July 25, 2019
Revised December 15, 2019

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

Jim Martens
8190 Poco Road
Colorado Springs, CO 80908

Re: Soil, Geology, Geologic Hazard and Wastewater Study
8190 Poco Road
Parcel No. 52280-00-001
Colorado Springs, Colorado

Previous comment not addressed: See comments on OWTS report. This report may need to be revised accordingly to reflect any changes made to that report to meet revised Code.

Dear Mr. Martens:

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the NW¼ of Section 28, Township 12 South, Range 66 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 1½ miles northeast of Colorado Springs city limits, northwest of Poco Road and Vollmer Road in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gradually sloping generally to the south. A minor drainage is located in the western portion of the property. Water was not observed in the drainage at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included grazing and pasture land and a rural residential development. The site contains primarily field grasses and weeds with scattered areas of ponderosa pines. A house is located in the northeastern portion of the site with an existing septic system and water well. Site photographs, taken April 23, 2019, are included in Appendix A.

Total acreage involved in the proposed minor subdivision is 12 acres. Two single-family rural residential lots are proposed as part of the replat. The proposed lot sizes are 5-acres for the western lot and 7-acres for the eastern lot. The new lot will be serviced by an individual well and on-site wastewater treatment system. The existing house is located on the eastern 7-acre lot and will remain. The Site Plan with the proposed replat is presented in Figure 3.

LAND USE AND ENGINEERING GEOLOGY

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of potentially seasonal shallow groundwater. Based on the proposed development plan, it appears that these areas will have some minor impacts on the development. These conditions will be discussed in greater detail in the 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.

SCOPE OF THE REPORT

The scope of the report will include the following:

- A general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions and their effects on the development of the property.

FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements and air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on April 23, 2019.

One (1) test pit was excavated on the site to determine general suitability for the use of on-site wastewater treatment systems and general soil characteristics. The location of the test pit is indicated on the Site Plan/Test Pit Location Map, Figure 3. The Test Pit Log is presented in Appendix B. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Results of the laboratory testing are included in Appendix C. A Summary of Laboratory Test Results is presented in Table 1.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 1, Figure 4), previously the Soil Conservation Service (Reference 2) has mapped one soil type on the site. Complete descriptions of the soil type is presented in Appendix D. In general, the soils consist of sandy loam. The soils are described as follows:

Type	Description
71	Pring Coarse Sandy Loam, 3 – 8% Slopes

The soils have been described to have rapid permeabilities. The soils are described as well suited for use as homesites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 2).

Soils

The soils encountered in the test pit consisted of gravelly sandy loam (silty sand) overlying weathered to formational silty sandstone. Weathered bedrock was encountered at 3 feet in the test pit. The sample of sand tested had approximately 25 percent of the soil size particles passing the No. 200 sieve. The sample of sandstone tested had 29 percent of the soil size particles passing the No. 200 sieve. The upper sand soils are considered to have low expansion potential. An FHA Swell pressure of 280 psf was measured on the silty sandstone, indicating low expansion potential. Atterberg Limits Testing on the sandstone resulted in the sandstone being non-plastic.

Groundwater

Groundwater or signs of seasonally occurring water were not encountered in the test pit, which was excavated to 6 feet. It is anticipated groundwater will not affect shallow foundations on the majority of the site. An area of potentially seasonal shallow groundwater has been mapped in a drainage on the site that is discussed in the following sections. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

Geology

Approximately 12 miles west of the site 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 a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (Reference 3). The bedrock underlying the site consists of the Dawson Formation of Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers siltstone or claystone.

The geology of the site was evaluated using the *Geologic Map of the Falcon NW Quadrangle,* by Madole in 2003, (Reference 4, Figure 5). The Geology for the site is presented in Figure 6. One mappable unit was identified on this site which is described as follows:

Qc/Tkd **Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The materials consist of colluvial or residual soils overlying the bedrock materials on-site. The colluvial soils were deposited by the action of sheetwash and gravity. The residual soils were derived from the in-situ weathering of the bedrock on site. These materials typically consist of silty to

clayey sand with potential areas of sandy clays. The bedrock consists of the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon NW Quadrangle* distributed by the Colorado Geologic Survey in 2003 (Reference 4, Figure 5), The *Geologic Map of the Colorado Springs-Castle Rock Area,* distributed by the US Geological Survey in 1979 (Reference 5), and the *Geologic Map of the Pueblo 1° x 2° Quadrangle,* distributed by the US Geological Survey in 1978 (Reference 6). The Test Pit was also used in evaluating the site and is included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

ENGINEERING GEOLOGIC HAZARDS

Mapping has been performed on this site to identify areas where various geologic conditions exist of which developers should be cognizant during the planning, design and construction stages where new construction is proposed. The engineering geologic hazards identified on this site include potentially seasonal shallow groundwater areas. These hazards and recommended mitigation techniques are discussed as follows:

Expansive Soils

Soils encountered in the test pit exhibited low expansion potential. However, highly expansive claystone and siltstone are commonly interbedded in the sandstone of the Dawson Formation. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These clays, if encountered beneath foundations, can cause differential movement in the structure foundation.

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 a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements.

Potentially Seasonal Shallow Groundwater Area

The site is not mapped within any floodplains according to the FEMA Map No. 08041CO535G, dated December 7, 2018 (Figure 7, Reference 7). Areas of potentially seasonal shallow groundwater were observed on the site (Figure 6). In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These areas lie within low-lying areas and along the minor drainage in the western portion of the site. Water was not observed in any of the drainages at the time of our site investigation. These areas can likely be avoided or properly mitigated by development. The potential exists for high

groundwater levels during high moisture periods and should structures encroach on these areas the following precautions should be followed.

Mitigation: Foundations must have a minimum 30-inch depth for frost protection. In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains are recommended to help prevent the intrusion of water into areas below grade. Typical drain details are presented in Figure 8. Any grading in these areas should be done to direct surface flow around construction to avoid areas of ponded water. All organic material would be completely removed prior to any fill placement. Specific drainage studies are beyond the scope of this report.

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

As mentioned, the proposed development will be single-family residential. The existing geologic and engineering geologic conditions will impose minor constraints on development and construction. The geologic conditions on the site include potentially seasonal shallow groundwater areas, which can be satisfactorily mitigated through avoidance or proper engineering design and construction practices.

The site consists of a 12-acre rural-residential lot. The proposed development consists of replatting the site into two single-family residential lots. A single-family residence currently exists on the eastern lot which will remain. A single-family residence is proposed for the western lot. The exact location of the proposed residence was not available at the time of this investigation.

The upper granular soils encountered in the test pit on the site were encountered at medium dense states to dense. Expansive layers may also be encountered in the soil on this site. Expansive soils, if encountered, will require special foundation design. These soils will not prohibit development.

Areas of potentially shallow groundwater were observed on the site (Figure 6). In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These areas lie within low-lying areas and along the minor drainage in the western portion of the site. These areas can likely be avoided or properly mitigated by development. The potential exists for high groundwater levels during high moisture periods and should structures encroach on these areas. A subsurface perimeter drain is recommended should structures encroach on this area. Typical drain details are presented in Figure 8. Septic systems are not recommended in in these areas due to the potential for shallow groundwater. Any grading in theses areas should be done to direct surface flow around construction to avoid areas of ponded water. All organic material should be completely removed prior to any fill placement. Specific drainage studies are beyond the scope of this report. The site is not mapped within any floodplains according to the FEMA Map No. 80841C0535G (Figure 7, Reference 7).

In summary, the granular soils will likely provide suitable support for shallow foundations. The geologic conditions encountered on site can be mitigated with avoidance or proper engineering and construction practices.

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 8), of the area of the site 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 9), areas of the site are not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 10), the area of the site has been mapped as "Fair" for industrial minerals. However, considering the silty to clayey nature of much of these materials and abundance of similar materials through the region and the close proximity to developed land, 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 10), 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. No metallic mineral resources have been mapped on the site (Reference 10).

The site has been mapped as "Fair" for oil and gas resources (Reference 10). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

EROSION CONTROL

The soil types observed on the site are mildly to highly 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 re-established, 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 revegetate successfully. Therefore, recommendations pertaining to the vegetation of the cut and fill slopes may require input from a qualified landscape architect and/or the Soil Conservation Service.

CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some minor constraints on development and construction of the site. The majority of these conditions can be avoided by construction. Others can be mitigated through proper engineering design and construction practices. The proposed development and use are consistent with anticipated geologic and engineering geologic conditions.

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. Individual investigations for new building sites and septic systems will be required prior to construction. Construction and design personnel should be made familiar with the contents 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.

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

Jim Martens
Soils, Geology, Geologic Hazard and Wastewater Study
8190 Poco Road
Parcel No. 52280-00-001
Colorado Springs, Colorado

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

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist

Kristen A. Andrew-Hoeser, P.G.
Senior Geologist

LLL/lll

Encl.

Entech Job No. 190411
AAprojects/2019/190411 sg&ghs

Reviewed by:

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

BIBLIOGRAPHY

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TABLES

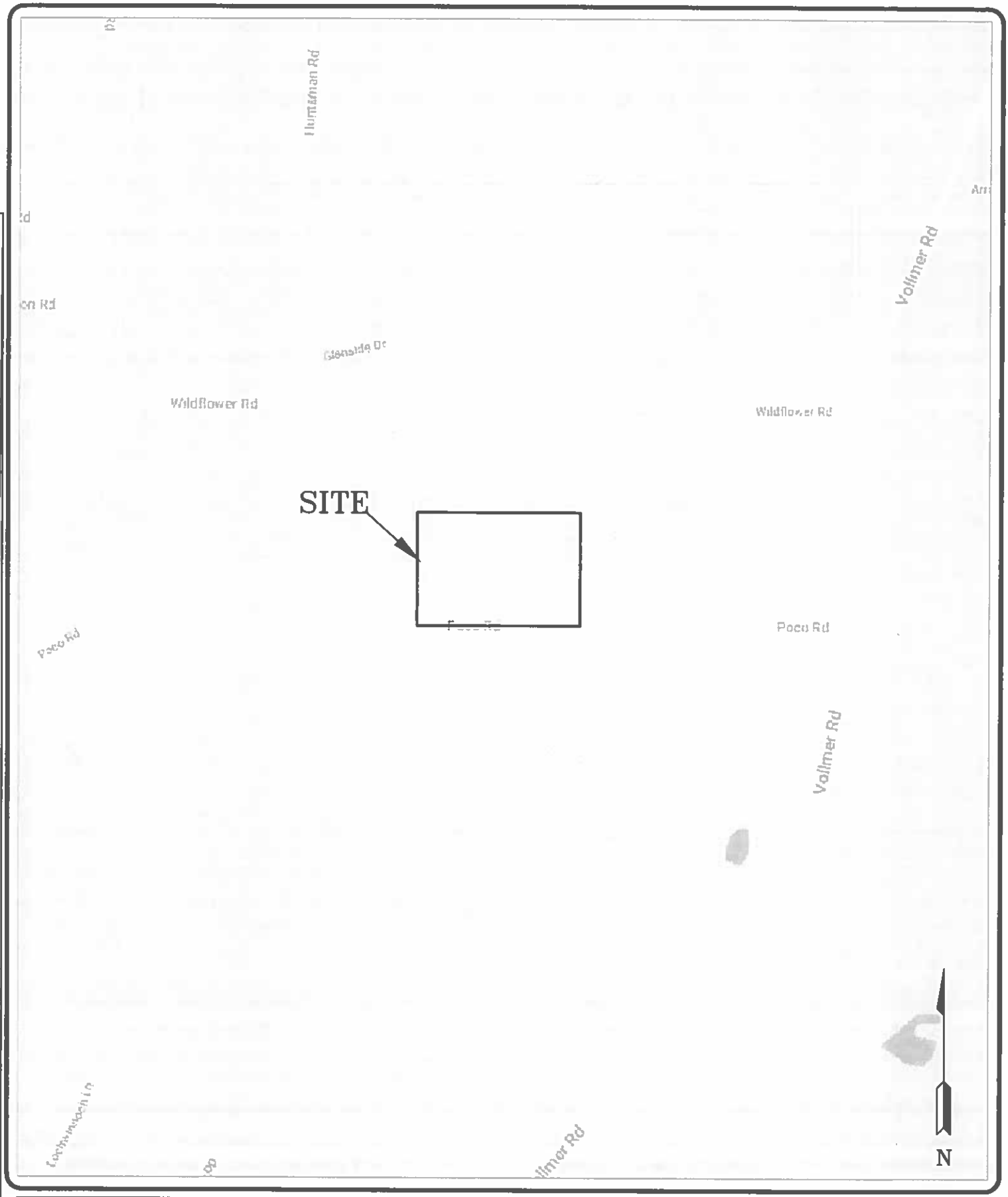
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT JIM MARTENS
PROJECT 8190 POCO ROAD
JOB NO. 190411

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	TP-1	0-2			25.4						SM	SAND, SILTY
2	TP-1	5-6			29.3	NV	NP		280		SM	WX SANDSTONE, SILTY

FIGURES



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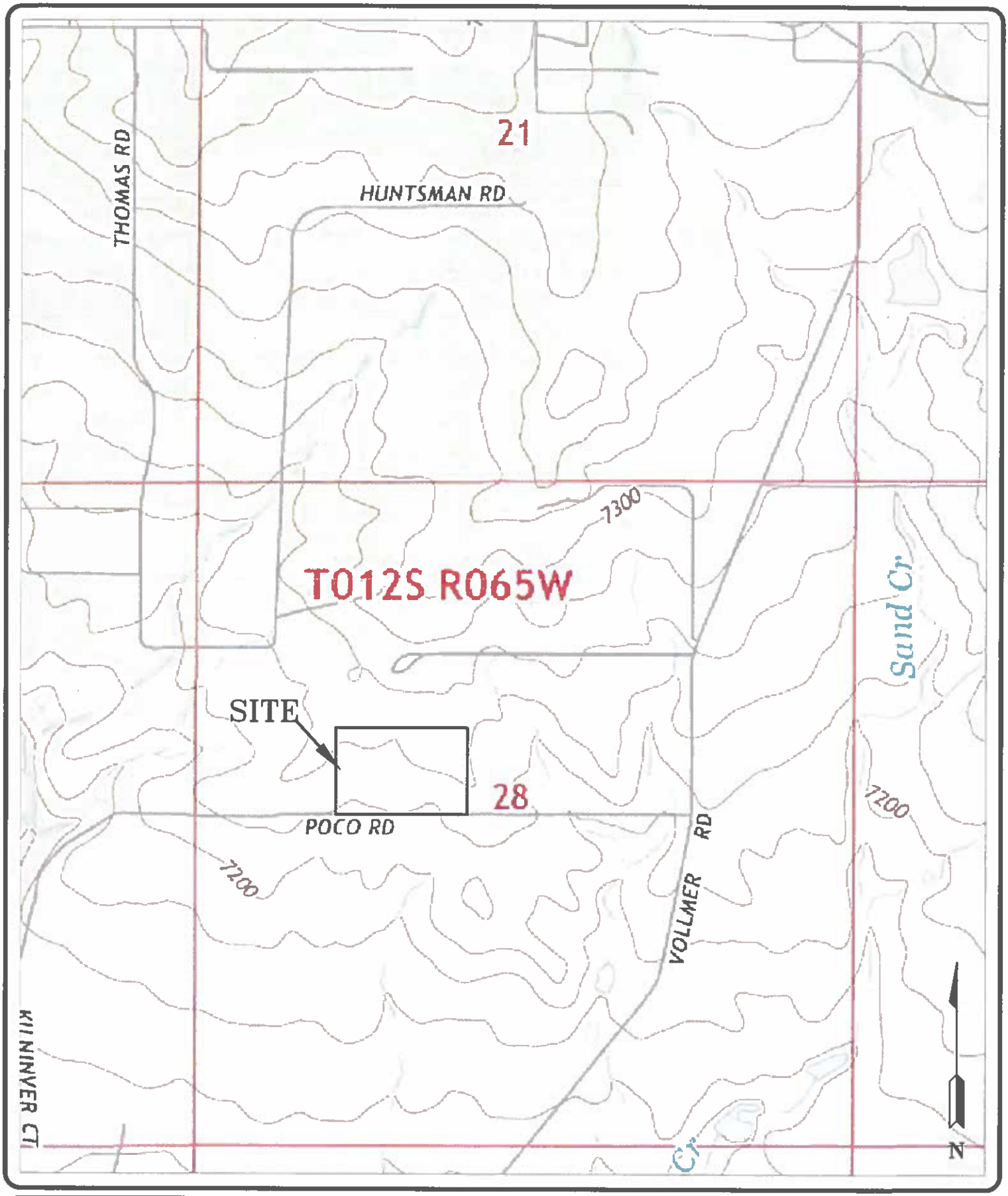
565 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
8190 POCO ROAD
COLORADO SPRINGS, CO.
FOR: JIM MARTENS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/24/19		

JOB NO.: 190411

FIG NO.: 1



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USGS MAP
8190 POCO ROAD
COLORADO SPRINGS, CO.
FOR: JIM MARTENS

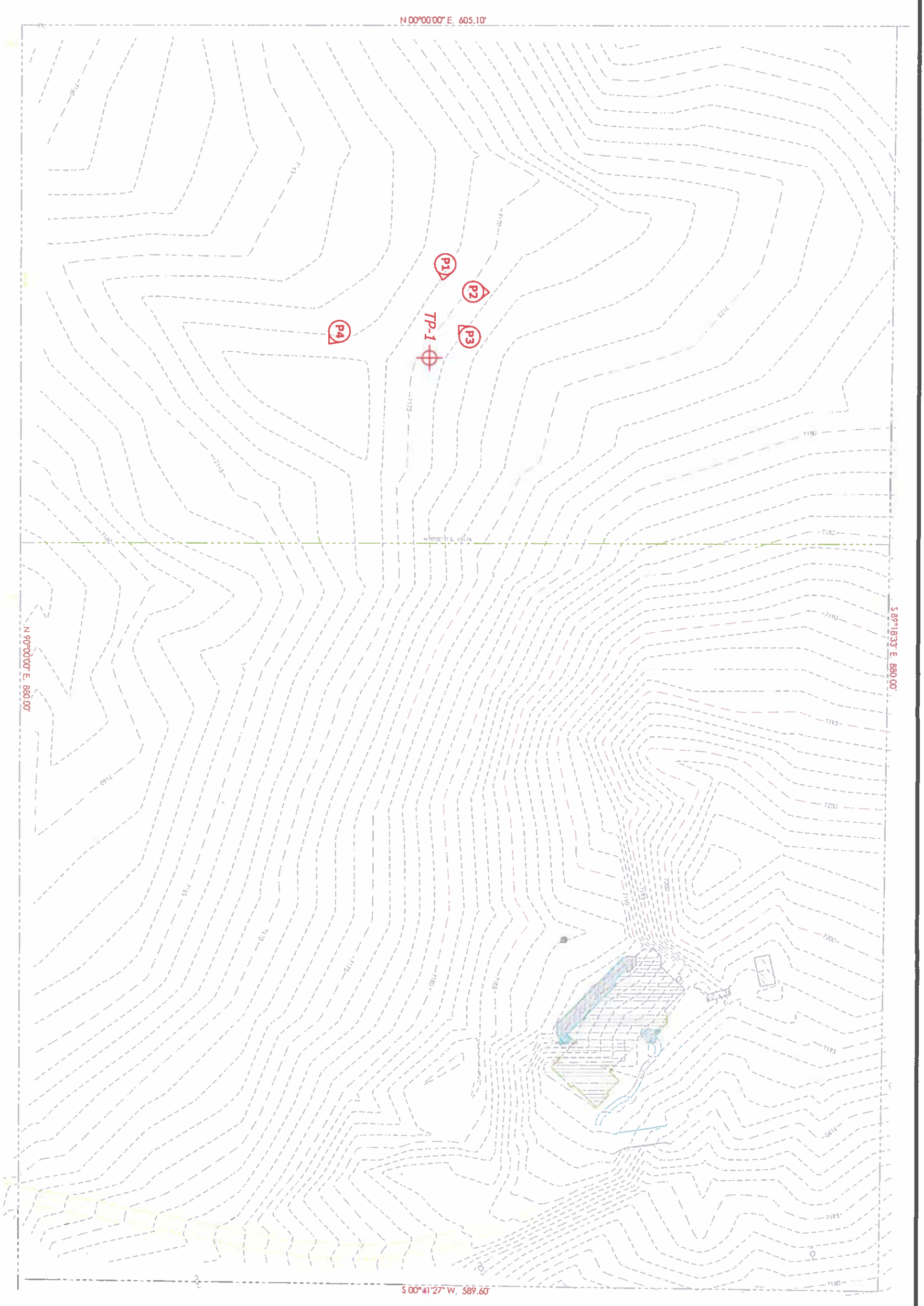
DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/24/19		

JOB NO.: 190411

FIG NO.: 2

P1 approximate test pit location and number

P1 approximate photograph location and number



SITE PLAN/TEST PIT LOCATION MAP
8190 POCO ROAD
COLORADO SPRINGS, CO.
FOR: JIM MARTENS

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

REVISION	BY

DRAWN TLT
CHECKED
DATE 5/24/19
SCALE AS SHOWN
JOB NO. 190411
SHEET NO. 3

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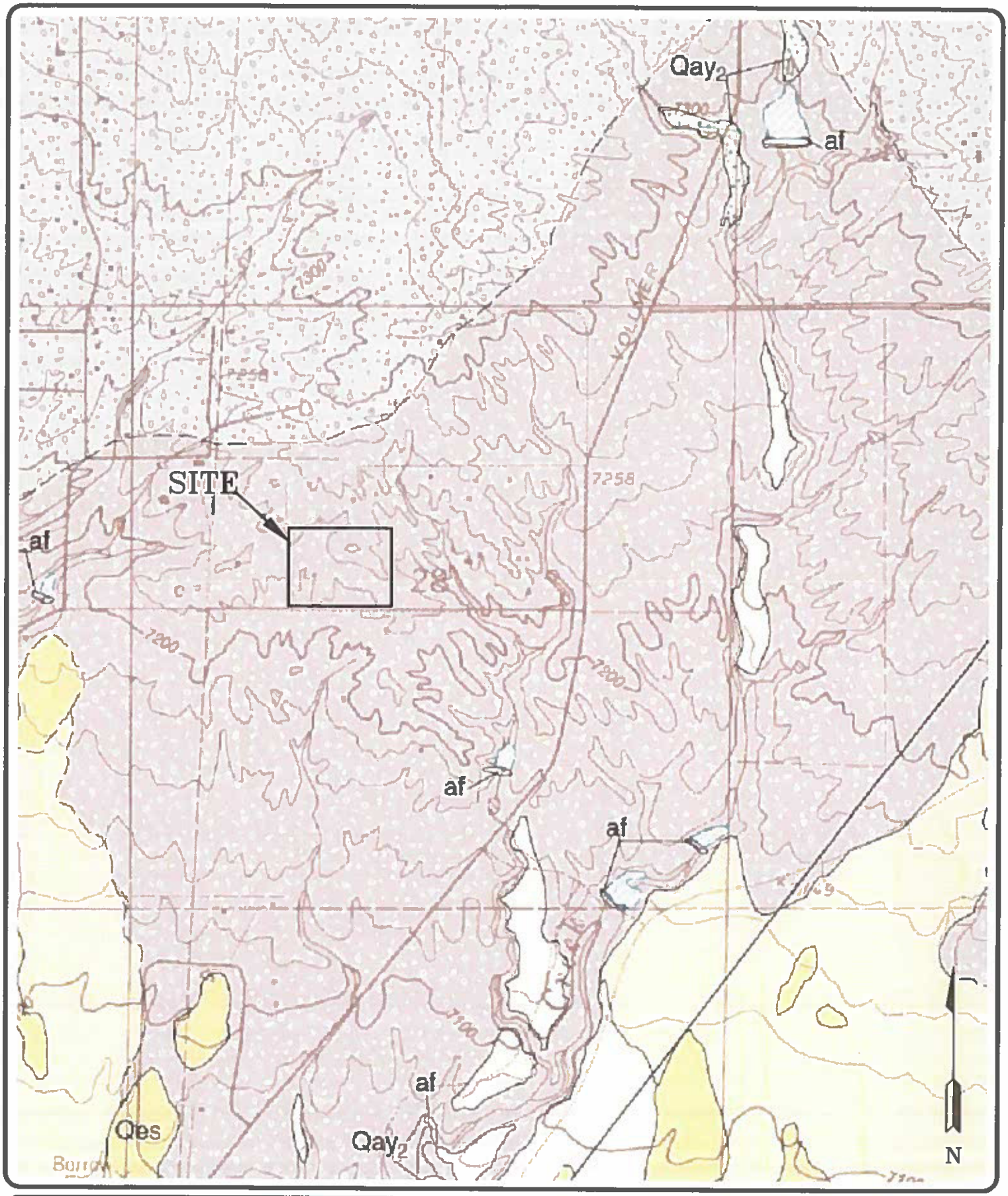
SOIL SURVEY MAP
8190 POCO ROAD
COLORADO SPRINGS, CO.
FOR: JIM MARTENS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/24/19		

JOB NO.: 190411

FIG NO.: 4



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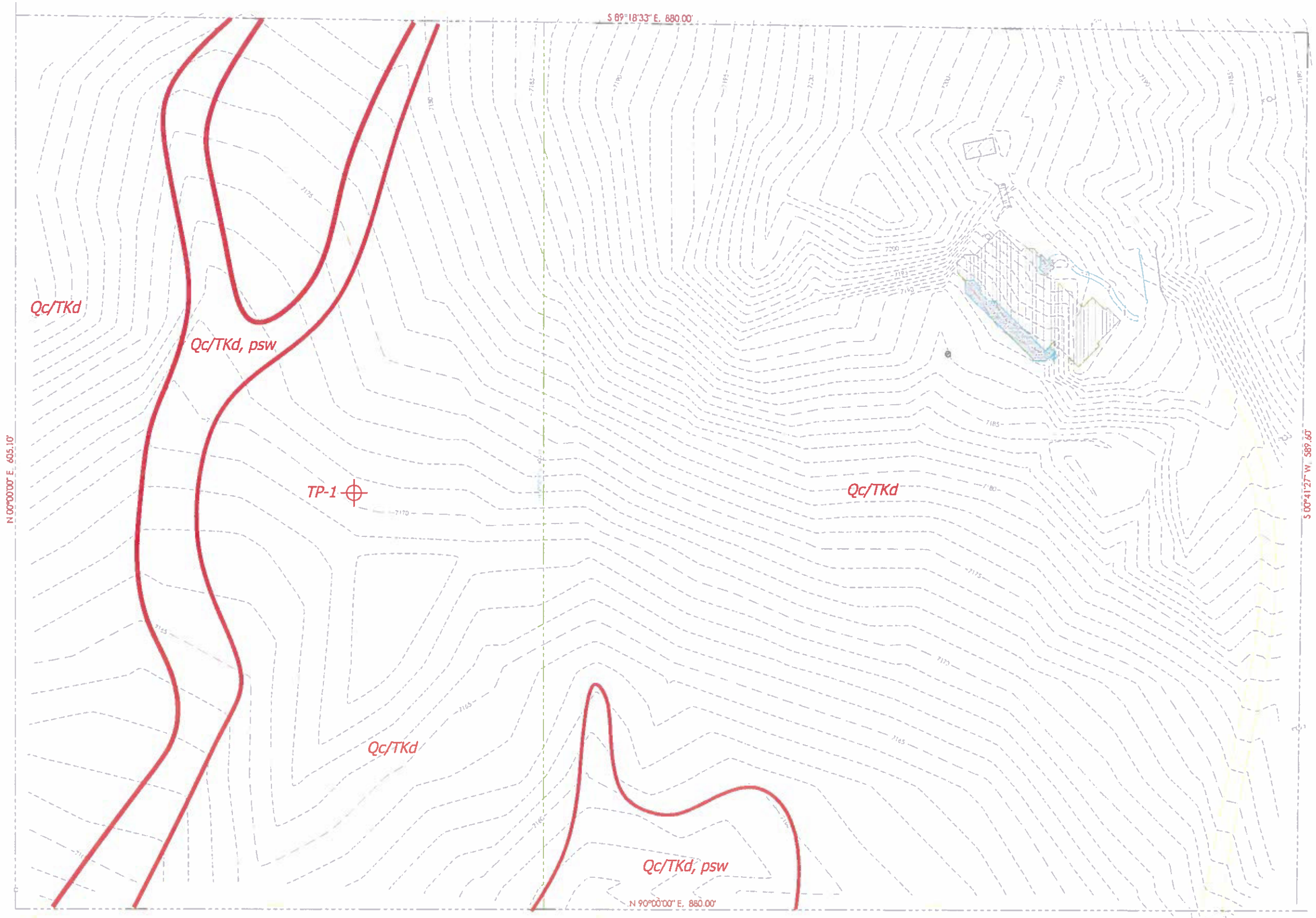
FALCON NW QUADRANGLE GEOLOGIC MAP
8190 POCO ROAD
COLORADO SPRINGS, CO.
FOR: JIM MARTENS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/24/19		

JOB NO.: 190411

FIG NO.: 5



LEGEND:

QcTKd - Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age: colluvial and residual soils overlying arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone

psw - potentially shallow groundwater area

REVISION	BY

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GEOLOGY/ENGINEERING GEOLOGY MAP
8190 POCO ROAD
COLORADO SPRINGS, CO.
FOR: JIM MARTENS

DRAWN	LLL
CHECKED	
DATE	10/26/17
SCALE	AS SHOWN
JOB NO.	170837
FIGURE No.	6

N

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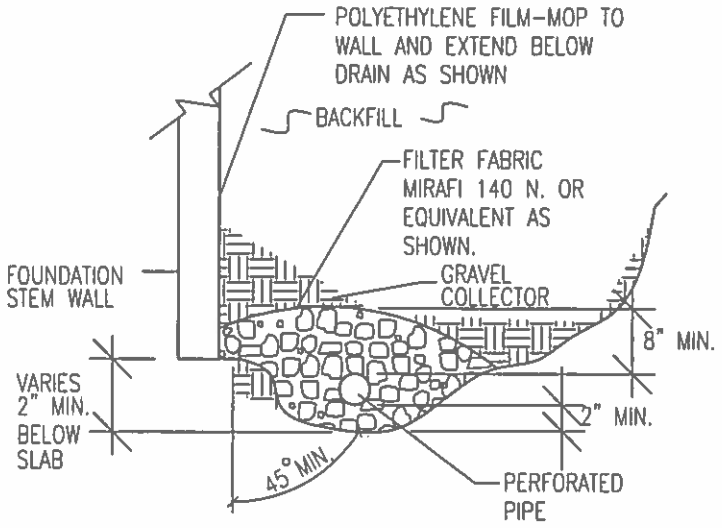
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

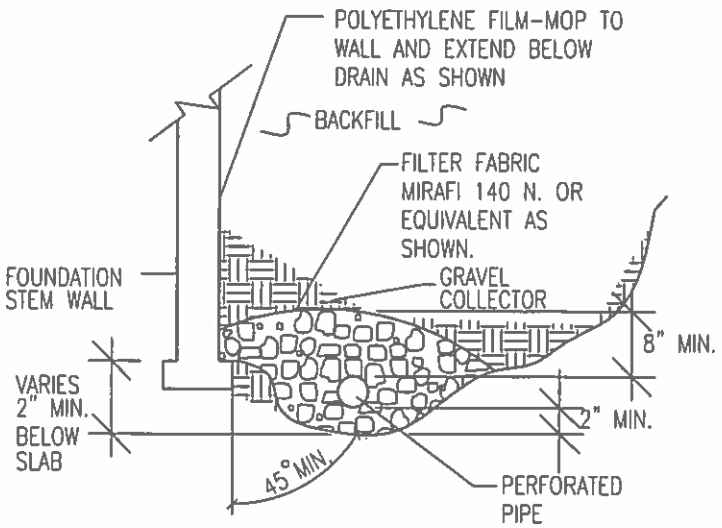
FEMA FLOODPLAIN MAP
8190 POCO ROAD
COLORADO SPRINGS, CO.
FOR: JIM MARTENS

DRAWN:	DATE:	CHECKED:	DATE:
LLL	5/24/19		

JOB NO.: 190411

FIG NO.: 7





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.

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

PERIMETER DRAIN DETAIL

DRAWN:	DATE DRAWN:	DESIGNED BY:	CHECKED:
		DS	LLL

JOB NO.: 19411

FIG. NO.: 9

APPENDIX A: Site Photographs

1

Looking east from the western portion of the site.

April 23, 2019

2

Looking north from the western portion of the site.

April 23, 2019

Job No. 190411

3

Looking south from the western portion of the site.

April 23, 2019

4

Looking southeast from the western portion of the site.

April 23, 2019

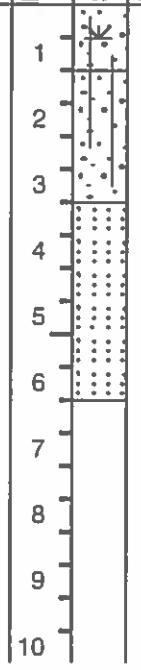
Job No. 190411

APPENDIX B: Test Pit Logs

TEST PIT NO. 1
DATE EXCAVATED 4/23/2019
Job # 190411

CLIENT JIM MARTENS
LOCATION 8190 POCO ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown						
gravelly sandy loam, fine to coarse grained, light brown				gr	m	2
weathered to formational silty sandstone, fine to coarse grained, tan				ma		3A



REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type

Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

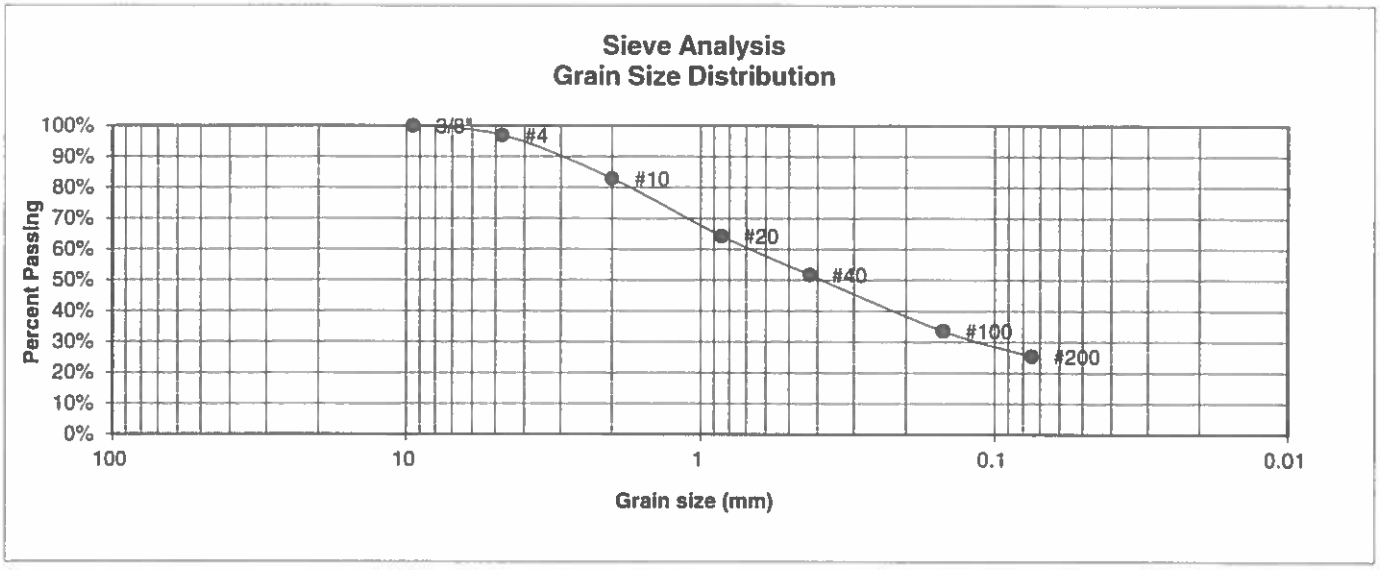
TEST PIT LOG

DRAWN:	DATE:	CHECKED: LLL	DATE: 5/16/19

JOB NO.: 190411
FIG NO.:

APPENDIX C: Laboratory Test Results

BORING NO.	TP-1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	0-2	AASHTO CLASSIFICATION		JOB NO.	190411
CLIENT	JIM MARTENS				
PROJECT	8190 POCO ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.9%
10	82.9%
20	64.3%
40	51.7%
100	33.6%
200	25.4%

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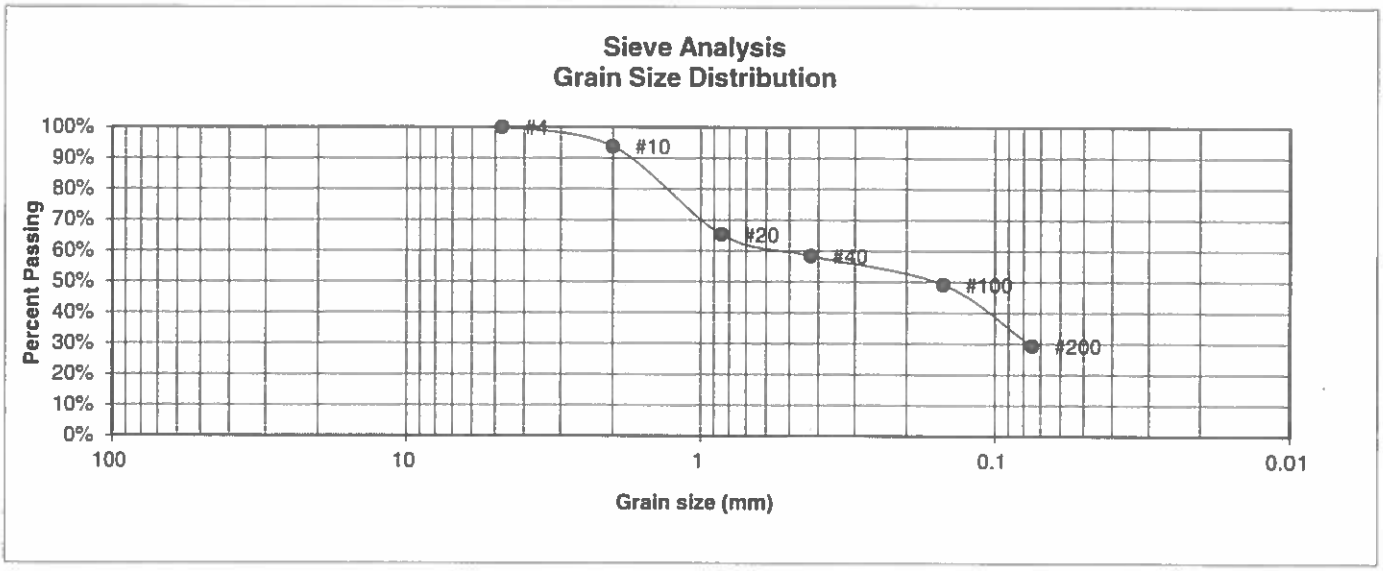
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED	DATE
		LLL	5/18/19

JOB NO.: 190411
FIG NO.:

BORING NO.	TP-1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	5-6	AASHTO CLASSIFICATION		JOB NO.	190411
CLIENT	JIM MARTENS				
PROJECT	8190 POCO ROAD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	93.8%
20	65.3%
40	58.4%
100	49.2%
200	29.3%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

Moisture at start	13.0%
Moisture at finish	24.2%
Moisture increase	11.2%
Initial dry density (pcf)	93
Swell (psf)	280

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

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	5/16/19

JOB NO.: 190411

FIG NO.:

APPENDIX D: Soil Survey Descriptions

71—Pring coarse sandy loam, 3 to 8 percent slopes. This deep, noncalcareous, well drained soil formed in sandy sediment derived from arkosic sedimentary rock on valley side slopes and on uplands. Elevation ranges from 6,800 to 7,600 feet. The average annual precipitation is about 17 inches, the average annual air temperature is about 43 degrees F, and the average frost-free period is about 120 days.

Typically, the surface layer is dark grayish brown coarse sandy loam about 4 inches thick. The substratum is dark grayish brown coarse sandy loam about 10 inches thick over pale brown gravelly sandy loam that extends to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Alamosa loam, 1 to 3 percent slopes, along drainageways; Cruckton sandy loam, 1 to 9 percent slopes; Peyton sandy loam, 1 to 5 percent slopes; Peyton sandy loam, 5 to 9 percent slopes; and Tomah-Crowfoot loamy sands, 3 to 8 percent slopes. In some places arkose beds of sandstone and shale are at a depth of 0 to 40 inches.

Permeability of this Pring soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate.

Almost all areas of this soil are used as rangeland. Some areas previously cultivated have been reseeded to grass. This soil is also used for wildlife habitat and homesites.

This soil is well suited to the production of native vegetation suitable for grazing by cattle and sheep. Rangeland vegetation is mainly mountain muhly, little bluestem, needleandthread, Parry oatgrass, and junegrass.

Deferment of grazing in spring helps to maintain vigor and production of the cool-season bunchgrasses. Fencing and properly locating livestock watering facilities help to control grazing.

Windbreaks and environmental plantings generally are suited to this soil. The hazard of soil blowing is the main limitation to 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.

This soil is well suited for use as homesites. Erosion control practices are needed to control soil blowing and water erosion on construction sites where the ground cover has been removed. Capability subclass IVe.