ENTECH
ENGINEERING, INC.

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

SOIL, GEOLOGY, GEOLOGIC HAZARD, AND WASTEWATER STUDY JENNINGS SUBDIVISION JUDGE ORR ROAD AND CURTIS ROAD EL PASO COUNTY, COLORADO

Prepared for

Catamount Engineering
321 West Henrietta Avenue, Suite A
Woodland Park, Colorado 80863

Attn: David Mijares

April 24, 2017

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford
Geologist

LLL/rm

Encl.

Entech Job No. 170314
AAprojects/2017/170314 countysoil/geo/wastewater

Reviewed by:

Joseph G. Goode, P.E.
President

COLORADO LICENSED
JOSEPH COLLIN GOODE
23725
4/24/17
PROFESSIONAL ENGINEER

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1.0 SUMMARY

Project Location

The project lies in a portion of the SE¼ of Section 33, Township 12 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 8½ miles east of Colorado Springs, Colorado. The property is bounded by Judge Orr Road to the south and Curtis Road to the northeast.

Project Description

Total acreage involved in the project is approximately forty acres. The proposed site development consists of seven rural residential lots. The development will utilize individual water wells and on-site wastewater treatment systems.

Scope of Report

This report presents the results of our geologic evaluation and treatment of engineering geologic hazard study.

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 flood plain and potentially seasonally shallow groundwater areas. Based on the proposed development plan, it appears that these areas have been designated as a no build area. 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 SE¼ of Section 33, Township 12 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 8½ miles east of Colorado Springs, Colorado, north and west of Judge Orr Road and Curtis Road. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is generally gently sloping to the southeast. The drainages on site flow in a southeasterly direction through the central portion of the site. Water was not observed in the drainages on-site 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, weeds, cacti, and yuccas, and scattered trees along the southern portion of the site. Site photographs, taken March 13, 2017, are included in Appendix A.

Total acreage involved in the proposed development is approximately forty acres. Seven single-family rural residential lots are proposed. The proposed lots will be approximately 5 acres. The area will be serviced individual water wells and on-site wastewater treatment systems. The proposed Development Plan is presented in Figure 3.

3.0 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.

- The site will be evaluated for 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 Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on March 13, 2017.

Two Test Borings were performed for the percolation test profile holes, and two tactile test pits for On-site Wastewater Treatment System (OWTS) were excavated across the site to determine general soil and bedrock characteristics. The locations of the profile holes and test pits are indicated on the Site Plan/Test Boring Location Map, Figure 4. The Test Boring 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, Atterberg Limits ASTM D-4318, volume change testing using FHA Swell testing. 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. Approximately 18 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 Upper Cretaceous in age. The bedrock underlying the site consists of the Dawson Formation. Overlying this formation are unconsolidated deposits of alluvial soils of Quaternary Age. The alluvial soils were deposited by water on site and as stream deposits along the drainages on-site. 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 two soil types on the site (Figure 4). In general, the soils classify as loamy sand and gravelly sandy loam. The soils are described as follows:

Type	Description
8	Blakeland Loamy Sand, 1 to 9% slopes
19	Columbine Gravelly Sandy Loam, 0 to 3% slopes

Complete descriptions of each soil type are presented in Appendix D. The soils have generally been described to have moderately rapid to rapid permeability. 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 Falcon NW 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. Three 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 drainages on-site.

Qa1 **Alluvium one of Holocene Age:** This material is a water-deposited alluvium, typically classified as a silty to well-graded sand, brown to dark brown in color and of moderate density. The alluvium can sometimes be highly stratified containing thin layers of very silty and clayey soil.

Qa3 **Alluvium Three of Pleistocene Age:** This material consists of lower stream terrace deposits. The alluvium typically consists of silty to clayey gravelly sands. This deposit is usually highly stratified and may contain lenses of silt, clay or cobbles.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon Quadrangle* distributed by the Colorado Geological Survey in 2012 (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 1^0 x 2^0 Quadrangle*, distributed by the US Geological Survey in 1981 (Reference 6). The Test Borings 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 Test Borings and Test Pits can be grouped into three general soil types. The soils were classified using the Unified Soil Classification System (USCS). The test pit soils were classified using the USDA Textural Soil Classification.

Soil Type 1 slightly silty to silty sand, well-graded sand, clayey to very clayey sand (SM, SM-SW, SW, SC), encountered in both of Test Borings and all of the test pits at the existing ground surface and extending to depths ranging from 5 foot to 14 feet bgs. These soils were encountered at medium dense states and at dry to very moist conditions. Samples tested had 5 to 44 percent passing the No. 200 Sieve. FHA Swell Testing on a sample of the very clayey sand resulted in an expansion pressure of 1515 psf, which is in the moderate expansion range.

Soil Type 2 sandy clay (CL), encountered in Test Pit No. 2 at 5 feet bgs and extending to the termination of the test pit (8 feet). The clay was encountered at soft to firm consistencies and at moist to very moist conditions. The sample tested had 60 percent passing the No. 200 Sieve.

Soil Type 3 very clayey sandstone (SC), encountered in both of Test Borings at 14 feet bgs and extending to the termination of the test borings (20 feet). The sandstone was encountered at medium dense to dense states and at moist conditions. A weathered zone was encountered in at approximately 18 feet in Test Boring No. 2. Samples tested had 31 to 43 percent passing the No. 200 Sieve. The sandstone in this area is commonly interbedded with expansive claystone and siltstone .

The Test Boring and Test Pit 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 encountered in the test borings at depths ranging from 6½ to 15½ feet. Signs of seasonally occurring groundwater were observed in Test Pit No. 2 at 6 feet. Areas of water, seasonal shallow groundwater water, and potential seasonal shallow groundwater have been mapped along the drainages 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 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

As mentioned previously, detailed mapping has been performed on this site to produce an Engineering Geology Map Figure 6. This map shows the location of various geologic conditions of which the developers should be cognizant during the planning, design and construction stages of the project. These hazards and the recommended mitigation techniques are as follows:

Areas of Erosion and Gullying

These are areas that are undergoing erosion by water and sheetwash producing gullies and rill erosion.

Mitigation: Due to the nature of the soils on this site, virtually all the soils are subject to erosion by wind and water. Areas of erosion can occur across the entire site, particularly if the soils are disturbed during construction. Vegetation reduces the potential for erosion. The areas identified where erosion is actually taking place may require check dams, regrading and revegetation using channel lining mats to anchor vegetation. Further recommendations for erosion control are discussed under Section 9.0 "Erosion Control" of this report. Recommendations pertaining to revegetation may require input from a qualified landscape architect and/or the Natural Resource Conservation Service (previously Soil Conservation Service).

Expansive Soils

Expansive soils were encountered in the test borings drilled and in Test Pit No. 2 on the site. 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. These occurrences should be identified and dealt with on an individual basis.

Mitigation Should expansive soils be encountered beneath the foundation, mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at 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. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be determined after additional investigation of each building site.

Groundwater and Floodplain Areas

Areas within the drainages on-site have been identified as areas of potentially seasonally high groundwater areas. Water was not flowing in the any of the drainages at the time of this investigation. The site is not mapped within floodplain zones according to the FEMA Map No. 08041CO575F, Figure 7 (Reference 7).

Potentially Seasonal Shallow Groundwater Area

In these areas, we would anticipate the potential for periodically high subsurface moisture conditions, frost heave potential and highly organic soils. The majority of these areas lie within defined drainages which can likely be avoided by the proposed development.

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. Structures should not block drainages. All organic material should be completely removed prior to any fill placement. Finished floor levels must be located a minimum of one foot above floodplain levels.

6.1 Relevance of Geologic Conditions to Land Use Planning

As mentioned earlier in this report, we understand that the development will be single family rural residential lots. It is our opinion that the existing geologic and engineering geologic conditions will impose some constraints on the proposed development and construction. The most significant problems affecting development will be those associated with the expansive soil and floodplain on site that can be properly mitigated or avoided. Other hazards on site may be satisfactorily mitigated through proper engineering design and construction practices.

The upper materials are typically at medium dense states. The granular soils encountered in the upper soil profiles of the test borings and test pits should provide good support for foundations. Loose soils if encountered at foundation depth will require mitigation. Foundations anticipated for the site are standard spread footings possibly in conjunction with overexcavation in areas of expansive soils or loose soils. Excavation is anticipated to be moderate with rubber tired equipment for the site sand materials. Expansive layers may also be encountered in the soil and bedrock on this site. Areas of expansive soils encountered on site are sporadic; therefore, none have been indicated on the maps. Expansive soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development.

In summary, development of the site can be achieved if the items mentioned above are mitigated. These items can be mitigated through proper design and construction or through avoidance. Investigation on each lot is recommended prior to construction.

7.0 ECONOMIC MINERAL RESOURCES

Some of the sandy materials on-site could be considered a low-grade sand resource. According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 8), the area is not mapped with any aggregate 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 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-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.

8.0 ON-SITE WASTEWATER TREATMENT

The site was evaluated for On-site Wastewater Treatment Systems (OWTS) for the proposed lots in accordance with El Paso Land Development Code. Two (2) percolation tests and two (2) tactile test pits were performed across the site. Percolation test and tactile test pits were located in anticipated locations of proposed on-site wastewater treatment system (OWTS) for the development. The approximate locations of the profile holes and test pits are indicated on Figure 3 and 6, and on the Septic Suitability Map, Figure 9. The locations were chosen to determine a general understanding of the soil and bedrock conditions across the site. The results of the percolation tests and test pits are presented in Table 2. The specific 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 two 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 moderately rapid to rapid percolation rates.

The percolation rates varied from 12 (PH-1) to 25 (PH-2) minutes per inch. The percolation rates are suitable for a conventional OWTS. Percolation rates slower than 60 minutes per inch will require designed systems. Additional drilling may identify areas where faster rates are encountered that are suitable for conventional systems.

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 The Profile Holes at 14 feet. Designed systems are required in areas of shallow bedrock.

Soils encountered in the tactile test pits consisted of sandy loam to gravelly sandy loam, gravelly loamy sand, and sandy clay. The limiting layers encountered in the test pits are the sandy loam and sandy clay, which corresponds to an LTAR values of 0.50 to 0.15 gallons per day per square foot. The conditions encountered in Test Pit No. 1 is suitable for a conventional OWTS, and the conditions in Test Pit No. 2 will require a designed system. Signs of seasonal shallow groundwater were observed at depths ranging from 5½ feet in Test Pit No. 2.

Absorption fields must be maintained a minimum of 4 feet above groundwater or bedrock. Groundwater was encountered in the profile holes at depths ranging from 6½ to 15½, and signs of seasonally shallow groundwater were observed in Test Pit No. 2 at 5½ feet. Bedrock was encountered in the profile holes at 14 feet.

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems 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 Guidelines and properly maintained. Based on the testing performed as part of this investigation and the type of project designed systems will likely be required for the majority of the lots. A Septic Suitability Map is presented in Figure 9. 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 ponded areas and 25 feet from dry gulches. It should be noted that additional testing will be required for the individual lots prior to construction on each lot.

9.0 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 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.

10.0 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some constraints on development and construction of the site. The majority of these conditions 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 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 Catamount Engineering 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.

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TABLES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

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PROJECT JUDGE ORR RD & CURTIS RD
JOB NO. 170314

SOIL TYPE	TEST BORING NO./TEST PIT NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			17.8					SM	SAND, SILTY
1	1	10			44.1			1515		SC	SAND, VERY CLAYEY
1	2	10			12.3					SM	SAND, SILTY
1	TP-1	2-3			4.6					SW	SAND
1	TP-2	2			5.4					SM-SW	SAND, SLIGHTLY SILTY
2	2	6			60.8					CL	CLAY, SANDY
3	1	15			42.9					SC	SANDSTONE, VERY CLAYEY
3	1	20			31.1					SC	SANDSTONE, CLAYEY

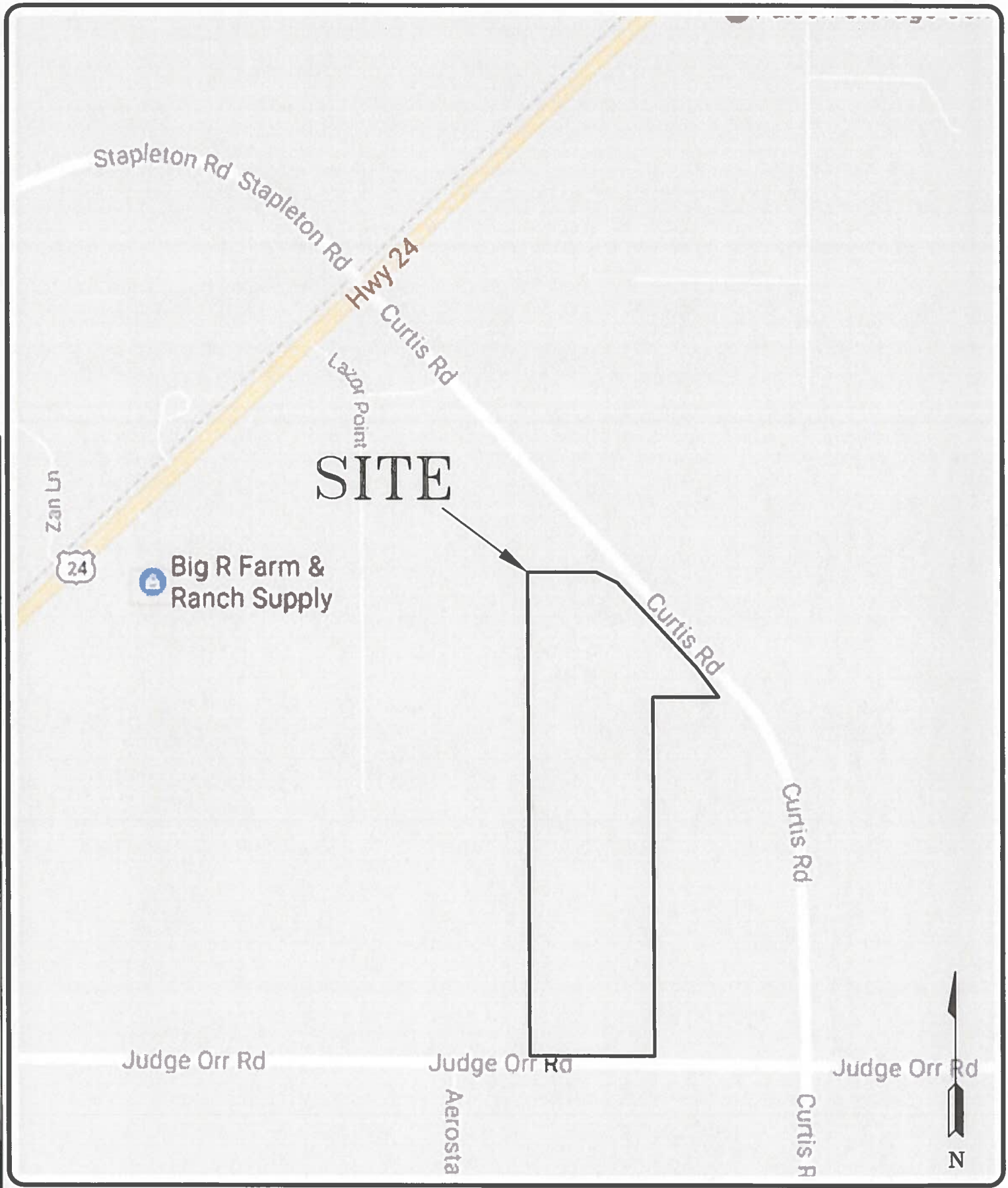
Table 2: Summary of Percolation Test and Tactile Test Pit Results

Percolation Test No.	Percolation Rate (min/in)	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
1	12	14	15.5
2	25	14	6.5

Test Pit No.	USDA Soil Type Limiting Layer	LTAR Value	Depth to Bedrock (ft.)	Depth to Seasonally Occurring Groundwater (ft.)
1	2A	0.50	N/A	N/A
2	4A*	0.15	N/A	5.5*

*- Conditions that will require an engineered OWTS

FIGURES



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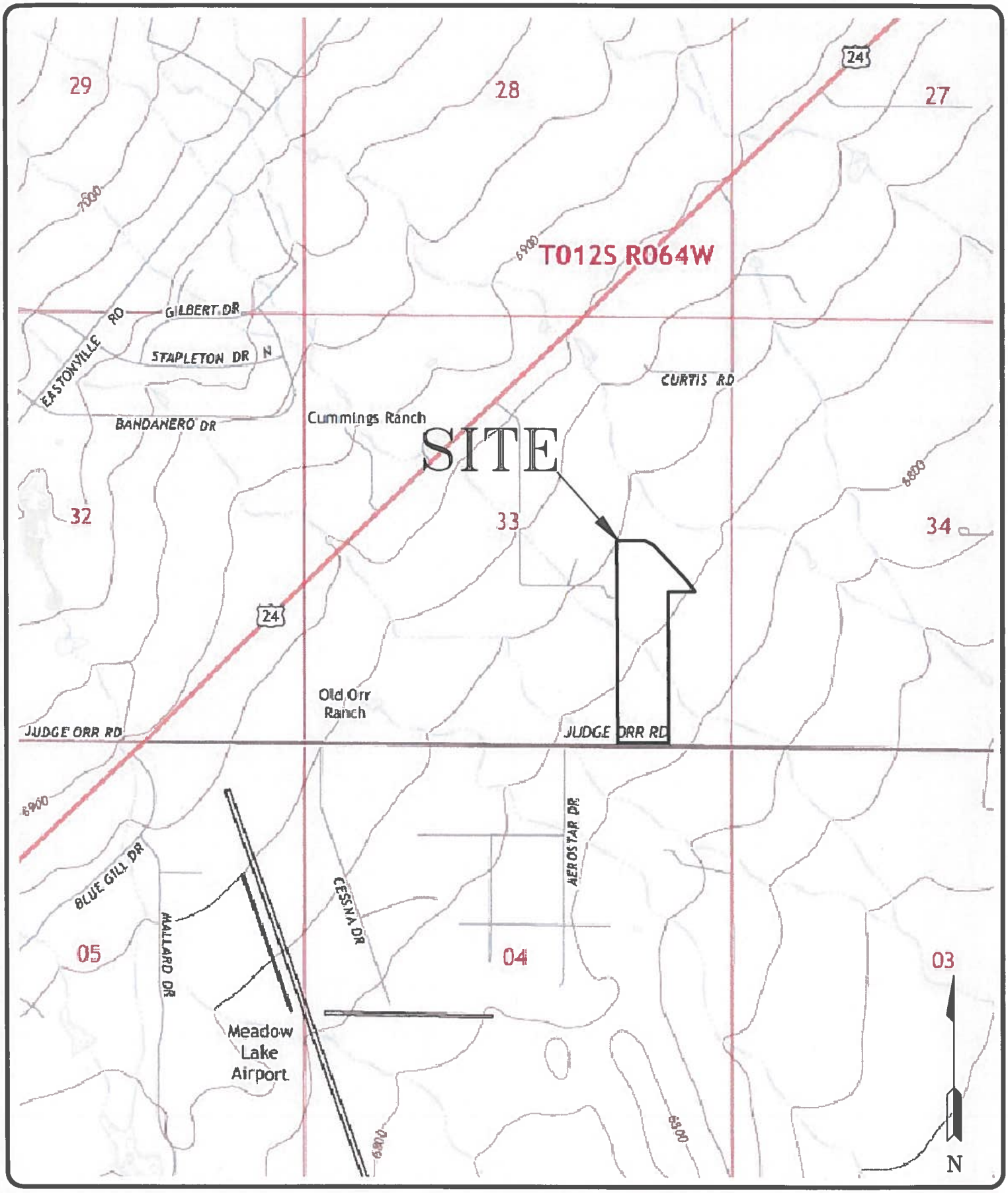
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
JENNINGS SUBDIVISION
JUDGE ORR ROAD AND CURTIS ROAD
EL PASO COUNTY, CO.
FOR: CATAMOUNT ENGINEERING

DRAWN:	DATE:	CHECKED:	DATE:
LLL	4/14/17		

JOB NO.: 170314

FIG NO.: 1



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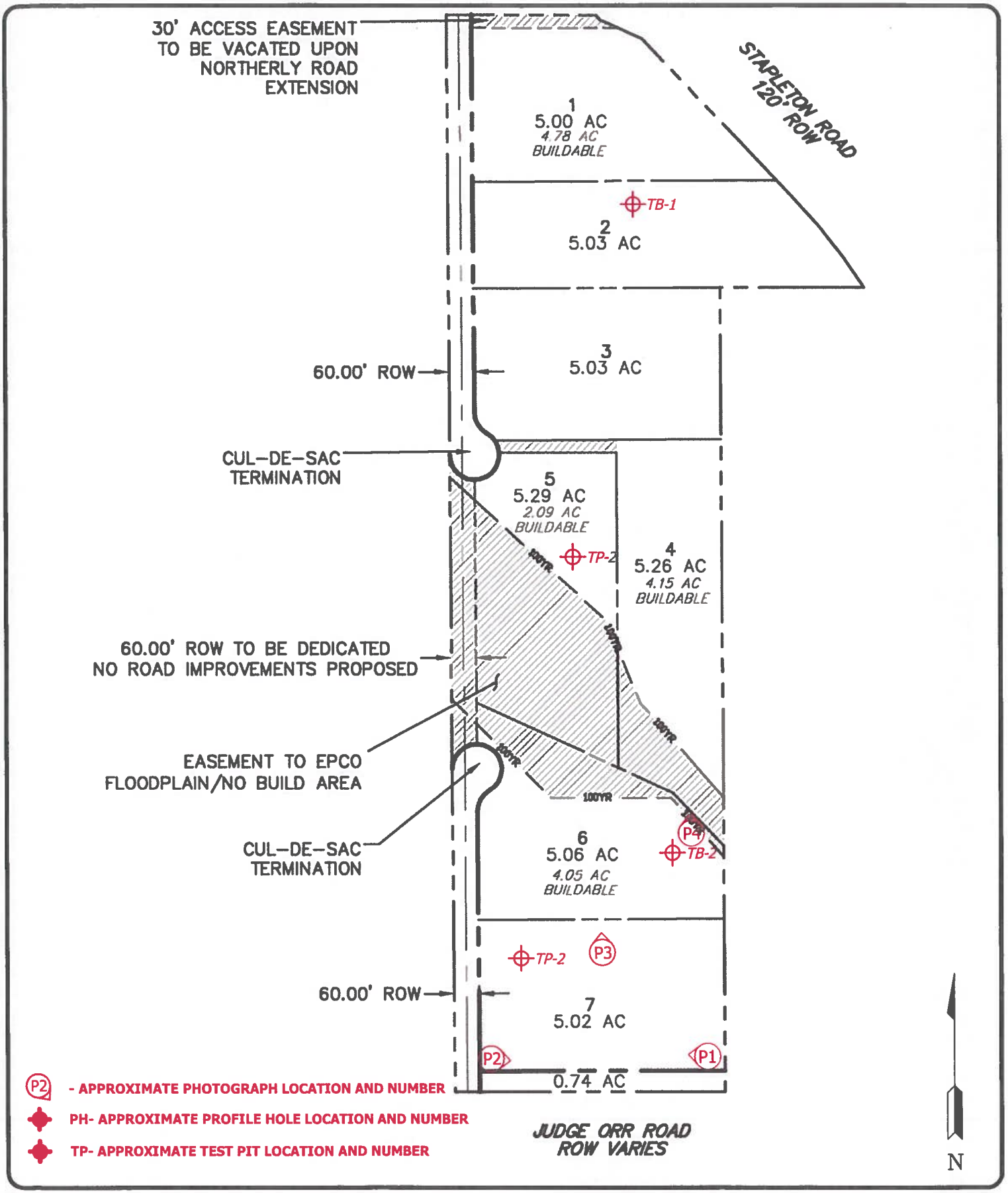
USGS MAP
JENNINGS SUBDIVISION
JUDGE ORR ROAD AND CURTIS ROAD
EL PASO COUNTY, CO.
FOR: CATAMOUNT ENGINEERING

DRAWN:	DATE:	CHECKED:	DATE:
LLL	4/14/17		

JOB NO.: 170314

FIG NO.: 2



P2 - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER

PH- APPROXIMATE PROFILE HOLE LOCATION AND NUMBER

TP- APPROXIMATE TEST PIT LOCATION AND NUMBER

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SITE CONCEPT PLAN
JENNINGS SUBDIVISION
JUDGE ORR ROAD AND CURTIS ROAD
EL PASO COUNTY, CO.
FOR: CATAMOUNT ENGINEERING

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JOB NO.: 170314

FIG NO.: 3

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SOIL SURVEY MAP
JENNINGS SUBDIVISION
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EL PASO COUNTY, CO.
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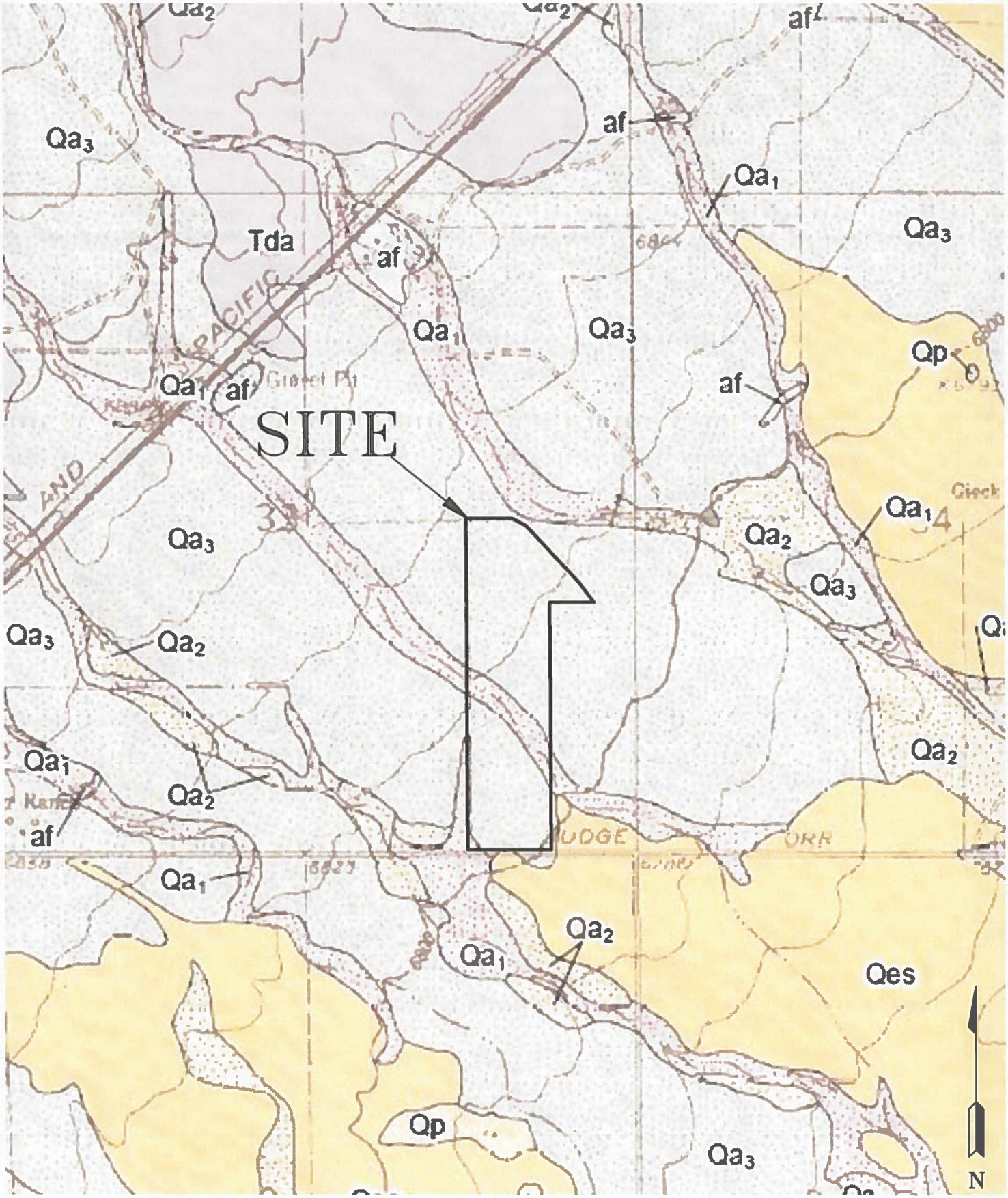
JOB NO.: 170314

FIG NO.: 4



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FALCON QUADRANGLE GEOLOGY MAP
JENNINGS SUBDIVISION
JUDGE ORR ROAD AND CURTIS ROAD
EL PASO COUNTY, CO.
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JOB NO.: 170314

FIG NO.: 5

STATIC LINE LLC
AP# 4233000038
RECEPTION NO. 216044524

JANE DAVIS LIVING TRUST
AP# 4233000031
RECEPTION NO. 215041137

STAPLETON ROAD (100')

FOUND REBAR CAP COLO PLS 22573

FOUND REBAR CAP COLO PLS 7228

BASIS OF BEARING
N43°33'49"W (REC)
539.12' (REC)
N43° 33' 49"W (AM)
539.12' (AM)

N66°02'38"W (REC)
N66° 01' 31"W (AM)
110.00' (AM & REC)

N43°33'49"W (REC)
N43° 20' 31"W (AM)
15.01' (AM) 15.00' (REC)

S89° 57' 45"E (AM)
347.60' (AM)

656.02' (AM)
N0° 11' 32"W (AM)

1282.87' (AM)
N0° 12' 47"W (AM)

N89° 57' 22"E (AM)
656.70' (AM)

Judge Orr Road (60')

Area 1,750,455 SF
40.1849 Acres

TB-1
TB-2
TP-1
TP-2

Qa3
Qal, er, fp, psw
Qa1, fp, psw
Qa3, fp
Qa1, psw

UNDERGROUND TELEPHONE PER FOUND FLAGS

S0° 17' 27"E (AM)
1312.97' (AM)

FOUND REBAR CAP ALUM. NOT STAMPED

S0° 17' 36"E (AM)
1283.25' (AM)

N. LINE NE 1/4 SE 1/4
S33 T12S R64W
S89°57'40"E PER
REC. NO. 216044524

STEVENS P. & MICHELLE LAZOR
AP# 4233000010
RECEPTION NO. 1354260 (BK.5123 PG.760)

DANIEL R. & TAMMY J. FIELDS
AP# 4233000029

LEGEND:

Qal - Recent Alluvium of Holocene Age:
recent water deposited materials
Qa1 - Alluvium One of Holocene Age:
water deposited sands and clays
Qa3 - Alluvium Three of Pleistocene Age:
stream terrace deposited sands

er - erosion
fp - floodplain
psw - potential seasonal shallow water

- Test Boring/ Test Pit

N

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COLORADO SPRINGS, CO. 80907

GEOLOGY MAP/ENGINEERING GEOLOGY
JENNINGS SUBDIVISION
JUDGE ORR ROAD AND CURTIS ROAD
EL PASO COUNTY, CO.
FOR: CATAMOUNT ENGINEERING

DRAWN	LLL
CHECKED	
DATE	4/14/17
SCALE	AS SHOWN
JOB NO.	170314
FIGURE No.	6

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. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, 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 decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	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.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the National Geodetic Vertical Datum of 1929

- A — A — Cross section line
- 23 — 23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4276000 m — 1000-meter Universal Transverse Mercator grid tick values, zone 4
- 600000 FT — 5000-foot grid tick values: Hawaii State Plane coordinate system, zone 3 (FIPSZONE 5103), Transverse Mercator projection
- DX5510 X — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M 2 — Coastal Mile marker

MAP REPOSITORY

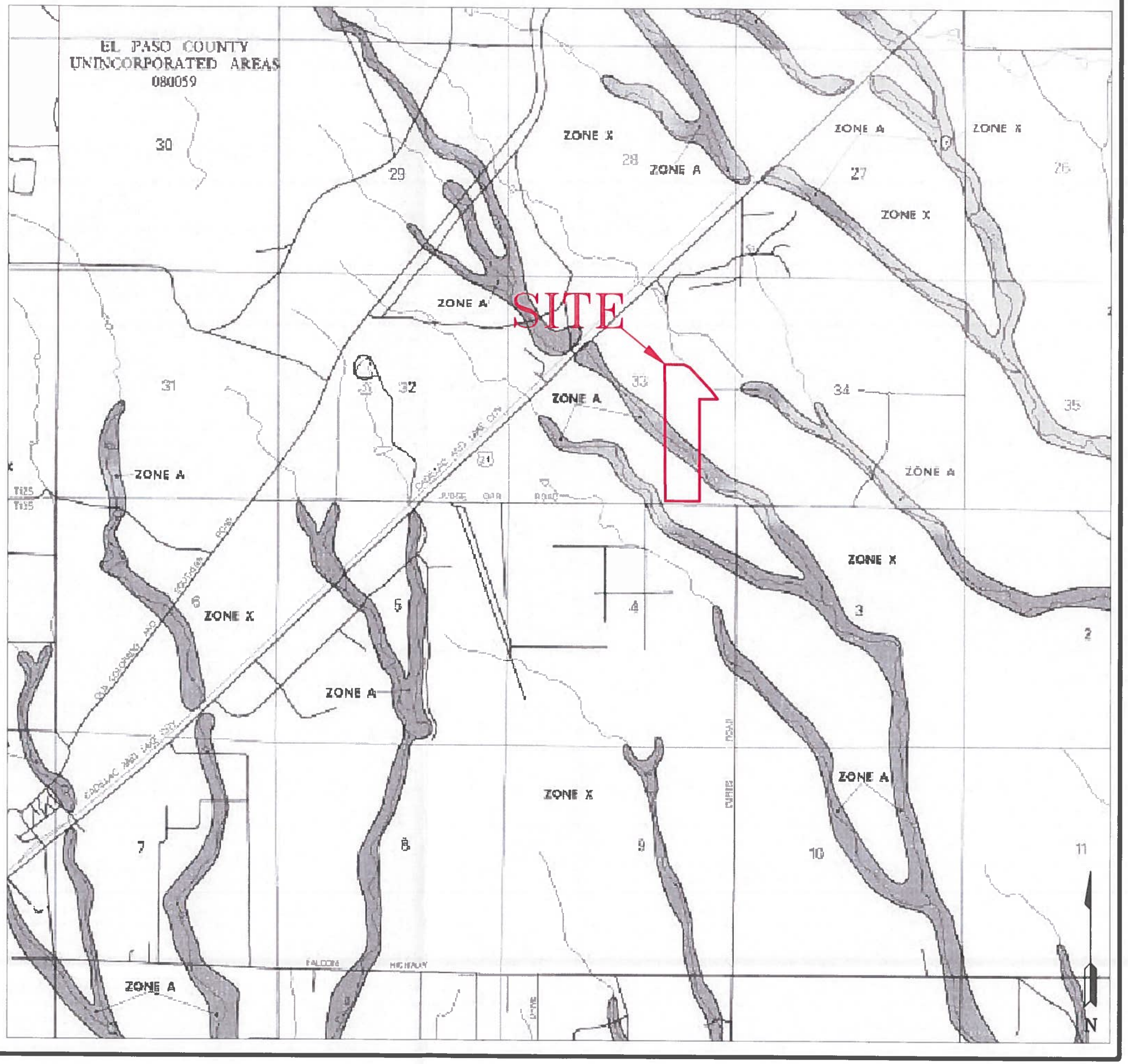
Refer to listing of Map Repositories on Map Index

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.



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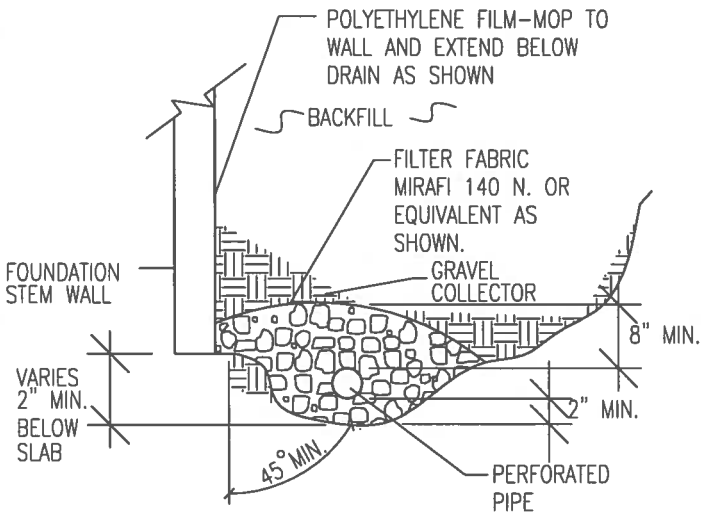
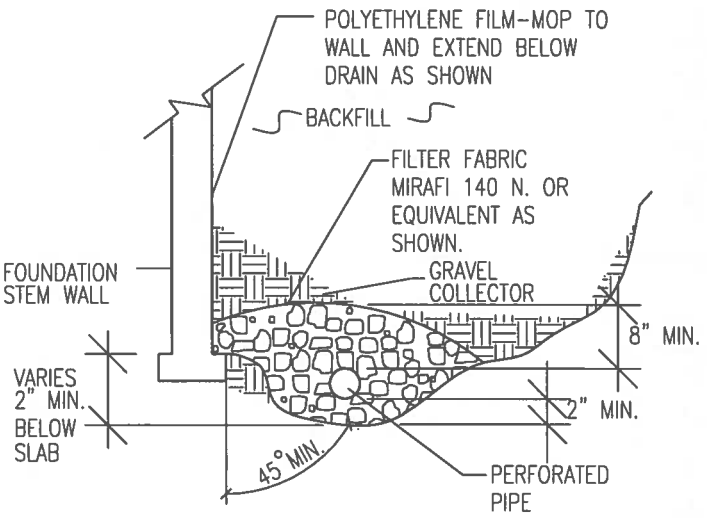
FLOODPLAIN MAP
JENNINGS SUBDIVISION
JUDGE ORR ROAD AND CURTIS ROAD
EL PASO COUNTY, CO.
FOR: CATAMOUNT ENGINEERING

DRAWN	LLL
CHECKED	
DATE	4/14/17
SCALE	AS SHOWN
JOB NO.	170314
FIGURE 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.

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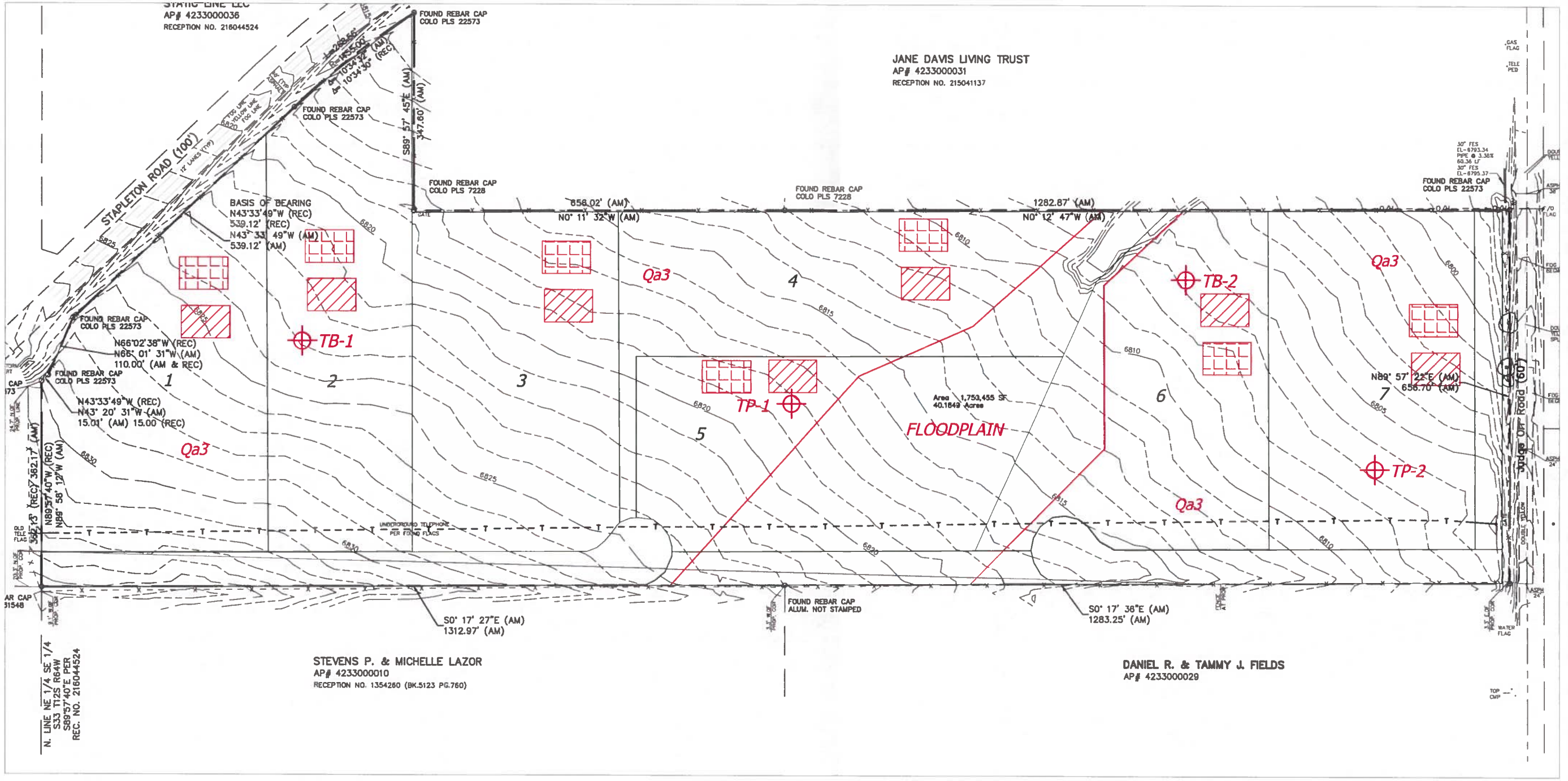
PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:
		DS	LLL

JOB NO.: 170314

FIG NO.: 8



POTENTIAL OWTS LOCATION

POTENTIAL ALTERNATE OWTS LOCATION

***OWTS MUST BE KEPT A MINIMUM OF 100' FROM ANY WATER WELL**
***OWTS LOCATIONS ARE NOT FINAL**
***LOT SPECIFIC INVESTIGATION WILL BE REQUIRED PRIOR TO CONSTRUCTION**

N

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SEPTIC SUITABILITY MAP
JENNINGS SUBDIVISION
JUDGE ORR ROAD AND CURITS ROAD
EL PASO COUNTY, CO.
FOR: CATAMOUNT ENGINEERING

DRAWN	I.H.
CHECKED	
DATE	4/14/17
SCALE	AS SHOWN
JOB NO.	170314
FIGURE No.	9

APPENDIX A: Site Photographs

1

Looking east from the southwestern portion of the site.

March 13, 2017

2

Looking west from the southeastern portion of the site.

March 13, 2017

Job No. 170314

3

Looking north from the southern portion of the site.

March 13, 2017

4

Looking north from the eastern portion of the site along the floodplain.

March 13, 2017

Job No. 170314

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

PROFILE HOLE NO. 1
DATE DRILLED 3/21/2017
Job # 170314

REMARKS

WATER @ 15.5', 3/22/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST		21	1.7	1
5			31	3.4	1
10	SAND, VERY CLAYEY, FINE GRAINED, BROWN, STIFF, VERY MOIST		20	19.4	1
15	SANDSTONE, VERY CLAYEY TO CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, WET		50/9"	13.0	2
20			50	13.5	2

PROFILE HOLE NO. 2
DATE DRILLED 3/21/2017
CLIENT CATAMOUNT ENGINEERING
LOCATION JUDGE ORR RD & CURTIS RD

REMARKS

WATER @ 6.5', 3/22/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST TO WET		19	2.8	1
5			32	2.5	1
10			42	10.8	1
15	SANDSTONE, VERY CLAYEY TO CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, WET		50/10"	12.0	2
20	WEATHERED ZONE		25	15.0	2

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PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314
FIG NO.: B-1

TEST PIT NO. 1
DATE EXCAVATED 3/13/2017
Job # 170314

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy loam, fine to coarse grained, brown	1			gr	w	2A
sandy loam, fine to coarse grained, tan	2			gr	w	2A
	3					
loamy sand, fine to coarse grained, tan	4			sg		1
	5					
	6					
	7					
	8					
	9					
	10					

TEST PIT NO. 2
DATE EXCAVATED 3/13/2017
CLIENT CATAMOUNT ENGINEERING
LOCATION JUDGE ORR RD & CURTIS RD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy loam, fine to coarse grained, brown	1			gr	w	2A
sandy loam, fine to coarse grained, tan	2			gr	w	2A
loamy sand, fine to coarse grained, tan	3			sg		1
	4					
	5					
sandy clay, gray brown *seasonally occurring groundwater at 5.5'	6			ma		4A
	7					
	8					
	9					
	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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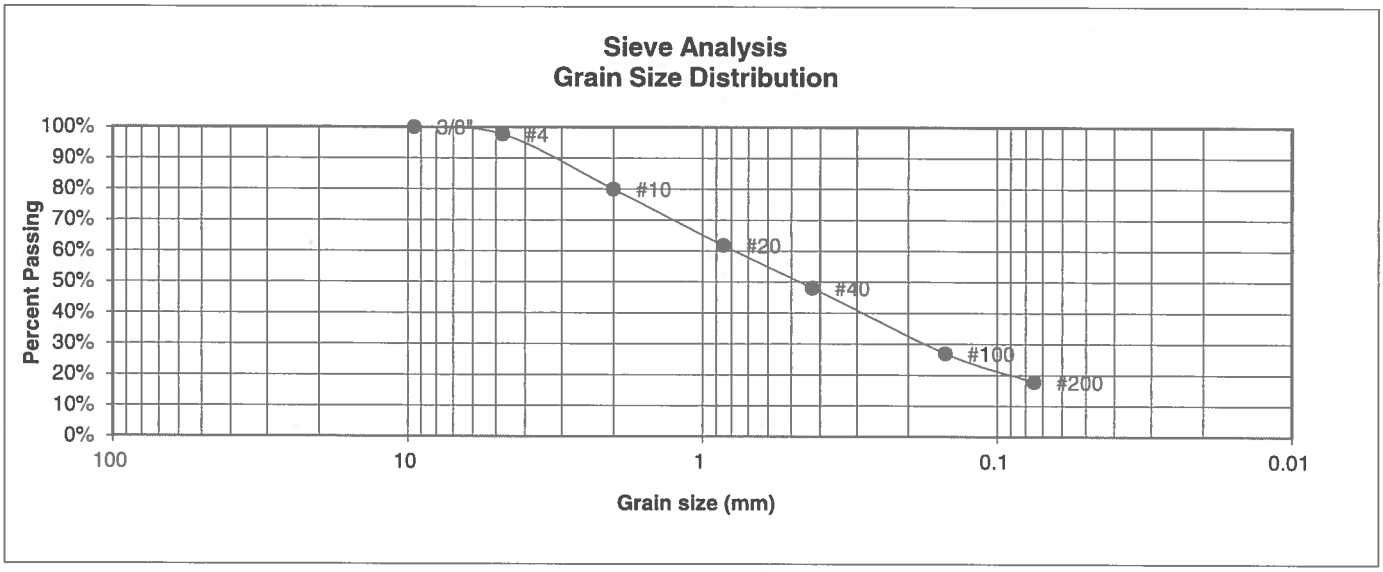
TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314
FIG NO.: B-2

APPENDIX C: Laboratory Test Results

BORING NO.	1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JENNINGS SUBDIVISION				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.7%
10	80.0%
20	61.8%
40	48.1%
100	27.0%
200	17.8%

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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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

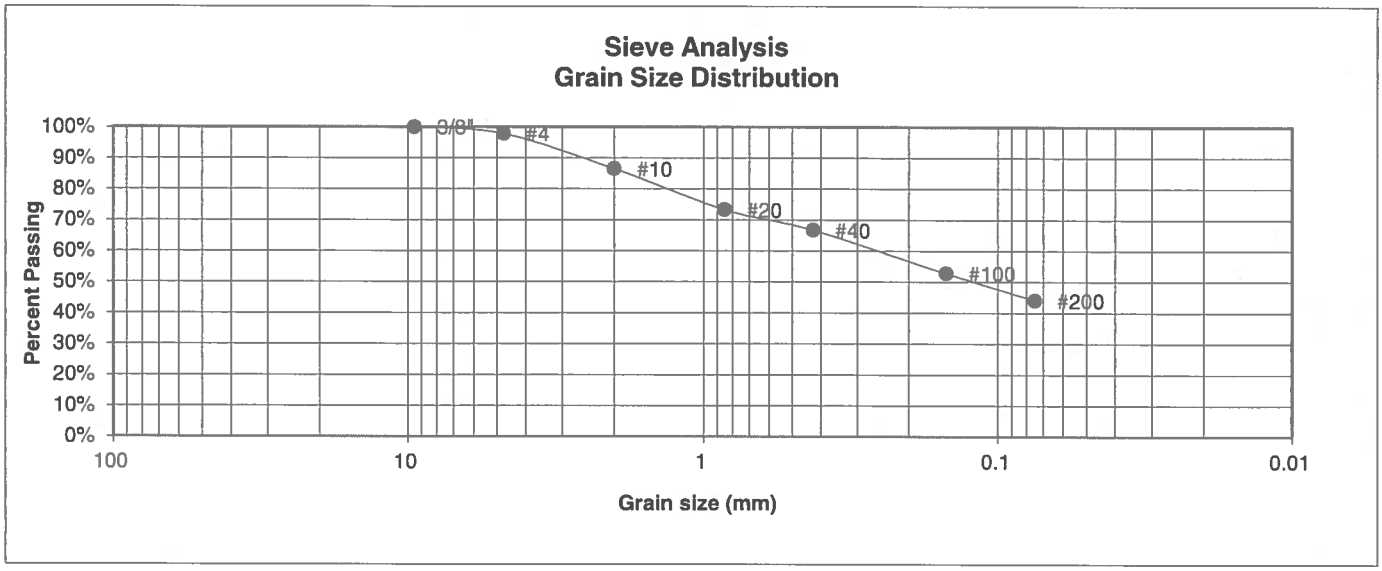
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314

FIG NO.: C-1

BORING NO.	1	UNIFIED CLASSIFICATION	SC	TEST BY	BL
DEPTH(ft)	10	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JENNINGS SUBDIVISION				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.8%
10	86.5%
20	73.3%
40	66.7%
100	52.8%
200	44.1%

Atterberg Limits

Plastic Limit

Liquid Limit

Plastic Index

Swell

Moisture at start	13.6%
Moisture at finish	21.9%
Moisture increase	8.3%
Initial dry density (pcf)	100
Swell (psf)	1515

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COLORADO SPRINGS, COLORADO 80907

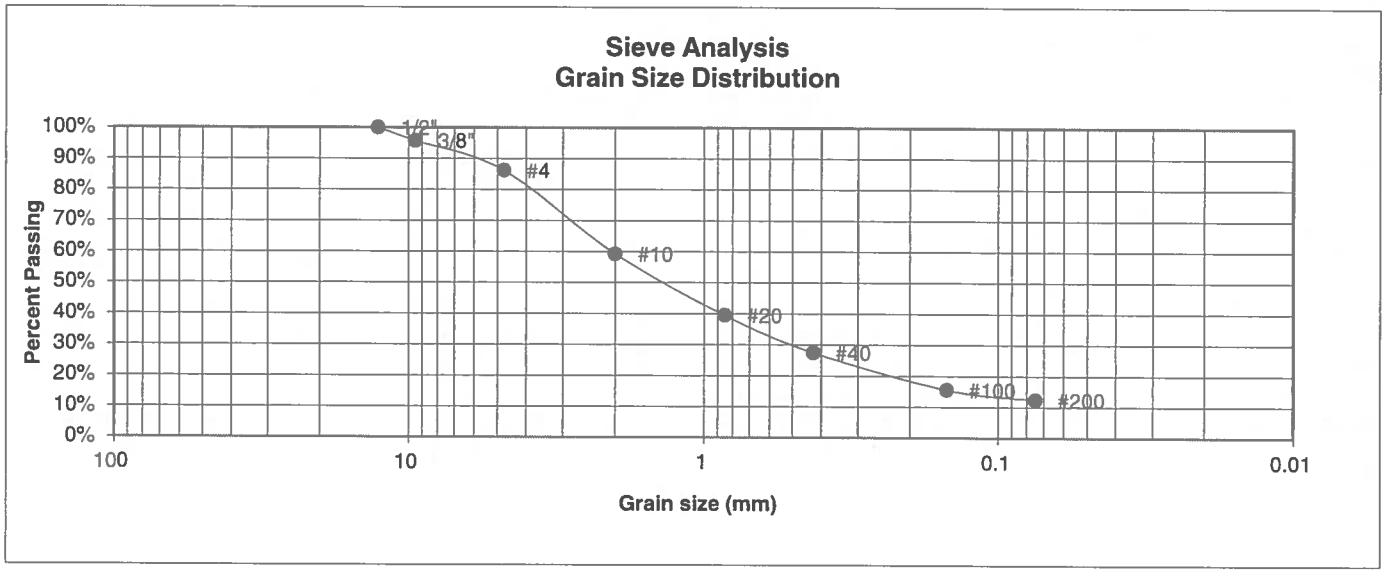
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314

FIG NO.: L-2

BORING NO.	2	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	10	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JENNINGS SUBDIVISION				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.7%
4	86.2%
10	59.2%
20	39.5%
40	27.5%
100	15.5%
200	12.3%

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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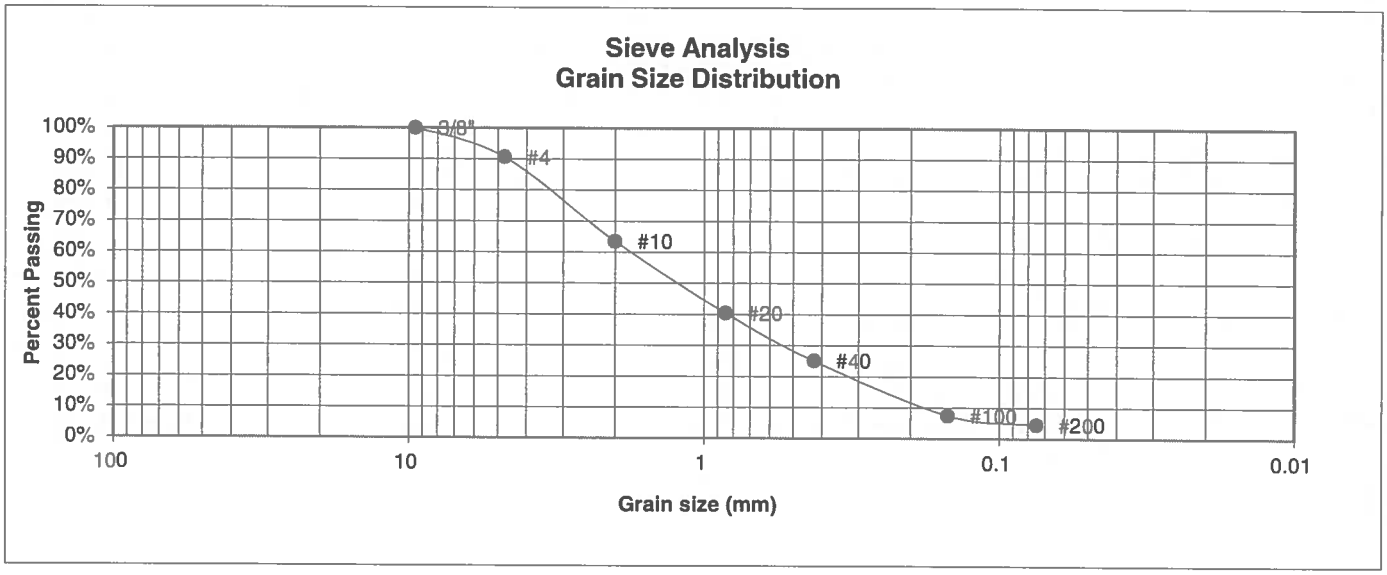
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314
FIG NO.: C-3

BORING NO.	TP-1	UNIFIED CLASSIFICATION	SW	TEST BY	BL
DEPTH(ft)	2-3	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JUDGE ORR RD & CURTIS RD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	90.6%
10	63.5%
20	40.5%
40	25.1%
100	7.5%
200	4.6%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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COLORADO SPRINGS, COLORADO 80907

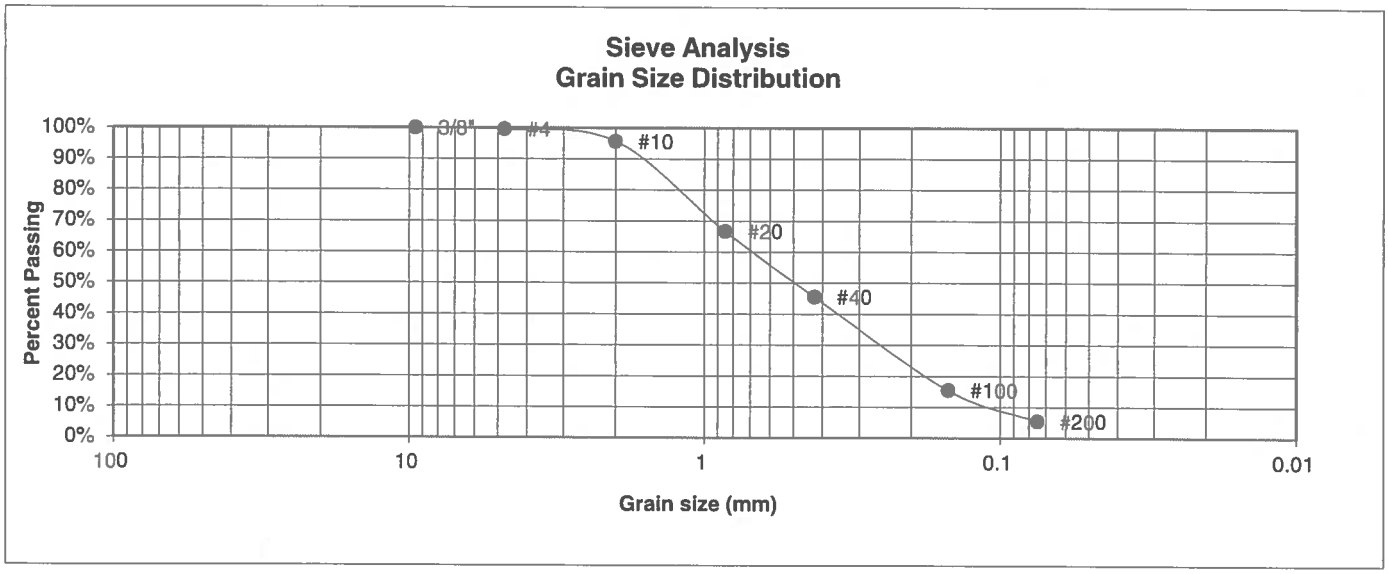
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314

FIG NO.: C-4

BORING NO.	TP-2	UNIFIED CLASSIFICATION	SM-SW	TEST BY	BL
DEPTH(ft)	2	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JUDGE ORR RD & CURTIS RD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.6%
10	95.7%
20	66.7%
40	45.5%
100	15.4%
200	5.4%

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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COLORADO SPRINGS, COLORADO 80907

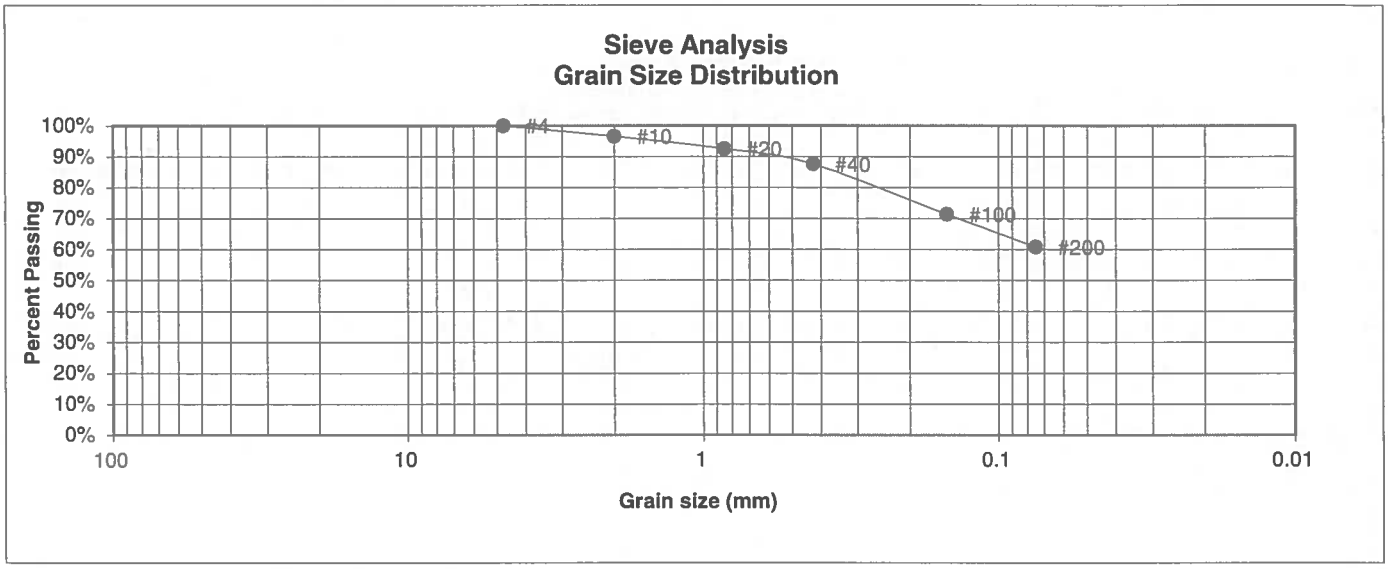
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314

FIG NO.: C-5

BORING NO.	TP-2	UNIFIED CLASSIFICATION	CL	TEST BY	BL
DEPTH(ft)	6	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JUDGE ORR RD & CURTIS RD				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.6%
20	92.5%
40	87.6%
100	71.4%
200	60.8%

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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COLORADO SPRINGS, COLORADO 80907

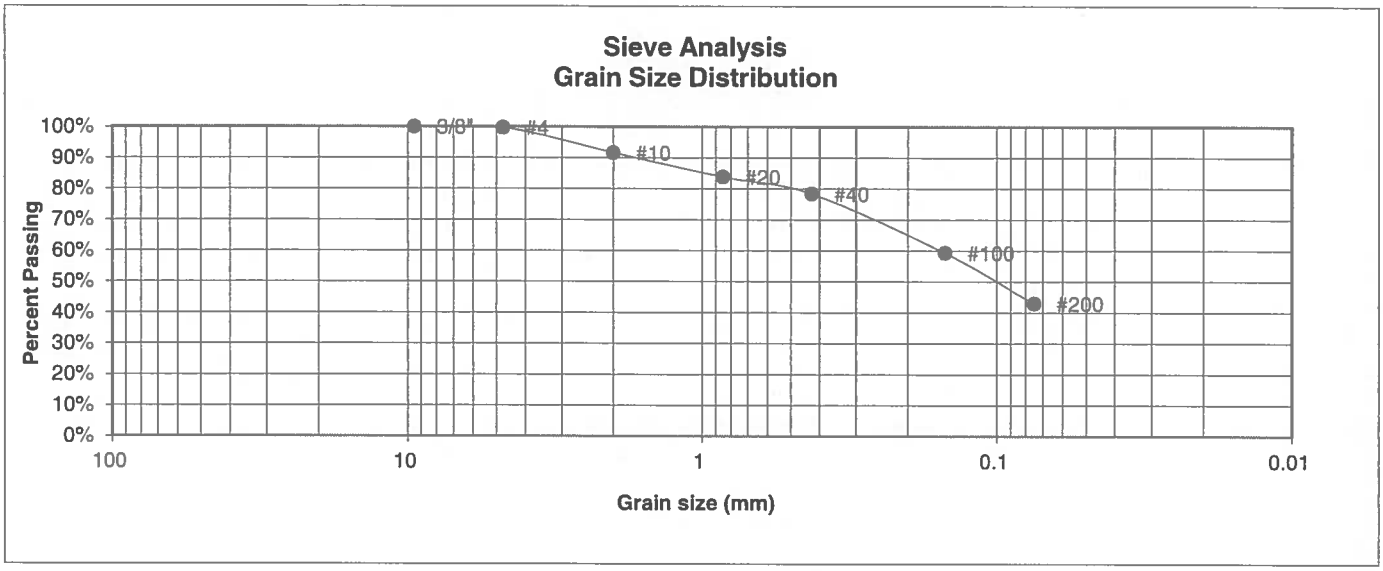
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314

FIG NO.: C-6

BORING NO.	1	UNIFIED CLASSIFICATION	SC	TEST BY	BL
DEPTH(ft)	15	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JENNINGS SUBDIVISION				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	91.6%
20	83.8%
40	78.4%
100	59.3%
200	42.9%

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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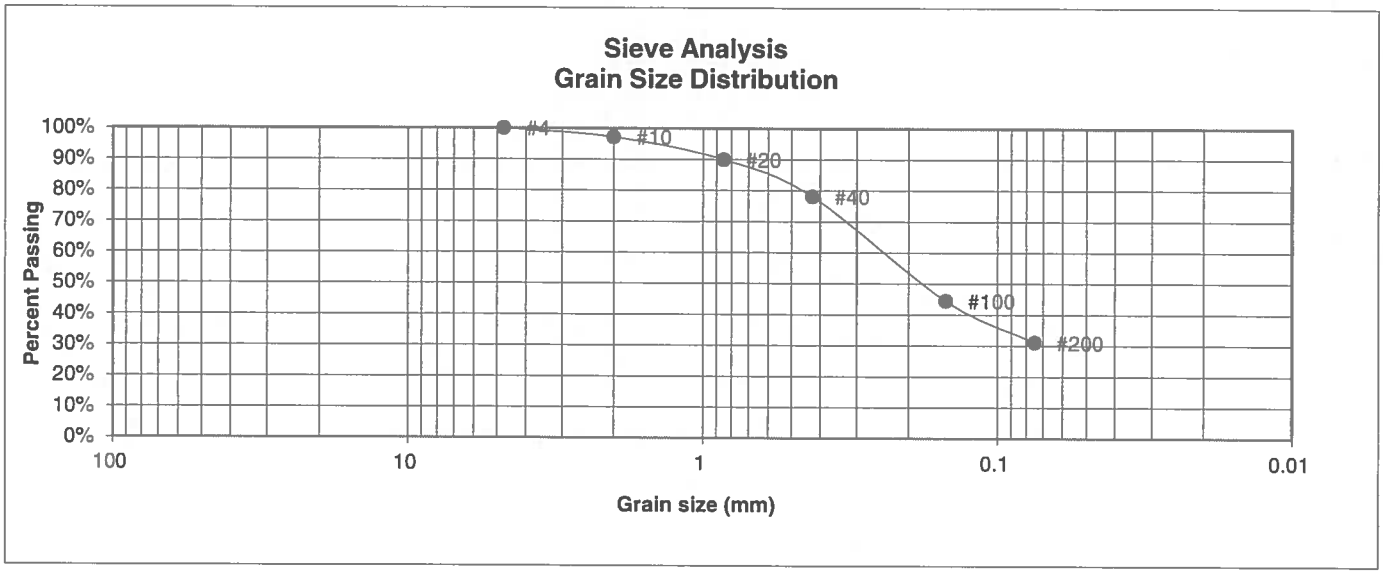
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314
FIG NO.: C-7

BORING NO.	1	UNIFIED CLASSIFICATION	SC	TEST BY	BL
DEPTH(ft)	20	AASHTO CLASSIFICATION		JOB NO.	170314
CLIENT	CATAMOUNT ENGINEERING				
PROJECT	JENNINGS SUBDIVISION				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	97.2%
20	90.0%
40	78.1%
100	44.5%
200	31.1%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314
FIG NO.: C-8

APPENDIX D: Soil Survey Descriptions

El Paso County Area, Colorado

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369v
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Blakeland

Setting

Landform: Flats, hills
Landform position (three-dimensional): Side slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock and/or eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 11 inches: loamy sand
AC - 11 to 27 inches: loamy sand
C - 27 to 60 inches: sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: 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: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Sandy Foothill (R049BY210CO)
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

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Columbine

Setting

Landform: Flood plains, fan terraces, fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well 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: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Gravelly Foothill (R049BY214CO)
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

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

APPENDIX E: Percolation Test Results

Client: Catamount Engineering
Test Location: Judge Orr Rd & Curtis Rd

Job Number: 170314

PERCOLATION HOLES #1

Date Holes Prepared: 3/21/2017

Date Hole Completed: 3/22/2017

Hole No. 1
Depth: 34"

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

Perc Rate (min./in.): 13

Hole No. 2
Depth: 33"

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

Perc Rate (min./in.): 13

Hole No. 3
Depth: 31"

Trial	Time (min.)	Water Level Change (in.)
1	10	2 5/8
2	10	1 1/4
3	10	1 1/4

Perc Rate (min./in.): 8

Average Perc Rate (min./in.) 12

PROFILE HOLE

Date Profile Hole Completed: 3/21/2017

Depth	Visual Classification	Remarks
0-9'	Sand, silty, fine to coarse grained, tan	
9-14'	Sand, very clayey, fine grained, brown	Sandstone Bedrock at 14'
14-20'	Sandstone, very clayey, fine to coarse grained, brown	Groundwater at 15.5'
	21 Blows / ft. @ 2'	
	31 Blows / ft. @ 4'	
	20 Blows / ft. @ 9'	

LTAR = 0.80 gallons per square foot per day.
Soil Treatment Area (Soil Type 1) = 1.25 square feet per gallon.

Remarks:

GPS Coordinates: 38° 57' 38.8" N, 104° 33' 23.5" W

Observer: Graham Espenlaub

By:

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

PERCOLATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314
FIG NO.: E-1

Client: Catamount Engineering
Test Location: Judge Orr Rd & Curtis Rd

Job Number: 170314

PERCOLATION HOLES #2

Date Holes Prepared: 3/21/2017

Date Hole Completed: 3/22/2017

Hole No. 1
Depth: 29"

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

Perc Rate (min./in.): 20

Hole No. 2
Depth: 37"

Trial	Time (min.)	Water Level Change (in.)
1	10	0
2	10	0
3	10	3/8

Perc Rate (min./in.): 27

Hole No. 3
Depth: 29"

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

Perc Rate (min./in.): 27

Average Perc Rate (min./in.) 25

PROFILE HOLE

Date Profile Hole Completed: 3/21/2017

Depth	Visual Classification	Remarks
0-14'	Sand, silty, fine to coarse grained, tan	
14-20'	Sandstone, very clayey, fine grained, brown	Sandstone Bedrock at 14' Groundwater at 6.5'

19 Blows / ft. @ 2'
32 Blows / ft. @ 4'
42 Blows / ft. @ 9'

LTAR = 0.60 gallons per square foot per day.
Soil Treatment Area (Soil Type 2) = 1.67 square feet per gallon.

Remarks:

GPS Coordinates: 38° 57' 23.6" N, 104° 33' 19.7" W

Observer: Graham Espenlaub

By:

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

PERCOLATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/17

JOB NO.: 170314
FIG NO.: E-2