

Soils and Geology
&
Wastewater Treatment
System
Evaluations
For
Wyoming Estates
3050 N. Curtis Road
June 6, 2019

same notes as
Soils and
Geology
report, verify
which lot will
require an
engineered
OWTS



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PROJECT DESCRIPTION

The following presents Soils and Geology for the proposed Wyoming Estates Minor Subdivision (Project Site) located in the SE ¼ of the NE ¼ of Section 33, Township 13 South, Range 64 West of the 6th P.M. in the County of El Paso (Figure 1).

The Project Site is comprised 40.01 acres of vacant land to be subdivided into 4 single- family residential RR-5 (Figure 2). The water supply for each lot will be from individual wells and wastewater will be treated by individual non-evaporative septic systems.

GEOLOGY

The Project Site is located within the Falcon Quadrangle near the southeastern edge of the Denver Basin, a geologic structural depression. This asymmetrical structural basin is shallow-dipping toward the northeast. The uppermost/surfacial deposits are unconsolidated Quaternary eolian deposits which include Lots 1, 3 and 4 and the western portion of Lot 2; the northeast corner of the Project Site (eastern portion of Lot 2) are older gravels and alluvium (Figure 3). These are underlain in vertical succession, by the Denver, Arapahoe and Laramie Fox Hills Aquifers. Residential Wells in the area can be found completed in the Denver and Arapahoe Aquifers. The base of the Denver Aquifer is about 490 feet below ground surface (bgs) and the Arapahoe Aquifer is from about 515 (top) to 1000 ft bgS (CDSS, SB5).

The Project Site generally slopes to the northeast ranging from 1% to 9%. In the southwest corner, drainage is to the southeast. Figure 4 provides the Project Site Surface Contours.

SOILS

The National Resource Conservation Service (NRCS) has identified three soil types with a northeast trend on the Property (Figure 5).

Type	Description	Percent Coverage
8	Blakeland Loamy Sand, 1 to 9 percent Slope	46.8
19	Columbine gravelly sandy loam sand, 0 to 3 % slopes	1.8
95	Truckton Sandy Loams, 1 to 9 percent Slope	51.4

Attachment 1 provides a complete description of the soils. The soil is classified as “well” to “excessively well” drained. Runoff potential is low with no ponding or flooding which is consistent with historical aerial photos.

FIELD INVESTIGATIONS

OTWS

Field investigations at the Project Site consisted of excavating two profile pits at each proposed lot (8 total) to identify onsite wastewater treatment system (OWTS) locations (PARR 2018, Figure 6). The OWTS profile pits were excavated to a maximum depth of 8.5 feet below ground surface. Samples were collected from select intervals and evaluated for soil properties. At locations tested on Lots 1, 2 and 4, a conventional, non-engineered onsite wastewater treatment system was determined to be acceptable. At the location tested at Lot 2, results indicate that an engineered onsite wastewater treatment system is needed. Table 1 summarizes the field investigations results. Attachment 3 provides the detailed engineering reports.

Pavement Design

Two test holes were evaluated for a proposed gravel roadway for pavement design (Raiper, 2019, Figure 7). Soil samples were collected with testing included sieve analysis and Atterberg limits in addition to determining resistance values (R-Values). The results are summarized in Table 2.

TABLE 1
Soil Sample Results for OWTS

3090 Curtis Road, Lot 4, 80831										3090 Curtis Road, Lot 3, 80831																
Depth (ft.)	Sample Interval	USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color	Depth (ft.)	Sample Interval	USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color	Depth (ft.)	Sample Interval	USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
Lot 4 P11	2	Sandy Clay Loam	Granular	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 3/2 (Moist)	Lot 4 P11	2	Sandy Clay Loam	Granular	Moderate	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 2/2 (Moist)	Lot 4 P12	2	Sandy Clay Loam	Granular	Moderate	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 2/2 (Moist)
4	4	Sandy Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	4	4	Sandy Clay Loam	Blocky	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	2.5Y 3/3 (Moist)	4	4	Sandy Clay Loam	Blocky	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	2.5Y 3/3 (Moist)
6	6	Sandy Clay Loam	Granular	Moderate	No	Type 2 (LTAR = 0.60) Treatment Level 1	<35%	10YR 5/3 (Moist)	6	6	Sandy Clay Loam	Granular	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 4/3 (Moist)	6	6	Sandy Clay Loam	Blocky	Moderate	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	2.5Y 4/3 (Moist)
8	8	Sandy Clay Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	8	8	Sandy Clay Loam	Blocky	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	2.5Y 4/3 (Moist)	8	8	Sandy Clay Loam	Blocky	Moderate	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	2.5Y 4/3 (Moist)
Lot 4 P 2	2	Sandy Clay Loam	Granular	Moderate	No	Type 2 (LTAR = 0.60) Treatment Level 1	<35%	10YR 3/3 (Moist)	Lot 4 P 2	2	Sandy Clay Loam	Granular	Moderate	No	Type 2 (LTAR = 0.60) Treatment Level 1	<35%	10YR 3/3 (Moist)	Lot 4 P 2	2	Sandy Clay Loam	Granular	Moderate	No	Type 2 (LTAR = 0.60) Treatment Level 1	<35%	10YR 3/3 (Moist)
4	4	Sandy Clay Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	4	4	Sandy Clay Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	4	4	Sandy Clay Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)
6	6	Sandy Clay Loam	Granular	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	6	6	Sandy Clay Loam	Granular	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	6	6	Sandy Clay Loam	Granular	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)
8	8	Sandy Clay Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	8	8	Sandy Clay Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)	8	8	Sandy Clay Loam	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)

TABLE 2

Location	Depth (ft)	Plasticity Index	%Passing #200	Moisture Content (%)	USCS Soil Classification	Tested R-Value
TP1	1-3	NP	26	4.2	SM	76
TP1	8-10	6	30	5.1	SC:SM	-
TP2	1-3	NP	17	3.6	SM	-
TP2	3-5	NP	20	3.5	SM	-

It was reported for the locations tested, “there was a very (low) potential for swell due to the sandy composition of site soils which consist of non-plastic to low plasticity silty sand and silty clayey sand soils with low percentage of particles passing the #200 sieve screen. Therefore, there is no need to provide any additional stabilization or treatments to subgrade soils” (Raiper, 2019)

GROUNDWATER

Groundwater was not encountered in any of the OWTS test pit and was not evident in the profile test pits a week following excavation. There are no existing wells on the Project Site. Shallow alluvial wells in the area occur in the older gravels and alluviums to the northeast (Soil Type 19 on Figure 5, Qgo Figure 3) which are also on the eastern portion of Lot 3. USGS reported groundwater levels in a Well labeled as SCO1306433AAA1 and located just north of Lot 3. Groundwater levels were measured consistently over the last 40 years and consistently occurs at an elevation of about 6480 ft amsl (Attachment 2) approximately 20 feet below the northeast corner of Lot 3. Based on review of the geology, well reports, and surface drainage, this is likely the location /elevation of the highest water table underlying at the Project Site.

GEOLOGIC HAZARDS

The Project Site was evaluated for geologic hazards that may impact development. Hazards identified in the El Paso County Land Development Code including: Mining, wildfire, highwater table or polluted water, landfills, fill areas, contamination; airports and major utility facilities, and landslides were not identified on the Project Site. The National Flood Hazard map delineated the Property and surrounding area an “area of Minimal Flood Hazard” (FEMA 2018). The Project Site is not located in a flood plain (Figure 8).

Erosion

The soils at the Project Site are susceptible to erosion. Currently, the property is covered with prairie grasses. Construction activities will enhance erosion potential however slopes are mild and once the disturbed surface is revegetated, erosion should be low.

Expansive Soils

Within the 8 profile pits to evaluate suitability for OWTS design, expansive soils were not encountered. The soils were described as having a sandy composition, non-plastic to low plastic sands, silty clayey sand soil. Due to potential variability, additional borings will be necessary prior to foundation excavation and subsequently re-evaluated upon completion of the foundation excavation and prior to the placement of any framework.

MINERAL RESOURCES

The Project Site is not included in the maps of aggregate deposits or known mineral resources. Colorado Geological Mineral Resources Derivative Map indicates a low potential to contain economically viable mineral resources.

CONCLUSION

The Project Site is compatible with the proposed development of single family residential lots. Lot 2 was identified as requiring an engineered individual wastewater treatment system however another location more to the west may yield a more positive result. Hazards are minimal and can be mitigated by standard practices.



REFERENCES

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El Paso County Planning Development. December 1995. El Paso County Aggregate Resource Evaluation Maps.

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Morgan, Mathew L. and White, Johnathan L. 2012. Geologic Map of the Falcon Quadrangle, El Paso County Colorado. Colorado Geological Survey. Open File Report 12-05.

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National Resource Conservation Service, <https://websoilsurvey.nrcs.usda.gov>

Parr Engineering and Consulting Inc. September 27, 2018. Profile Pits Subdivision JN 18.394, 18.395, 18.396, 18.397

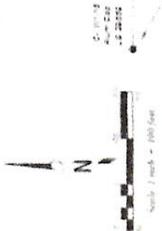
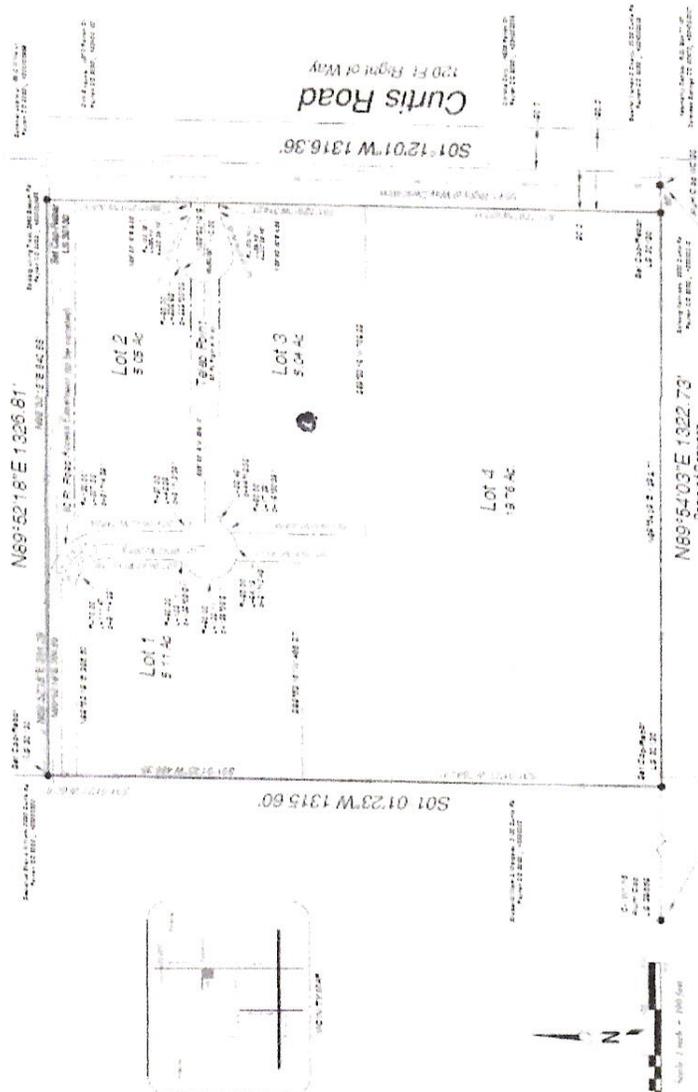
Rapier, Delbert , Protex, Geotechnical Pavement Design, Curtis Road and David Road Job No. 8619, January 9, 2019.

Schwochow, S.D; et al. 1974. Atlas of Sand, Gravel, and Quarry Aggregate Resources, Colorado Front Range Counties. Colorado Geological Survey, Special Publication 5-B.

Thorson, Jon P., 2003. *Geologic Map of the Black Forest Quadrangle, El Paso County, Colorado*. Colorado Geological Survey Open -File Report 03-06.

Wyoming Estates

The Southeast Quarter of the Northeast Quarter of Section 33, Township 13 South, Range 64 West of the 6th P.M., E. Reed County, Colorado



Field Notes:
 This plat was prepared from a survey conducted on the 15th day of August, 2010, by the undersigned, a duly licensed and sworn Surveyor of the State of Wyoming. The survey was conducted in accordance with the provisions of the Wyoming Statutes, and the results are shown on this plat. The survey was conducted in accordance with the provisions of the Wyoming Statutes, and the results are shown on this plat.

Field Statements:
 I, the undersigned, being a duly licensed and sworn Surveyor of the State of Wyoming, do hereby certify that the foregoing plat was prepared from a survey conducted by me or under my direct supervision, and that the same is a true and correct copy of the original survey notes and field data.

Signatures:

 Surveyor

Legals:
 I, the undersigned, being a duly licensed and sworn Surveyor of the State of Wyoming, do hereby certify that the foregoing plat was prepared from a survey conducted by me or under my direct supervision, and that the same is a true and correct copy of the original survey notes and field data.

Notary Public:

 Notary Public

Notes:
 This plat was prepared from a survey conducted on the 15th day of August, 2010, by the undersigned, a duly licensed and sworn Surveyor of the State of Wyoming. The survey was conducted in accordance with the provisions of the Wyoming Statutes, and the results are shown on this plat. The survey was conducted in accordance with the provisions of the Wyoming Statutes, and the results are shown on this plat.

Know All Men By These Presents,
 That the undersigned, _____, of the County of _____, State of Wyoming, do hereby certify that the foregoing plat was prepared from a survey conducted by me or under my direct supervision, and that the same is a true and correct copy of the original survey notes and field data.

Declaration:
 I, the undersigned, being a duly licensed and sworn Surveyor of the State of Wyoming, do hereby certify that the foregoing plat was prepared from a survey conducted by me or under my direct supervision, and that the same is a true and correct copy of the original survey notes and field data.

In Witness Whereof,
 I, the undersigned, have hereunto set my hand and the seal of my office, at _____, Wyoming, this _____ day of _____, 2010.

Notary Public:

 Notary Public

Recorded:

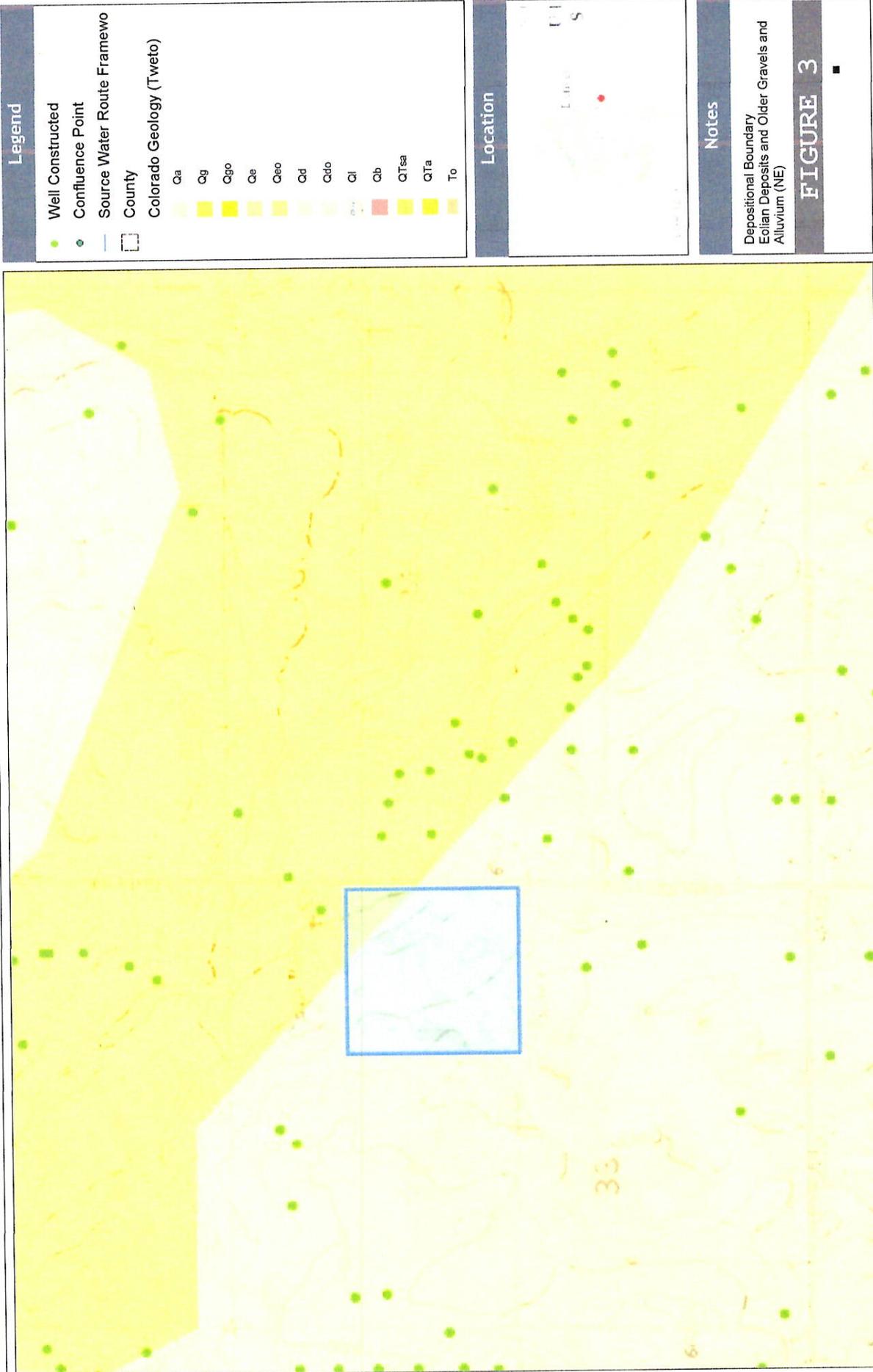
 Recorder

ALLESSI
 ALLESSI SURVEYING & CONSULTING, INC.
 1000 W. 10th Street, Suite 100
 Cheyenne, WY 82001
 Phone: 307.634.1234
 Fax: 307.634.1235
 Email: info@allessi.com

FIGURE 2
 Wyoming Estates



Wyoming Estates

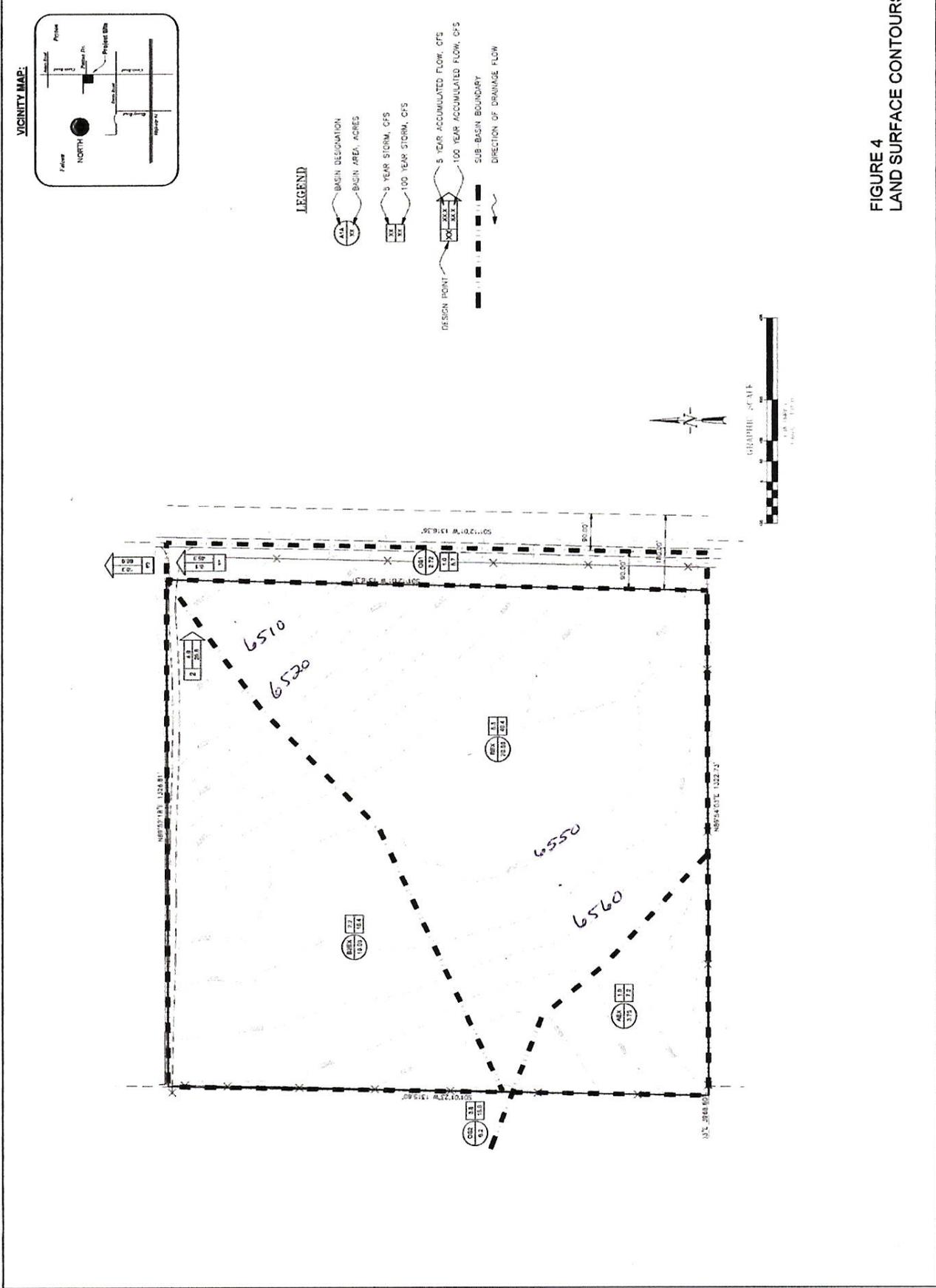


2,339 0 1,169 2,339 Feet

1: 14,032

This product is for informational purposes and may not have been prepared for, or be suitable for, legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Date Prepared: 5/20/2019 4:44:19 PM



**FIGURE 4
LAND SURFACE CONTOURS**

FIGURE 5
 Soil Map—El Paso County Area, Colorado
 (Wyoming Estates)

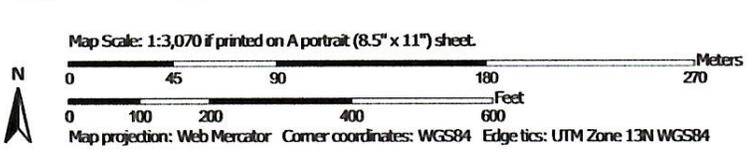
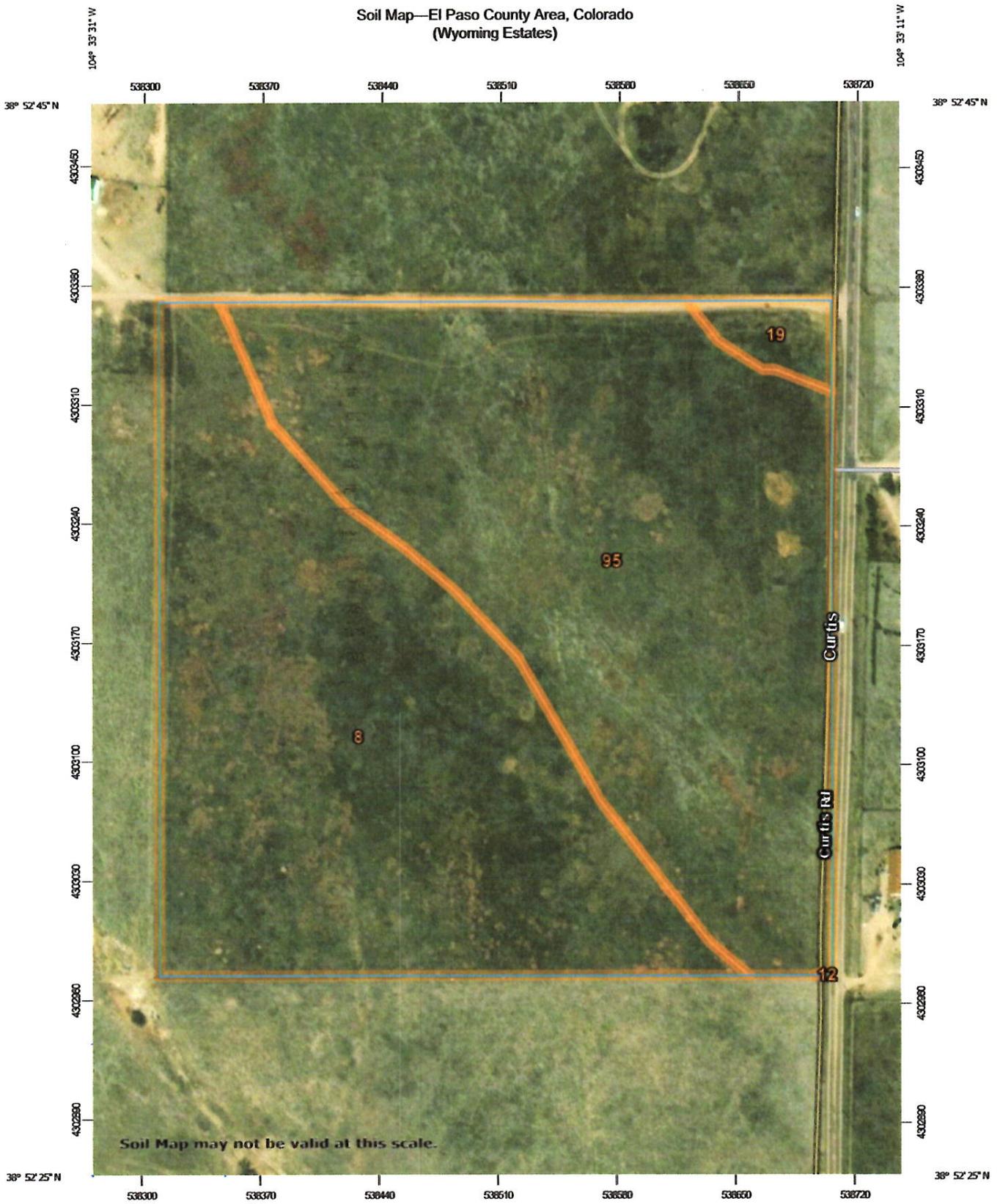
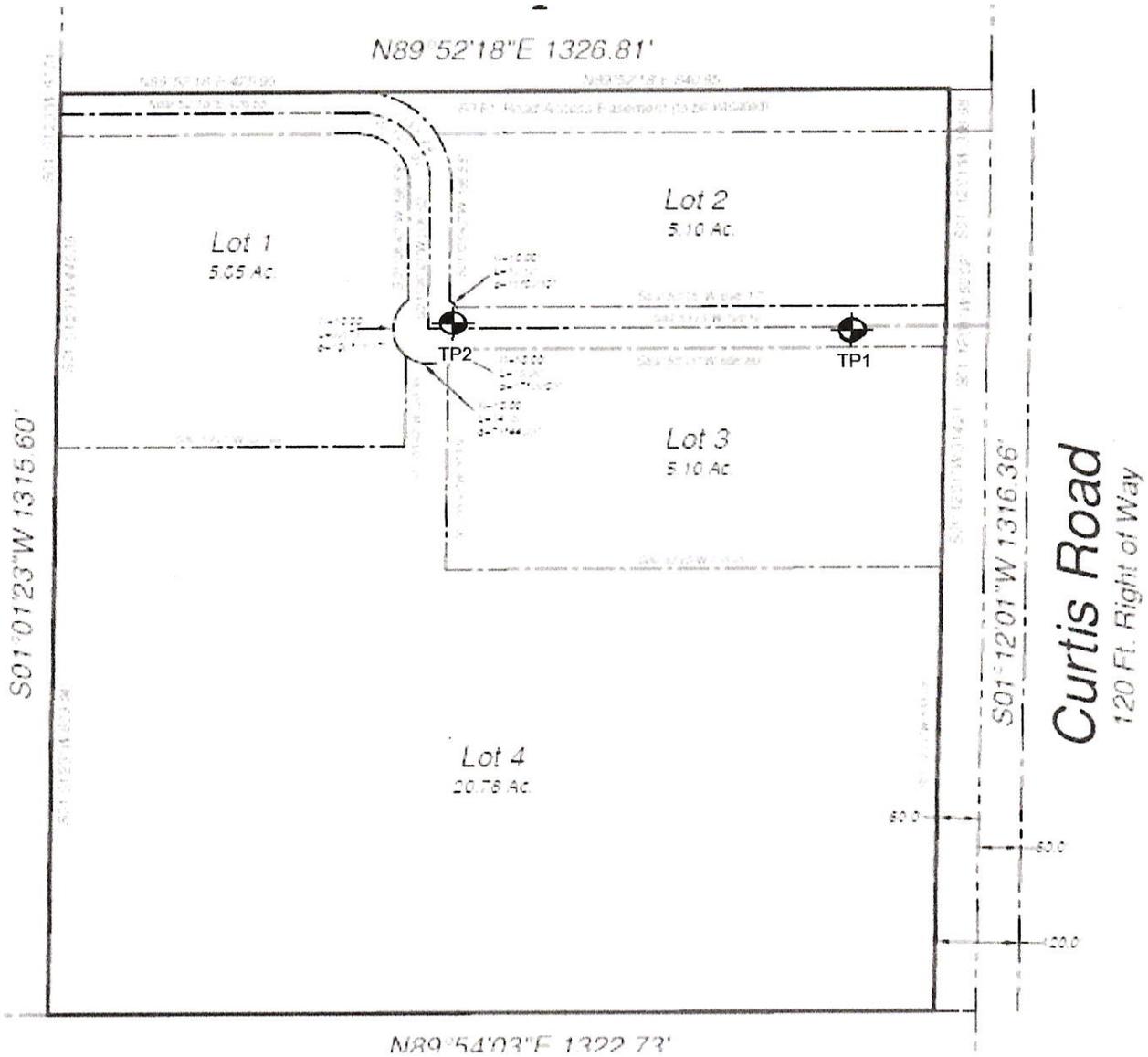
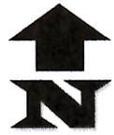


FIGURE 7
Pavement Design Test Pit Locations



Legend:

 Approximate Backhoe Test Pit Excavation

Site Plan

Scale: N.T.S.

Drawn by: KR

Date: 1/9/18

Curtis Road and David Road

3050 Curtis Road
 El Paso, Colorado



ProTeX Job No.: 8619

National Flood Hazard Layer FIRMette



FIGURE 8

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



- SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth Zone AE, AO, AH, VE, AR
 - Regulatory Floodway
 - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee. See Notes. Zone X
 - Area with Flood Risk due to Levee Zone B
- OTHER AREAS OF FLOOD HAZARD**
- Area of Minimal Flood Hazard Zone X
 - Effective LOMRs
 - Area of Undetermined Flood Hazard Zone B
- OTHER AREAS**
- Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall
- GENERAL STRUCTURES**
- Cross Sections with 1% Annual Chance Water Surface Elevation
 - Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature
- OTHER FEATURES**
- Digital Data Available
 - No Digital Data Available
 - Unmapped
- MAP PANELS**
- Digital Data Available
 - No Digital Data Available
 - Unmapped

- OTHER AREAS OF FLOOD HAZARD**
- Area of Minimal Flood Hazard Zone X
 - Effective LOMRs
 - Area of Undetermined Flood Hazard Zone B
- OTHER AREAS**
- Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall
- GENERAL STRUCTURES**
- Cross Sections with 1% Annual Chance Water Surface Elevation
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- OTHER FEATURES**
- Digital Data Available
 - No Digital Data Available
 - Unmapped
- MAP PANELS**
- Digital Data Available
 - No Digital Data Available
 - Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/25/2019 at 12:54:03 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

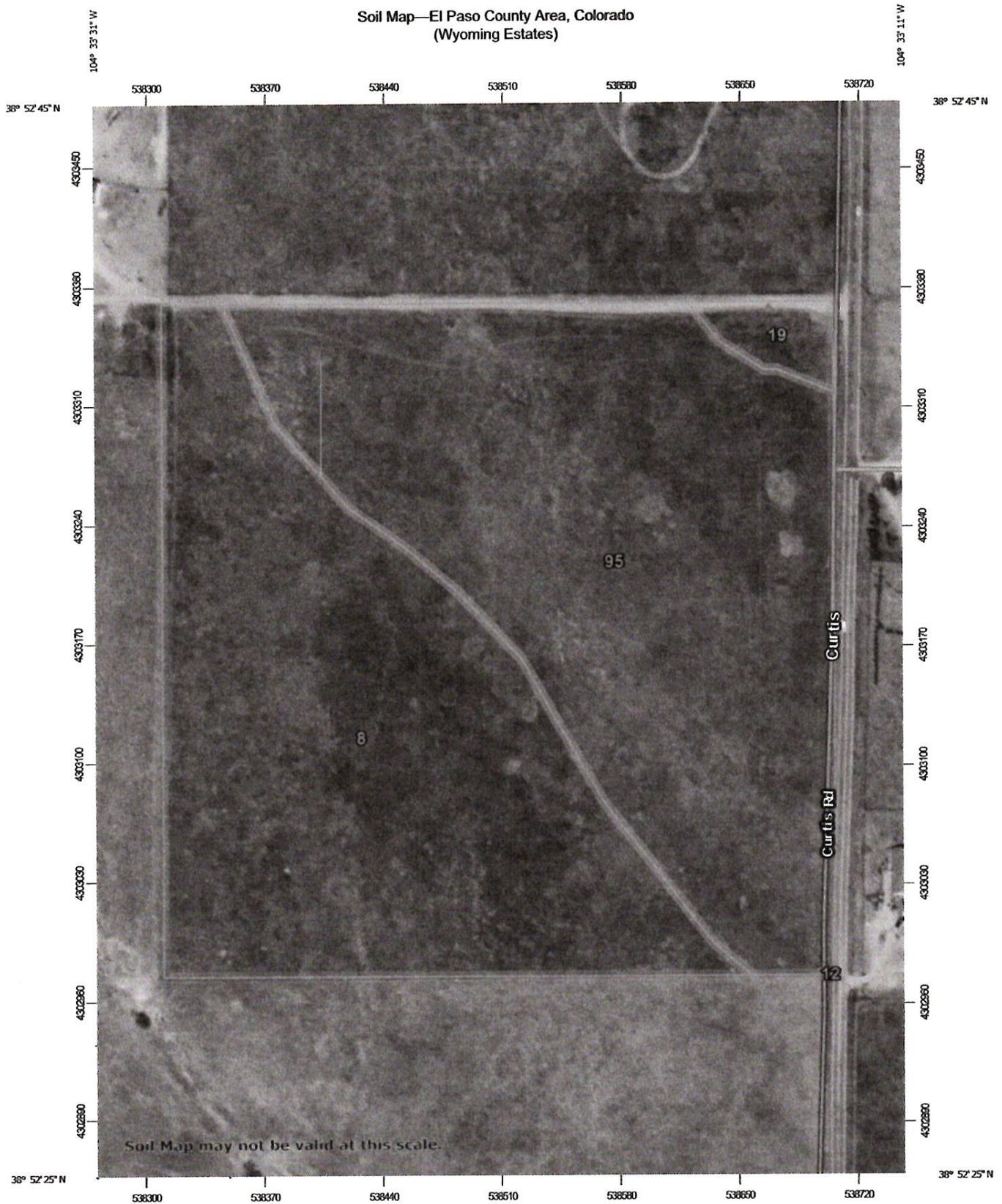
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



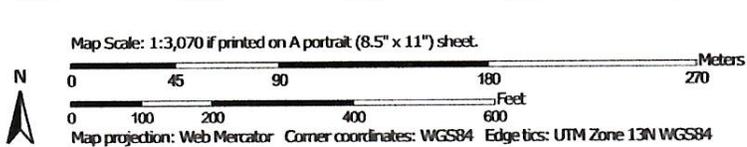
ATTACHMENT 1

SOILS

Soil Map—El Paso County Area, Colorado
(Wyoming Estates)



Soil Map may not be valid at this scale.



MAP LEGEND

- Area of Interest (AOI)
- Area of Interest (AOI)
- Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points
- Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Water Features
- Streams and Canals
- Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads
- Background**
- Aerial Photography
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 7, 2016—Aug 17, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	18.2	46.8%
12	Bresser sandy loam, cool, 3 to 5 percent slopes	0.0	0.0%
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	0.7	1.8%
95	Truckton loamy sand, 1 to 9 percent slopes	20.0	51.4%
Totals for Area of Interest		38.9	100.0%

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: Hills, flats
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 16, Sep 10, 2018

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

Pleasant

*Percent of map unit:
Landform: Depressions
Hydric soil rating: Yes*

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 16, Sep 10, 2018

El Paso County Area, Colorado

95—Truckton loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 36bd
Elevation: 6,000 to 7,000 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

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

Description of Truckton

Setting

Landform: Hills, flats
Landform position (three-dimensional): Side slope, talf
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 8 inches: loamy sand
Bt - 8 to 24 inches: sandy loam
C - 24 to 60 inches: coarse sandy loam

Properties and qualities

Slope: 1 to 9 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 (1.98 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 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
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 16, Sep 10, 2018

ATTACHMENT 2

GROUNDWATER LEVEL

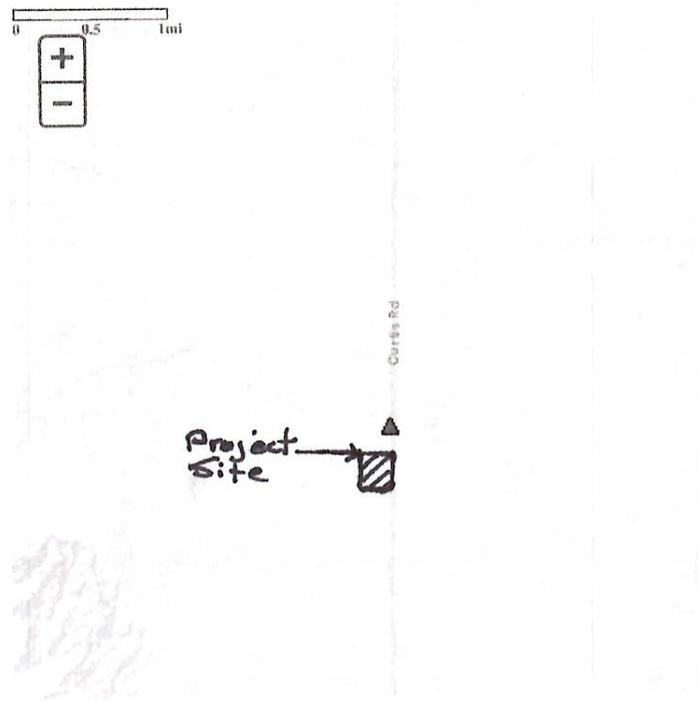
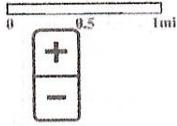


Groundwater Watch

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Site Number: 385250104331301 - 5C01306433AAA1



DESCRIPTION:

Latitude 38°52'49.7", Longitude 104°33'14.5" NAD83
 El Paso County, Colorado, Hydrologic Unit 11020004
 Well depth: 75.1 feet
 Hole depth: 75.1 feet
 Land surface altitude: 6,485.00feet above NGVD29.

AVAILABLE DATA:

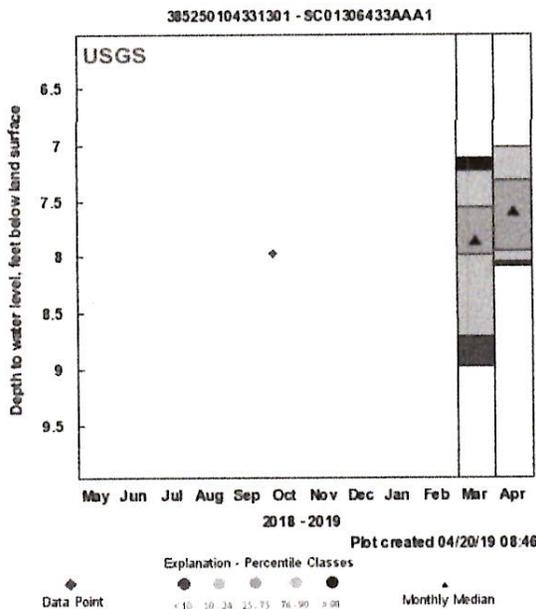
Data Type	Begin Date	End Date	Count	
Field groundwater-level measurements	1979-03-14	2018-10-02	37	
Additional Data Sources		Begin Date	End Date	Count
Groundwater Watch	**offsite**	1979	2018	37

OPERATION:

Record for this site is maintained by the USGS Colorado Water Science Center
 Email questions about this site to Colorado Water Science Center Water-Data Inquiries

[Groundwater Watch Help Page](#)

Site Statistics



Most recent data value: 7.97 on 10/2/2018
Period of Record Monthly Statistics for 385250104331301
Depth to water level, feet below land surface
All Approved Continuous & Periodic Data Used In Analysis
 Note: Highlighted values in the table indicate closest statistic to the most recent data value.

Month	Lowest Median	10th %ile	25th %ile	50th %ile	75th %ile	90th %ile	Highest Median	Number of Years
Mar	8.97	8.71	7.98	7.87	7.56	7.23	7.11	13
Apr	8.08	8.04	7.95	7.61	7.32	7.02	7.02	15

As of 4/19/2019 16:51-2

Statistics Options

View month/year statistics

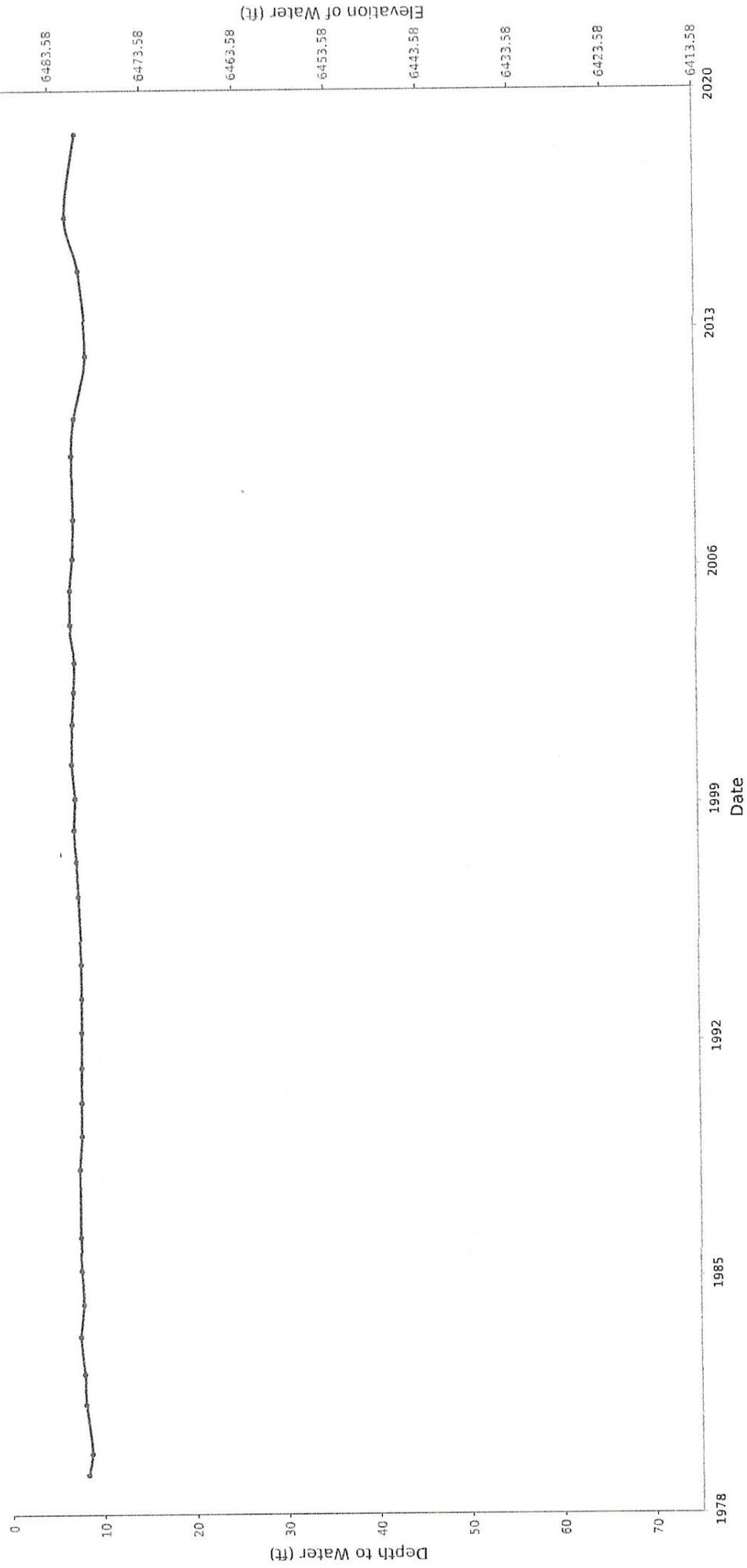
Periodic Groundwater Data

Summary for Period of Record Periodic Water Levels
Depth to water level, feet below land surface
Approved Periodic Water Level Values

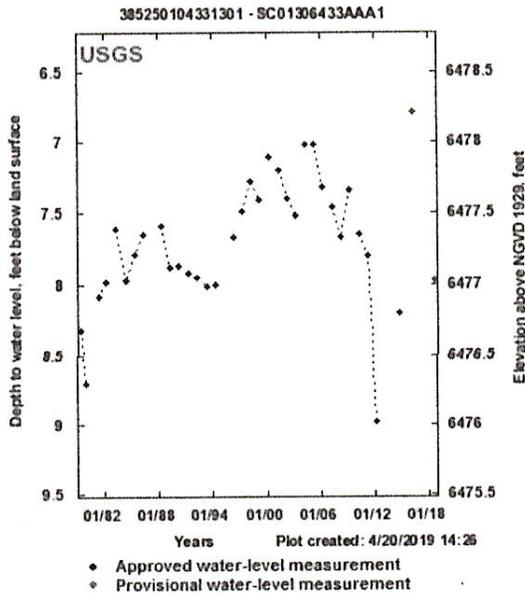
Begin Date	End Date	Number of Values
03/14/79	10/02/18	37

SC01306433AAA1

— Depth — Elevation



Highest WL	Date of Highest WL	Lowest WL	Date of Lowest WL
6.78	04/21/16	8.97	03/27/12



Groundwater Levels Options

[View latest data on NWISWeb](#)

[Download groundwater levels in text format](#)

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*References to non-Department of the Interior (DOI) products do not constitute an endorsement by the DOI.

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U.S. Department of the Interior | U.S. Geological Survey
 URL: <https://groundwaterwatch.usgs.gov/AWLSites.asp>
 Page Contact Information: Contact the USGS Office of Groundwater
 Last update: Friday, August 10, 2018 at 08:39



Page displayed in 0.398 seconds.

ATTACHMENT 3

SOIL SAMPLES OWTS



PARR ENGINEERING & CONSULTING, INC.

Christopher L. Parr, P.E. Principal
 11590 Black Forest Road, Suite 10, Colorado Springs, CO 80908
 Office: 719-494-0404 Cell: 719-659-1313

STA SOIL EVALUATION

Date: September 27, 2018 **Job:** JN: 18.395

Site Location: 3050 Curtis Road, Lot 1
 Peyton, CO 80831
 (Lot number updated 6/7/19)

Purpose of Investigation: To determine general subsurface soil conditions at the site location & to formulate design criteria for the proposed On-Site Wastewater Treatment system (OWTS)

Field Procedure: The materials in the various strata of the soil profile pit were visually classified in accordance with the U.S. Department of Agriculture (USDA) standards.



Profile Pit	YES
Perc Test	-

Profile Pit 1	
Latitude:	38°52'41.42"N
Longitude:	104°33'25.06"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 6'-0"	Type 2 (LTAR=0.60)
6'-0" - 8'-6"	Type 4 (LTAR=0.20)
-	-

Date: (Profile Eval) September 18, 2018
Excavator Homeowner
Evaluator R.J & S.D.

Depth to Groundwater (permanent or seasonal) Pit #1: Not Reached
Depth to Groundwater (permanent or seasonal) Pit #2: Not Reached

Depth to Bedrock - Pit #1: Not Reached
Depth to Bedrock - Pit #2: Not Reached

Profile Pit 2	
Latitude:	38°52'41.10"N
Longitude:	104°33'24.94"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 3'-0"	Type 2 (LTAR=0.60)
3'-0" - 8'-6"	Type 4 (LTAR=0.20)
-	-

Other Terrain Features or Soil Conditions: See Attached Site Map

Endorsement: Jared R. Dumke, P.E.

Location	
Latitude:	Longitude:
-	-
-	-
-	-
Average:	N/A Min./In.

Perc #1	N/A	Min./In.
Perc #2	N/A	Min./In.
Perc #3	N/A	Min./In.
Average:	N/A	Min./In.

Recommendations: (1) An Engineered On-Site Wastewater Treatment system (OWTS) is required for this location due to: Soil Type 4 identified in the treatment zone of Profile Pit #1 & Profile Pit #2.



Parr Engineering & Consulting, Inc.
 11590 Black Forest Road, Suite 10
 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log

Job Number:	18.395
Date Evaluated:	09/18/18
Profile Pit#:	Pit #1

Excavator:	Homeowner	Total Depth:	8'-6"
Logged By:	R.J. & S.D.	STA Slope & Direction:	N 45° E @ 4%
Method:	Profile Pit	Latitude:	38°52'41.42"N
Equipment:	Excavator	Longitude:	104°33'25.06"W

3050 Curtis Road, Lot 1, 80831

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 1, 80831						
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
		Topsoil						
2		Sandy Loam	Granular	Moderate	No	Type 2 (LTAR = 0.60) Treatment Level 1	<35%	10YR 3/3 (Moist)
4								
6		Clay	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)
8								
		Total Depth= 8'-6"						
10								

Evidence of Groundwater:	Not Reached
Depth to Bedrock:	Not Reached

Additional Notes:



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 11590 Black Forest Road, Suite 10
 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log	
Job Number:	18.395
Date Evaluated:	09/18/18
Profile Pit#:	Pit #2

Excavator:	Homeowner	Total Depth:	8'-6"
Logged By:	R.J. & S.D.	STA Slope & Direction:	N 25° E @ 4%
Method:	Profile Pit	Latitude:	38°52'41.10"N
Equipment:	Excavator	Longitude:	104°33'24.94"W

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 1, 80831						
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
		Topsoil						
2		Sandy Loam	Granular	Moderate	No	Type 2 (LTAR = 0.60) Treatment Level 1	<35%	10YR 3/3 (Moist)
4								
6		Clay	Blocky	Strong	No	Type 4 (LTAR = 0.20) Treatment Level 1	<35%	2.5Y 5/4 (Moist)
8								
		Total Depth= 8'-6"						
10								

Evidence of Groundwater:	Not Reached
Depth to Bedrock:	Not Reached

Additional Notes:



PARR ENGINEERING & CONSULTING, INC.

Christopher L. Parr, P.E. Principal
 11590 Black Forest Road, Suite 10, Colorado Springs, CO 80908
 Office: 719-494-0404 Cell: 719-659-1313

STA SOIL EVALUATION

Date: September 27, 2018 **Job:** JN: 18.396

Site Location: 3050 Curtis Road, Lot 2
 Peyton, CO 80831
 (Lot number updated 6/7/19)

Purpose of Investigation: To determine general subsurface soil conditions at the site location & to formulate design criteria for the proposed On-Site Wastewater Treatment system (OWTS)

Field Procedure: The materials in the various strata of the soil profile pit were visually classified in accordance with the U.S. Department of Agriculture (USDA) standards.



Profile Pit	YES
Perc Test	-

Profile Pit 1	
Latitude:	38°52'40.93"N
Longitude:	104°33'18.76"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 8'-6"	Type 3 (LTAR=0.35)
-	-
-	-

Date: (Profile Eval) September 18, 2018
Excavator Homeowner
Evaluator R.J & S.D.
Depth to Groundwater (permanent or seasonal) Pit #1: Not Reached
Depth to Groundwater (permanent or seasonal) Pit #2: Not Reached
Depth to Bedrock - Pit #1: Not Reached
Depth to Bedrock - Pit #2: Not Reached

Profile Pit 2	
Latitude:	38°52'41.21"N
Longitude:	104°33'18.03"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 8'-6"	Type 3 (LTAR=0.35)
-	-
-	-

Other Terrain Features or Soil Conditions: See Attached Site Map

Endorsement: Jared R. Dumke, P.E.

Perc #	Soil Type	Min./In.
Perc #1	N/A	Min./In.
Perc #2	N/A	Min./In.
Perc #3	N/A	Min./In.
Average:		N/A Min./In.

Location	
Latitude:	Longitude:
-	-
-	-
-	-

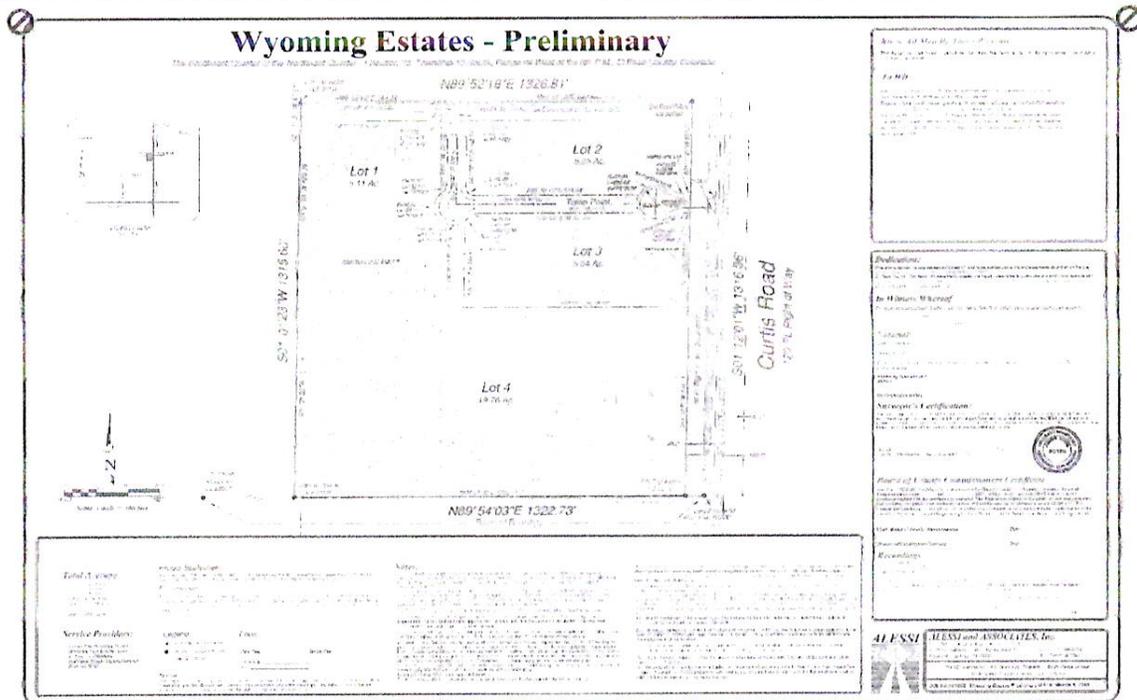
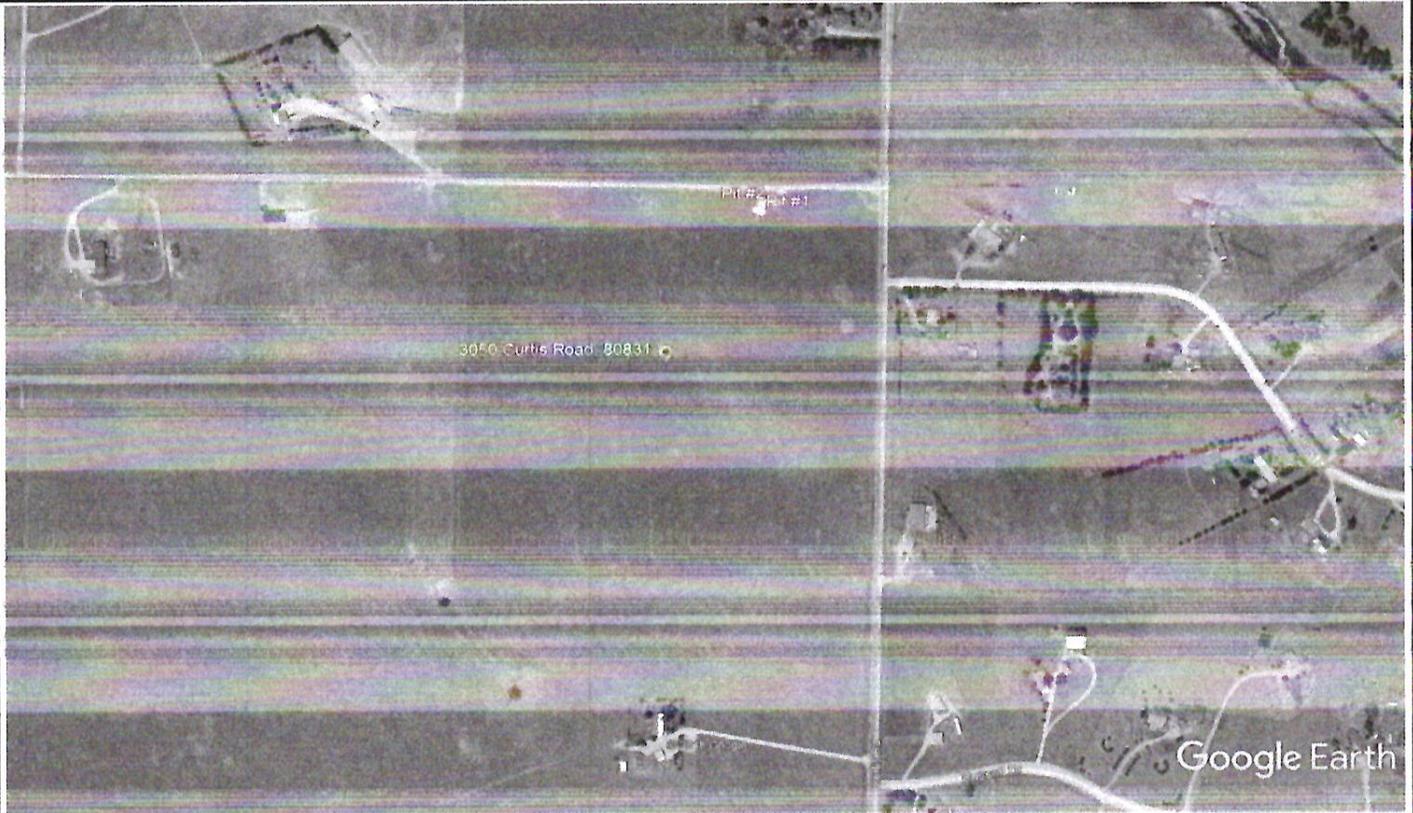
Recommendations: (1) A conventional, non-engineered On-Site Wastewater Treatment system (OWTS) is acceptable for this site.



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Google Site Map





Parr Engineering & Consulting, Inc.
 11590 Black Forest Road, Suite 10
 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log

Job Number:	18.396
Date Evaluated:	09/18/18
Profile Pit#:	Pit #1

Excavator:	Homeowner	Total Depth:	8'-6"
Logged By:	R.J. & S.D.	STA Slope & Direction:	N 35° E @ 4%
Method:	Profile Pit	Latitude:	38°52'40.93"N
Equipment:	Excavator	Longitude:	104°33'18.76"W

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 2, 80831						
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
		Topsoil						
2								
4		Sandy Clay Loam	Granular	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 4/3 (Moist)
6								
8								
		Total Depth= 8'-6"						
10								

Evidence of Groundwater:	Not Reached
Depth to Bedrock:	Not Reached

Additional Notes:



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 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log

Job Number:	18.396
Date Evaluated:	09/18/18
Profile Pit#:	Pit #2

Excavator:	Homeowner
Logged By:	R.J. & S.D.
Method:	Profile Pit
Equipment:	Excavator

Total Depth:	8'-6"
STA Slope & Direction:	N 35° E @ 4%
Latitude:	38°52'41.21"N
Longitude:	104°33'18.03"W

3050 Curtis Road, Lot 2, 80831

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 2, 80831						
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
		Topsoil						
2		Sandy Clay Loam	Granular	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 4/3 (Moist)
4								
6								
8								
		Total Depth= 8'-6"						
10								

Evidence of Groundwater:	Not Reached
Depth to Bedrock:	Not Reached

Additional Notes:



PARR ENGINEERING & CONSULTING, INC.

Christopher L. Parr, P.E. Principal
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 Office: 719-494-0404 Cell: 719-659-1313

STA SOIL EVALUATION

Date: September 27, 2018 **Job:** JN: 18.397

Site Location: 3050 Curtis Road, Lot 3
 Peyton, CO 80831
 (Lot number updated 6/7/19)

Purpose of Investigation: To determine general subsurface soil conditions at the site location & to formulate design criteria for the proposed On-Site Wastewater Treatment system (OWTS)

Field Procedure: The materials in the various strata of the soil profile pit were visually classified in accordance with the U.S. Department of Agriculture (USDA) standards.



Profile Pit	YES
Perc Test	-

Profile Pit 1	
Latitude:	38°52'37.92"N
Longitude:	104°33'17.81"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 2'-6"	Type 3 (LTAR=0.35)
2'-6" - 4'-0"	Type 3 (LTAR=0.35)
4'-0" - 8'-6"	Type 3 (LTAR=0.35)

Date: (Profile Eval) September 18, 2018
Excavator Homeowner
Evaluator R.J & S.D.
Depth to Groundwater (permanent or seasonal) Pit #1: Not Reached
Depth to Groundwater (permanent or seasonal) Pit #2: Not Reached
Depth to Bedrock - Pit #1: Not Reached
Depth to Bedrock - Pit #2: Not Reached

Profile Pit 2	
Latitude:	38°52'37.81"N
Longitude:	104°33'16.94"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 8'-6"	Type 3 (LTAR=0.35)
-	-
-	-

Other Terrain Features or Soil Conditions: See Attached Site Map

Endorsement: Jared R. Dumke, P.E.

Location	
Latitude:	Longitude:
-	-
-	-
-	-

Perc #1	N/A	Min./In.
Perc #2	N/A	Min./In.
Perc #3	N/A	Min./In.
Average:	N/A	Min./In.

Recommendations: (1) A conventional, non-engineered On-Site Wastewater Treatment system (OWTS) is acceptable for this site.



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 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log

Job Number:	18.397
Date Evaluated:	09/18/18
Profile Pit#:	Pit #1

Excavator:	Homeowner	Total Depth:	8'-6"
Logged By:	R.J. & S.D.	STA Slope & Direction:	N 35° E @ 5%
Method:	Profile Pit	Latitude:	38°52'37.92"N
Equipment:	Excavator	Longitude:	104°33'17.81"W

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 3, 80831						
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
		Topsoil						
2		Sandy Clay Loam	Granular	Moderate	No	Type 3 (LTAR = 0.35)	<35%	10YR 2/2 (Moist)
4		Sandy Clay Loam	Blocky	Strong	No	Type 3 (LTAR = 0.35)	<35%	2.5Y 3/3 (Moist)
6		Sandy Clay Loam	Blocky	Moderate	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	2.5Y 4/3 (Moist)
8								
		Total Depth= 8'-6"						
10								

Evidence of Groundwater:	Not Reached
Depth to Bedrock:	Not Reached

Additional Notes:



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 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log

Job Number:	18.397
Date Evaluated:	09/18/18
Profile Pit#:	Pit #2

Excavator:	Homeowner	Total Depth:	8'-6"
Logged By:	R.J. & S.D.	STA Slope & Direction:	N 35° E @ 5%
Method:	Profile Pit	Latitude:	38°52'37.81"N
Equipment:	Excavator	Longitude:	104°33'16.94"W

3050 Curtis Road, Lot 3, 80831

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 3, 80831						
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
		Topsoil						
2		Sandy Clay Loam	Granular	Moderate	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	2.5Y 4/3 (Moist)
4								
6								
8								
		Total Depth= 8'-6"						
10								

Evidence of Groundwater: Not Reached

Depth to Bedrock: Not Reached

Additional Notes:



PARR ENGINEERING & CONSULTING, INC.

Christopher L. Parr, P.E. Principal
11590 Black Forest Road, Suite 10, Colorado Springs, CO 80908
Office: 719-494-0404 Cell: 719-659-1313

STA SOIL EVALUATION

Date: September 27, 2018 **Job:** JN: 18.394

Site Location: 3050 Curtis Road, Lot 4
Peyton, CO 80831
(Lot number updated 6/7/19)

Purpose of Investigation: To determine general subsurface soil conditions at the site location & to formulate design criteria for the proposed On-Site Wastewater Treatment system (OWTS)

Field Procedure: The materials in the various strata of the soil profile pit were visually classified in accordance with the U.S. Department of Agriculture (USDA) standards.



Profile Pit	YES
Perc Test	-

Profile Pit 1	
Latitude:	38°52'31.31"N
Longitude:	104°33'28.35"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 5'-0"	Type 3 (LTAR=0.35)
5'-0" - 8'-0"	Type 2 (LTAR=0.60)
-	-

Date: (Profile Eval) September 18, 2018
Excavator Homeowner
Evaluator R.J & S.D.

Profile Pit 2	
Latitude:	38°52'30.60"N
Longitude:	104°33'27.64"W
Layer	Soil Type & LTAR
0 - 1'-0"	Topsoil
1'-0" - 8'-6"	Type 3 (LTAR=0.35)
-	-
-	-

Depth to Groundwater (permanent or seasonal) Pit #1: Not Reached
Depth to Groundwater (permanent or seasonal) Pit #2: Not Reached

Depth to Bedrock - Pit #1: Not Reached
Depth to Bedrock - Pit #2: Not Reached

Other Terrain Features or Soil Conditions: See Attached Site Map

Endorsement: Jared R. Dumke, P.E.

Location	
Latitude:	Longitude:
-	-
-	-
-	-
Average:	N/A
Min./In.	Min./In.

Perc #1	N/A	Min./In.
Perc #2	N/A	Min./In.
Perc #3	N/A	Min./In.
Average:	N/A	Min./In.

Recommendations: (1) A conventional, non-engineered On-Site Wastewater Treatment system (OWTS) is acceptable for this site.



Parr Engineering & Consulting, Inc.
 11590 Black Forest Road, Suite 10
 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log

Job Number:	18.394
Date Evaluated:	09/18/18
Profile Pit#:	Pit #1

Excavator:	Homeowner	Total Depth:	8'-0"
Logged By:	R.J. & S.D.	STA Slope & Direction:	S @ 3%
Method:	Profile Pit	Latitude:	38°52'31.31"N
Equipment:	Excavator	Longitude:	104°33'28.35"W

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 4, 80831					
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.

		Topsoil						
2		Sandy Clay Loam	Granular	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 3/2 (Moist)
4								
6		Sandy Loam	Granular	Moderate	No	Type 2 (LTAR = 0.60) Treatment Level 1	<35%	10YR 5/3 (Moist)
8								
		Total Depth= 8'-0"						
10								

Evidence of Groundwater:	Not Reached
Depth to Bedrock:	Not Reached

Additional Notes:



Parr Engineering & Consulting, Inc.
 11590 Black Forest Road, Suite 10
 Colorado Springs, Colorado 80908
 Phone: 719-494-0404

Profile Pit - Log

Job Number:	18.394
Date Evaluated:	09/18/18
Profile Pit#:	Pit #2

Excavator:	Homeowner	Total Depth:	8'-6"
Logged By:	R.J. & S.D.	STA Slope & Direction:	S @ 3%
Method:	Profile Pit	Latitude:	38°52'30.60"N
Equipment:	Excavator	Longitude:	104°33'27.64"W

3050 Curtis Road, Lot 4, 80831

Depth (ft.)	Sample Interval	3050 Curtis Road, Lot 4, 80831						
		USDA Soil Texture	USDA Soil Structure - Shape	Soil Structure Grade	Redoximorphic Features Present? (Y/N)	Soil Type (from Table 9 in O-14)	% Rock Frag.	Color
		Topsoil						
2		Sandy Clay Loam	Granular	Strong	No	Type 3 (LTAR = 0.35) Treatment Level 1	<35%	10YR 3/2 (Moist)
4								
6								
		Total Depth= 8'-6"						
8								
10								

Evidence of Groundwater:	Not Reached
Depth to Bedrock:	Not Reached

Additional Notes: