



Drainage Report

15435 East Chaparral Loop, Peyton, CO 80831

PREPARED FOR: Mike Cartmell

PREPARED BY: WaterVation, PLLC

DATE: May 10th, 2022

PCD File No. VR-225



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Engineer's Statement

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

[Name, P.E. # _____]

Date

Developer's Statement

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

[Name, Title]

Date

[Business Name]

[Address]

El Paso County

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Jennifer Irvine, P.E.
County Engineer / ECM Administrator

Date

Conditions:

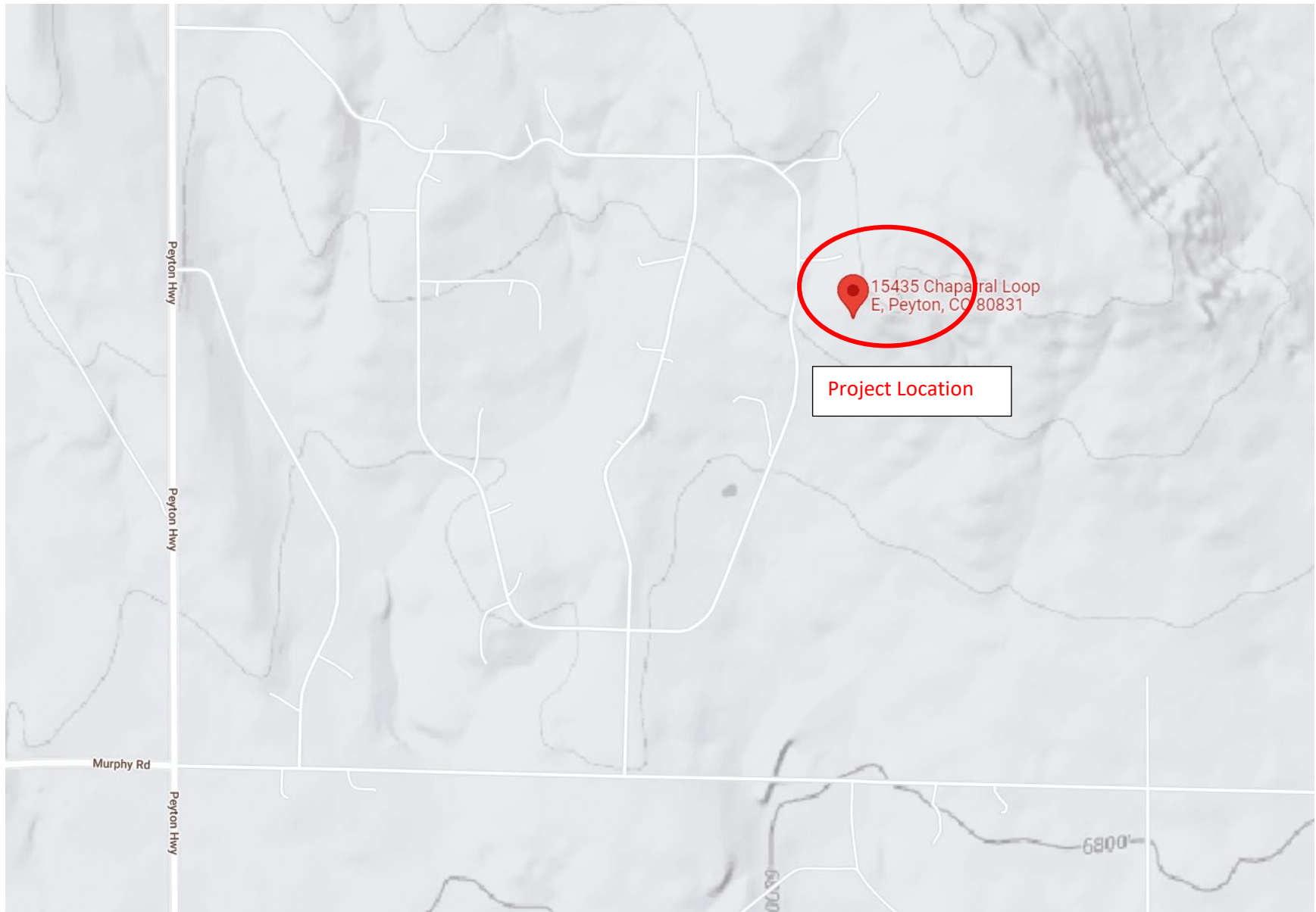
Revise to Joshua
Palmer, PE
Interim County
Engineer

Property Description

This Project is located approximately 0.75 miles to the northwest of the intersection of Murphy Road and Peyton Highway (Figure 1). The Project area is comprised of one 17.82-acre lot and is proposed to be subdivided into three lots.

15435 EAST CHAPARRAL LOOP
DRAINAGE REPORT

Figure 1. Site Map



Purpose

The purpose of this drainage report is to evaluate existing and proposed drainage characteristics for the proposed subdivision of 15435 East Chaparral Loop, Peyton, CO 80831 (Project). This report was prepared on September 24th, 2021.

Drainage Fee

There are no fees associated with the Upper Bracket Creek basin therefore drainage fees do not apply to this project.

Drainage Basin Characteristics

The existing and proposed lot slopes to the south and southwest at slopes ranging from 0.01 ft/ft to 0.015 ft/ft. The Project area was delineated into size drainage basins and two different design points. Existing impervious area was delineated using aerial imagery flown in July 2021.

The Natural Resources Conservation Service (NRCS) Web Soil Survey was referenced to identify hydrologic soil groups within the Project area. The Project area is comprised of Hydrologic Soil Group (HSG) A and HSG B soils. However, HSG B soils were assumed to be the most representative of existing conditions since most of the existing Project area has either been developed or the soils have been modified (compacted) through the process of development. Soil conditions for all basins will remain unchanged in proposed conditions.

Hydrologic soil groups are based on estimates of runoff potential. HSG A soils have a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission. HSG B soils have a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission. Soil maps for the Project area are provided in Appendix A. Soil conditions for all basins will remain unchanged in proposed conditions.

Peak flow rates were calculated using the Rational Method with precipitation data from Figure 6-5 of El Paso County's DCM. Runoff coefficients were calculated as a function of impervious area storm frequency using impervious area. A summary of estimated peak flows for existing conditions is provided in Table 1.

Table 1. Peak Flows for Existing Conditions

EXISTING SUBBASIN CHARACTERISTICS				EXISTING PEAK FLOW (CFS)		
SUBBASIN	AREA (AC)	NRCS HYDROLOGIC SOIL GROUP	PERCENT IMPERVIOUS	2-YR	25-YR	100-YR
A	0.60	B	0.00%	0.00	0.75	1.66
B	3.10	B	0.72%	0.02	2.99	6.58
C	5.20	B	1.42%	0.07	5.56	12.12
D	6.70	B	0.47%	0.03	6.83	15.09
E	3.50	B	0.27%	0.01	4.24	9.40
F	1.70	B	0.00%	0.00	1.92	4.28

Unresolved. Discuss what the suitable outfall is for the site.

Proposed Drainage Characteristics

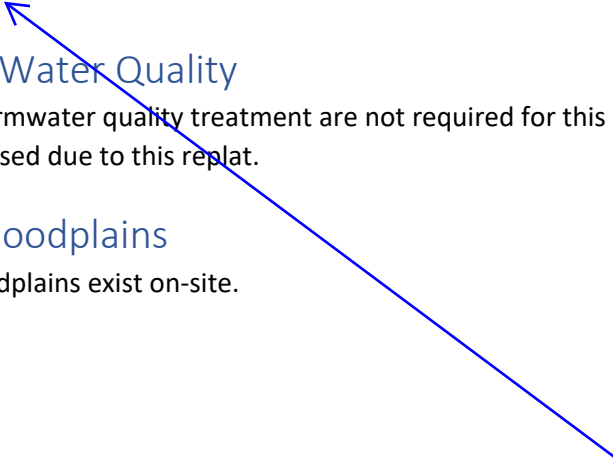
Proposed conditions are similar to existing conditions and will not significantly change the flow of drainage. The ultimate design points and sub basins are not affected by this replat and flows remain as per the existing conditions.

Detention & Water Quality

Detention and stormwater quality treatment are not required for this project since impervious area will not be significantly increased due to this replat.

Regulatory Floodplains

No regulatory floodplains exist on-site.



Discuss what exclusions apply for water quality and detention per the ECM.

Unresolved. Please provide a conclusion summarizing what is being proposed and include potential impacts and mitigation if applicable.

Unresolved. Please provide a narrative describing whether there are any floodplains on the site. Provide the firm panel number and attach a printout of it to the appendix.

References

City of Colorado Springs, Drainage Criteria Manual Volume 1, May 2014.

El Paso Engineering Criteria Manual, 2018

Mile High Flood Control District, UD Rational 2.00

Natural Resources Conservation Service (NRCS) Web Soil Survey

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Drainage Plan

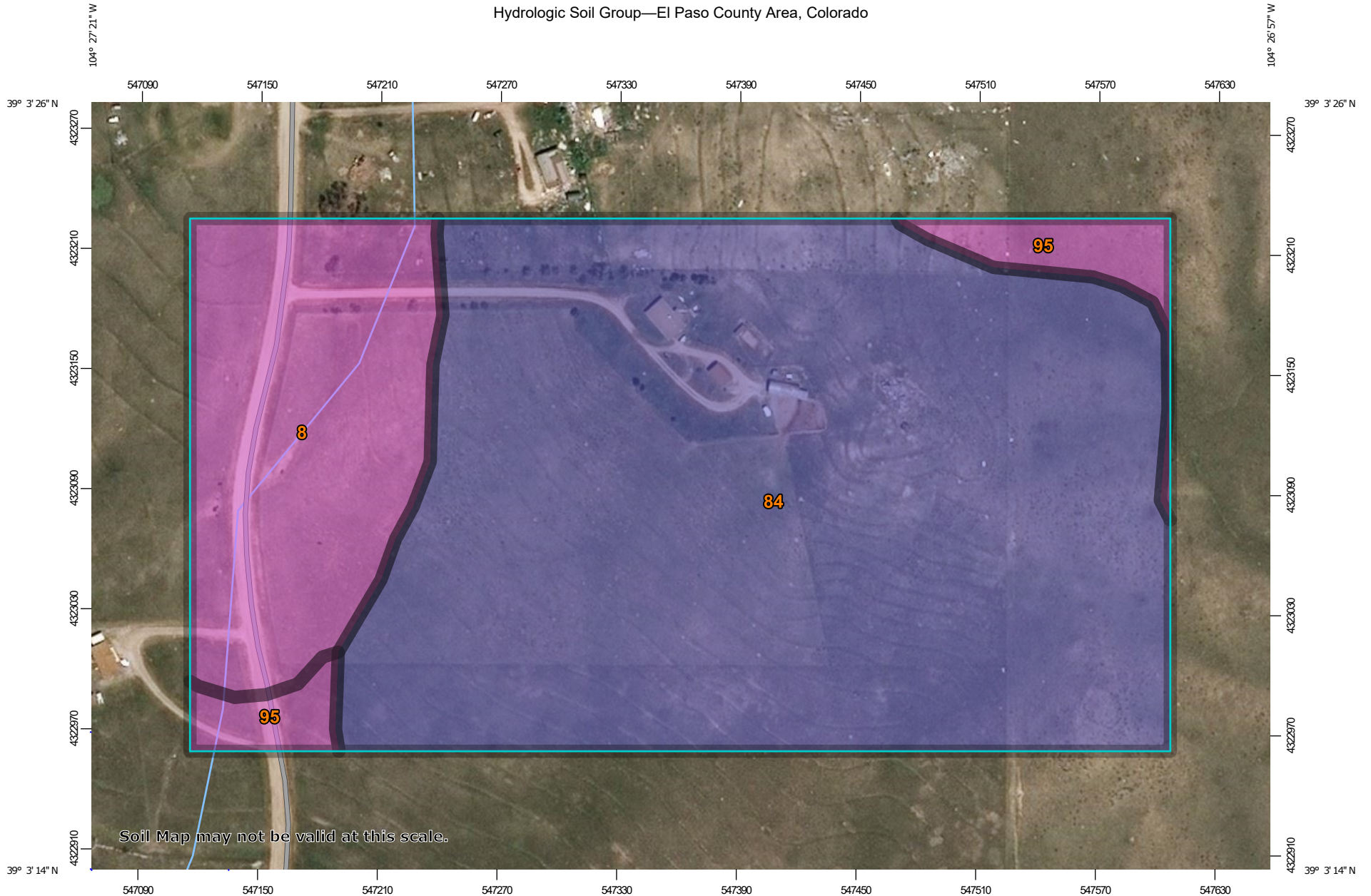
Appendix A

A summary of the hydrologic calculations for this Project are provided in Table 3 and Table 4. Rational calculations were performed using the UD-RATIONAL 2.00 software.

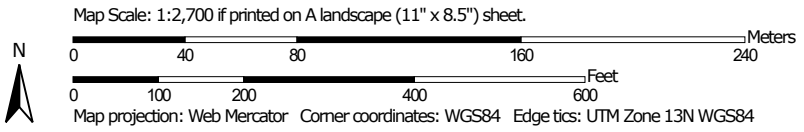
Table 2. Hydrologic Calculations for Existing Conditions

Calculation of Peak Runoff using Rational Method																																					
Designer: L. Babbitt		Version 2.00 released May 2012		Clear Worksheet		$t_i = \frac{0.395(1.1 - C_s)\sqrt{L_i}}{S^{0.33}}$		Computed $t_c = t_i + t_t$		$t_{\text{minimum}} = 5$ (urban) $t_{\text{minimum}} = 10$ (non-urban)		Link for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website		1-hour rainfall depth, P1 (in) =		2-yr 5-yr 10-yr 25-yr 50-yr 100-yr 500-yr		a b c		$I(\text{in/hr}) = \frac{a}{(b + I)^c}$ Use Denver Area Intensity		Q(cfs) = CIA															
Company: WaterVation		Date: 5/10/2022		Project: 15435 East Chaparral Loop		Location: El Paso County, CO		Cells of this color are for required user-input		Cells of this color are for optional override		Cells of this color are for calculated results		$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$		Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$		Selected $t_c = \max\{t_{\text{minimum}}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$		Fall Intensity Equation Coefficients =		28.50 10.00 0.786															
Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time				Channelized (Travel) Flow Time						Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)						
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L _i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S _i (ft/ft)	Overland Flow Time t _i (min)	Channelized Flow Length L _i (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S _i (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V _i (ft/sec)	Channelized Flow Time t _i (min)	Computed t _c (min)	Regional t _c (min)	Selected t _c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr
A (EX)	0.60	B	0.00	0.00	0.00	0.06	0.25	0.33	0.43	0.54	84.00	7026.00	7015.00	0.131	7.79	518.00	7015.00	6974.00	0.079	7	1.97	4.38	12.17	29.41	12.17	2.99	3.62	4.49	4.99	6.11	6.49	0.00	0.00	0.15	0.75	1.20	1.66
B (EX)	3.10	B	0.72	0.00	0.00	0.06	0.25	0.33	0.43	0.54	117.00	7051.00	7035.00	0.137	9.03	1333.00	7035.00	6946.00	0.067	7	1.81	12.28	21.31	35.33	21.31	2.28	2.76	3.42	3.80	4.66	4.95	0.02	0.03	0.67	2.99	4.80	6.58
C (EX)	5.20	B	1.42	0.01	0.01	0.07	0.26	0.34	0.43	0.54	142.00	7051.00	7035.00	0.113	10.56	960.00	7035.00	6946.00	0.093	7	2.13	7.51	18.07	31.47	18.07	2.49	3.01	3.73	4.15	5.08	5.39	0.07	0.13	1.33	5.56	8.87	12.12
D (EX)	6.70	B	0.47	0.00	0.00	0.06	0.25	0.33	0.43	0.54	111.00	7051.00	7040.00	0.099	9.79	1115.00	7040.00	6946.00	0.084	7	2.03	9.14	18.94	32.98	18.94	2.43	2.93	3.64	4.05	4.96	5.26	0.03	0.05	1.48	6.83	10.98	15.09
E (EX)	3.50	B	0.27	0.00	0.00	0.06	0.25	0.33	0.43	0.54	114.00	7043.00	7030.00	0.114	9.49	481.00	7030.00	6981.00	0.102	7	2.23	3.59	13.07	28.73	13.07	2.90	3.51	4.35	4.84	5.92	6.29	0.01	0.02	0.90	4.24	6.83	9.40
F (EX)	1.70	B	0.00	0.00	0.00	0.06	0.25	0.33	0.43	0.54	234.00	7043.00	7023.00	0.085	14.97	1.00	7023.00	7022.50	0.500	7	4.95	0.00	14.97	26.00	14.97	2.73	3.29	4.09	4.54	5.57	5.91	0.00	0.00	0.40	1.92	3.10	4.28
DP 1 (EX)	15.60	B	0.20	0.00	0.00	0.06	0.25	0.33	0.43	0.54	142.00	7051.00	7035.00	0.113	10.63	960.00	7035.00	6946.00	0.093	7	2.13	7.51	18.14	31.79	18.14	2.48	3.00	3.72	4.14	5.07	5.38	0.02	0.05	3.40	16.15	26.02	35.82
DP 2 (EX)	3.50	B	0.27	0.00	0.00	0.06	0.25	0.33	0.43	0.54	114.00	7043.00	7030.00	0.114	9.49	481.00	7030.00	6981.00	0.102	7	2.23	3.59	13.07	28.73	13.07	2.90	3.51	4.35	4.84	5.92	6.29	0.01	0.02	0.90	4.24	6.83	9.40
DP 3 (EX)	1.70	B	0.0	0.00	0.00	0.06	0.25	0.33	0.43	0.54	234.00	7043.00	7023.00	0.085	14.97	1.00	7023.00	7022.50	0.500	7	4.95	0.00	14.97	26.00	14.97	2.73	3.29	4.09	4.54	5.57	5.91	0.00	0.00	0.40	1.92	3.10	4.28

Hydrologic Soil Group—El Paso County Area, Colorado




Soil Map may not be valid at this scale.



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Lines

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

Soil Rating Points


-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

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 18, Jun 5, 2020

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

Date(s) aerial images were photographed: Sep 8, 2018—May 26, 2019

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	6.4	19.6%
84	Stapleton sandy loam, 8 to 15 percent slopes	B	24.6	75.7%
95	Truckton loamy sand, 1 to 9 percent slopes	A	1.5	4.7%
Totals for Area of Interest			32.5	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher