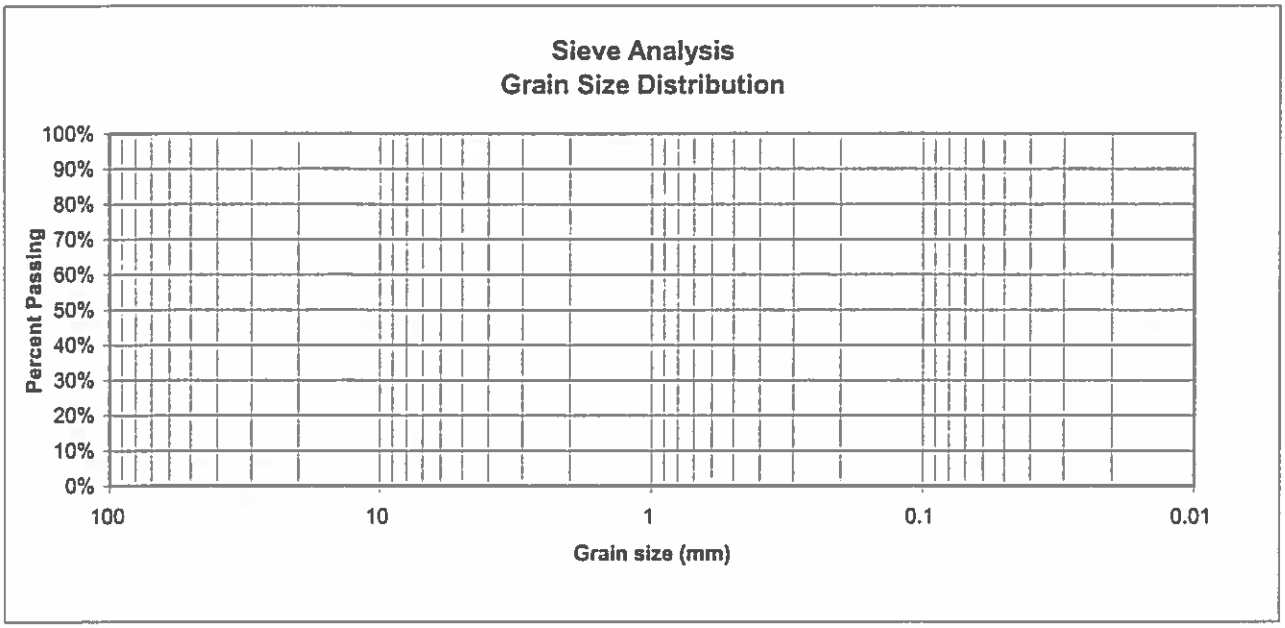
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-22

UNIFIED CLASSIFICATION	CL	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	4	PROJECT	FOUR WAY RANCH
TEST BORING #	302	JOB NO.	120675
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	
200	

Atterberg Limits	
Plastic Limit	25
Liquid Limit	40
Plastic Index	15

Swell	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	

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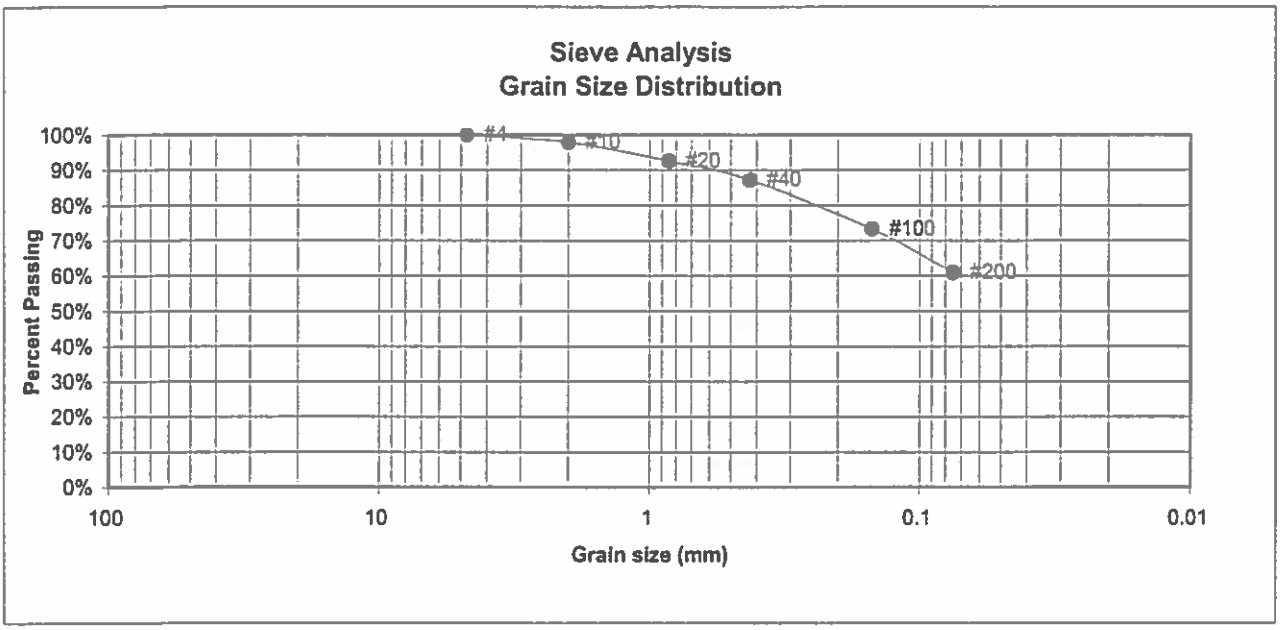
LABORATORY TEST RESULTS

DRAWN:	DATE.	CHECKED:	DATE.
			7/18/12

JOB NO.: 120675
FIG NO.: E-23

UNIFIED CLASSIFICATION	CL	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	4	PROJECT	FOUR WAY RANCH
TEST BORING #	308	JOB NO.	120675
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.0%
20	92.6%
40	87.3%
100	73.3%
200	61.0%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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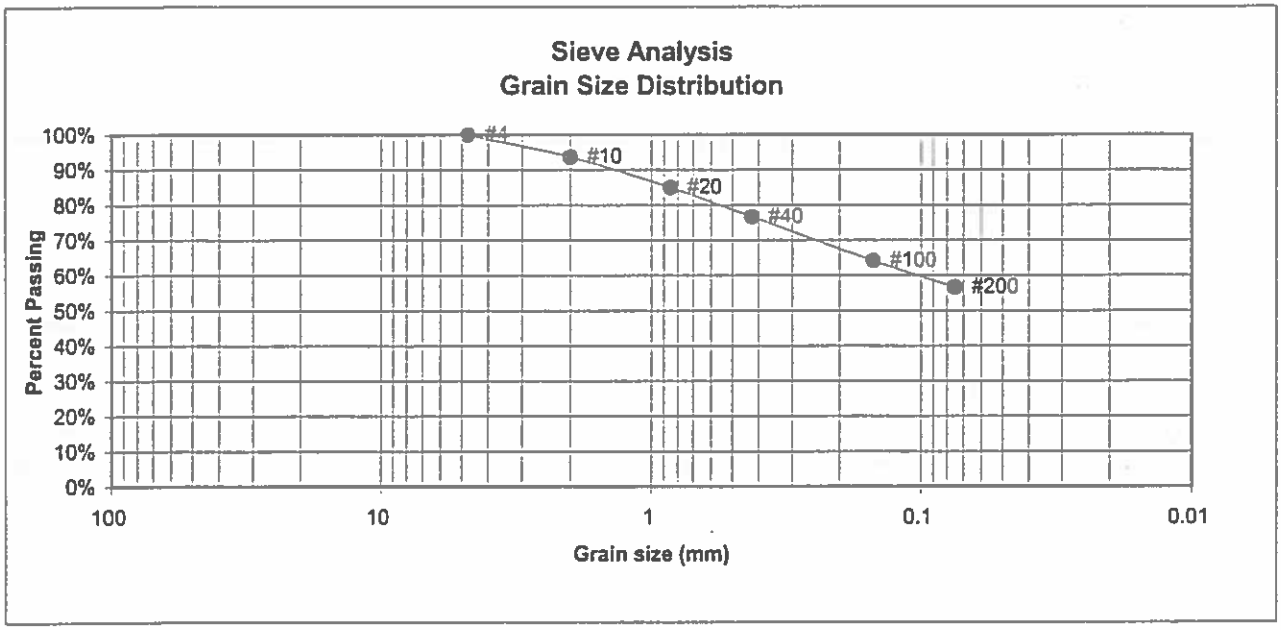
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN.	DATE.	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-24

UNIFIED CLASSIFICATION	CL	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	4	PROJECT	FOUR WAY RANCH
TEST BORING #	314	JOB NO.	120675
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	93.6%
20	85.0%
40	76.6%
100	64.2%
200	56.6%

Atterberg Limits	
Plastic Limit	18
Liquid Limit	35
Plastic Index	17

Swell	
Moisture at start	12.5%
Moisture at finish	20.1%
Moisture increase	7.6%
Initial dry density (pcf)	105
Swell (psf)	1360

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LABORATORY TEST RESULTS

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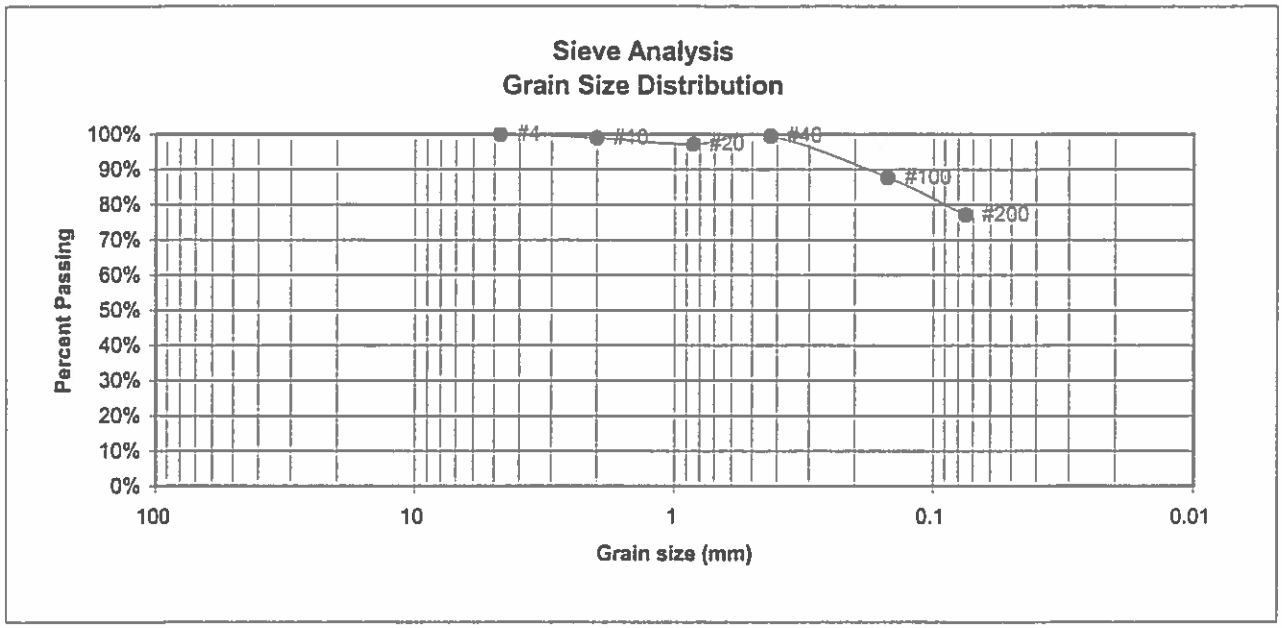
JOB NO.: 120675
FIG NO.: G-25

UNIFIED CLASSIFICATION	CL	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	4	PROJECT	FOUR WAY RANCH
TEST BORING #	315	JOB NO.	120675
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.0%
20	97.3%
40	99.5%
100	87.7%
200	77.1%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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LABORATORY TEST RESULTS

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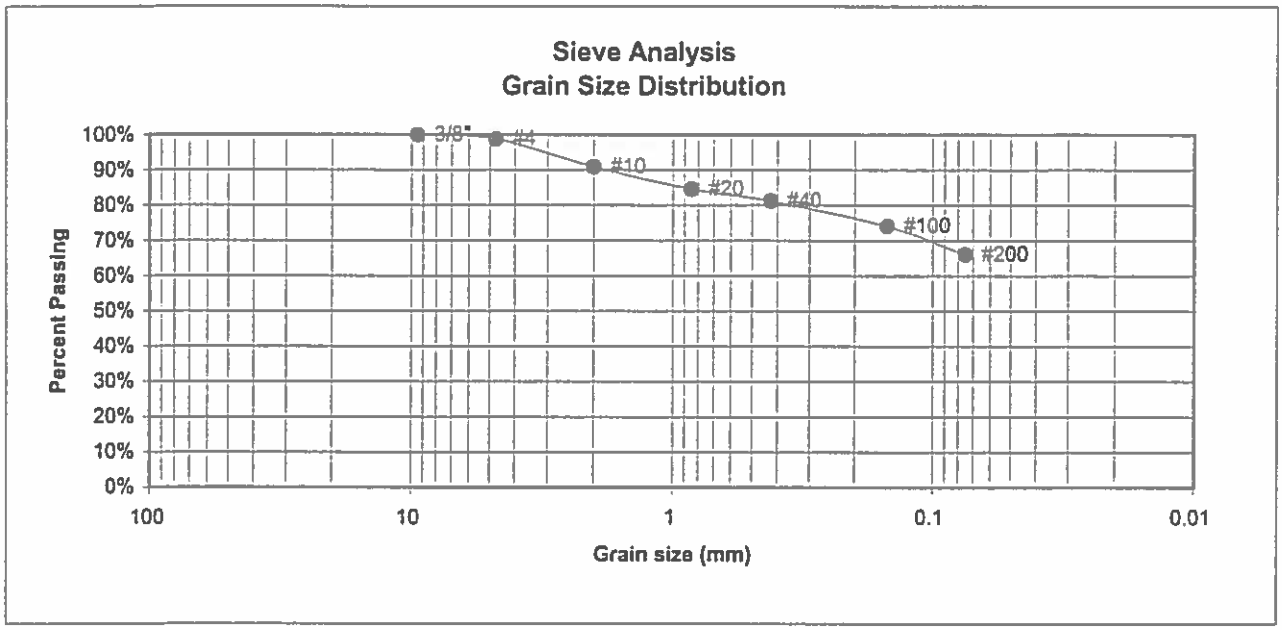
JOB NO.: 120675
FIG NO.: E-26

UNIFIED CLASSIFICATION	CL	CLIENT	4 WAY JOINT VENTURE
SOIL TYPE #	4	PROJECT	FOUR WAY RANCH
TEST BORING #	316	JOB NO.	120675
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.8%
10	90.9%
20	84.6%
40	81.2%
100	74.1%
200	66.0%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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LABORATORY TEST RESULTS

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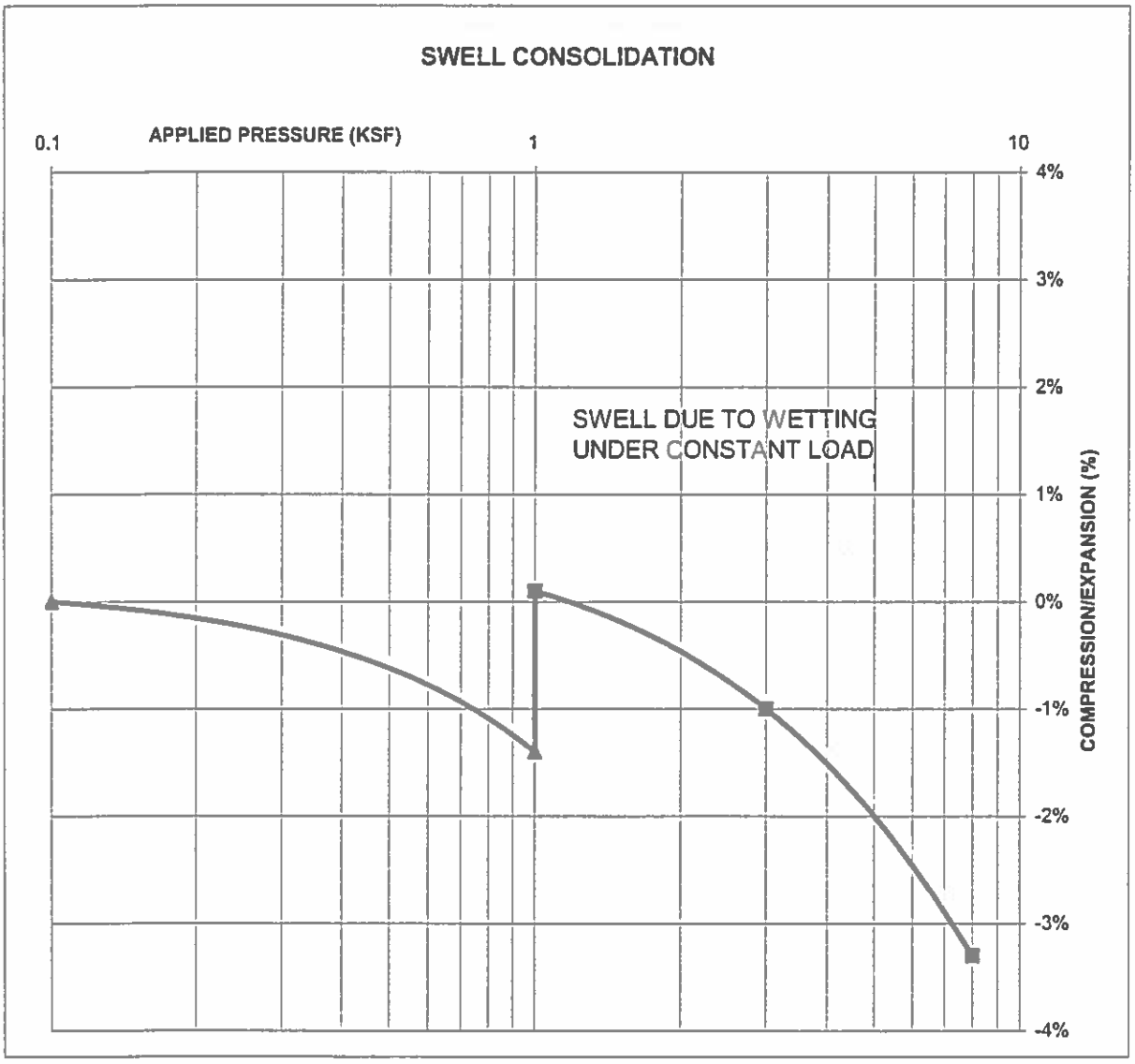
JOB NO.: 120675
FIG NO.: E-27

CONSOLIDATION TEST RESULTS

TEST BORING #	312	DEPTH(ft)	5
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			108
NATURAL MOISTURE CONTENT			16.4%
SWELL/CONSOLIDATION (%)			1.5%

JOB NO. 120675
CLIENT 4 WAY JOINT VENTURE
PROJECT FOUR WAY RANCH



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SWELL CONSOLIDATION
TEST RESULTS

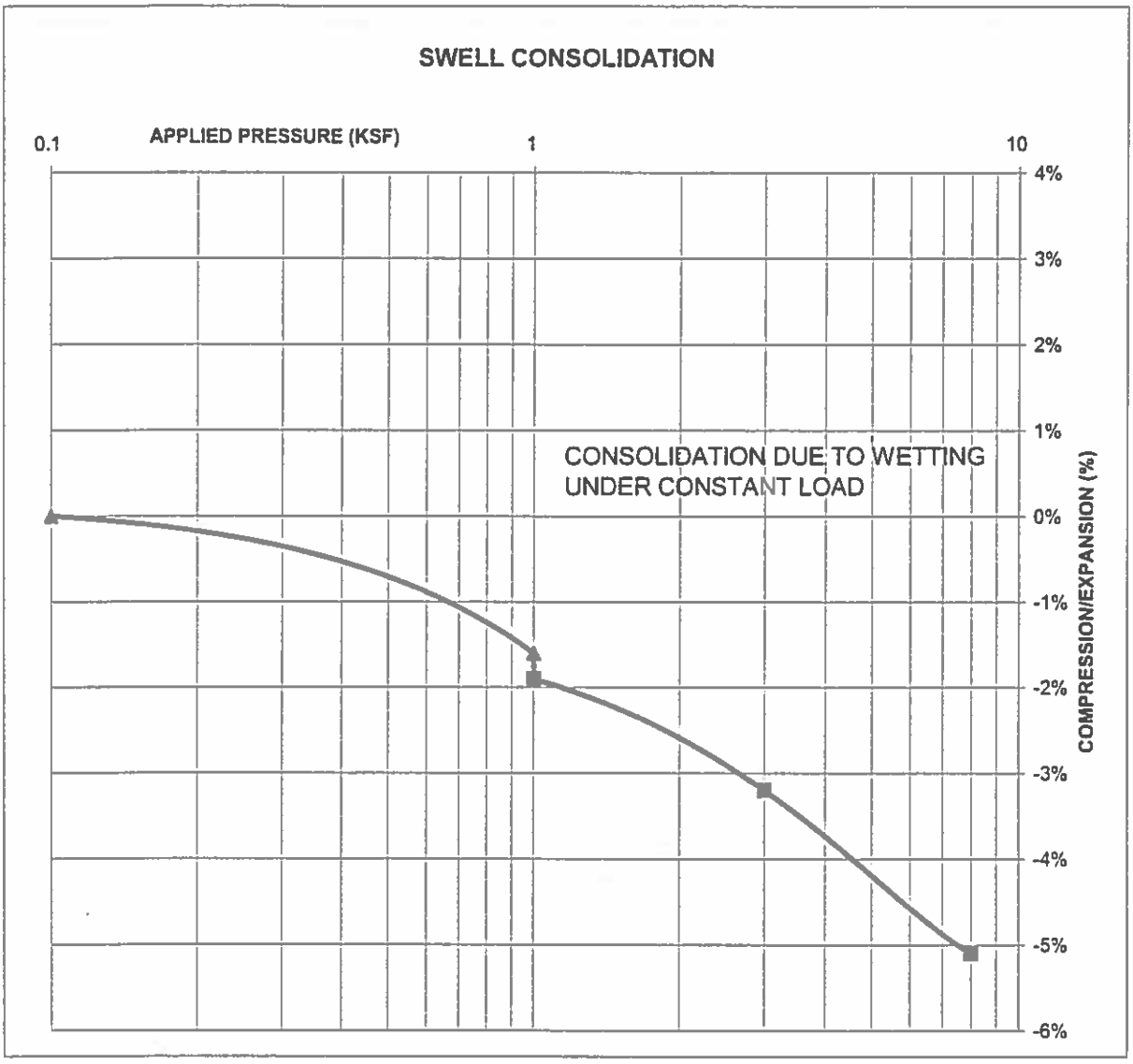
DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-28

CONSOLIDATION TEST RESULTS

TEST BORING #	318	DEPTH(ft)	10
DESCRIPTION	SM	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			119
NATURAL MOISTURE CONTENT			12.8%
SWELL/CONSOLIDATION (%)			-0.3%

JOB NO. 120675
CLIENT 4 WAY JOINT VENTURE
PROJECT FOUR WAY RANCH



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SWELL CONSOLIDATION
TEST RESULTS

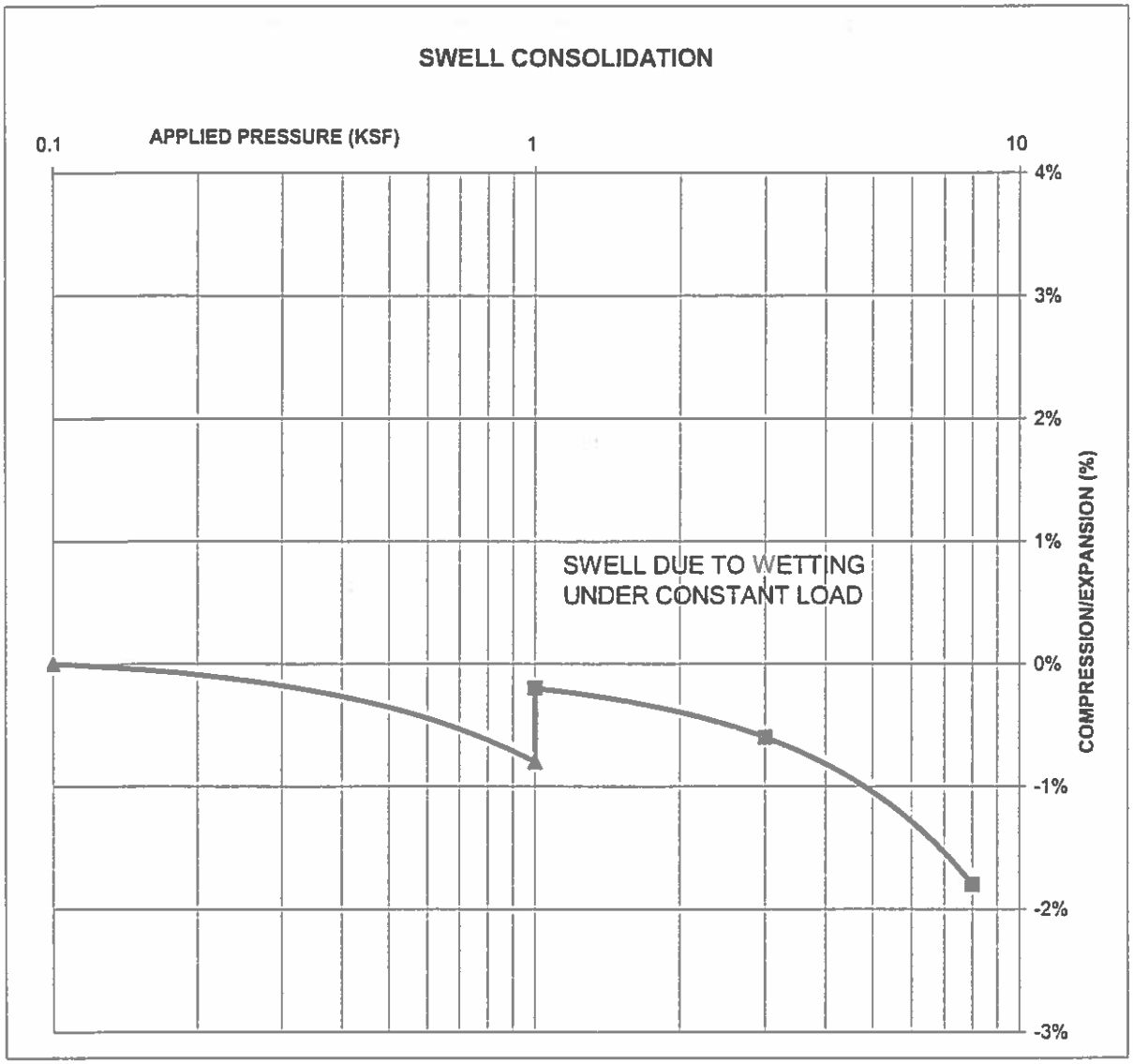
DRAWN:	DATE:	CHECKED:	DATE:
			2/18/12

JOB NO: 120675
FIG NO: E-29

CONSOLIDATION TEST RESULTS

TEST BORING #	308	DEPTH(ft)	10
DESCRIPTION	CL	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			116
NATURAL MOISTURE CONTENT			16.4%
SWELL/CONSOLIDATION (%)			0.6%

JOB NO. 120675
CLIENT 4 WAY JOINT VENTURE
PROJECT FOUR WAY RANCH



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SWELL CONSOLIDATION
TEST RESULTS

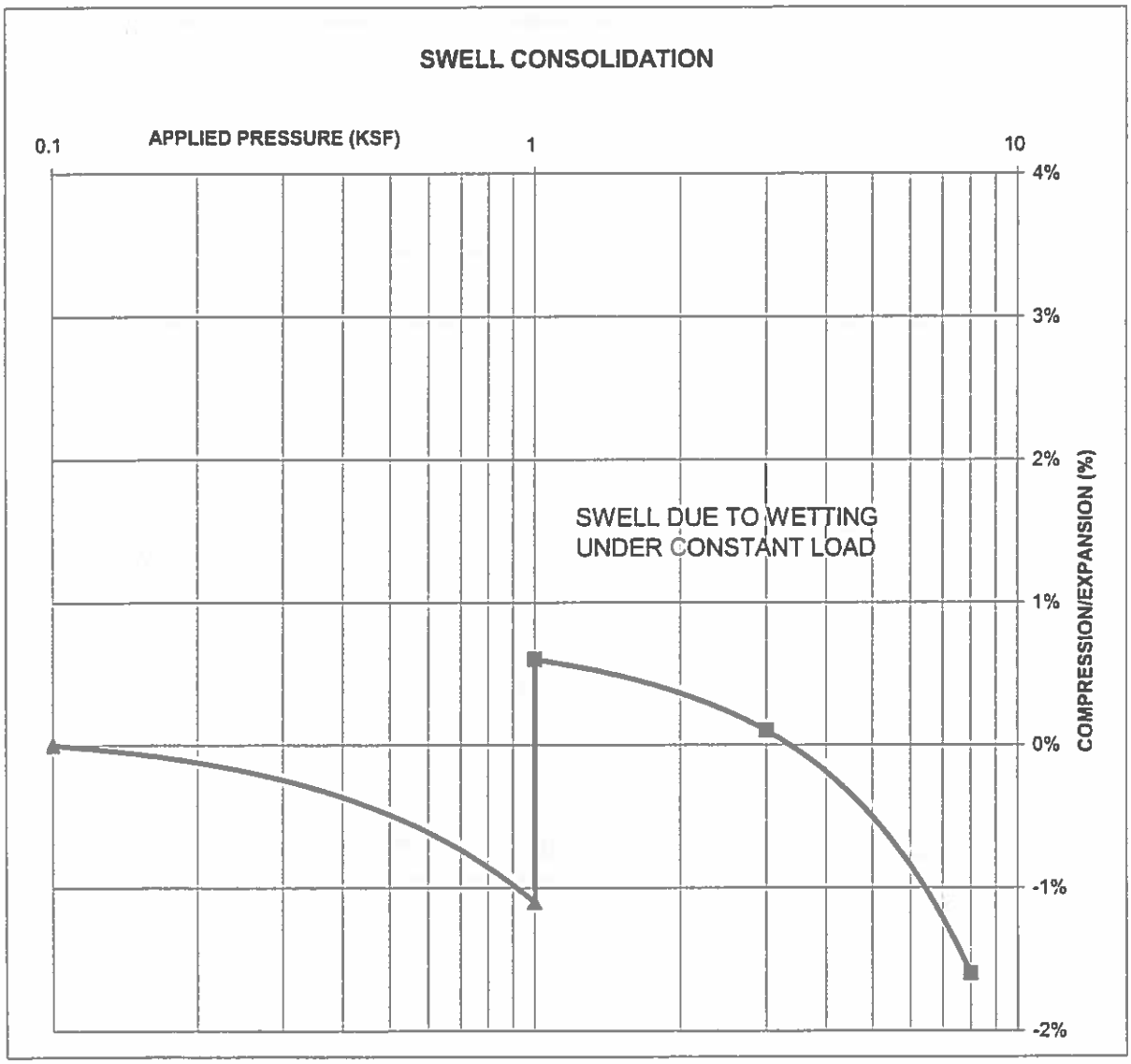
DRAWN:	DATE:	CHECKED:	DATE:
			7/16/12

JOB NO: 120675
FIG NO: G-30

CONSOLIDATION TEST RESULTS

TEST BORING #	315	DEPTH(ft)	10
DESCRIPTION	CL	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			117
NATURAL MOISTURE CONTENT			15.8%
SWELL/CONSOLIDATION (%)			1.7%

JOB NO. 120675
CLIENT 4 WAY JOINT VENTURE
PROJECT FOUR WAY RANCH



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SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		m	7/19/12

JOB NO.: 120675
FIG NO.: E-31

CLIENT	4 WAY JOINT VENTURE	JOB NO.	120675
PROJECT	FOUR WAY RANCH	DATE	7/10/2012
LOCATION	FOUR WAY RANCH	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-301	2-3	1	SM-SW	0.01
TB-302	15	4	CL	0.02
TB-307	5	2	CL	0.00
TB-318	10	3	SM	0.00

QC BLANK PASS

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LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			7/18/12

JOB NO.: 120675
FIG NO.: E-32