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**WASTEWATER STUDY  
ROLLIN RIDGE ESTATES  
HODGEN ROAD AND HIGHWAY 83 – SOUTHWEST CORNER  
EL PASO COUNTY, COLORADO**

Note: any studies done  
in the area identified for  
tract B was not  
reviewed as this is to  
be held for future  
development.

Prepared for

**Carl Turse**  
17572 Colonial Park Drive  
Monument, Colorado 80132

November 12, 2019

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.  
Geologist

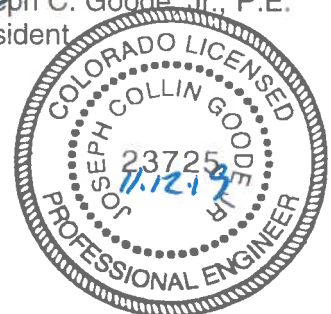
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Encl.

Entech Job No. 170837  
AAprojects/2017/170837 countysoil/geo/ww

Reviewed by:

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



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## **1.0 SUMMARY**

### ***Project Location***

The project lies in a portion of the NE¼ of the NW¼ and the NW¼ of the NE¼ of Section 27, Township 11 South, Range 66 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is located approximately 4½ miles southeast of Monument, Colorado.

### ***Project Description***

Total acreage involved in the project is approximately 57 acres. The proposed site development consists of sixteen single-family rural residential lots and three commercial lots. The development will utilize individual wells and on-site wastewater treatment systems.

### ***Scope of Report***

This report presents the results of wastewater study for individual and commercial on-site wastewater treatment systems.

### ***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 artificial fill, expansive soils, and seasonal shallow groundwater areas. Based on the proposed development plan, it appears that these areas will have some impact 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.

## **2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION**

The site is located in a portion of the NE $\frac{1}{4}$  of the NW $\frac{1}{4}$  and the NW $\frac{1}{4}$  of the NE $\frac{1}{4}$  of Section 27, Township 11 South, Range 66 West of the 6<sup>th</sup> Principal Meridian in El Paso County, Colorado. The site is located approximately 4½ miles northeast of Monument, Colorado, southwest of Hodgen Road and Highway 83. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site consists of rolling hills that vary from gradually to moderately sloping generally to the northwest and northeast, with steep slopes along the man-made dam in the northeastern portion of the site. The drainages on site flow in northerly direction through the eastern portion of the site. Water was not observed in the pond or drainages 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. The site contains primarily field grasses and weeds with areas of ponderosa pines in the southwestern and western portion of the site. An existing house is located on Lot 8 which will remain. Several pole barns are located around the area of the house and will be removed. An existing septic system and water well are located at the house. El Paso County Health Department records for the septic are included in Appendix F. Site photographs, taken June 27 and July 10, 2017, are included in Appendix A.

Total acreage involved in the proposed development is approximately 57 acres. Sixteen single-family rural residential lots are proposed and three commercial lots. The proposed lots are approximately 2.5 to 2.8 acres each. The area will be serviced by individual wells and on-site wastewater treatment systems. The proposed Development Plan/Test Boring Location Map is presented in Figure 3.

## **3.0 SCOPE OF THE REPORT**

The scope of the report will include the following:

- The site will be evaluated for individual on-site wastewater treatment systems in accordance with El Paso Land Development Code.

## **4.0 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 July 10, 2017.

Two (2) percolation tests, and fourteen (14) test pits were performed on the site to determine general suitability of the site for the use of on-site wastewater treatment systems. Ten test pits were excavated in the three commercial lots for OWTS evaluations. The locations of the percolation tests, test borings, and test pits are indicated on the Development Plan/Test Boring Location Map, Figure 3. The Profile Hole and Test Pit Logs are 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.

## **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 along the Palmer Divide. Approximately 8 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 southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northeasterly direction (Reference 1). The rocks in the area of the site are sedimentary in nature and typically Tertiary to Upper Cretaceous in age. The bedrock underlying the site consists of the Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of residual soils, man-made, and alluvial soils of the Quaternary Age. The residual soils are produced by the in-situ action of weathering of the bedrock on site. The alluvial soils were deposited by water in the major drainages on site and as stream terraces on some of the ridge lines. Man-made soils exist as earthen dams and erosion berms. The site's stratigraphy will be discussed in more detail in Section 5.3.

### **5.2 Soil Conservation Survey**

The Natural Resource Conservation Service (Reference 2), previously the Soil Conservation Service (Reference 3) has mapped four soil types on the site (Figure 4). In general, they vary from gravelly loamy sand to sandy loam. The soils are described as follows:

<u>Type</u>	<u>Description</u>
21	Cruckton Sandy Loam, 1-9% slopes
28	Ellicott Loamy Coarse Sand, 0-5% slopes
41	Kettle Gravelly Loamy Sands, 8-40% slopes
68	Peyton-Pring Complex, 3-8% slopes

Complete descriptions of each soil type are presented in Appendix D. The soils have generally been described to typically have moderate to moderately rapid permeabilities. Roads may need to be designed to minimize frost-heave potential. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The majority of the soils have been described to have slight to moderate erosion hazards.

### **5.3 Site Stratigraphy**

The Monument Quadrangle Geology Map showing the site is presented in Figure 5 (Reference 4). The Geology Map prepared for the site is presented in Figure 6. Four mappable units were identified on this site which are described as follows:

- Qal Recent Alluvium of Holocene Age:** These are recent deposits that have been deposited along the drainage that exist on-site. These materials typically consist of silty to clayey sands and sandy clays. Some of these alluviums contain highly organic soils.
- Qaf Recent Artificial Fill of Holocene Age:** These are man-made fill deposits associated with erosion berms and earthen dams on-site.
- QTa Alluvium of Palmer Divide of Pleistocene Age:** These materials consist of water-deposited stream terrace deposits. They typically consist of silty to clayey sands with gravelly lenses and may contain areas of pebble and cobble lenses.
- Tkd Dawson Formation of Tertiary to Cretaceous Age:** The Dawson formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation is a variable layer of residual soil. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty to clayey sands, sandy clays and sandy silts.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Monument Quadrangle* distributed by the Colorado Geological Survey in 2003 (Reference 4), 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 Denver 1° x 2° Quadrangle*, distributed by the US Geological Survey in 1981 (Reference 6). The Test Pits and Profile Holes were also used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

#### **5.4 Soil Conditions**

The soils encountered in the Profile Holes can be grouped into three general soil and rock types. The profile hole soils were classified using the Unified Soil Classification System (USCS). The soils encountered in the Test Pits can be grouped into three general soil types. The test pit soils were classified using the USDA Textural Soil Classification.

Soil Type 1 is a very sandy to sandy clay and silty clay loam (CL, ML). This material was encountered in both of the profile holes and in six of the test pits. The clay and silt soils were encountered at the existing surface and extended to depths ranging from 3 to 10 feet bgs. These soils were encountered at soft to firm states and at dry to moist conditions. Samples tested had 55 to 73 percent passing the No. 200 Sieve. FHA Swell Testing on a sample of sandy clay resulted in an expansion pressure of 430 psf, which is in the low expansion range.

Soil Type 2 is a clayey sand, sandy loam, and slightly silty to silty sand (SC, SM-SW). This material was encountered in Profile Hole No. 1 and in eight of the test pits. The sands were encountered at depths ranging from the existing surface grade to 3 feet and extended to depths ranging from 5 to 12 feet. The sands were encountered at medium dense to states and dry to moist conditions. Samples tested had 6 to 40 percent passing the No. 200 sieve. FHA Swell Testing on a sample of clayey sand resulted in an expansion pressure of 556 psf, which is in the low expansion range.

Soil Type 3 is a slightly silty to silty sandstone and clayey sandstone (SM-SW, SM, SC). This material was encountered in Profile Hole No. 2 and in eleven of the test pits. The sandstone was encountered at depths ranging from the 1 to 12 feet and extended to the termination of the profile hole (20 feet) and test pits (8 to 9 feet). The sandstone was encountered at dense to very dense states and moist conditions. Samples tested had 9 to 25 percent passing the No. 200 sieve. The sandstones are typically non-expansive, however; expansive clayey sandstone and claystone are common in the area.

The Test Boring Logs and the Profile Hole Logs are presented in Appendix B. Laboratory Test Results are presented in Appendix C. A Summary of Laboratory Test Results is presented in Table 1.



### **5.5 Groundwater**

Groundwater was not encountered in the profile holes which were drilled to 10 to 20 feet. Signs of seasonally occurring groundwater was observed in ten of the test pits at depths ranging from 5 to 8 feet. Areas of seasonal shallow groundwater and ponded water have been mapped in low-lying areas and in the drainage on-site. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time.

It should be noted that in the sandy materials on site, some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying bedrock. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction.

## **6.0 ON-SITE WASTEWATER TREATMENT**

The site was evaluated for individual and commercial on-site wastewater treatment systems in accordance with El Paso Land Development Code. Two (2) percolation tests and fourteen (14) test pits were performed on the property. Percolation tests and test pits were located in potential locations of future systems. Four (4) of the test pits were excavated on the residential lots, and ten (10) of the test pits were excavated on the commercial lots. The approximate locations of the percolation tests are indicated on Figure 3, on the Geology/Engineering Geology Map, Figure 6, and on the Septic Suitability Maps, Figures 9 and 10. A table showing the results of the percolation tests is presented in Table 2. The specific percolation test results are presented in Appendix E of this report.

The Natural Resource Conservation Service (Reference 2), previously the Soil Conservation Service (Reference 3) has been mapped with four soil descriptions. The Soil Survey Map (Reference 2) is presented in Figure 4, and the Soil Survey Descriptions are presented in Appendix D. The soils are described as having moderate to moderately rapid percolation rates.

The percolation rates were 67 and 76 minutes per inch. Neither of the percolation rates are suitable for conventional on-site wastewater treatment systems. Both of the percolation rates are slower than 60 minutes per inch which will require designed systems. Shallow bedrock was also encountered in ten of the test pits, which will require designed systems. Additional investigation may identify areas where suitable for conventional systems could be used.

Standard penetration testing, ASTM D-1586, was performed in each profile hole to evaluate the density of the soil and the presence of bedrock. Bedrock was encountered in Profile Hole No. 2 at 12 feet. Absorption fields must be maintained a minimum of 4 feet above groundwater bedrock, or confining layer. Groundwater was not encountered in the profile holes which were drilled to depths of 10 to 20 feet. Shallow bedrock was encountered in ten (10) of the test pits at depths ranging from 1.5 to 6 feet. Should groundwater or bedrock be encountered within 6 feet of the surface, designed systems will be required.

Soils encountered in the tactile test pits consisted of loamy sand, silty clay loam and sandy clay, with underlying weathered silty to slightly silty sandstone and clayey sandstone. The limiting layers encountered in the test pits are the sandy loam, silty clay loam, sandy clay, and weathered sandstone, which corresponds to an LTAR values of 0.35 to 0.15 gallons per day per square foot. The bedrock was encountered at approximately 5 feet in Test Pit No. 3. The conditions encountered in the Test Pit No. 3 will require a designed system.

#### Commercial Lots

Test pits (TP-5 to TP-14) were excavated in potential areas of absorptions fields and alternate locations on the commercial lots. Two of the proposed fields are located in the existing pond and drainage area in the western portion of Lot 19. Additional testing for these field will be required after site grading is completed. The other test locations should be evaluated after grading is completed to determine if test results from our investigation remain valid.

Areas of seasonal shallow groundwater and potentially seasonal shallow groundwater were encountered on site. A pond and earthen dam are located in the northeastern portion of the site. Water was not observed in the pond or drainages on-site. Due to the size of the lots and the proposed development, these areas can be avoided by construction on the residential lots. Structures should not block drainages. Septic fields should not be located in these areas due to the potential for periodic high groundwater conditions.

In summary, it is our opinion the site is suitable for individual and commercial on-site wastewater treatment systems (OWTS) and that contamination of surface and subsurface water resources should not occur provided the OWTS sites are evaluated and installed according to El Paso County and State Guidelines and properly maintained. Based on the testing performed as part of this investigation designed systems will be required for the majority of the lots. Septic Suitability Maps are presented in Figures 9 and 10. Individual soil testing is required on each lot prior to construction. Absorption fields must be located a minimum of 100 feet from any well, including those on adjacent properties. Absorption fields must also be located a minimum of 50 feet from any drainages, floodplains or ponded areas and 25 feet from dry gulches.

Areas of seasonal shallow groundwater and potentially seasonal shallow groundwater were encountered on site. A pond and earthen dam are located in the northeastern portion of the site. Water was not observed in the pond or drainages on-site. Due to the size of the lots and the proposed development, these areas can be avoided by construction on the residential lots. Structures should not block drainages. Septic fields should not be located in these areas due to the potential for periodic high groundwater conditions.

## **7.0 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 is 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 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 Carl Turse, 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 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.

## BIBLIOGRAPHY

1. Bryant, Bruce; McGrew, Laura W, and Wabus, Reinhard A. 1981. *Geologic Structure Map of the Denver 1° x 2° Quadrangle, North-Central Colorado*. Sheet 2. U.S. Geologic Survey. Map I-1163.
2. Natural Resource Conservation Service, September 23, 2016. *Web Soil Survey*. United States Department Agriculture, <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.
3. United States Department of Agriculture Soil Conservation Service. June 1981. *Soil Survey of El Paso County Area, Colorado*.
4. Thorson, Jon P. and Madole, Richard F., 2003. *Geologic Map of the Monument Quadrangle, El Paso County, Colorado*. Colorado Geological Survey. Open-File Report 02-40.
5. Trimble, Donald E. and Machette, Michael N. 1979. *Geologic Map of the Colorado Springs-Castle Rock Area, Front Range Urban Corridor, Colorado*. USGS, Map I-857-F.
6. Bryant, Bruce; McGrew, Laura W. and Wobus, Reinhard A. 1981. *Geologic Map of the Denver 1° x 2° Quadrangle, North-Central Colorado*. U.S. Geologic Survey. Map 1-1163.
7. Federal Emergency Management Agency. March 17, 1997. *Flood Insurance Rate Maps for the City of Colorado Springs, Colorado*. Map Number 08041CO315F
8. El Paso County Planning Development. December 1995. *El Paso County Aggregate Resource Evaluation Maps*.
9. Schwochow, S.D.; Shroba, R.R. and Wicklein, P.C. 1974. *Atlas of Sand, Gravel, and Quarry Aggregate Resources, Colorado Front Range Counties*. Colorado Geological Survey. Special Publication 5-B.
10. Keller, John W.; TerBest, Harry and Garrison, Rachel E. 2003. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board*. Colorado Geological Survey. Open-File Report 03-07.

## TABLES

TABLE 1

## SUMMARY OF LABORATORY TEST RESULTS

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837

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	1	2-3			55.0						CL	CLAY, VERY SANDY
1	TP-1	2-3			71.7				430		CL	CLAY, SANDY
1	TP-1	5-6			56.0						ML	SILTY CLAY LOAM
1	TP-2	2-3			62.2						ML	SILTY CLAY LOAM
1	TP-3	2-3			63.2						ML	SILTY CLAY LOAM
1	TP-5	2-3			58.2						CL	CLAY, VERY SANDY
1	TP-10	6-8			54.5						CL	CLAY, VERY SANDY
1	TP-14	3-4			64.5						CL	CLAY, SANDY
2	2	5			34.6				556		SC	SAND, CLAYEY
2	TP-4	5-6			38.9						SC	SANDY LOAM
2	TP-5	6-8			6.0						SM-SW	SAND, SLIGHTLY SILTY
2	TP-6	3-8			41.7						SC	SAND, VERY CLAYEY
2	TP-11	4-6			26.4						SM	SAND, SILTY
3	2	15			11.9						SM-SW	SANDSTONE, SLIGHTLY SILTY
3	TP-3	5-6			13.9						SC	SANDSTONE, CLAYEY
3	TP-7	6-8			8.8						SM-SW	SANDSTONE, SLIGHTLY SILTY
3	TP-8	6-8			14.3						SM	SANDSTONE, SILTY
3	TP-12	5-6			12.2						SM	SANDSTONE, SILTY
3	TP-13	1.5-8			25.4						SM	SANDSTONE, SILTY

**Table 2: Summary of Percolation Test and Tactile Test Pit Results**

<b>Percolation Test No.</b>	<b>Percolation Rate (min/in)</b>	<b>Depth to Bedrock (ft.)</b>	<b>Depth to Groundwater (ft.)</b>
1	67*	N/A	N/A
2	76*	12	N/A

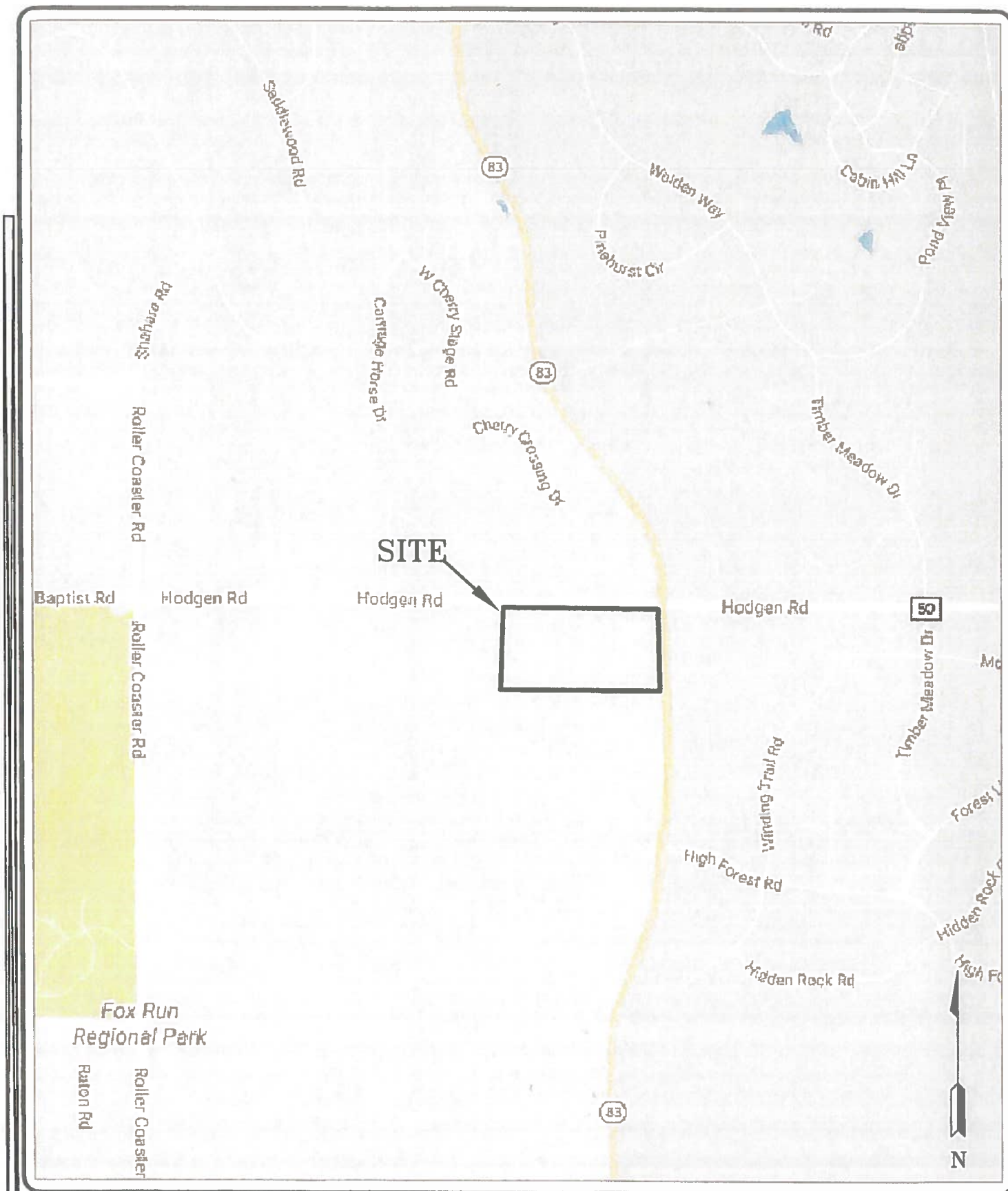
<b>Test Pit No.</b>	<b>USDA Soil Type</b>	<b>LTAR Value</b>	<b>Depth to Bedrock (ft.)</b>	<b>Depth to Seasonally Occurring Groundwater (ft.)</b>
1	3	0.35	N/A	N/A
2	3	0.35	N/A	N/A
3	4A*	0.15	5**	N/A
4	2A	0.50	N/A	N/A
5	3A*	0.30	6**	6
6	3A*	0.30	8**	8
7	3A*	0.30	5**	6.5
8	4*	0.20	6**	6
9	4A*	0.15	6**	6
10	4A*	0.15	6**	6
11	3A*	0.30	5**	5
12	3A*	0.30	5**	5
13	3A*	0.30	1**	N/A
14	3A*	0.30	5**	5

\*- Conditions that will require an engineered OWTS

\*\* - Sandstone highly weathered to formational (Dawson Formation)



## FIGURES



**ENTECH**  
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VICINITY MAP  
ROLLIN RIDGE ESTATES  
HODGEN ROAD AND HIGHWAY 83  
EL PASO COUNTY, CO.  
FOR: CARL TURSE

DRAWN:  
LLL

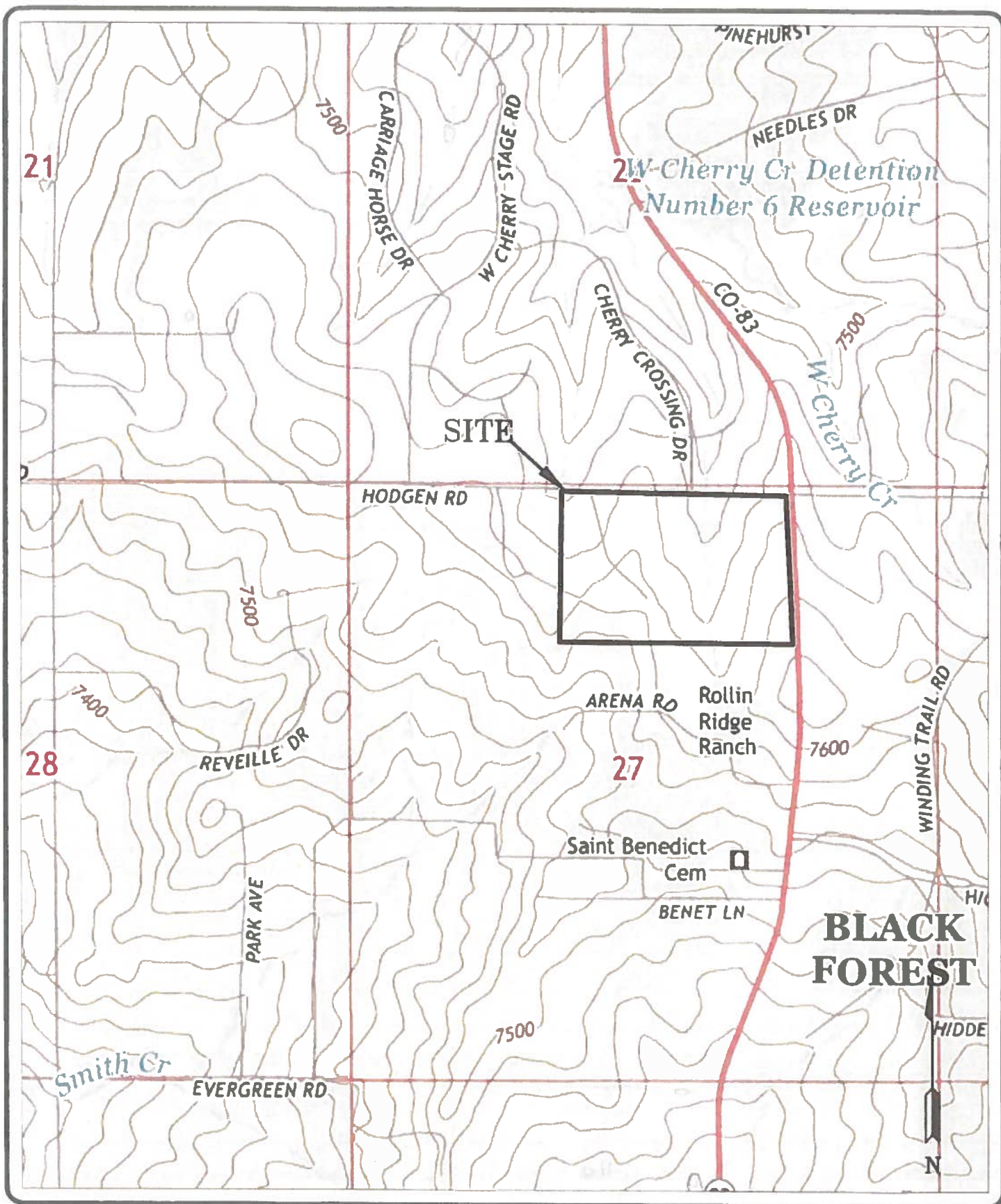
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JOB NO.:  
170837

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1



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USGS MAP  
ROLLIN RIDGE ESTATES  
HODGEN ROAD AND HIGHWAY 83  
EL PASO COUNTY, CO.  
FOR: CARL TURSE

DRAWN:  
LLL

DATE:  
10/17/16

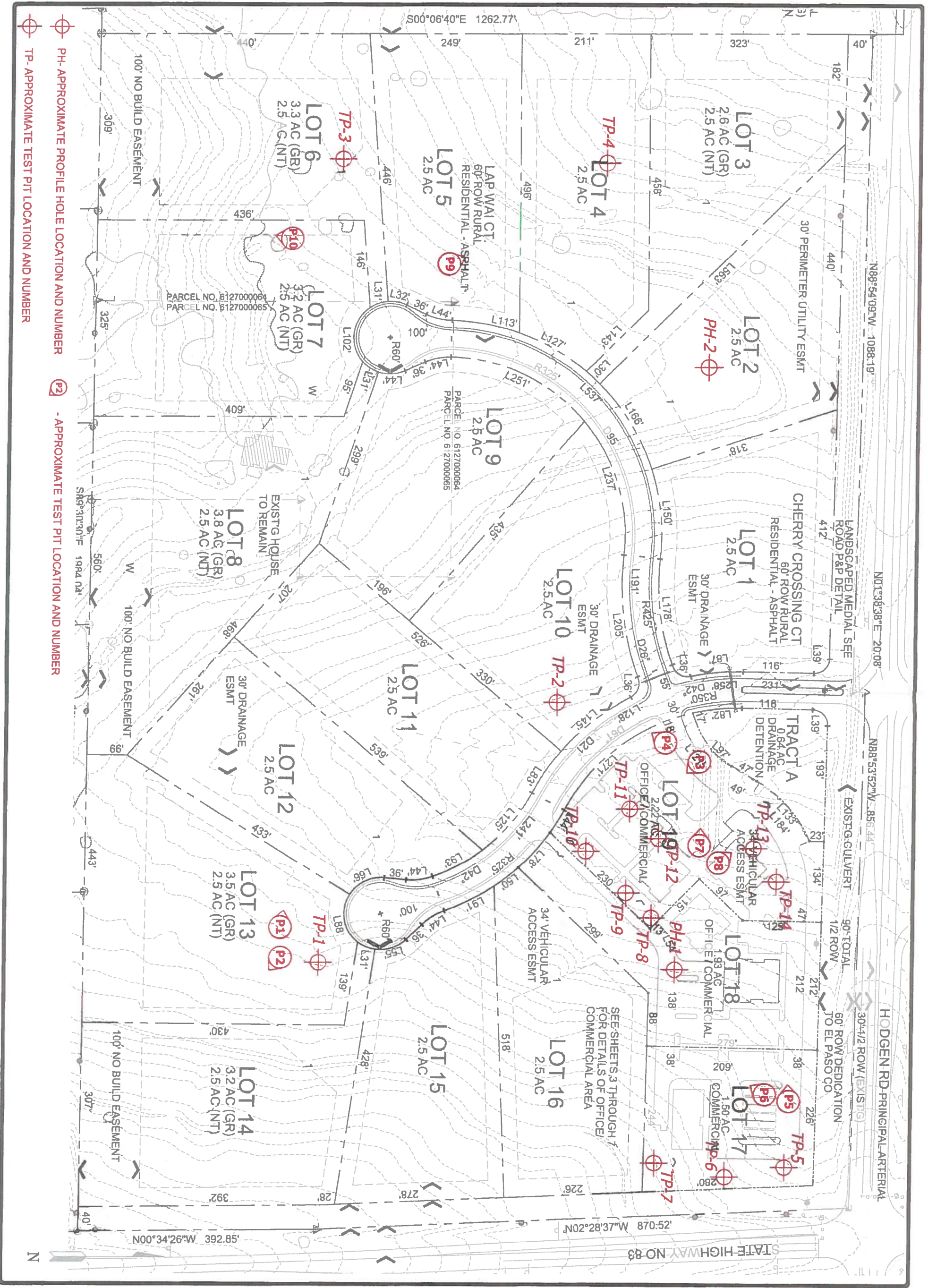
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JOB NO.:  
170837


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2





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BY	170837
SCALE	1/4" = 1'
3	

DEVELOPMENT PLAN/TEST BORING AND  
TEST PIT LOCATION MAP  
ROLLIN RIDGE ESTATES  
HODGEN ROAD AND HIGHWAY 83  
EL PASO COUNTY, CO.  
FOR: CARL TURSE



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REVISION	BY



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SCS MAP  
ROLLIN RIDGE ESTATES  
HODGEN ROAD AND HIGHWAY 83  
EL PASO COUNTY, CO.  
FOR: CARL TURSE

DRAWN:  
LLL

DATE:  
7/19/17

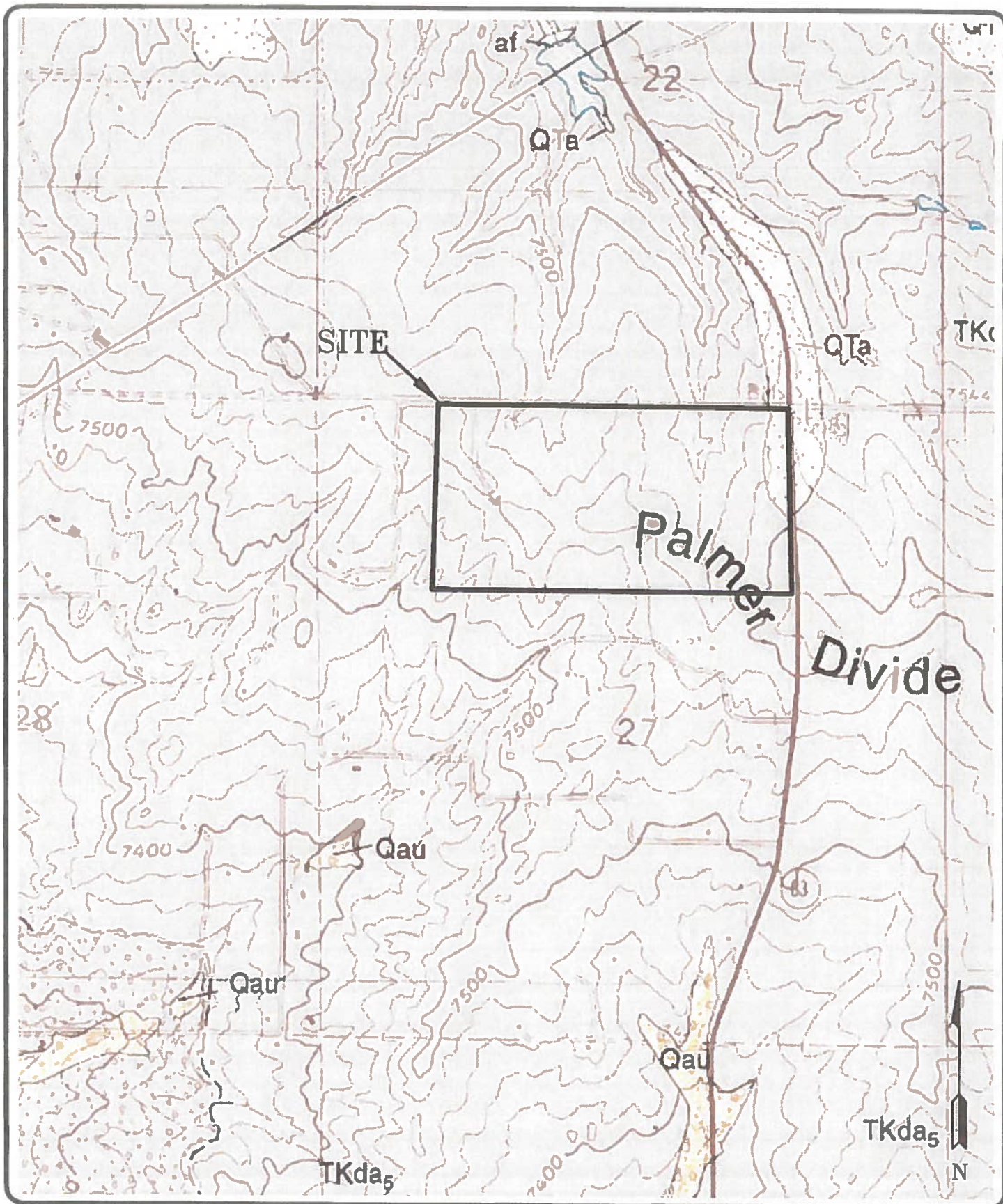
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DATE:

JOB NO.:  
170837

FIG NO.:  
4





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MONUMENT QUADRANGLE GEOLOGIC MAP  
ROLLIN RIDGE ESTATES  
HODGEN ROAD AND HIGHWAY 83  
EL PASO COUNTY, CO.  
FOR: CARL TURSE

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LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood) also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. The Special Flood Hazard Areas include Zones A, AE, AH, AO, AR, AV, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance 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 AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE AV Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities

Base Flood Elevation line and value: elevation in feet

Base Flood Elevation value where uniform within area; elevation in feet

Retrieved to the National Geographic Vertical Datum of 1929

Open section line

Traced line

Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

1000-meter Universal Transverse Mercator grid tick values, zone 4

5000-foot grid tick values: Hawaii State Plane coordinate system, zone 3 (NAD 83), Transverse Mercator projection

Branch mark (see explanation in Notes to Users section of this FEMA panel)

Coastal mile marker

MAP REPOSITORY

Refer to Listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE

FLOOD INSURANCE RATE MAP

November 20, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 30, 2004 - to change Special Flood Hazard Areas to update map format, to reflect revised shoreline and to incorporate previously issued Letters of Map Revision.

EL PASO COUNTY  
UNINCORPORATED AREAS  
080059

ON THIS PANEL IS LOCATED WITHIN  
AGE 66 WEST.

SITE

ZONE X

22

27

28

ARENA

ROAD

HODGEN

ROAD

83

N

REVISION BY

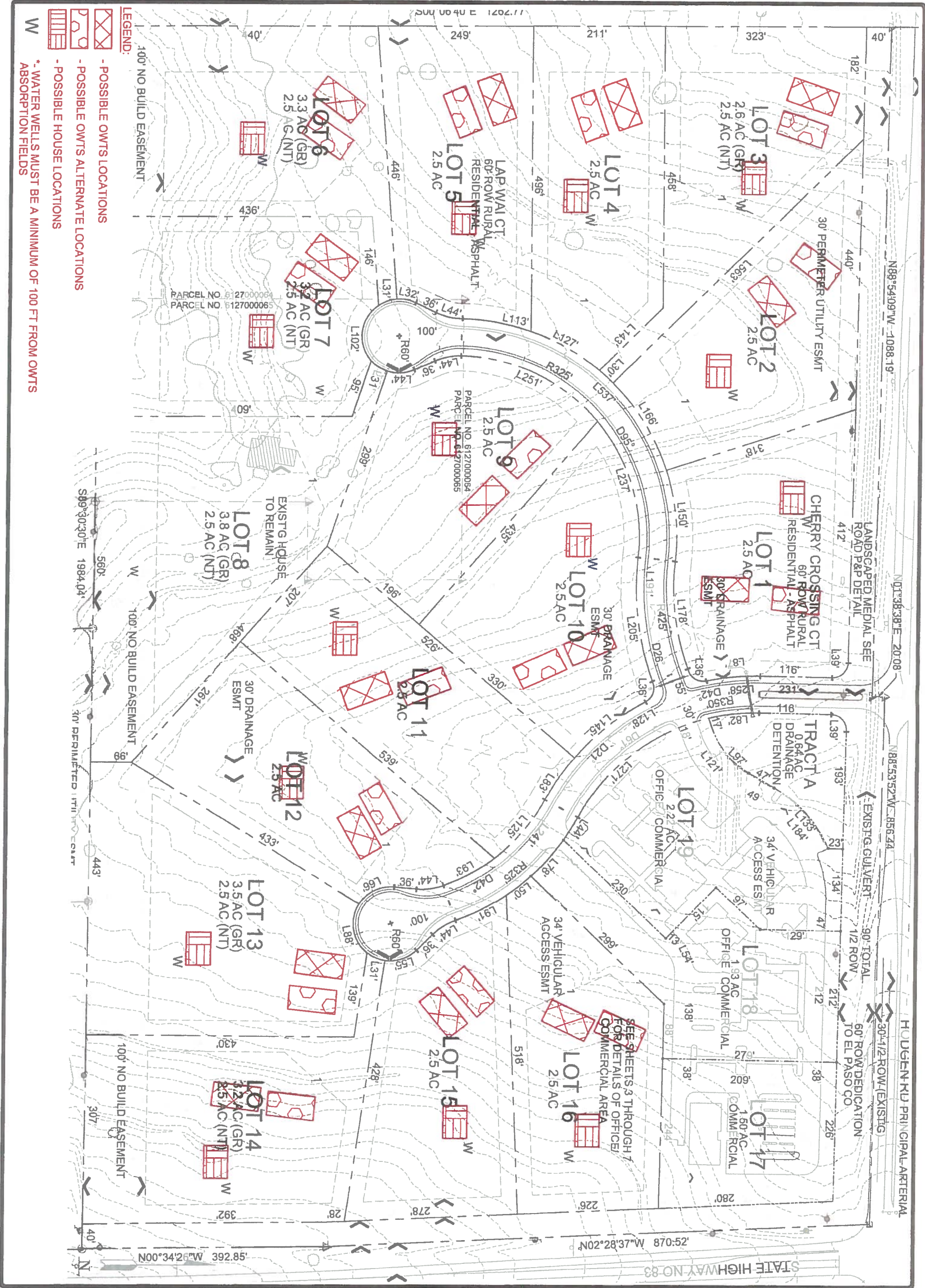
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ENGINEERING, INC.  
505 ELKTON DRIVE  
COLORADO SPRINGS, CO. 80907  
(719) 531-5599



FLOODPLAIN MAP  
ROLLIN RIDGE ESTATES  
HODGEN ROAD AND HIGHWAY 83  
EL PASO COUNTY, CO.  
FOR: CARL TURSE

DRAWN  
T.L.L.  
CHECKED  
7/19/17  
DATE  
AS BROWN  
BY  
170837  
NAME NO.  
7





REVISION BY	DATE	DESCRIPTION

**ENTECH ENGINEERING, INC.**

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

**SEPTIC SUITABILITY MAP**

**ROLLIN RIDGE ESTATES**

**HODGEN ROAD AND HIGHWAY 83**

**EL PASO COUNTY, CO.**

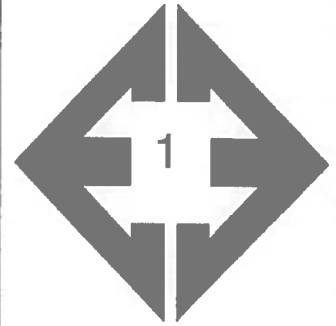
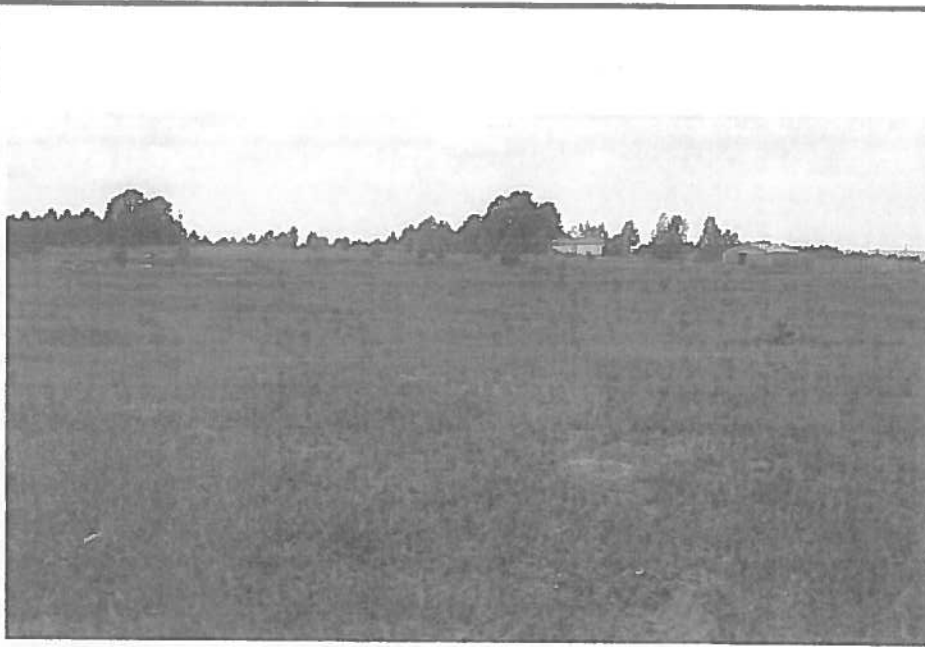
**FOR: CARL TURSE**

DATE	TIME	BY
7/19/17	11:17	AS SHOWN
7/19/17	11:17	AS SHOWN
7/19/17	11:17	AS SHOWN
7/19/17	11:17	AS SHOWN



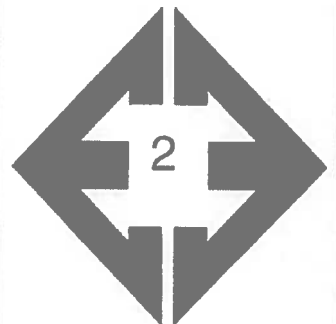


## **APPENDIX A: Site Photographs**



**Looking west from the  
southeastern portion  
of the site.**

June 27, 2017

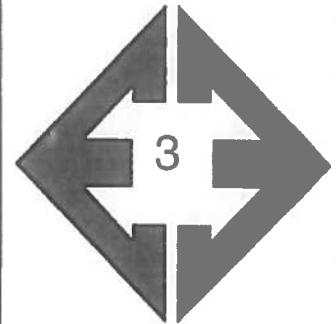
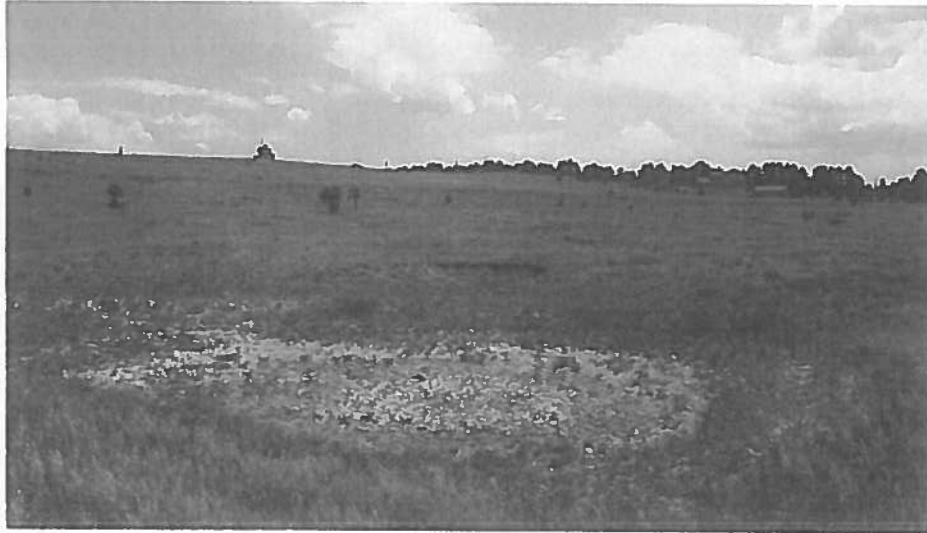


**Looking southeast  
from Test Pit No. 1 in  
the southeastern  
portion of the site.**

June 27, 2017

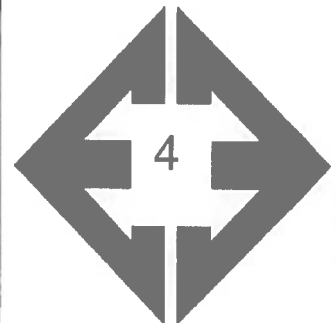


Job No. 170837



**Looking southeast  
from the pond in the  
northeastern portion of  
the site.**

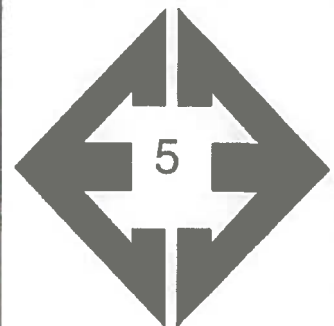
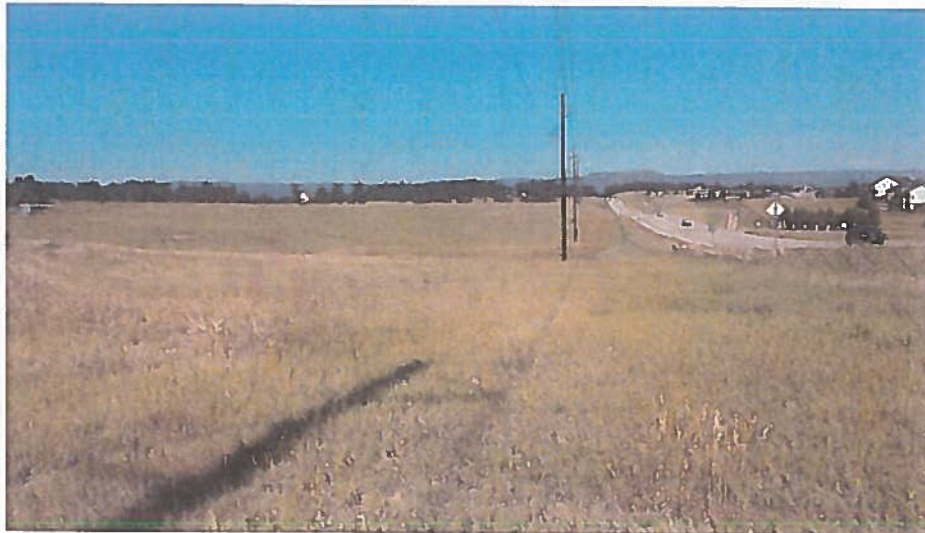
June 27, 2017



**Looking southwest  
from the northern  
portion of the site.**

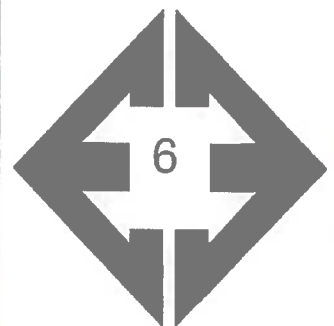
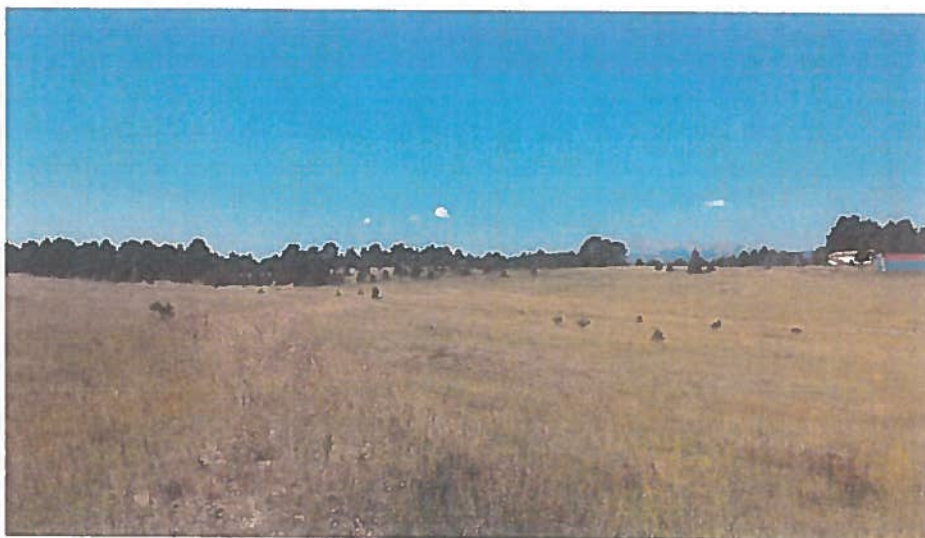
June 27, 2017

Job No. 170837



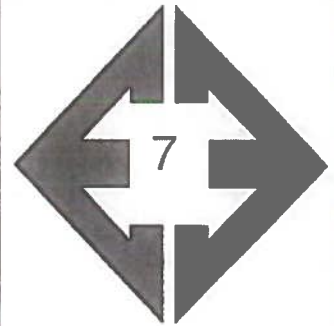
**Looking west from the  
northeast corner of the  
site.**

July 10, 2017



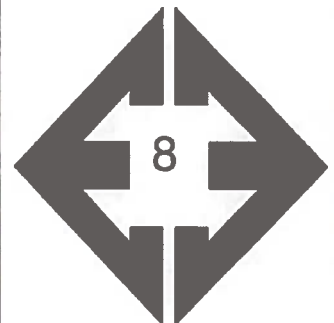
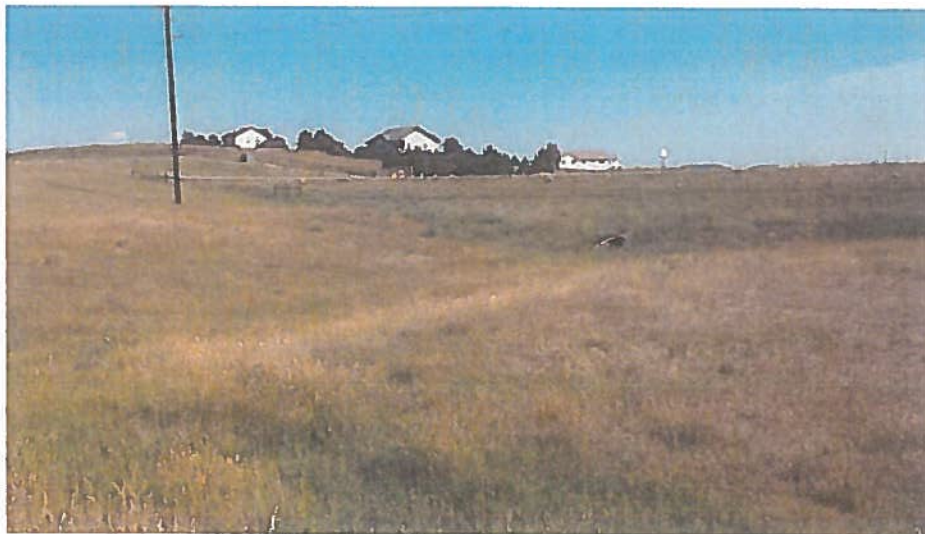
**Looking southwest  
from the northeast  
corner of the site.**

July 10, 2017



**Looking west along  
the dam located in the  
northeastern portion of  
the site.**

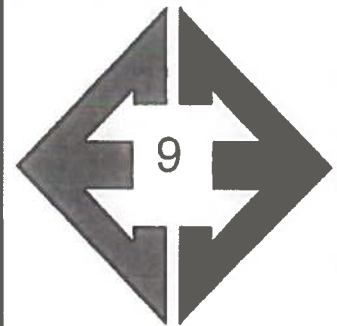
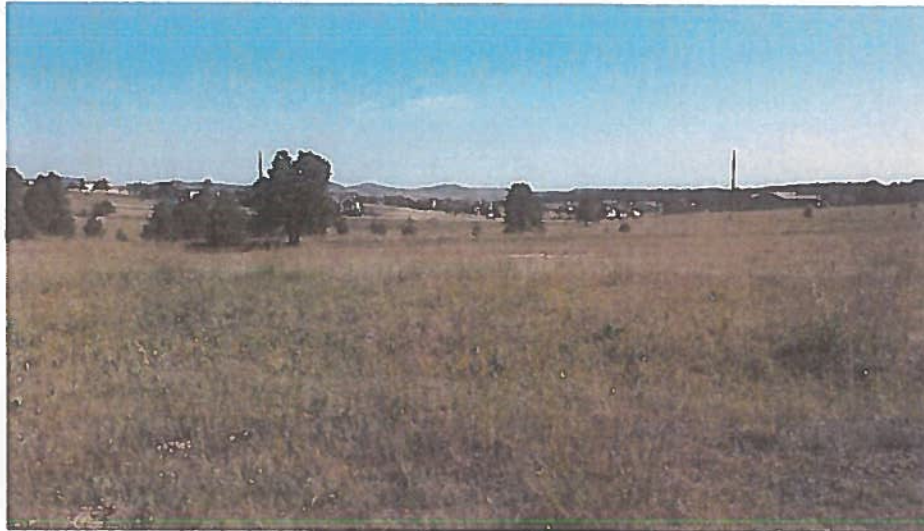
July 10, 2017



**Looking northwest  
from the northeastern  
portion of the site.**

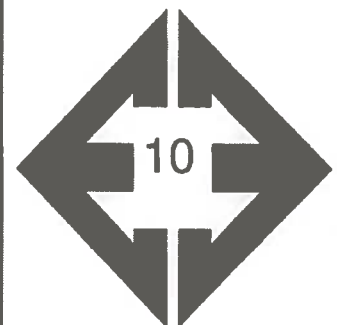
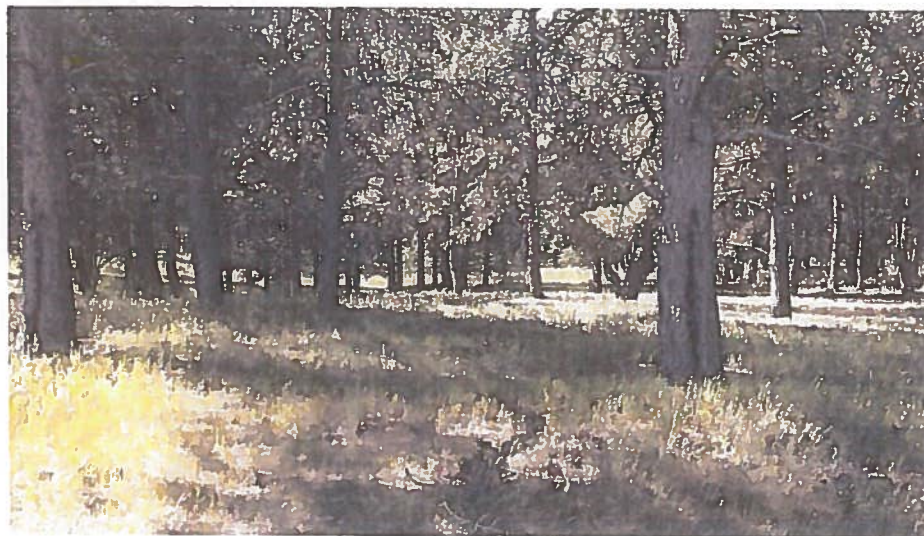
July 10, 2017





**Looking northwest  
from the western  
portion of the site.**

July 10, 2017



**Looking south from  
the southwestern  
portion of the site.**

July 10, 2017



**APPENDIX B: Test Boring Logs from the Profile Holes  
and Test Pit Logs**

PROFILE HOLE NO. 1  
 DATE DRILLED 7/10/2017  
 Job # 170837

PROFILE HOLE NO. 2  
 DATE DRILLED 7/10/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS

DRY TO 9.5', 7/11/17  
 CLAY, SANDY, TAN, FIRM,  
 MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			10	6.0	1
5			12	4.7	1
10			15	10.6	1
15					
20					

REMARKS

DRY TO 10', 7/10/17  
 CAVED TO 10', 7/11/17, DRY

CLAY, SANDY, TAN, SOFT,  
 MOIST  
 SAND, CLAYEY, FINE TO  
 COARSE GRAINED, TAN, DENSE,  
 MOIST  
 SANDSTONE, SLIGHTLY SILTY,  
 FINE TO COARSE GRAINED, TAN,  
 VERY DENSE TO DENSE,  
 MOIST

\* - WEATHERED ZONE

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			5	5.0	1
5			30	2.9	2
10			47	8.1	2
15			50	6.8	3
20			32*	12.8	3



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PROFILE HOLE LOG

DRAWN

DATE:

CHECKED:

DATE

LLL

7/19/17

JOB NO.:

170837

FIG NO.:

B-1

TEST PIT NO. 1  
 DATE EXCAVATED 6/27/2017  
 Job # 170837

TEST PIT NO. 2  
 DATE EXCAVATED 6/27/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, silty clay loam, brown	1			gr	m	3	topsoil, silty clay loam, brown	1			gr	m	3
silty clay loam, brown	2			gr	m	3	silty clay loam, light brown	2			gr	m	3
	3						sandy loam, fine to medium grained, tan	3			gr	m	2
	4							4					
	5							5					
	6							6					
	7							7					
	8							8					
	9							9					
	10							10					

Soil Structure Shape

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



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**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:  
 LLL

DATE:  
 7/19/17

JOB NO.:  
 170837

FIG NO.:  
 B-2

TEST PIT NO. 3  
 DATE EXCAVATED 6/27/2017  
 Job # 170837

TEST PIT NO. 4  
 DATE EXCAVATED 6/27/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, silty clay loam, brown	1			gr	m	3	topsoil, sandy loam. Brown	1			gr	m	2
silty clay loam, orange-brown	2			gr	m	3	sandy loam, fine to medium grained, orange-brown	2			gr	m	2
	3							3					
	4							4					
weathered clayey sandstone, fine to coarse grained, tan	5			ma		4A	sandy loam, fine to medium grained, orange-brown	5			gr	w	2A
	6							6					
	7							7					
	8							8					
	9							9					
	10							10					

Soil Structure Shape

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



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 COLORADO SPRINGS, COLORADO 80907

**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

DATE:

LL

7/19/17

JOB NO.:

170837

FIG NO.:

B-3

TEST PIT NO. 5  
 DATE EXCAVATED 9/18/2017  
 Job # 170837

TEST PIT NO. 6  
 DATE EXCAVATED 9/18/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy loam, brown	1			gr	m	2	topsoil, sandy loam, brown	1			gr	w	2A
sandy loam, fine to coarse grained, light brown	2			gr	m	2	sandy loam, fine to coarse grained, light brown	2			gr	w	2A
	3							3					
	4							4					
	5							5					
weathered silty sandstone, fine to coarse grained, tan *signs of seasonally occurring groundwater at 6'	6			ma		3A		6					
	7							7					
	8						weathered silty sandstone, fine to coarse grained, buff *signs of seasonally occurring groundwater at 8'	8			ma		3A
	9							9					
	10							10					

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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**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:  
 LLL

DATE:  
 10/24/17

JOB NO.:  
 170837  
 FIG NO.:  
 B-4

TEST PIT NO. 7  
 DATE EXCAVATED 9/18/2017  
 Job # 170837

TEST PIT NO. 8  
 DATE EXCAVATED 9/18/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy loam, brown	1			gr	m	2	topsoil, sandy clay, brown	1			gr	m	4
sandy loam, fine to coarse grained, light brown	2			gr	m	2	sandy clay, brown	2			gr	m	4
	3							3					
	4							4					
	5							5					
weathered silty sandstone, fine to coarse grained, tan *signs of seasonally occurring groundwater at 6.5'	6			ma		3A	weathered silty sandstone, fine to coarse grained, tan *signs of seasonally occurring groundwater at 6'	6			ma		3A
	7							7					
	8							8					
	9							9					
	10							10					

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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**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:

LLL

DATE:

10/24/17

JOB NO:

170837

FIG NO:

B-5

TEST PIT NO. 9  
 DATE EXCAVATED 9/18/2017  
 Job # 170837

TEST PIT NO. 10  
 DATE EXCAVATED 9/18/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy clay loam, brown	1			gr	m	3	topsoil, sandy clay loam, brown	1			gr	m	3
sandy clay loam, light brown	2			gr	m	3	sandy clay loam, brown	2			gr	m	3
	3							3					
	4							4					
	5							5					
	6							6					
weathered very clayey sandstone, tan	7			ma		4A	weathered very clayey sandstone, tan	7			ma		4A
*signs of seasonally occurring groundwater at 6'	8						*signs of seasonally occurring groundwater at 6'	8					
	9							9					
	10							10					

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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TEST PIT LOG

DRAWN:

DATE:

CHECKED:

DATE:

LLC

10/24/17

JOB NO.:

170837

FIG NO.:

B-6

TEST PIT NO. 11  
 DATE EXCAVATED 9/18/2017  
 Job # 170837

TEST PIT NO. 12  
 DATE EXCAVATED 9/18/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy loam, brown	1			gr	m	2	topsoil, sandy loam, brown	1			gr	m	2
sandy loam, fine to coarse grained, light brown	2			gr	m	2	sandy loam, fine to coarse grained, light brown	2			gr	m	2
	3							3					
	4							4					
	5							5					
weathered silty sandstone, fine to coarse grained, tan *signs of seasonally occurring groundwater at 5'	6			ma		3A	weathered silty sandstone, fine to coarse grained, tan *signs of seasonally occurring groundwater at 5'	6			ma		3A
	7							7					
	8							8					
	9							9					
	10							10					

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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**TEST PIT LOG**

DRAWN:

DATE:

CHECKED:  
 LLL

DATE:  
 10/24/17

JOB NO.:

170837

FIG NO.:

B-7



TEST PIT NO. 13  
 DATE EXCAVATED 9/18/2017  
 Job # 170837

TEST PIT NO. 14  
 DATE EXCAVATED 9/18/2017  
 CLIENT CARL TURSE  
 LOCATION ROLLIN RIDGE ESTATES

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy loam, brown	1			gr	w	2A	topsoil, sandy clay, brown	1			gr	m	4
weathered to formational silty sandstone, fine to coarse grained, tan	2			ma		3A	sandy clay, brown	2			gr	m	4
	3							3					
	4							4					
	5							5					
	6						weathered to formational silty sandstone, fine to coarse grained, tan	6			ma		3A
	7						*signs of seasonally occurring groundwater at 5'	7					
	8							8					
	9							9					
	10							10					

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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 COLORADO SPRINGS, COLORADO 80907

### TEST PIT LOG

DRAWN:

DATE:

CHECKED:

DATE:

LL

10/24/17

JOB NO.:

170837

FIG NO.:

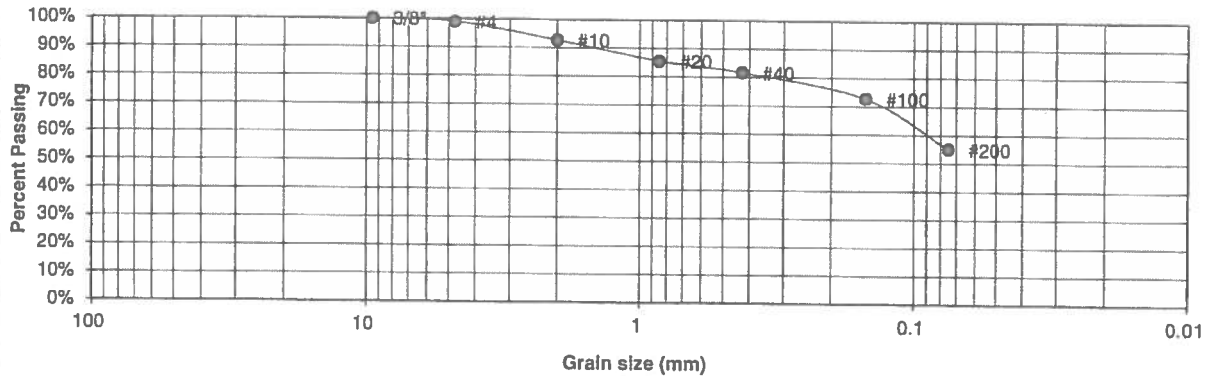
B-8

## **APPENDIX C: Laboratory Test Results**

UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # 1  
 DEPTH (FT) 2-3

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.9%
10	92.7%
20	85.5%
40	81.6%
100	72.7%
200	55.0%

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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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

### LABORATORY TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LL L

10/25/17

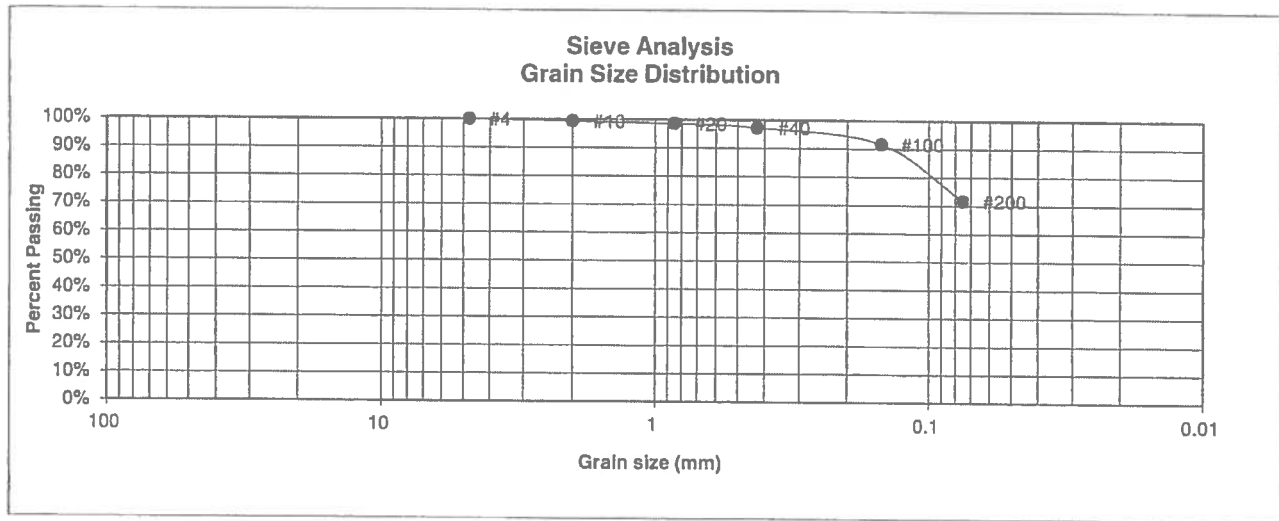
JOB NO.:  
170837

FIG NO.:

C-1

UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # TP-1  
 DEPTH (FT) 2-3

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.4%
20	98.6%
40	97.3%
100	91.7%
200	71.7%

Atterberg  
Limits  
 Plastic Limit  
 Liquid Limit  
 Plastic Index

Swell  
 Moisture at start 8.4%  
 Moisture at finish 20.9%  
 Moisture increase 12.6%  
 Initial dry density (pcf) 99  
 Swell (psf) 430



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 COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST  
RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	10/25/17

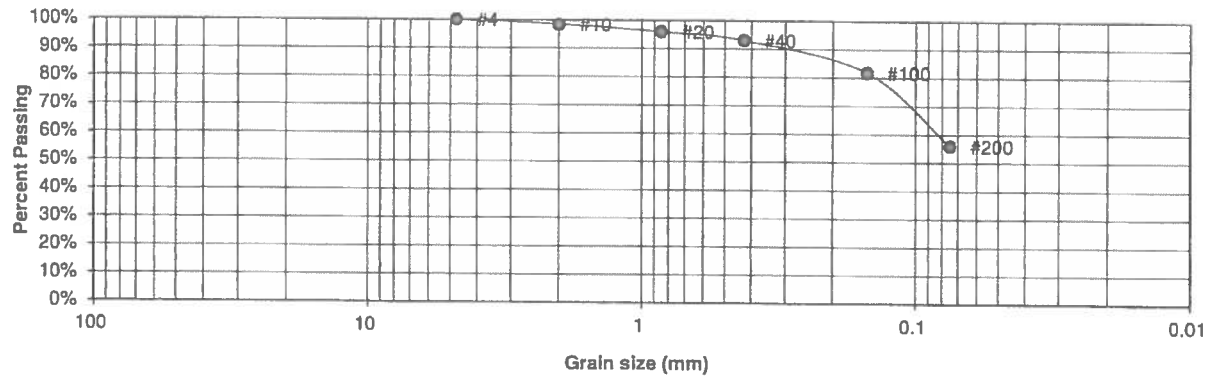
JOB NO.:  
170837

FIG NO.:  
C-2

UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # TP-1  
 DEPTH (FT) 5-6

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

Sieve Analysis  
 Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.5%
20	95.9%
40	93.0%
100	81.8%
200	56.0%

Atterberg  
 Limits  
 Plastic Limit  
 Liquid Limit  
 Plastic Index

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



**ENTECH**  
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505 ELKTON DRIVE  
 COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST  
 RESULTS

DRAWN:

DATE:

CHECKED:

LLL

DATE:

10/25/17

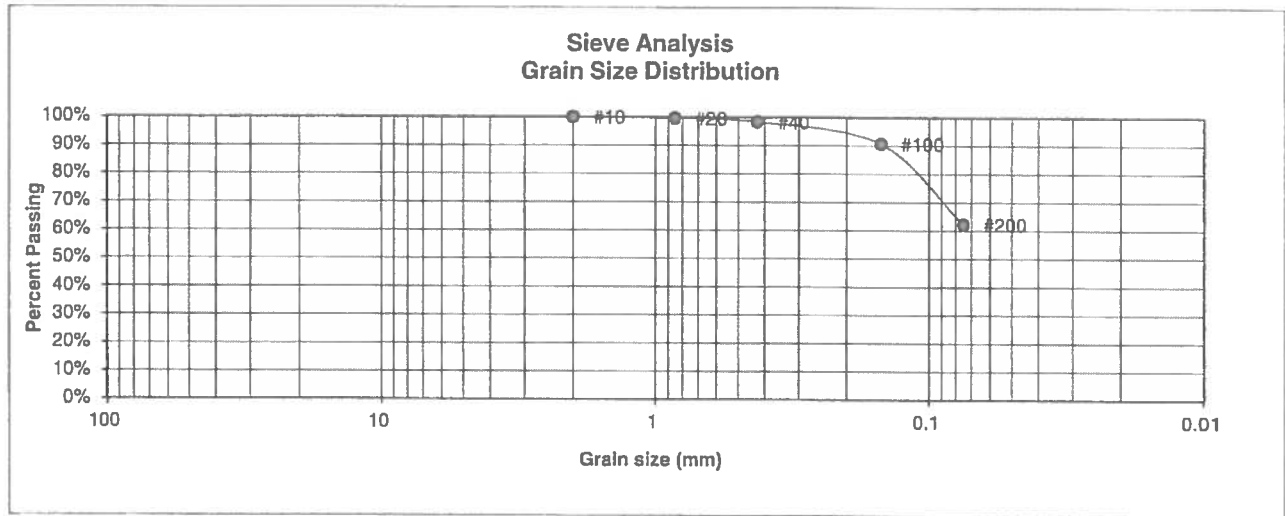
JOB NO.:  
 170837

FIG NO.:

C-3

UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # TP-2  
 DEPTH (FT) 2-3

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.6%
40	98.3%
100	90.7%
200	62.2%

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**

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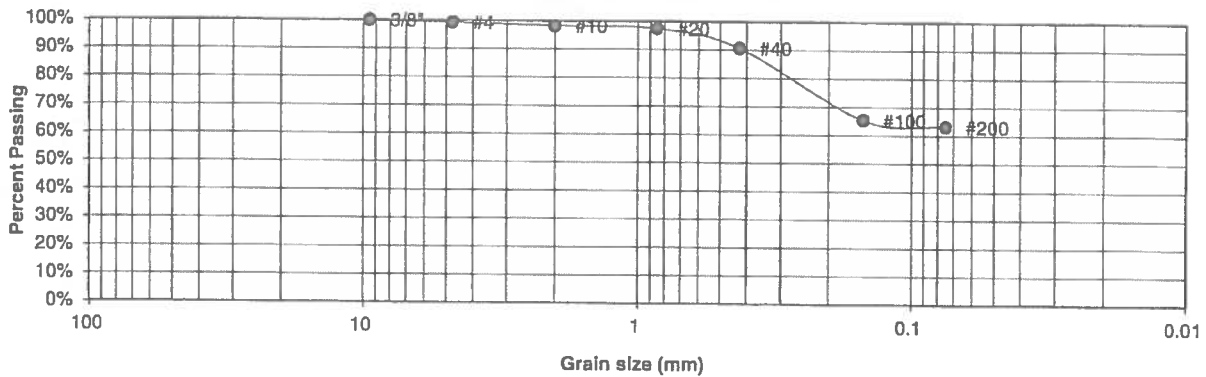
JOB NO.:  
170837

FIG NO.:  
C-4

UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # TP-3  
 DEPTH (FT) 2-3

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.3%
10	98.3%
20	97.4%
40	90.6%
100	65.4%
200	63.2%

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

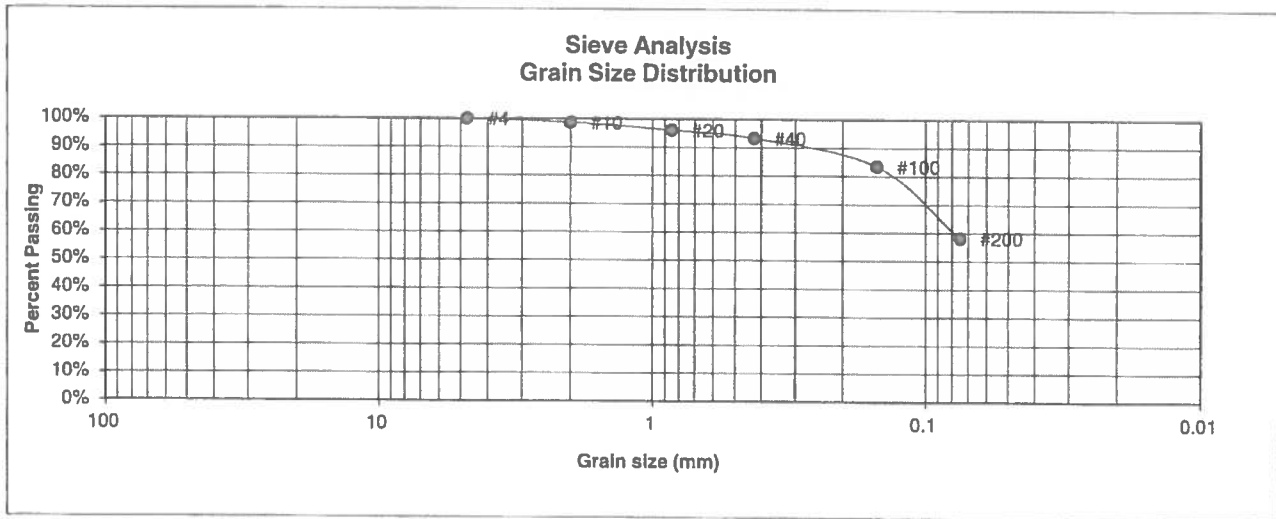
DRAWN:	DATE:	CHECKED: LLL	DATE: 10/25/17
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JOB NO.:  
170837

FIG NO.:  
C-5

UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # TP-5  
 DEPTH (FT) 2-3

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.7%
20	96.1%
40	93.3%
100	83.6%
200	58.2%

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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RESULTS**

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JOB NO.:  
170837

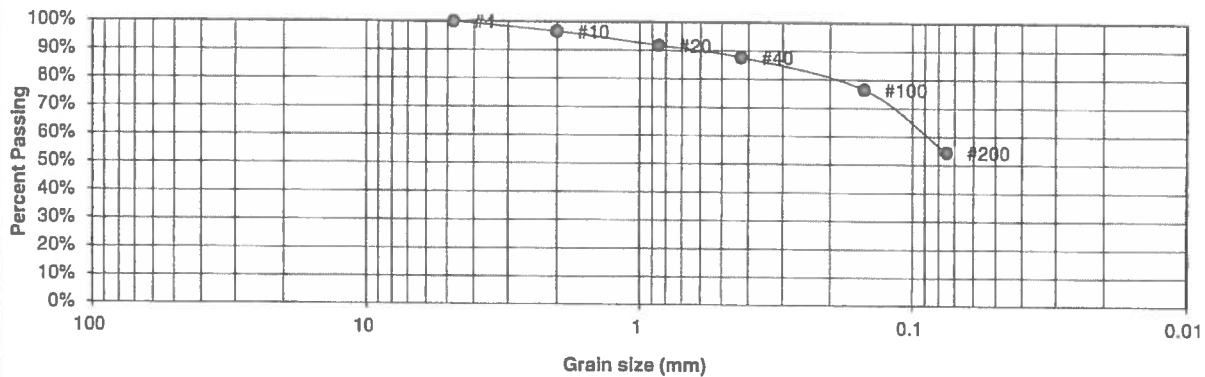
FIG NO.:  
C-6



UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # TP-10  
 DEPTH (FT) 6-8

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

Sieve Analysis  
 Grain Size Distribution



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

Percent  
Finer  
  
  
  
  
  
 100.0%  
 96.5%  
 91.7%  
 87.7%  
 76.5%  
 54.5%

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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JOB NO :  
 170837

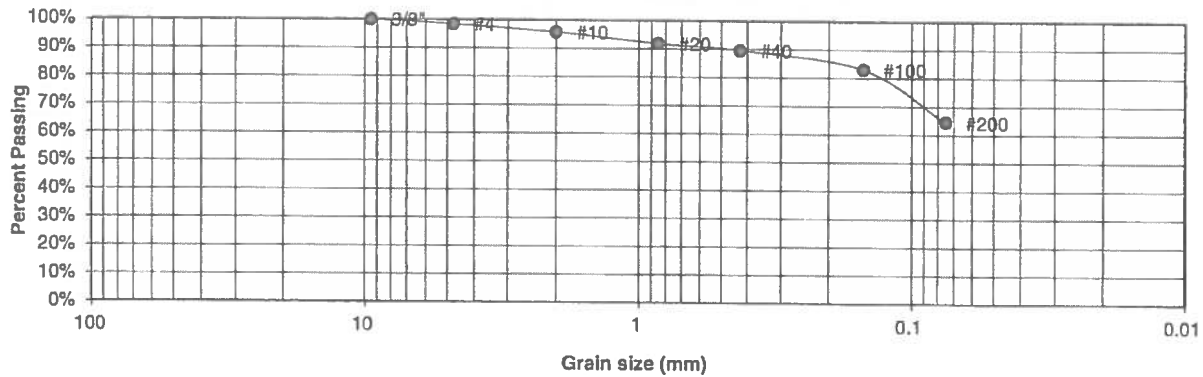
FIG NO :

C-7

UNIFIED CLASSIFICATION CL  
 SOIL TYPE # 1  
 TEST BORING # TP-14  
 DEPTH (FT) 3-4

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.5%
10	95.7%
20	91.8%
40	89.6%
100	83.0%
200	64.5%

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

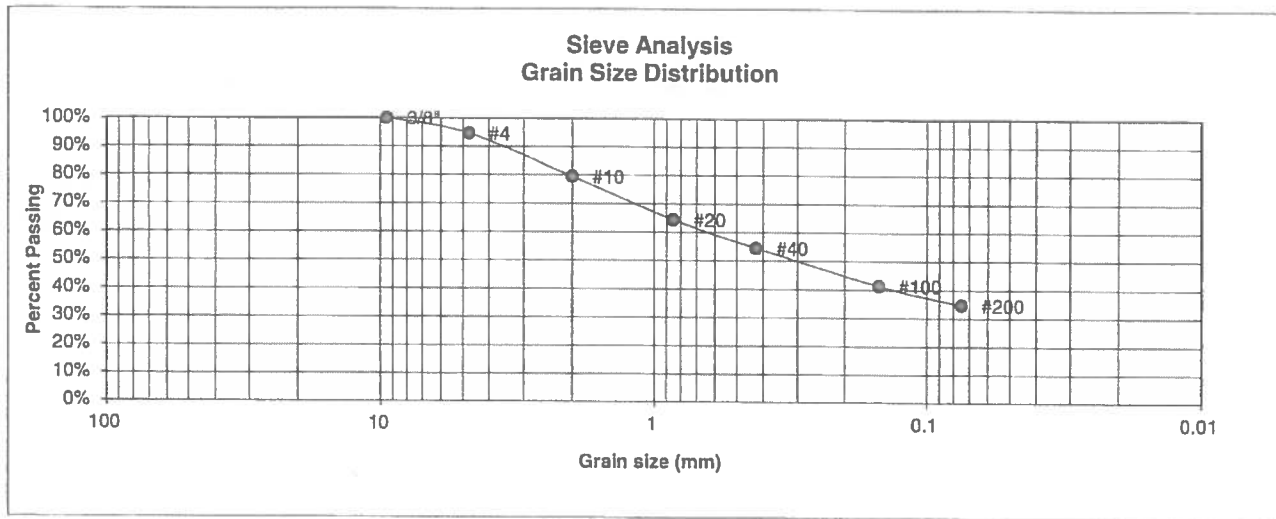
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		LL	10/25/17

JOB NO.:  
170837

FIG NO.:  
C-8

UNIFIED CLASSIFICATION SC  
 SOIL TYPE # 2  
 TEST BORING # 2  
 DEPTH (FT) 5

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.7%
10	79.5%
20	64.4%
40	54.5%
100	41.4%
200	34.6%

Atterberg  
Limits  
Plastic Limit  
Liquid Limit  
Plastic Index

<u>Swell</u>	
Moisture at start	4.2%
Moisture at finish	9.5%
Moisture increase	5.3%
Initial dry density (pcf)	211
Swell (psf)	556



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**LABORATORY TEST  
RESULTS**

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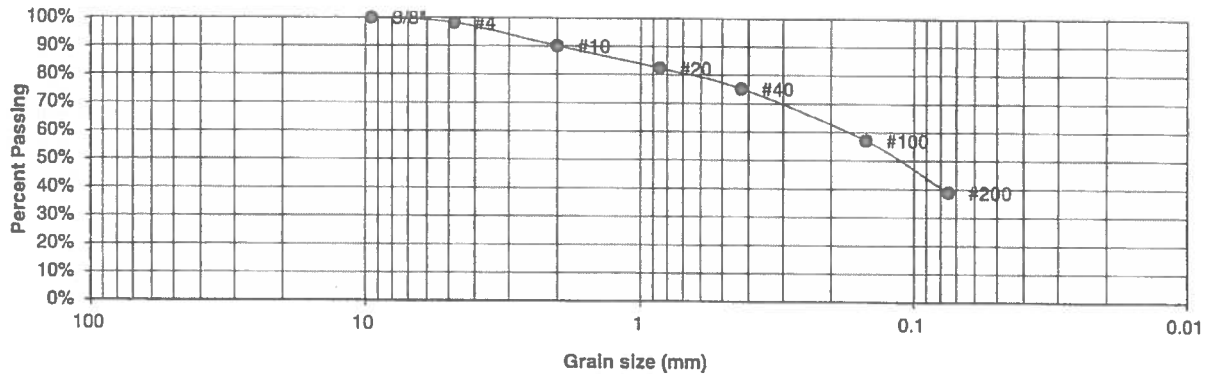
JOB NO.:  
170837

FIG NO.:  
C-9

UNIFIED CLASSIFICATION SC  
 SOIL TYPE # 2  
 TEST BORING # TP-4  
 DEPTH (FT) 5-6

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

Sieve Analysis  
 Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.2%
10	90.1%
20	82.3%
40	75.2%
100	57.1%
200	38.9%

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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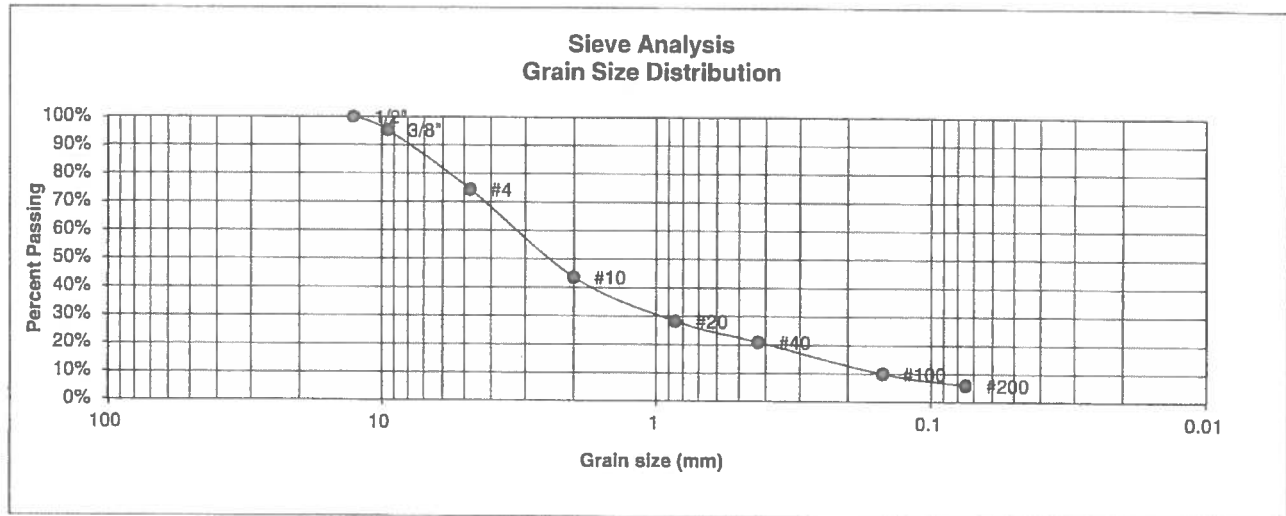
10/25/17

JOB NO.:  
 170837

FIG NO.:  
 C-10

**UNIFIED CLASSIFICATION** SM-SW  
**SOIL TYPE #** 2  
**TEST BORING #** TP-5  
**DEPTH (FT)** 6-8

**CLIENT** CARL TURSE  
**PROJECT** ROLLIN RIDGE ESTATES  
**JOB NO.** 170837  
**TEST BY** BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.2%
4	74.4%
10	43.6%
20	28.2%
40	20.9%
100	10.0%
200	6.0%

**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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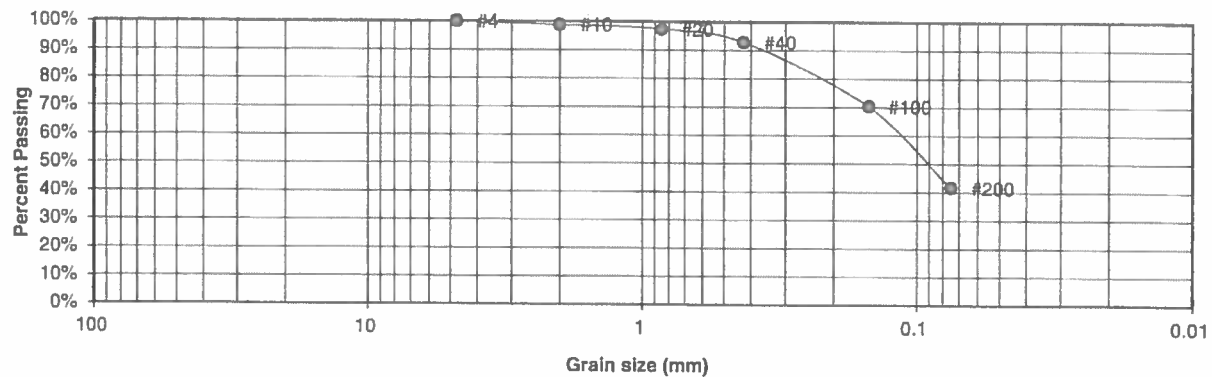
JOB NO.:  
 170837

FIG NO.:  
 C-11

UNIFIED CLASSIFICATION SC  
 SOIL TYPE # 2  
 TEST BORING # TP-6  
 DEPTH (FT) 3-8

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

Sieve Analysis  
 Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.9%
20	97.4%
40	92.8%
100	70.3%
200	41.7%

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

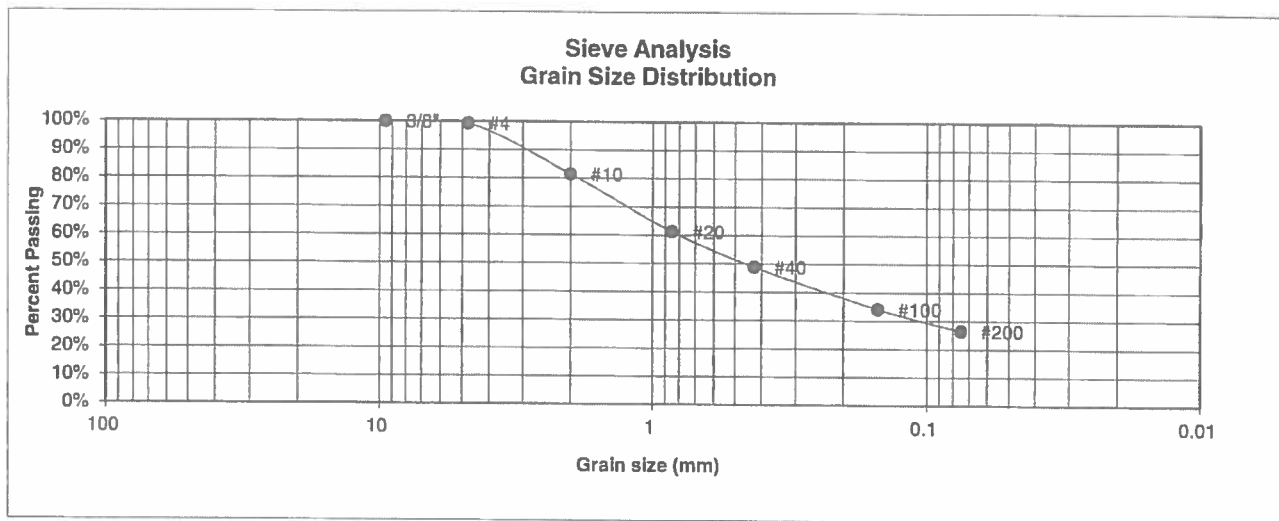
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JOB NO.:  
 170837

FIG NO.:  
 C-12

UNIFIED CLASSIFICATION SM  
 SOIL TYPE # 2  
 TEST BORING # TP-11  
 DEPTH (FT) 4-6

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.2%
10	81.5%
20	61.3%
40	48.8%
100	34.2%
200	26.4%

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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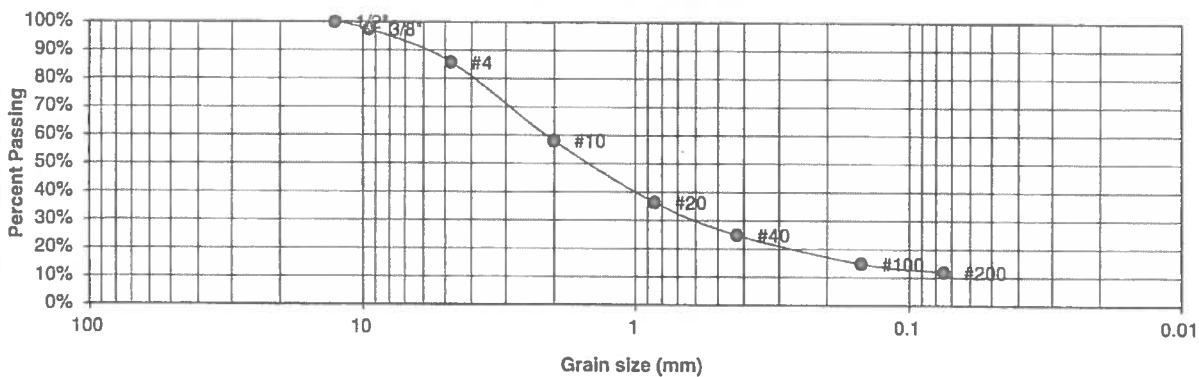
FIG NO.:

C-13

UNIFIED CLASSIFICATION SM  
 SOIL TYPE # 3  
 TEST BORING # 2  
 DEPTH (FT) 15

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.4%
4	85.8%
10	58.1%
20	36.4%
40	24.9%
100	14.8%
200	11.9%

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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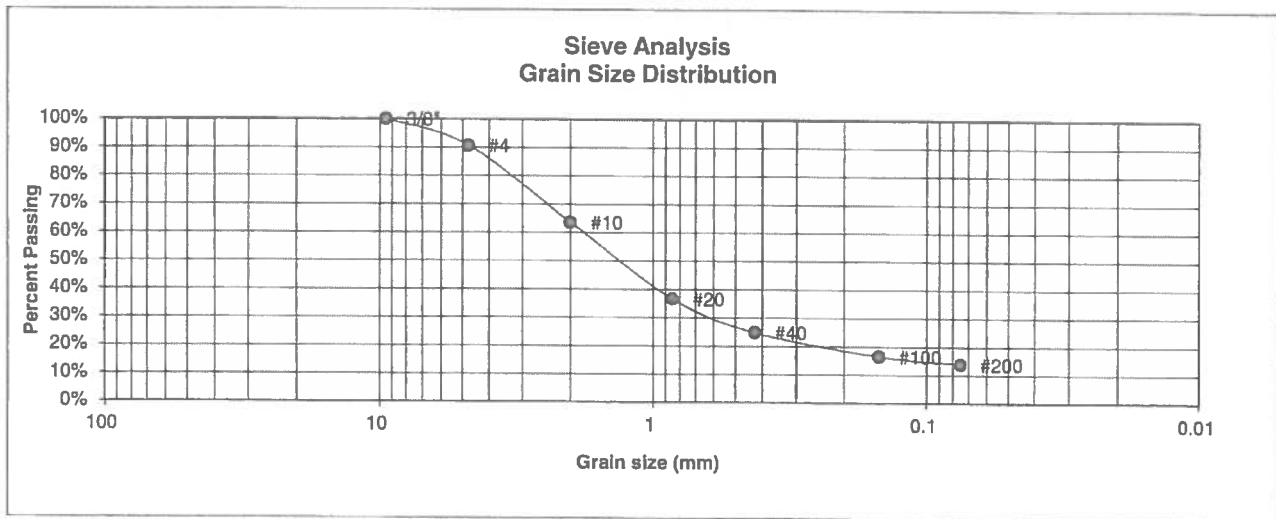
JOB NO.:  
170837

FIG NO.:  
C-14



UNIFIED CLASSIFICATION SM  
 SOIL TYPE # 3  
 TEST BORING # TP-3  
 DEPTH (FT) 5-6

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	90.7%
10	63.6%
20	36.7%
40	24.9%
100	16.6%
200	13.9%

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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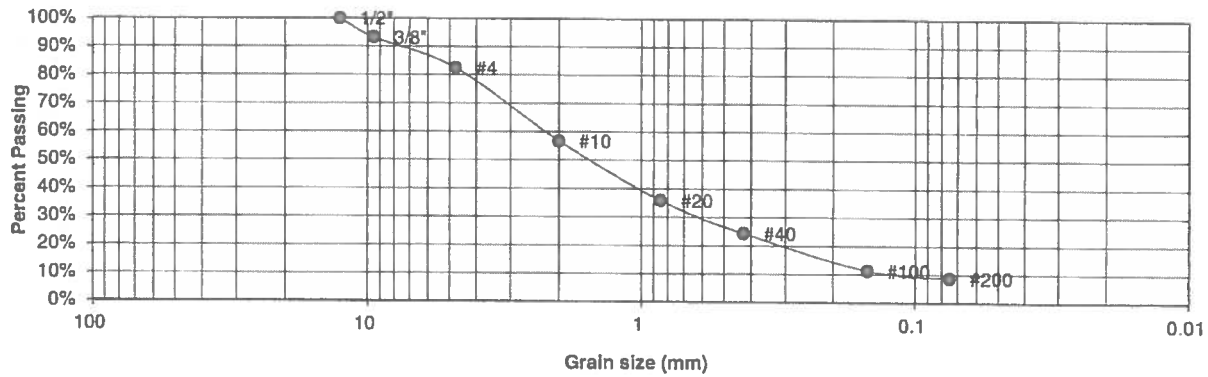
JOB NO.:  
170837

FIG NO.:  
C-15

UNIFIED CLASSIFICATION SM-SW  
 SOIL TYPE # 3  
 TEST BORING # TP-7  
 DEPTH (FT) 6-8

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

Sieve Analysis  
 Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	93.2%
4	82.5%
10	56.8%
20	35.9%
40	24.3%
100	11.3%
200	8.8%

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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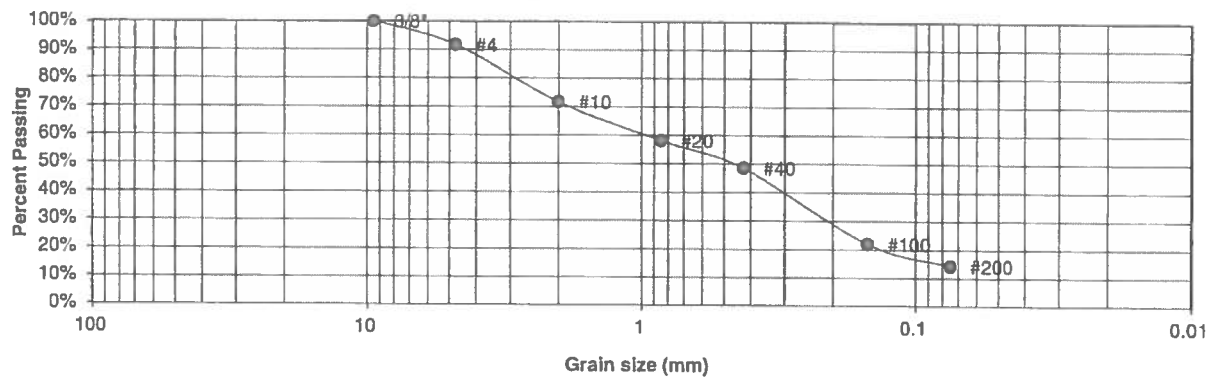
JOB NO.:  
 170837

FIG NO.:  
 C-16

UNIFIED CLASSIFICATION SM  
 SOIL TYPE # 3  
 TEST BORING # TP-8  
 DEPTH (FT) 6-8

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

### Sieve Analysis Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.7%
10	71.7%
20	58.1%
40	48.5%
100	22.0%
200	14.3%

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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		LL	10/25/17

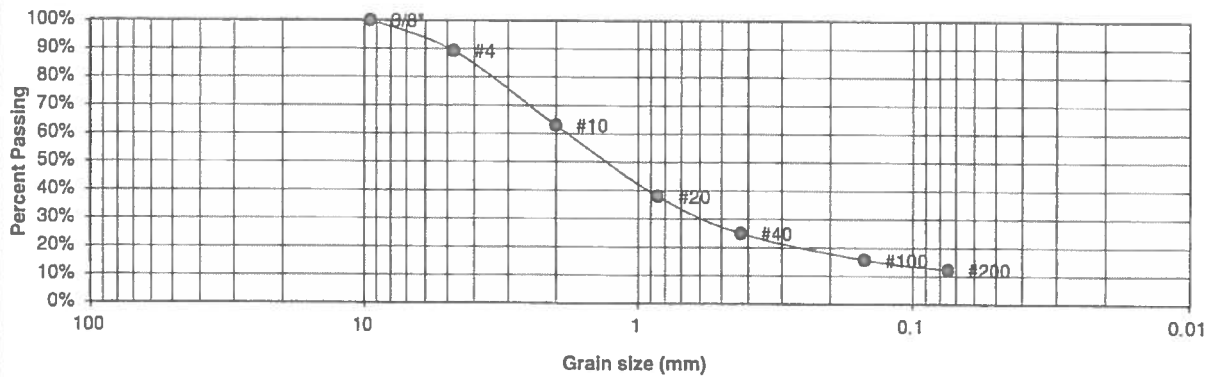
JOB NO.:  
170837

FIG NO.:  
C-17

UNIFIED CLASSIFICATION SM  
 SOIL TYPE # 3  
 TEST BORING # TP-12  
 DEPTH (FT) 5-6

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

Sieve Analysis  
 Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	89.2%
10	62.9%
20	38.0%
40	25.0%
100	15.7%
200	12.2%

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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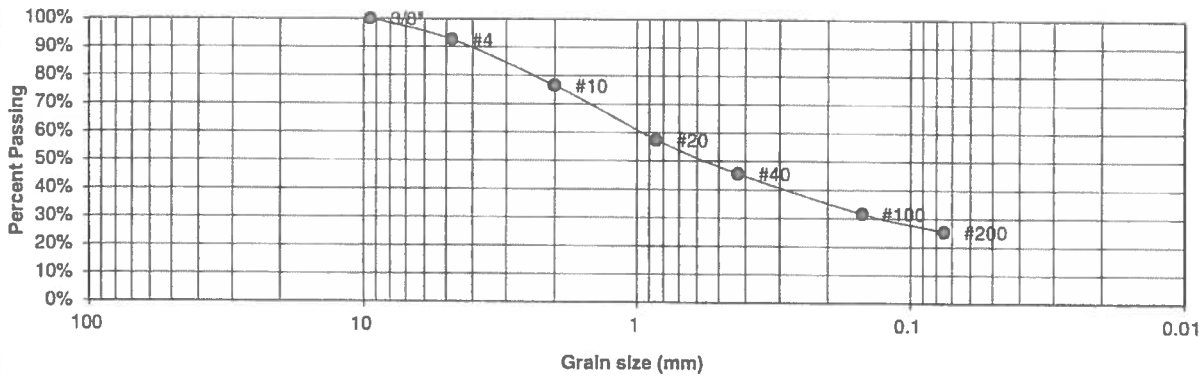
JOB NO.:  
 170837

FIG NO.:  
 C-18

UNIFIED CLASSIFICATION SM  
 SOIL TYPE # 3  
 TEST BORING # TP-13  
 DEPTH (FT) 1.5-8

CLIENT CARL TURSE  
 PROJECT ROLLIN RIDGE ESTATES  
 JOB NO. 170837  
 TEST BY BL

Sieve Analysis  
 Grain Size Distribution



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	92.6%
10	76.5%
20	57.5%
40	45.6%
100	31.7%
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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LABORATORY TEST  
 RESULTS

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DATE

10/25/17

JOB NO.:  
 170837

FIG NO.:  
 C-19

## **APPENDIX D: Soil Survey Descriptions**



## El Paso County Area, Colorado

### 21—Cruckton sandy loam, 1 to 9 percent slopes

#### Map Unit Setting

*National map unit symbol:* 367s  
*Elevation:* 7,200 to 7,600 feet  
*Mean annual precipitation:* 16 to 18 inches  
*Mean annual air temperature:* 42 to 46 degrees F  
*Frost-free period:* 110 to 120 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Cruckton and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Cruckton

##### Setting

*Landform:* Flats, hills  
*Landform position (three-dimensional):* Side slope, talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Alluvium derived from arkose

##### Typical profile

*A - 0 to 11 inches:* sandy loam  
*Bt - 11 to 28 inches:* sandy loam  
*C - 28 to 60 inches:* loamy coarse sand

##### Properties and qualities

*Slope:* 1 to 9 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Medium  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately high to high (0.60 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 5.9 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* B  
*Ecological site:* Sandy Divide (R049BY216CO)  
*Hydric soil rating:* No

Map Unit Description: Cruckton sandy loam, 1 to 9 percent slopes—El Paso County Area,  
Colorado

---

### **Minor Components**

#### **Other soils**

*Percent of map unit:*

*Hydric soil rating:* No

### **Data Source Information**

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 14, Sep 23, 2016



## El Paso County Area, Colorado

### 28—Ellicott loamy coarse sand, 0 to 5 percent slopes

#### Map Unit Setting

*National map unit symbol:* 3680  
*Elevation:* 5,500 to 6,500 feet  
*Mean annual precipitation:* 13 to 15 inches  
*Mean annual air temperature:* 47 to 50 degrees F  
*Frost-free period:* 125 to 145 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Ellicott and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Ellicott

##### Setting

*Landform:* Flood plains, stream terraces  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Sandy alluvium

##### Typical profile

*A - 0 to 4 inches:* loamy coarse sand  
*C - 4 to 60 inches:* stratified coarse sand to sandy loam

##### Properties and qualities

*Slope:* 0 to 5 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Somewhat excessively drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* Frequent  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 4.1 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7w  
*Hydrologic Soil Group:* A  
*Ecological site:* Sandy Bottomland LRU's A & B (R069XY031CO)  
*Other vegetative classification:* SANDY BOTTOMLAND (069AY031CO)  
*Hydric soil rating:* No

Map Unit Description: Ellicott loamy coarse sand, 0 to 5 percent slopes—El Paso County Area,  
Colorado

---

#### **Minor Components**

##### **Fluvaquentic haplaquoll**

*Percent of map unit:*

*Landform:* Swales

*Hydric soil rating:* Yes

##### **Other soils**

*Percent of map unit:*

*Hydric soil rating:* No

##### **Pleasant**

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes

### **Data Source Information**

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 14, Sep 23, 2016

## El Paso County Area, Colorado

### 41—Kettle gravelly loamy sand, 8 to 40 percent slopes

#### Map Unit Setting

*National map unit symbol:* 368h

*Elevation:* 7,000 to 7,700 feet

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Kettle and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Kettle

##### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy alluvium derived from arkose

##### Typical profile

*E - 0 to 16 inches:* gravelly loamy sand

*Bt - 16 to 40 inches:* gravelly sandy loam

*C - 40 to 60 inches:* extremely gravelly loamy sand

##### Properties and qualities

*Slope:* 8 to 40 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Somewhat excessively drained

*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* High  
(2.00 to 6.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Low (about 3.4 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

##### Minor Components

##### Other soils

*Percent of map unit:*

*Hydric soil rating:* No

Map Unit Description: Kettle gravelly loamy sand, 8 to 40 percent slopes—El Paso County Area, Colorado

---

**Pleasant**

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes

**Data Source Information**

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 14, Sep 23, 2016





## El Paso County Area, Colorado

### 68—Peyton-Pring complex, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 369f

*Elevation:* 6,800 to 7,600 feet

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Peyton and similar soils:* 40 percent

*Pring and similar soils:* 30 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Peyton

##### Setting

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Arkosic alluvium derived from sedimentary rock  
and/or arkosic residuum weathered from sedimentary rock

##### Typical profile

*A - 0 to 12 inches:* sandy loam

*Bt - 12 to 25 inches:* sandy clay loam

*BC - 25 to 35 inches:* sandy loam

*C - 35 to 60 inches:* sandy loam

##### Properties and qualities

*Slope:* 3 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high (0.20 to 0.60 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Moderate (about 7.3 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4c

*Hydrologic Soil Group:* B

*Ecological site:* Sandy Divide (R049BY216CO)

*Hydric soil rating:* No

### **Description of Pring**

#### **Setting**

*Landform:* Hills

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Arkosic alluvium derived from sedimentary rock

#### **Typical profile**

*A - 0 to 14 inches:* coarse sandy loam

*C - 14 to 60 inches:* gravelly sandy loam

#### **Properties and qualities**

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* High  
(2.00 to 6.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Low (about 6.0 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* B

*Ecological site:* Loamy Park (R048AY222CO)

*Hydric soil rating:* No

### **Minor Components**

#### **Other soils**

*Percent of map unit:*

*Hydric soil rating:* No

#### **Pleasant**

*Percent of map unit:*

*Landform:* Depressions

*Hydric soil rating:* Yes

## **Data Source Information**

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 14, Sep 23, 2016

## **APPENDIX E: Percolation Test Results**

Client: Carl Turse  
Test Location: Rollin Ridge Estates

Job Number: 170837

## PERCOLATION HOLES

Date Holes Prepared: 7/10/2017

Date Hole Completed: 7/11/2017

PH-1

Hole No. 1

Depth: 34"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	10	1/8
2	10	1/4
3	10	1/8

Perc Rate (min./in.): 80

Hole No. 2

Depth: 36"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	10	1/8
2	10	1/8
3	10	1/8

Perc Rate (min./in.): 80

Average Perc Rate (min./in.) 67

Hole No. 3

Depth: 33"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	10	1/4
2	10	1/4
3	10	1/4

Perc Rate (min./in.): 40

## PROFILE HOLE

Date Profile Hole Completed: 7/10/2017

Depth

0-10'

Visual Classification

Clay, sandy, tan

Remarks

No Bedrock  
No Groundwater

10 Blows / ft. @ 2'

12 Blows / ft. @ 4'

15 Blows / ft. @ 9'

LTAR = 0.30 gallons per square foot per day.

Remarks:

Observer: Stu Wood

By:



**ENTECH**  
**ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

## PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED:

LLC

DATE:

7/19/17

JOB NO.:

170837

FIG NO.:

E-1

Client: Carl Turse  
Test Location: Rollin Ridge Estates

Job Number: 170837

## PERCOLATION HOLES

Date Holes Prepared: 7/10/2017

Date Hole Completed: 7/11/2017

### PH-2

Hole No. 1

Depth: 46"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	10	1/16
2	10	1/8
3	10	1/16

Hole No. 2

Depth: 42"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	10	3/4
2	10	1/2
3	10	1/4

Hole No. 3

Depth: 40"

<u>Trial</u>	<u>Time (min.)</u>	<u>Water Level Change (in.)</u>
1	10	1/2
2	10	3/8
3	10	3/8

Perc Rate (min./in.): 160

Perc Rate (min./in.): 40

Perc Rate (min./in.): 27

Average Perc Rate (min./in.): 76

## PROFILE HOLE

Date Profile Hole Completed: 7/10/2017

### Depth

0-3'

3-12'

12-20'

### Visual Classification

Clay, sandy, tan

Sand, clayey, fine to coarse grained, tan

Sandstone, slightly silty, fine to coarse grained, tan

Blows / ft. @ 2'

Blows / ft. @ 4'

Blows / ft. @ 9'

### Remarks

Sandstone Bedrock at 12'

No Groundwater

LTAR = 0.20 gallons per square foot per day.

Remarks:

Observer: Stu Wood

By:



**ENTECH**  
**ENGINEERING, INC.**

505 ELKTON DRIVE  
COLORADO SPRINGS, COLORADO 80907

## PERCOLATION TEST RESULTS

DRAWN:

DATE:

CHECKED:  
LLL

DATE:  
7/19/17

JOB NO.:

170837

FIG NO.:

E-2

**APPENDIX F: El Paso County Health Department**  
**Septic Records**



Permit # DN0007076  
Date April 17, 2006

### Environmental Health Specialist:

Owner Cooper

Legal Description - See Attached -

Residence ☒ # Bedrooms 3 Commercial ☐ System Installer (Down to Earth 2006) (ROR Ditching 1993)

**SEPTIC TANK:**

Commercial ☒ Noncommercial ☐ Construction Material Concrete Capacity Gallon 1,250 Gallons

**DISPOSAL FIELD:**

Trench: Depth (Range) \_\_\_\_\_ Width \_\_\_\_\_ Total Length \_\_\_\_\_ Sq. Ft. \_\_\_\_\_

Bed: \_\_\_\_\_ Depth (Range) \_\_\_\_\_ Length \_\_\_\_\_ Width \_\_\_\_\_ Sq. Ft. \_\_\_\_\_

Depth of Rock \_\_\_\_\_ Under PVC \_\_\_\_\_ Type of cover on Rock \_\_\_\_\_

**DRYWELLS:** # of Pits \_\_\_\_\_ Rings (Pit 1) \_\_\_\_\_ Rings (Pit 2) \_\_\_\_\_ Working Depth #1 \_\_\_\_\_ #2 \_\_\_\_\_

Size (L x W) #1 \_\_\_\_\_ #2 \_\_\_\_\_ Total Sq. Ft. \_\_\_\_\_

## ROCKLESS SYSTEMS:

Standard Chamber: Type INFANTS #Chambers 72 Sq. Ft./Chamber 15.5 Bed Trench X

High Profile Units: Type	Chamber	#Chambers	Sq. Ft./Chamber	Bed	Trench

Reduction Allowed 70 % Sq. Ft. Required 917 Depth (Range) 12" → 36"

Sq. Ft. Installed \_\_\_\_\_ Equivalent Sq. Ft. Installed with Reduction  $930 \text{ FT}^2 + 930 \text{ FT}^2 = 1860 \text{ FT}^2$

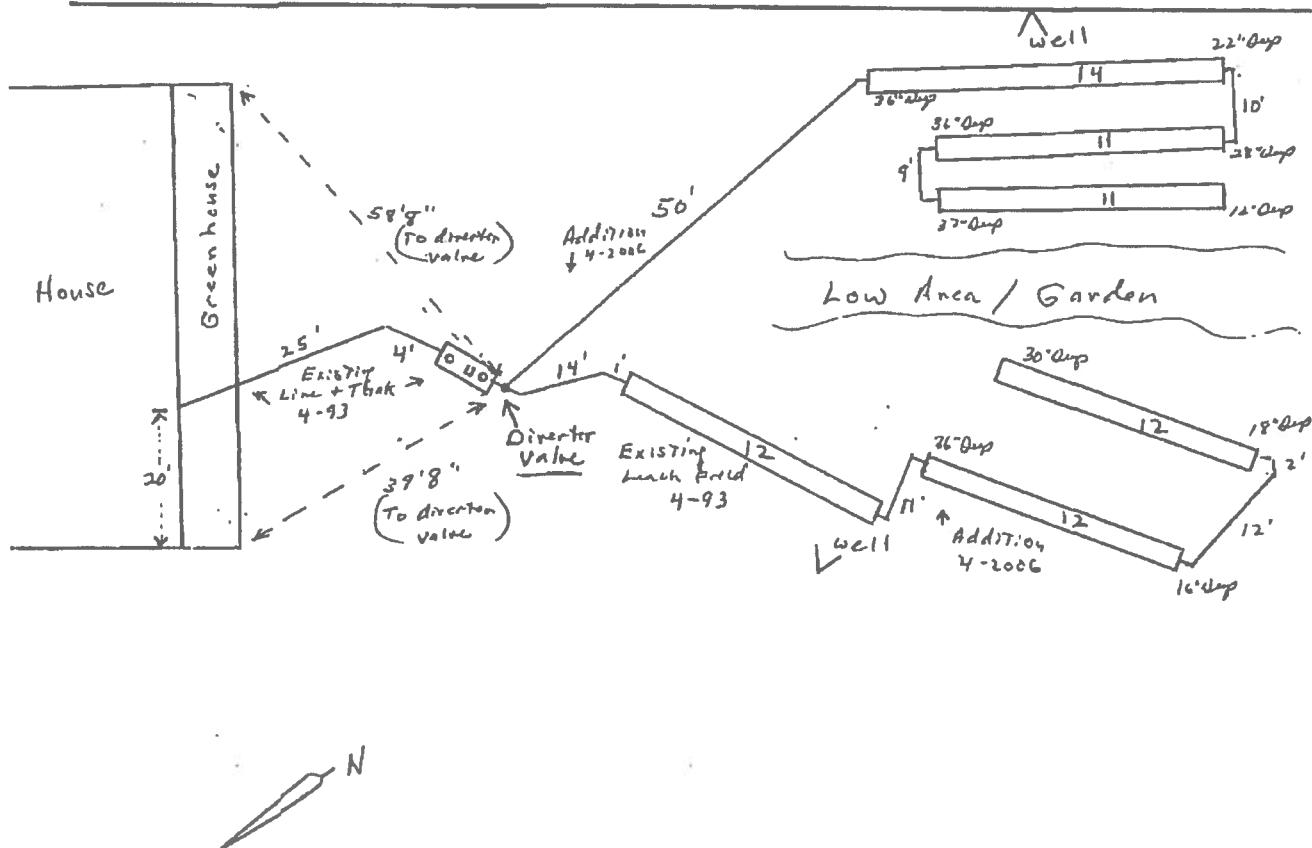
Engineer Design: Y (N) Engineering Firm \_\_\_\_\_

Approval letter provided? Y N

Well installed at time of septic system inspection? ☒ Y ☐ N Public Water?

\*Approval will be revoked if in the future the well is found to be within 50 feet of the septic tank and/or 100 feet of the disposal field.

**NOTES:**



EL PASO COUNTY  
DEPARTMENT OF HEALTH AND ENVIRONMENT  
301 S Union Blvd, Colorado Springs, Colorado 719-575-8636

INDIVIDUAL SEWAGE DISPOSAL SYSTEM PERMIT

OWNER NAME: KAY T COOPER  
ADDRESS: 3285 HODGEN ROAD  
CITY, STATE, ZIP: COLORADO SPRINGS CO 80921  
INSTALLED BY:

PERMIT NUMBER: ON0007076  
DATE PERMITTED: 3/30/2006  
PHONE NUMBER: 7194953152

This permit is issued in accordance with 25-10-107 Colorado Revised Statutes. PERMIT EXPIRES upon completion-installation of sewage-disposal system or at the end of twelve (12) months from date of issue- whichever occurs first-(unless work is in progress). If both a building and an ISDS permit are issued for the same property and construction has not commenced prior to the expiration date of the building permit, the ISDS permit shall expire at the same time as the building permit. This permit is revokable if all stated requirements are not met.  
Sewage disposal system to be installed by an El Paso County Licensed System Contractor or the property owner.

THIS PERMIT DOES NOT DENOTE APPROVAL OF ZONING AND ACREAGE REQUIREMENTS.

*Rosemary C. Baker-Martin*

DIRECTOR, EL PASO COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT

PERMIT EXPIRATION DATE :  
Expires twelve months from date of issue

*Janet Christensen* 578-3141  
ENVIRONMENTALIST / PHONE NUMBER\*

\* NOTE: FOR INSPECTIONS CALL 575-8699 BEFORE 8:30 A.M. OF THE DAY TO BE INSPECTED.  
(WEEKENDS & HOLIDAYS EXCLUDED)  
LEAVE THE ENTIRE SEWAGE DISPOSAL SYSTEM UNCOVERED FOR FINAL INSPECTION.

WATER SOURCE: WELL

MINIMUM SEPTIC TANK SIZE: Existing 1250 GALLONS

MINIMUM ABSORPTION AREA REQUIRED N/A SQ FT

PLANNING DEPARTMENT



ENUMERATION



FLOOD PLAIN



WASTEWATER



COMMENTS:

OWNER MAY ADD DESIRED SQUARE FOOTAGE DIRECTLY TO THE EXISTING LEACH FIELD.

DEPTH OF SYSTEM SHALL NOT EXCEED 4 FEET BELOW NATIVE GROUND SURFACE DUE TO BEDROCK AT 8 FEET. (SOIL PERCOLATION TEST OF FEB 1993).

IF A DIVERTER VALVE IS INSTALLED - A MINIMUM OF 917 SQUARE FEET ABSORPTION AREA MUST BE INSTALLED. IF OWNER DESIRES TO BRING EXISTING ABSORPTION AREA SQUARE FOOTAGE TO CURRENT REGULATION SIZE, AN ADDITIONAL 317 SQUARE FEET PLUS CURRENT 600 SQUARE FEET = 917 SQUARE FEET.

The Health Office shall assume no responsibility in case of failure or inadequacy of a sewage-disposal system, beyond consulting in good faith with the property owner or representative. Free access to the property shall be authorized at reasonable time for the purpose of making such inspections as are necessary to determine compliance with requirements of this law.

FOR ADMINISTRATIVE USE ONLY

Permit Ready: 3-30-06

Called

Mailed

Final Inspection Requested:

BY:

*Jackie Dumbath*

Date Called In:

*4/17/06 '6:24*

Phone #

*495-3660*

Septic Site will be ready:

*NOV*

Inspector \_\_\_\_\_

Record I.D. \_\_\_\_\_

7076

## EL PASO COUNTY DEPARTMENT OF HEALTH &amp; ENVIRONMENT

301 South Union Boulevard • Colorado Springs, CO • 80910-3123 • (719) 575-8635 • Fax: (719) 578-3188

**\*ALL PAYMENTS ARE DUE AT TIME OF SUBMITTAL IN CASH OR CHECK**

## APPLICATION FOR AN ON-SITE WASTEWATER TREATMENT SYSTEM PERMIT

☐ NEW CONSTRUCTION ☐ MINOR REPAIR ☒ MAJOR REPAIR/ADDOwner Kay T Cooper / Michael D Stowell Daytime Phone 719-84Address of Property 32 F5 Hodgen Road City & Zip C/S CO 80921Legal Description E2 NE4 NW4 EX N 30 FT SEC 27-11-66Owner's MAILING Address same City, State & Zip \_\_\_\_\_Lot Size 21.62 Tax Schedule # 61270-00-055Type of Building: ☐ Frame ☐ Modular ☐ Mobile ☐ Commercial ☐ Manufactured ☐ Other \_\_\_\_\_Water Supply: ☐ Well or Spring ☐ Cistern ☐ Public Inside City Limits: ☐ No ☐ Yes-City \_\_\_\_\_☐ MAIL PERMIT OR ☒ PICK UP PERMIT ☐ THERE IS AN ADDITIONAL RESIDENCE ON THIS PROPERTYMAXIMUM POTENTIAL NUMBER OF BEDROOMS 3Percolation Test Attached Y Basement N Garbage Disposal Y N Clothes Washer Y N

I have supplied a plot plan as described on the back of this form. I acknowledge the completeness of the application is conditional upon such further mandatory and additional tests and reports as may be required by the Department to be made and furnished by an applicant for purposes of evaluating the application, and issuance of the permit is subject to such terms and conditions as deemed necessary to ensure compliance with rules and regulations adopted pursuant to C.R.S. 25-10-107 et. seq. I hereby certify all represented to be true and correct to the best of my knowledge and belief, and are designed to be relied on by the El Paso County Department of Health and Environment in evaluating the same for purposes of issuing the permit applied for herein. I further understand any falsification or misrepresentation may result in the denial of the application or revocation of any permit granted based upon said application and in legal action for perjury as provided by law.

OWNER'S SIGNATURE see attached application Date 3/29/06You will be notified by telephone when your permit is ready for pick up. Please allow a minimum of 10 days for new septic.

## DEPARTMENT OF HEALTH USE ONLY

Existing 1250 Minimum Tank Capacity

N/A Minimum Absorption Area

30 March 2006 Date of Site Inspection

REMARKS: Owner may add desired square footage directly to the existing leach field. Depth of system shall not exceed 4ft below native ground surface due to bedrock at 3ft. (Soil percolation test of Feb. 1993). If a diverter valve is installed - a minimum of 917 ft<sup>2</sup> absorption area must be installed. If owner desires to bring existing absorption area square footage to current regulation size, an additional 317 ft<sup>2</sup> + current 600 ft<sup>2</sup> = 917 ft<sup>2</sup>.

EHS INSPECTOR Janet Christensen DATE 03-30-06 APPROVED \_\_\_\_\_ DENIED \_\_\_\_\_

## FEES AS OF 02/22/2006:

NEW CONSTRUCTION \$350.00 + Planning Department Surcharge of \$118.00

MAJOR REPAIR/ADDITION \$430.00

MINOR REPAIR/ADDITION \$179.00

DATE TO PLANNING / WASTEWATER: \_\_\_\_\_

DATE TO FLOODPLAIN/ENUMERATIONS \_\_\_\_\_

PLEASE COMPLETE THE BACK OF THIS FORM

- 1) We require an original of your **PERCOLATION (PERC) TEST** with an original professional engineer's (PE) stamp and signature as well as a plot of the percolation test hole locations with measurements from a fixed reference point.
- 2) **PROPERTY ADDRESS OR LOT NUMBER MUST BE POSTED AND CLEARLY VISIBLE FROM ROAD. PERC HOLES MUST BE CLEARLY MARKED OR AN ADDITIONAL CHARGE FOR A RETURN TRIP TO THE SITE MAY BE ASSESSED.**
- 3) A **PLOT PLAN** must be drawn (not to scale) on an 8 1/2 x 11 sheet of paper. The plot plan must include:
  - 1) a north bearing
  - 2) property lines
  - 3) property dimensions
  - 4) all buildings (proposed or existing)
  - 5) proposed septic system site
  - 6) alternate septic system site
  - 7) driveway (proposed or existing and name of adjoining street)
- 4) Initial any of the following features that apply to your property and **INCLUDE** them on your **PLOT PLAN**.
 

<input type="checkbox"/> Well(s)	<input type="checkbox"/> Adjacent property well(s)	<input type="checkbox"/> Subsoil drain
<input type="checkbox"/> Cistern	<input type="checkbox"/> Water line	
- 5) Initial any of the following that are within 100 feet of your proposed septic system and **INCLUDE** on your **PLOT PLAN**.
 

<input type="checkbox"/> Spring(s)	<input type="checkbox"/> Lake(s)
<input type="checkbox"/> Pond(s)	<input type="checkbox"/> Stream(s)
<input type="checkbox"/> Dry Gulch(es)	<input type="checkbox"/> Natural drainage course(s)

**6) GIVE COMPLETE DIRECTIONS TO THE PROPERTY FROM A MAIN HIGHWAY**

Hwy 83 North

West on Hodgen

about 1/4 mile driveway on LEFT side.

\* please call before going out \*

Cell-210-1971


Percolation rate 18 min / inch  
bedrock @ 8 ft  
9.17 ft<sup>2</sup> = current reg. 13.6 chambers trench  
or 39 in bed  
13.6 chambers - credited for 600 ft<sup>2</sup>

# OWTS\_V1.pdf Markup Summary

Locked (3)


Note: any studies done in the area identified for tract B was not reviewed as this is to be held for future development.

Drive

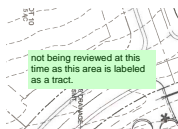
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**Space:**


Note: any studies done in the area identified for tract B was not reviewed as this is to be held for future development.



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the PSW layout is not matching final plat



**Subject:** Text Box  
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**Date:** 12/30/2019 9:05:48 AM  
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**Color:**   
**Layer:**  
**Space:**

not being reviewed at this time as this area is labeled as a tract.