

# True West Co., LLC

## FINAL DRAINAGE REPORT

Hotchkiss Commercial Offices, 2290 Old Ranch Road, Colorado Springs, Colorado  
Lot 8, Block E, Amended Filing of Springs Crest Subdivision  
El Paso County, Colorado

Prepared for:

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Prepared by:

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Attn: Connie Ellefson, P.E.

Revised June 25, 2020  
August 5, 2019

PCD File No. PPR203

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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.

\_\_\_\_\_  
Connie L. Ellefson, P.E. Colorado P.E. 23317

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:

## A. PURPOSE

The purpose of this letter is to demonstrate that the proposed drainage changes to Lot 8, Block E, Amended Filing of Springs Crest Subdivision will not adversely affect downstream properties, and conform to El Paso County drainage criteria.

This site was previously developed with a residence, storage shed, and garage, with a circular gravel driveway, landscape and utilities. With the proposed development, the existing house will be removed and replaced with a 5700-square foot office building (2-story). The existing garage will be remodeled into a studio/office, and the gravel drive replaced with paved drive and parking for the office building and studio. The new building will have a deck around much of the 2<sup>nd</sup> floor, but no concrete apron as shown on an earlier site development plan.

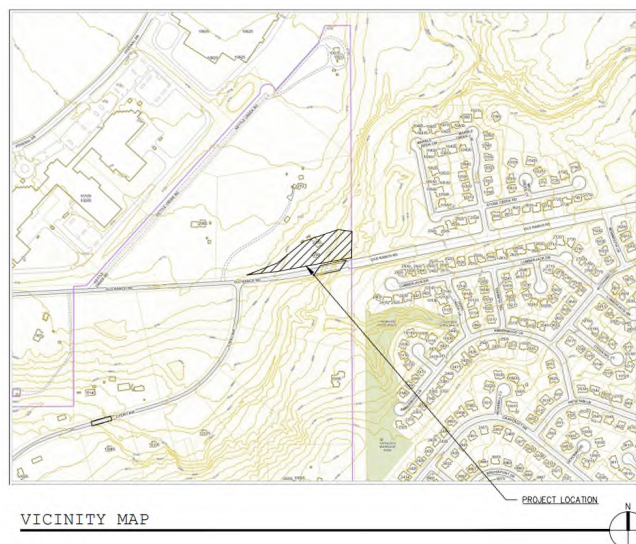
Parking areas will be asphalt with wheel stops only in order to maximize the opportunity for the impervious area to drain to open space and improve water quality, and in keeping with the more rural nature of the area this site is in. A small amount of concrete curb will be needed around the remodeled garage- to-studio to redirect new runoff away from the existing building.

## B. GENERAL LOCATION AND DESCRIPTION

The site is located in the Kettle Creek drainage basin FOMO300.

It is a roughly triangular area north of Old Ranch Road, approximately 0.6 miles west of Voyager Parkway and one mile east of N. Powers Boulevard. Kettle Creek forms the southeast side of the site.

The lot contains 2.19 acres, of which approximately 0.5 acres along Kettle Creek is in the Zone AE floodplain (floodplain base flood elevation at 6671 adjacent to buildings, at least 10 below the finished floor elevations.)



The existing entrance will be repaved with the redevelopment and the drive extended to parking spaces with asphalt paving.

Runoff will flow off the pavement as sheet flow, and via a shallow concrete pan, over riprap erosion protection to help return it to sheet flow, and flow into Kettle Creek.

### **C. EXISTING DRAINAGE CHARACTERISTICS**

The existing site is sloped from the northwest to the southeast, with steep slopes, between 8 and 20% along the northwest side. The area in the middle of the lot, where the existing buildings and circular drive are located is much flatter, averaging 1.5% slope. The lot drops off steeply to the southeast beyond that, to Kettle Creek, within the floodplain area.

The drainageway appears stable, with mature vegetation throughout the area within the lot. A limited area of riprap exists near the bridge over Kettle Creek, presumably to stabilize the area after bridge construction. It appears to be stable as well, without signs of excessive erosion.

The slope along the northwest side is heavily wooded with evergreen trees, the floodplain contains several large deciduous trees, and other trees of both types are scattered more sparsely throughout the lot, with native grass, and a small amount of sod and landscaping around the existing residence.

Offsite runoff enters the site from the northwest (2.83 acres) part of an existing large-acreage residence (one residence on 11.9 acres) of primarily grassland, with the heavily wooded area adjacent to the northwest corner of the site as sheet flow (Design Point 1).

The existing onsite area corresponding to the proposed developed area of the lot has been divided into two basins. Basin H1 (0.72 acres) contains roof, gravel drive, concrete walk, and landscape. It drains, along with runoff from Basin O1 to the southeast around the south side of the house, and around the south side of the garage, to Kettle Creek (Design Point H1.)

Basin H2 (0.27 acres) contains roof, concrete patio, and landscape. It drains around the north end of the house, then southeast to Kettle Creek (Design Point H2).

Both Basins H1 and H2, as well as developed Basins A1 and A2, described below, include small areas along the north side of the site that are tributary to the rest of the basins, but will not be disturbed. Thus the total disturbed area is approximately 0.90 acres, even though the basin areas total to 0.99 acres.

The only drainage provisions are an existing 24" CMP culvert under the entrance drive, connecting the roadside swale that flows along the north side of Old Ranch

Road to Kettle Creek. On the east side of the drive the roadside swale angles more northeasterly towards the Creek, crossing a small area of Lot 8.

#### **D. PROPOSED DRAINAGE CHARACTERISTICS**

The developed area of the site has been divided into five small basins, and the flows from the total of these five areas was compared to the same area of the existing site, since existing and proposed development areas are roughly in the same part of the lot.

The wedge of land extending west along the right-of-way from the proposed parking lot, as well as the area of the floodplain for Kettle Creek, were both omitted from calculations. This is due to the fact that the land in both areas will remain unchanged, and any flows from offsite areas draining to those two areas will not be changed or redirected.

The existing culvert under the entrance drive will be cleaned of sediment, or replaced if damaged. The existing entrance drive will be repaved to the existing grade to the R.O.W. line, then regraded as needed on site to make the new drainage pattern work.

Onsite Basin A1 (0.14 acres) consists of the greenbelt area north of the parking lot. It will receive runoff from offsite Basin O1 (Design Point 1), and a swale will be graded in that basin to direct the offsite runoff east (Design Point 2) around the new development, rather than letting it flow onto the proposed parking areas.

Basin A2 (0.29 acres) contains open space and the north half of the proposed new office building at the east side of the new development. A swale has been graded to continue directing offsite flow around the building and into Kettle Creek (Design Point 3).

Basin B1A (0.14 acres of parking lot along the northwest end of the developed area will sheet flow off the edge of the pavement towards the southeast (Design Point 4A). Basin B1B (0.26 acres of the remainder of the parking lot and parts of the roofs of both buildings) will drain, along with runoff from Basin B1A, to a small concrete crossspan south of the studio office (Design Point 4B), and across riprap erosion protection designed to help spread the flow. The runoff will continue across an approximate 60' buffer of open space before reaching the Kettle Creek top of bank.

Basin B2 (0.16 acres of roof, concrete walk, and open space) drains southeast towards Kettle Creek in a wide, shallow swale designed to help return flow to sheet flow.

The flows are as follows:

## RUNOFF SUMMARY

DES. PT.	BASIN	AREA (AC.)	5-YR FLOW (cfs)	100-YR FLOW (cfs)
1	O1	2.83	1.05	6.54
	H1	0.72	0.73	2.63
H1	O1 + H1	3.55	1.53	8.42
H2	H2	0.27	0.16	0.75
	O1 + H1 + H2	3.82	1.65	9.06
	H1 - H2	0.99	0.75	2.95

## RUNOFF SUMMARY

DES. PT.	BASIN	AREA (AC.)	5-YR FLOW (cfs)	100-YR FLOW (cfs)
1	O1	2.83	1.05	6.54
	A1	0.14	0.05	0.38
2	O1 + A1	2.97	1.00	6.26
	A2	0.29	0.24	1.05
3	O1 + A1 + A2	3.22	1.25	6.54
4A	B1A	0.14	0.53	1.05
	B1B	0.26	0.87	1.79
4B	B1A + B1B	0.40	1.40	2.82
	B2	0.16	0.28	0.76
5	B1A+B1B+B2	0.56	1.68	3.61
	A1 - B2	0.99	1.68	4.23
	O1 + A1 - B2	3.82	2.23	9.01

### **E. WATER QUALITY**

No permanent water quality BMPs as the development will disturb less than 1.0 acre, and the site is not part of an overall development.

Water quality is improved by the fact that all the impervious areas drain to wide grass buffers before draining into Kettle Creek.

See “Four-Step Process” below for further information.

## **F. HYDROLOGY CALCULATIONS AND DRAINAGE FACILITY DESIGN**

Drainage criteria was taken from the El Paso County Drainage Design Criteria Manual Volume 1 (DCM). This manual refers to the Urban Drainage and Flood Control District’s Criteria Manual, Volumes 1-3 (UD) for certain calculation methods, specifically in determining detention volume and Minimize Directly Connected Impervious Area.

The design rainfall for the minor storm (5-year) is a one-hour precipitation rate of 1.50 inches, and for the major storm (100-year), a one-hour rate of 2.60 inches. Runoff from all Basins was calculated using the rational method, as outlined in the DCM. Time of concentration was calculated using c-values from the El Paso County DCM Volume 1, Chapter 6. Design storm recurrence intervals used in this hydrologic analysis were the 5-year and the 100-year storms.

Flow rate calculations are shown in the Appendix for the Rational Method. The standard values used for the calculations, such as the rainfall intensity curves also appear in the Appendix.

Four Step Process for receiving water protection. The El Paso County requires discussion of how the “Four Step Process” as outlined in Appendix I.7.2 for “reducing runoff volumes, treating water quality capture volume (EURV), stabilizing drainageways, and implementing long-term source controls.”

The steps have been considered and incorporated in the drainage plan for this project as follows:

### **Step 1: Employ runoff reduction practices**

The site is designed to provide only the required parking and circulation impervious areas, even though more parking might be possible. The amount of open space/landscape area on the overall site is more than 82%.

All of the existing and proposed impervious area will release into open space landscape buffers ranging from 30-70’ wide before reaching the Kettle Creek channel.

The parking areas will be constructed without curb and gutter, and are graded to drain as sheet flow to landscape/open space where possible. Almost all the roof area drains to landscape.

### **Step 2: Stabilize drainageways.**

The swales will be grass-lined, and designed with low velocities. Riprap will protect the one location of concentrated flow (outfall of small crossspan south of studio) to help return it to sheet flow.

### **Step 3: Provide Water Quality Capture Volume**

Detention and Water Quality Capture Volume is not required for this site, as it will disturb under 1.0 acre.

Flowrates will increase less than 1 cfs for the 5-year storm, and 1.3 cfs for the 100-year storm, for the developed area of the site. When combined with the offsite area runoff, the totals are only 0.6 cfs higher for the 5-year storm, and show no increase for the 100-year storm. This is because part of the lot will be graded with a more meandering flowpath than the existing ground.

### **Step 4: Consider Need for Industrial and Commercial BMP's.**

Source pollutants are not expected to be a large problem with the proposed site use. No automotive servicing activities are anticipated other than parking. All parking areas will be routed through wide grass buffers.

## **G. FLOODPLAIN STATEMENT**

According to the Federal Emergency Management Agency (FEMA), as depicted on Flood Insurance Rate Map ((FIRM) No. 08041C0506G, Dec. 7, 2018, the southeastern 0.5 acres of the site is in Zone AE, the deep, defined channel for Kettle Creek. The floodplain won't be disturbed with this redevelopment, and the floodplain base flood elevation is at 6671 adjacent to buildings, at least 10 below the finished floor elevations.

## **H. EROSION CONTROL**

Erosion control plans were not required for this small site, with its substantial grass buffers all around the developed areas.

## **I. DRAINAGE/BRIDGE FEES**

No fees are due with site development plan applications.



## J. CONSTRUCTION COST OPINION

### Storm Sewer Cost Estimate (All are non-reimbursable)

DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	COST
<b>PRIVATE</b>				
24" CMP - if needed	28	LF	\$ 40	\$ 1,120.00
Private Storm Improvements Cost				\$ 1,120.00
Subtotal Cost \$			1,120.00	
Contingency			112.00	
Total \$			1,232.00	

## CONCLUSION

The redevelopment and proposed drainage patterns for Lot 8, Block E, Amended Filing of Springs Crest Subdivision, Hotchkiss Commercial Offices, will not negatively impact downstream properties. The flowrates will increase only slightly from existing to proposed conditions.

The existing stream, Kettle Creek is protected by grass buffers at least 30-70' wide from any proposed or existing impervious area, and the one new point of concentrated flow will be protected with riprap.

## APPENDIX

# National Flood Hazard Layer FIRMette



## 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
OTHER AREAS OF FLOOD HAZARD		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 D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
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 7/20/2019 at 12:03:47 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.



**True West Co., LLC  
Hotchkiss Commercial Offices  
2290 Old Ranch Road**

5/22/2020

Hydrologic Soil Type B

**Existing Site**

2.19 acres      95600

**Existing Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	87,770	0.08	0.35	2%
Gravel Rd	3,725	0.59	0.70	80%
Roof	2,990	0.73	0.81	90%
Walks/Drives	1,115	0.90	0.96	100%

95,600

**Proposed Imperviousness**

I= 8.9%

C5 = 0.13

C100 = 0.39

**Proposed Site**      2.19 acres      95600

**Proposed Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	78,217	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	3,951	0.73	0.81	90%
Walks/Drives	13,432	0.90	0.96	100%

95,600

**Proposed Imperviousness**

I= 19.4%

C5 = 0.22

C100 = 0.45

**Basin O1**      2.83 acres      123350 Soil Type A

**Existing Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	118,490	0.08	0.35	2%
Gravel Rd	3,860	0.59	0.70	80%
Roof	1,000	0.73	0.81	90%
Walks/Drives	0	0.90	0.96	100%

123,350

**Proposed Imperviousness**

I= 5.2%

C5 = 0.10

C100 = 0.36

**Basin H1**                      0.72 acres                      31200 Soil Type B  
 (corresponding to developed area calculated)

**Existing Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	24,590	0.08	0.35	2%
Gravel Rd	3,725	0.59	0.70	80%
Roof	1,837	0.73	0.81	90%
Walks/Drives	1,048	0.90	0.96	100%
31,200				

**Proposed Imperviousness**

I= 19.8%

C5 = 0.21

C100 = 0.44

**O1 and H1 weighted imperviousness and runoff coefficients**

**Imperviousness**

O1	2.83	5.2	14.7
H	0.72	19.8	14.3
	3.55		29.0

Ave =  $29.0/3.55 = 8.2$  %

**C5**

O1	2.83	0.10	0.28
H	0.72	0.21	0.15
	3.55		0.43

Ave =  $0.43/3.55 = 0.12$

**C100**

O1	2.83	0.36	1.02
H	0.72	0.44	0.32
	3.55		1.34

Ave =  $1.34/3.55 = 0.38$

**Basin H2**                      0.27 acres                      11809 Soil Type B

**Existing Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	10,589	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	1,153	0.73	0.81	90%
Walks/Drives	67	0.90	0.96	100%
11,809				

**Proposed Imperviousness**

I= 11.1%

C5 = 0.15

C100 = 0.40

# **O1 and H1-H2 weighted imperviousness and runoff coefficients**

## **Imperviousness**

O1 + H1	3.55	8.2	29.1
H2	0.27	11.1	3.0
	3.82		32.1

$$\text{Ave} = 32.1/3.82 = 8.4 \quad \%$$

## **C5**

O1 + H1	3.55	0.12	0.43
H2	0.27	0.15	0.04
	3.82		0.47

$$\text{Ave} = 0.47/3.82 = 0.12$$

## **C100**

O1 + H1	3.55	0.38	1.35
H2	0.27	0.40	0.11
	3.82		1.46

$$\text{Ave} = 1.46/3.82 = 0.38$$

**Basin H1 -H2**      0.99 acres      43009 Soil Type B  
(corresponding to developed area calculated)

## **Existing Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	35,179	0.08	0.35	2%
Gravel Rd	3,725	0.59	0.70	80%
Roof	2,990	0.73	0.81	90%
Walks/Drives	1,115	0.90	0.96	100%
	43,009			

## **Proposed Imperviousness**

$$I = 17.4\%$$

$$C5 = 0.19$$

$$C100 = 0.43$$

A1 0.14 acres 6043

**Proposed Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	6,043	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	0	0.73	0.81	90%
Walks/Drives	0	0.90	0.96	100%

6,043

**Proposed Imperviousness**

I= 2.0%

C5 = 0.08

C100 = 0.35

**O1 and A1 weighted imperviousness and runoff coefficients**

**Imperviousness**

O1	2.83	5.2	14.7
A1	0.14	2.0	0.3

2.97	15.0
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Ave =  $15.0/2.97 = 5.0$  %

**C5**

O1	2.83	0.10	0.28
A1	0.14	0.08	0.01

2.97	0.29
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Ave =  $0.29/2.97 = 0.10$

**C100**

O1	2.83	0.36	1.02
A1	0.14	0.35	0.05

2.97	1.07
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Ave =  $1.07/2.97 = 0.36$

A2 0.29 acres 12665

**Proposed Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	11,033	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	1,581	0.73	0.81	90%
Walks/Drives	51	0.90	0.96	100%

12,665

**Proposed Imperviousness**

I= 13.4%

C5 = 0.16

C100 = 0.41

**O1 + A1 + A2 weighted imperviousness and runoff coefficients**

**Imperviousness**

O1+A1	2.97	5.0	14.9
+A2	0.29	13.4	3.9
	3.26		18.7

$$\text{Ave} = 18.7/3.26 = 5.7 \quad \%$$

**C5**

O1 + A1	2.97	0.10	0.36
+A2	0.29	0.16	0.05
	3.26		0.41

$$\text{Ave} = 0.41/3.26 = 0.12$$

**C100**

O1 + A1	2.97	0.36	1.07
+A2	0.29	0.41	0.12
	3.26		1.19

$$\text{Ave} = 1.19/3.26 = 0.36$$

**B1A** 0.14 acres 6025

**Proposed Composite Coefficients of ch**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	1,075	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	0	0.73	0.81	90%
Walks/Drives	4,950	0.90	0.96	100%
	6,025			

**Proposed Imperviousness**

$$I = 82.5\%$$

$$C5 = 0.75$$

$$C100 = 0.85$$

**B1B** 0.26 acres 11445

**Proposed Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	3,240	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	367	0.73	0.81	90%
Walks/Drives	7,838	0.90	0.96	100%
	11,445			

**Proposed Imperviousness**

$$I = 71.9\%$$

$$C5 = 0.66$$

$$C100 = 0.78$$



**B1A and B1B weighted imperviousness and runoff coefficients****Imperviousness**

B1A	0.14	82.5	11.6
+B1B	0.26	71.9	18.7
	0.40		30.2

$$\text{Ave} = 30.2/0.4 = 75.6 \quad \%$$

**C5**

B1A	0.14	0.75	0.1
+B1B	0.26	0.66	0.2
	0.40		0.28

$$\text{Ave} = 0.28/0.40 = 0.69$$

**C100**

B1A	0.14	0.85	0.1
+B1B	0.26	0.78	0.2
	0.40		0.32

$$\text{Ave} = 0.32/0.56 = 0.80$$

**B2**                      0.16 acres                      6831

**Proposed Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	4,235	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	2,003	0.73	0.81	90%
Walks/Drives	593	0.90	0.96	100%
	6,831			

**Proposed Imperviousness**

$$I = 36.3\%$$

$$C5 = 0.34$$

$$C100 = 0.54$$

**B1A, B1B and B2 weighted imperviousness and runoff coefficients****Imperviousness**

B1A + B1B	0.40	75.6	30.2
+B2	0.16	36.3	5.8
	0.56		36.0

$$\text{Ave} = 36.0/0.4 = 64.4 \quad \%$$

**C5**

B1A + B1B	0.40	0.69	0.3
+B2	0.16	0.34	0.1
	0.56		0.33

$$\text{Ave} = 0.33/0.56 = 0.59$$

**C100**

B1A + B1B	0.40	0.80	0.3
+B2	0.16	0.54	0.1
	0.56		0.41

$$\text{Ave} = 0.41/0.56 = 0.73$$

**A1-B2**

Imperviousness of redeveloped area - corresponding to H

Dev. Area-A1-B2 0.99 acres 43009

**Proposed Composite Coefficients of Runoff**

Cover type	Area (sf)	C5	C100	Imperviousness
Landscape	25,626	0.08	0.35	2%
Gravel Rd	0	0.59	0.70	80%
Roof	3,951	0.73	0.81	90%
Walks/Drives	13,432	0.90	0.96	100%
	43,009			

**Proposed Imperviousness**

$$I = 40.7\%$$

$$C5 = 0.40$$

$$C100 = 0.58$$

O1 + A1-B2 weighted imperviousness and runoff coefficients

**Imperviousness**

O1	2.83	5.2	14.7
A1-B2	0.99	40.7	40.3
		3.82	55.0

$$\text{Ave} = 55.0/3.82 = 14.4 \quad \%$$

**C5**

O1	2.83	0.10	0.28
A1-B2	0.99	0.40	0.40
		3.82	0.68

$$\text{Ave} = 0.68/3.82 = 0.18$$

**C100**

O1	2.83	0.36	1.02
A1-B2	0.99	0.58	0.57
		3.82	1.59

$$\text{Ave} = 1.59/3.82 = 0.42$$

Designer:		Version 2.00 released May 2017
Company:		
Date:	5/24/2020	Cells of this color are for required user-input
Project:	Hotchkiss Office Buildings	Cells of this color are for optional override
Location:		Cells of this color are for calculated results

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

$$\text{Regional } t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$$

$$\text{Selected } t_c = \max\{t_{\text{minimum}}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$$

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1-hour rainfall depth, P1 (in) =	1.19	1.50	1.80	2.00	2.25	2.60	3.35

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

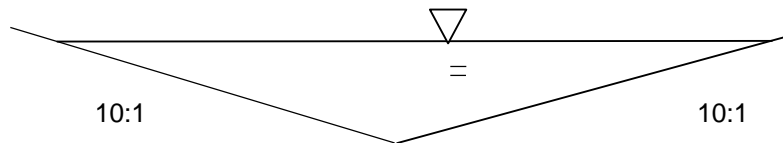
Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C								Overland (Initial) Flow Time					Channelized (Travel) Flow Time						Time of Concentration			Rainfall Intensity, I (in/hr)								Peak Flow, Q (cfs)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L <sub>i</sub> (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S <sub>i</sub> (ft/ft)	Overland Flow Time t <sub>i</sub> (min)	Channelized Flow Length L <sub>i</sub> (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S <sub>i</sub> (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V <sub>i</sub> (ft/sec)	Channelized Flow Time t <sub>i</sub> (min)	Computed t <sub>c</sub> (min)	Regional t <sub>c</sub> (min)	Selected t <sub>c</sub> (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	100-yr	500-yr																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Site Historic	2.19	B	8.9	0.05	0.06	0.13	0.30	0.38	0.47	0.57	50.00			0.080	6.67	160.00			0.019	20	2.76	0.97	7.64	26.38	10.00	3.22	4.06	4.87	5.41	6.09	7.03	9.06	0.35	0.55	1.37	3.61	5.03	7.20	11.29																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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**True West Co., LLC**  
**Hotchkiss Commercial Offices**  
**2290 Old Ranch Road**

6/8/2020

**Swale A1 - for Basins O1 + A1 flow - Grass-lined**

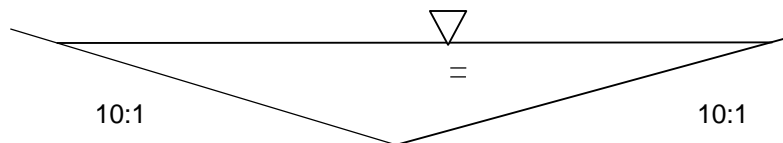
$$\begin{aligned} Q_5 &= 1.00 \text{ cfs}, Q_{100} = 6.26 \text{ cfs} & Q &= \frac{1.486AR^{2/3}S^{1/2}}{n} \\ S &= 2.1 \% \\ n &= 0.035 \end{aligned}$$



D =	N =	0.035	Q =	6.47 cfs	
0.51	A =	2.60 sf.	V =	2.5	fps
10	WP =	10.25 ft.			
10	S =	0.021 %			

**Swale A2-for Basins O1 + A1 + A2 flow - Grass-lined**

$$\begin{aligned} Q_5 &= 1.25 \text{ cfs}, Q_{100} = 6.51 \text{ cfs} & Q &= \frac{1.486AR^{2/3}S^{1/2}}{n} \\ S &= 1.2 \% \\ n &= 0.035 \end{aligned}$$



D =	N =	0.035	Q =	6.58 cfs	
0.57	A =	3.25 sf.	V =	2.0	fps
10	WP =	11.46 ft.			
10	S =	0.012 %			

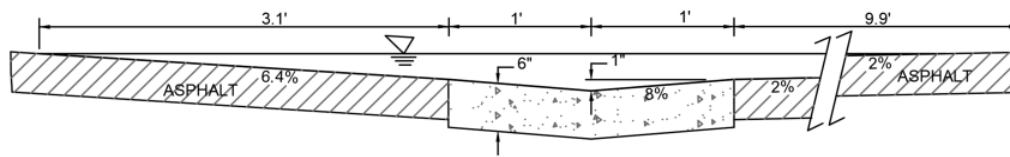
### Swale B1 for Basin B1 - Concrete and Asphalt

$$Q_{100} = 2.82 \text{ cfs}$$

$$S = 0.7 \%$$

$$n = 0.017$$

$$Q = \frac{1.486AR^{2/3}S^{1/2}}{n}$$



$$D = 0.28'$$

$$N = 0.017$$

$$Q = 3.13 \text{ cfs}$$

$$A = 1.76 \text{ sf.}$$

$$V = 1.8 \text{ fps}$$

$$WP = 15.00 \text{ ft.}$$

$$S = 0.007 \%$$

### Riprap B1 Swale

With outlet velocity at only 1.8 fps for the 100-year storm, only minimal riprap erosion protection is proposed.

Use 5' W x 5' long x 1.5' deep buried Type L riprap

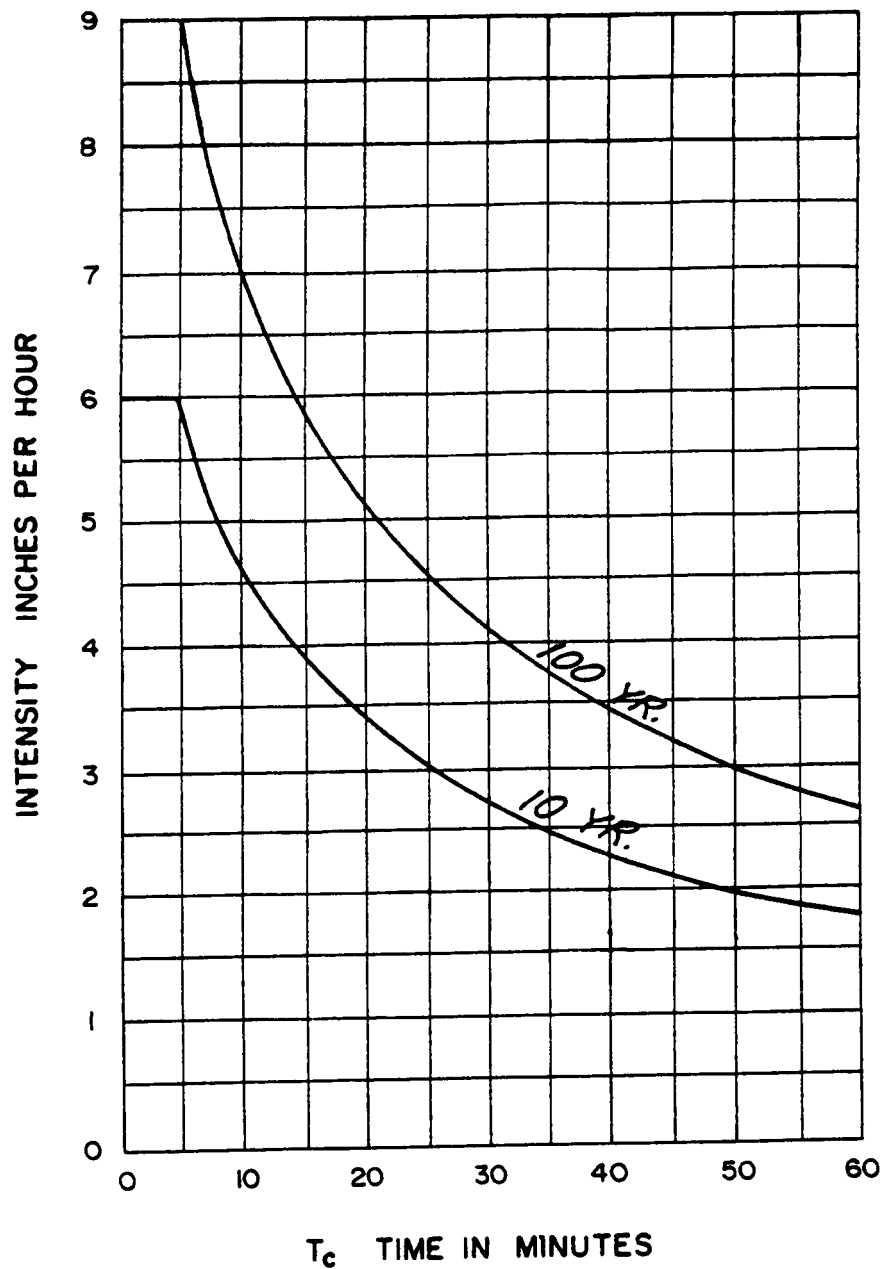
**Table 6-6. Runoff Coefficients for Rational Method**  
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis-- Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

### 3.2 Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration ( $t_c$ ) consists of an initial time or overland flow time ( $t_i$ ) plus the travel time ( $t_t$ ) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time ( $t_i$ ) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion ( $t_t$ ) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.



RE: Based upon Pikes Peak area council of governments/  
areawide urban runoff control manual.



HDR Infrastructure, Inc.  
A Centerra Company

The City of Colorado Springs / El Paso County  
Drainage Criteria Manual

Storm Rainfall  
Time Intensity-Frequency Curves

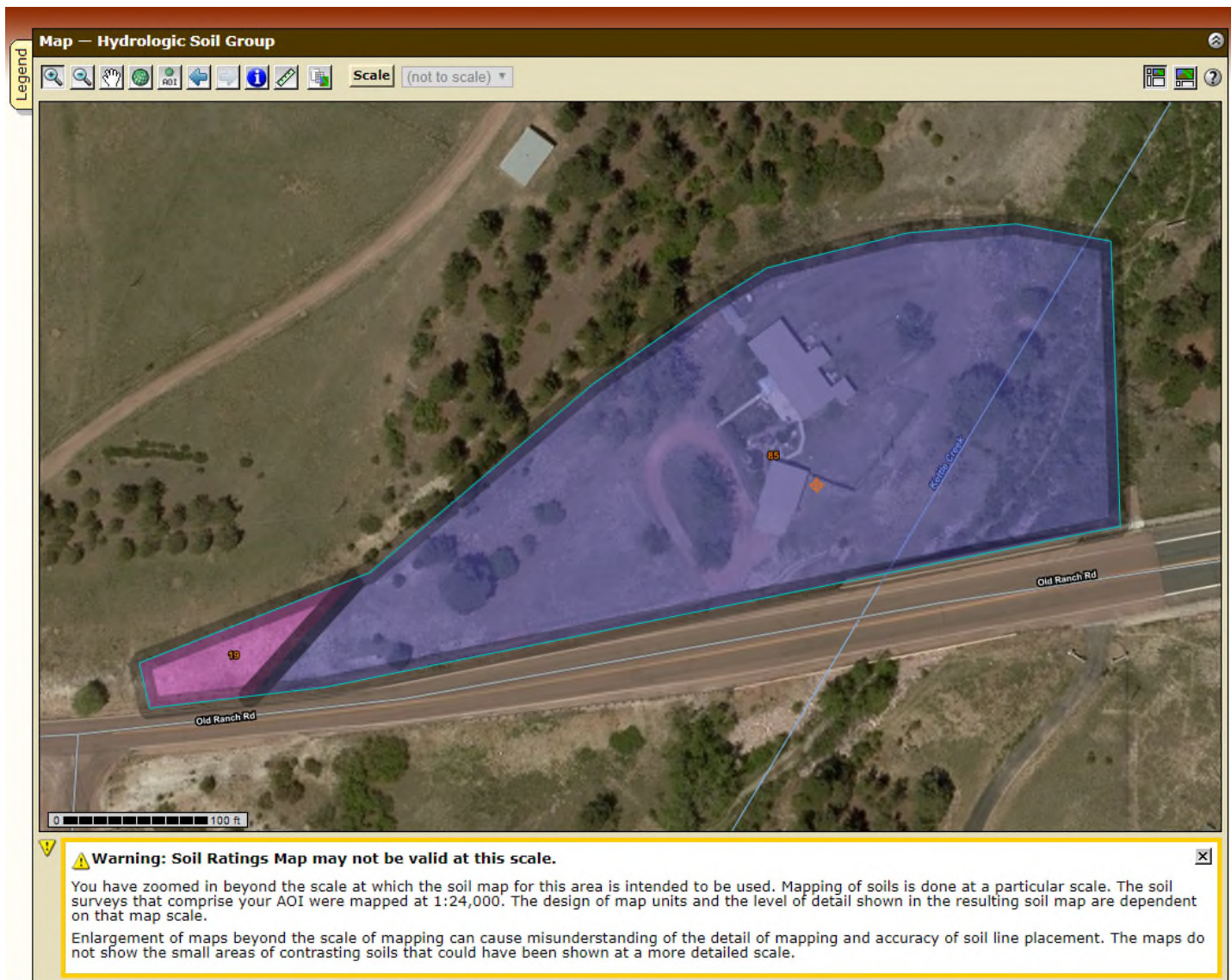
Date

OCT. 1987

Figure

5 - 1





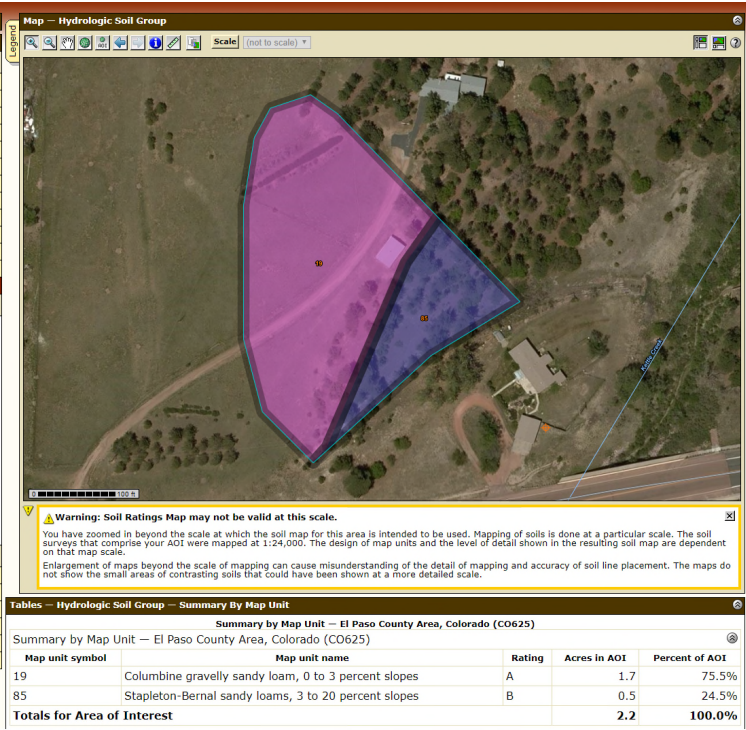
**Tables — Hydrologic Soil Group — Summary By Map Unit**

**Summary by Map Unit — El Paso County Area, Colorado (CO625)**

Summary by Map Unit — El Paso County Area, Colorado (CO625)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	A	0.1	4.8%
85	Stapleton-Bernal sandy loams, 3 to 20 percent slopes	B	2.3	95.2%
<b>Totals for Area of Interest</b>			<b>2.4</b>	<b>100.0%</b>

**Description — Hydrologic Soil Group**







United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

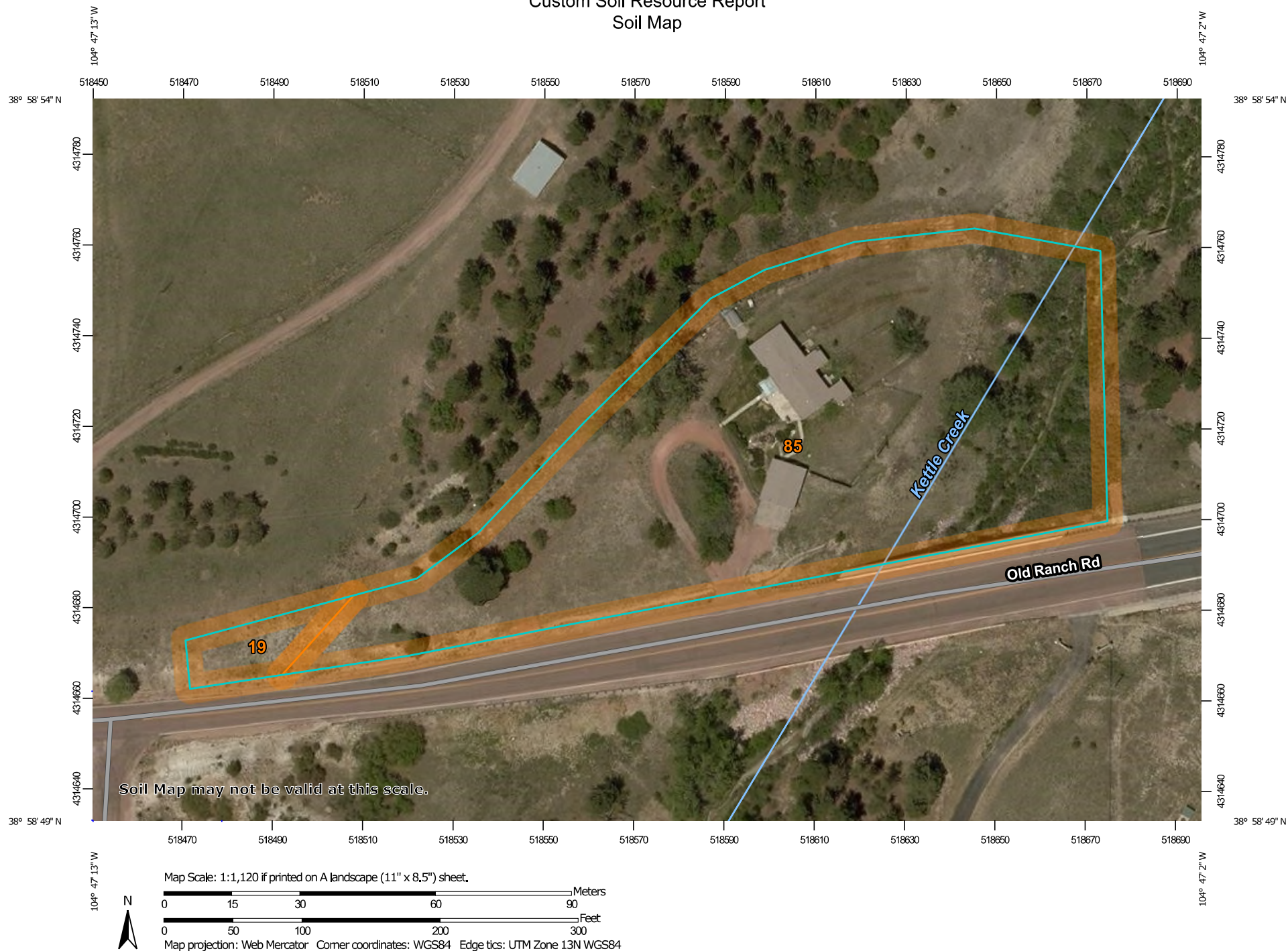
A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for **El Paso County Area, Colorado**



July 20, 2019

# Custom Soil Resource Report Soil Map



## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Columbine gravelly sandy loam, 0 to 3 percent slopes	0.1	3.9%
85	Stapleton-Bernal sandy loams, 3 to 20 percent slopes	2.2	96.1%
<b>Totals for Area of Interest</b>		<b>2.3</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,



## 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

## **85—Stapleton-Bernal sandy loams, 3 to 20 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 36b1

*Elevation:* 6,500 to 6,800 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**

*Stapleton and similar soils:* 40 percent

*Bernal and similar soils:* 30 percent

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

**Description of Stapleton**

**Setting**

*Landform:* Hills

*Landform position (three-dimensional):* Crest, side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Sandy alluvium derived from arkose

**Typical profile**

*A - 0 to 11 inches:* sandy loam

*Bw - 11 to 17 inches:* gravelly sandy loam

*C - 17 to 60 inches:* gravelly loamy sand

**Properties and qualities**

*Slope:* 3 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* Low

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

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Low (about 4.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

→ *Hydrologic Soil Group: B*  
*Ecological site: Gravelly Foothill (R049BY214CO)*  
*Hydric soil rating: No*

## **Description of Bernal**

### **Setting**

*Landform: Hills*  
*Landform position (three-dimensional): Crest, side slope*  
*Down-slope shape: Linear*  
*Across-slope shape: Linear*  
*Parent material: Residuum weathered from sandstone*

### **Typical profile**

*A - 0 to 4 inches: sandy loam*  
*Bt - 4 to 11 inches: sandy clay loam*  
*C - 11 to 13 inches: sandy loam*  
*R - 13 to 17 inches: unweathered bedrock*

### **Properties and qualities**

*Slope: 3 to 20 percent*  
*Depth to restrictive feature: 8 to 20 inches to lithic bedrock*  
*Natural drainage class: Well drained*  
*Runoff class: Medium*  
*Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 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 1.8 inches)*

### **Interpretive groups**

*Land capability classification (irrigated): None specified*  
*Land capability classification (nonirrigated): 6e*

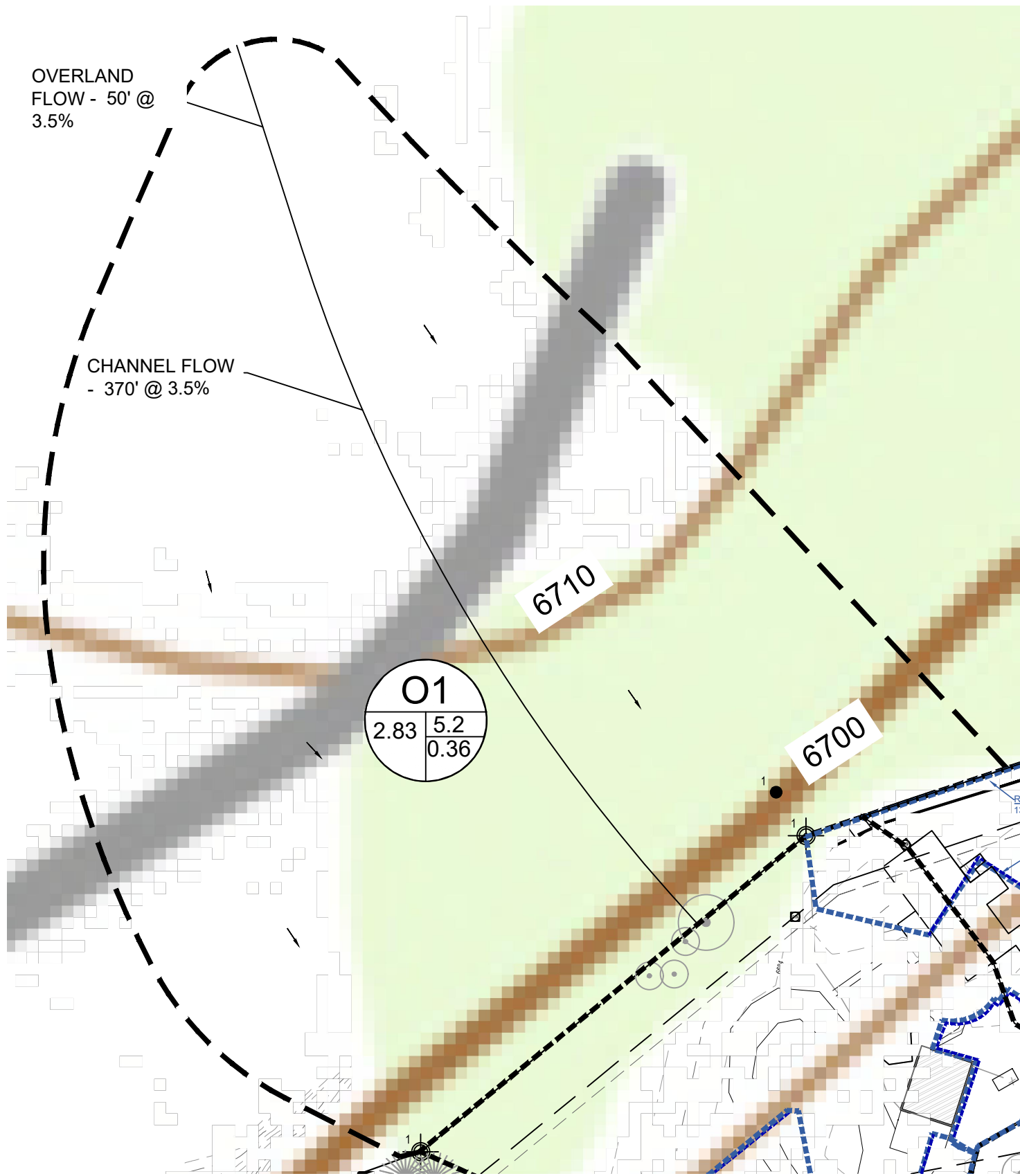
→ *Hydrologic Soil Group: D*  
*Ecological site: Shallow Foothill (R049BY204CO)*  
*Hydric soil rating: No*

## **Minor Components**

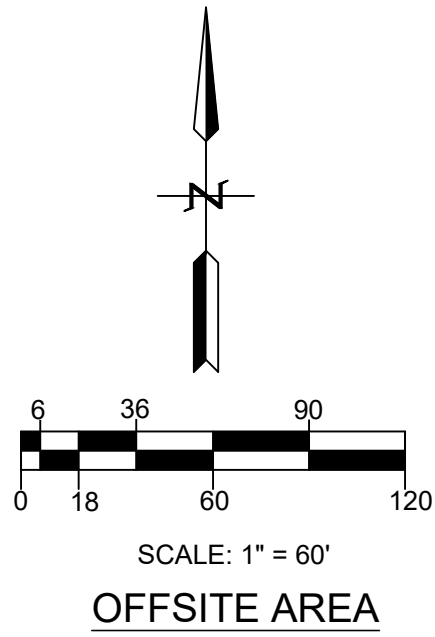
### **Other soils**

*Percent of map unit:*  
*Hydric soil rating: No*

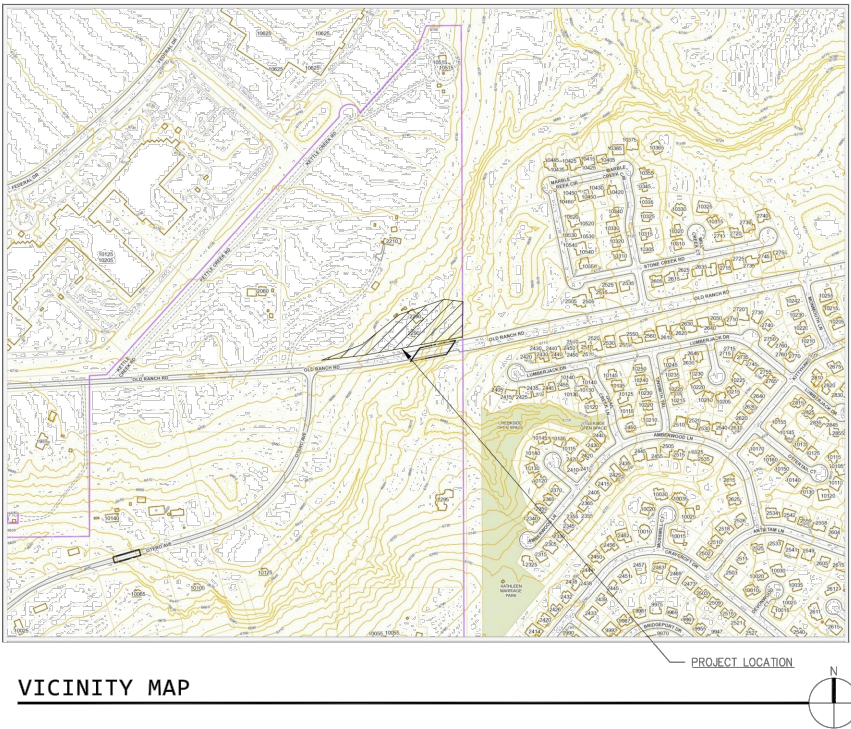
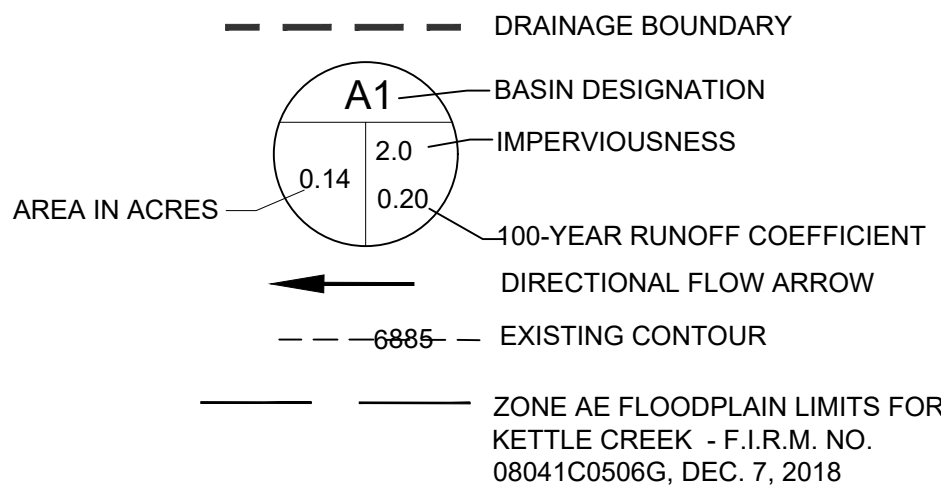




2290 OLD RANCH ROAD  
LOTS 8, BLOCK E, AMENDED FILING OF SPRINGS CREST SUBDIVISION  
NW 1/4, SEC. 28, T.12 S., R. 66 W OF THE 6TH P.M.  
COUNTY OF EL PASO, STATE OF COLORADO

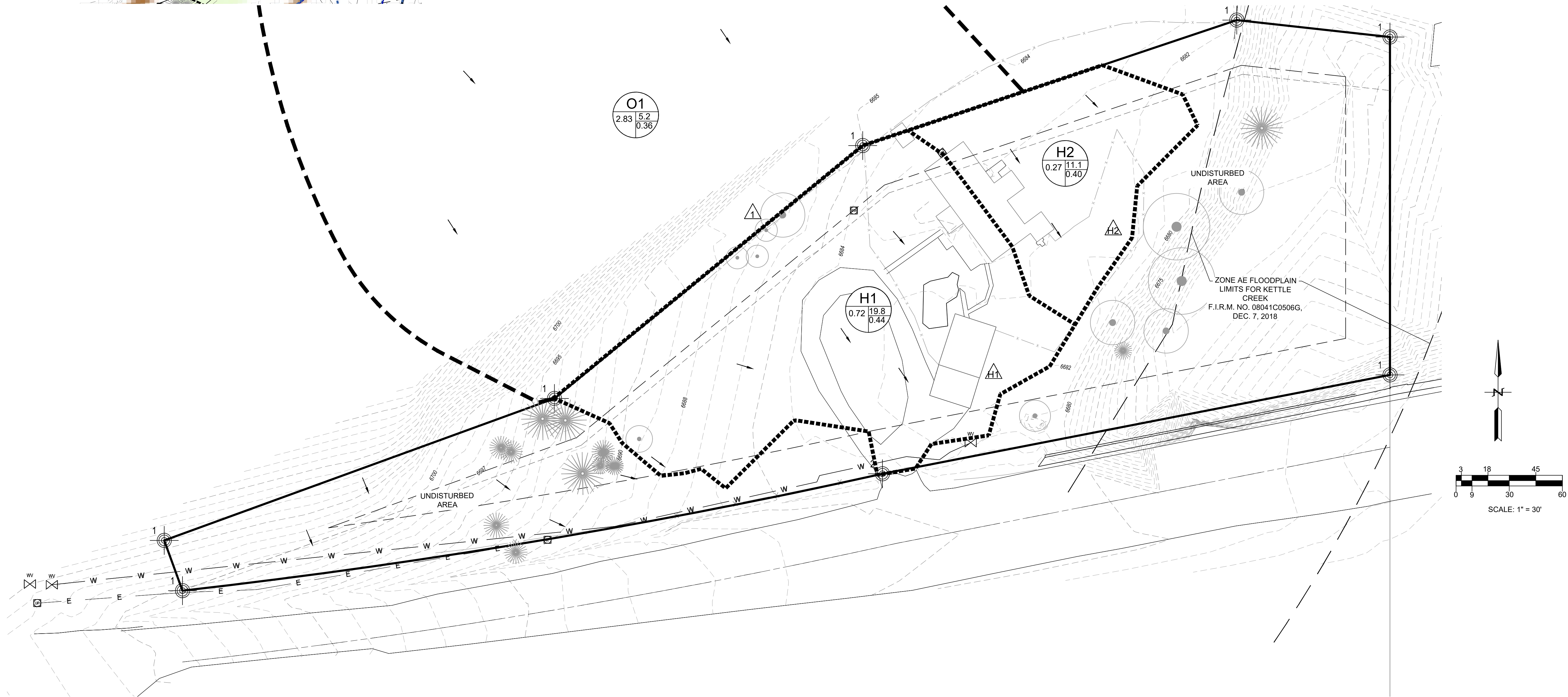


DRAINAGE LEGEND



RUNOFF SUMMARY

DES. PT.	BASIN	AREA (AC.)	5-YR FLOW (cfs)	100-YR FLOW (cfs)
1	O1	2.83	1.05	6.54
	H1	0.72	0.73	2.63
H1	O1 + H1	3.55	1.53	8.42
H2	H2	0.27	0.16	0.75
	O1 + H1 + H2	3.82	1.65	9.06
	H1 - H2	0.99	0.75	2.95



BEFORE YOU DIG CALL UTILITY NOTIFICATION CENTER OF COLORADO 811 CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU BEGIN ANY EXCAVATION MARKING OF UNDERGROUND UTILITIES	
NO.	BY
DATE	
DESCRIPTION	
REVISIONS	
PREPARED BY:  TRUE WEST CO., LLC 16352 E Bates Drive Aurora, CO 80013 303-523-3664 truwest@twusa.net	
DESCRIPTION: HISTORIC DRAINAGE HOTCHKISS COMMERCIAL OFFICES 2290 OLD RANCH ROAD	
PREPARED FOR: JOHN HOTCHKISS 9161 ESTEBURY CIRCLE COLORADO SPRINGS, CO 80920-7580	
ENGINEERS SEAL:	
DESIGNED BY: CLE	
DRAWN BY: CLE	
CHECKED BY: CLE	
DRAWER NUMBER:	
DATE: 5/26/2020	
SCALE: AS NOTED	
SHEET NUMBER: 1 OF 2	

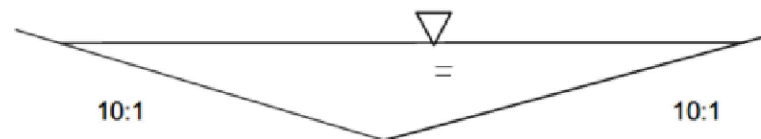


2290 OLD RANCH ROAD  
LOTS 8, BLOCK E, AMENDED FILING OF SPRINGS CREST SUBDIVISION  
NW 1/4, SEC. 28, T.12 S., R. 66 W OF THE 6TH P.M.  
COUNTY OF EL PASO, STATE OF COLORADO

Swale A1 - for Basins O1 + A1 flow - Grass-lined

Q5 = 1.00 cfs, Q100 = 6.26 cfs  
S = 2.1 %  
n = 0.035

$Q = \frac{1.486AR^{2/3}S^{1/2}}{n}$



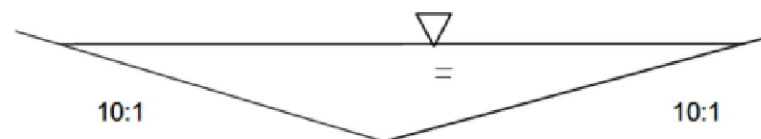
D = 0.51  
N = 0.035  
A = 2.60 sf.  
WP = 10.25 ft.  
S = 0.021 %

Q = 6.47 cfs  
V = 2.5 fps

Swale A2 for Basins O1 + A1 + A2 flow - Grass-lined

Q5 = 1.25 cfs, Q100 = 6.51 cfs  
S = 1.2 %  
n = 0.035

$Q = \frac{1.486AR^{2/3}S^{1/2}}{n}$



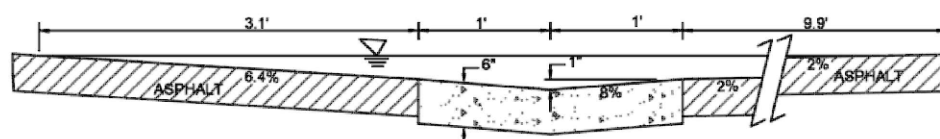
D = 0.57  
N = 0.035  
A = 3.25 sf.  
WP = 11.46 ft.  
S = 0.012 %

Q = 6.58 cfs  
V = 2.0 fps

Swale B1 for Basin B1 - Concrete and Asphalt

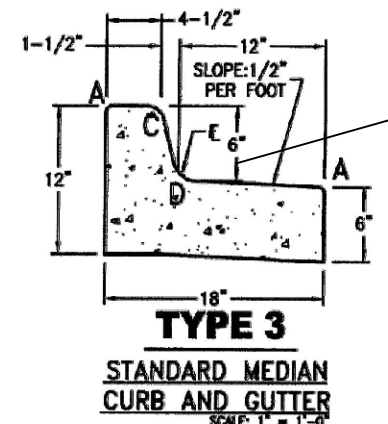
Q100 = 2.82 cfs  
S = 0.7 %  
n = 0.017

$Q = \frac{1.486AR^{2/3}S^{1/2}}{n}$



D = 0.28'  
N = 0.017  
A = 1.76 sf.  
WP = 15.00 ft.  
S = 0.007 %

Q = 3.13 cfs  
V = 1.8 fps



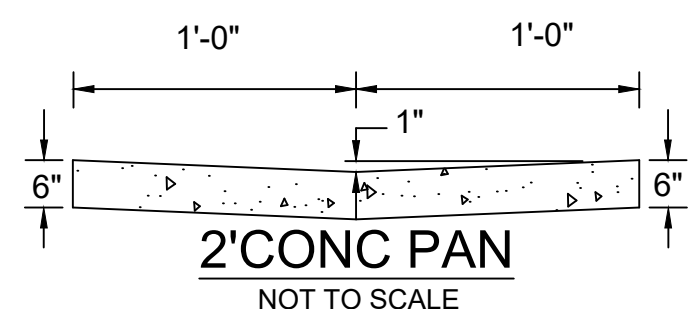
HEIGHT VARIES: 0" TO 6"

RUNOFF SUMMARY

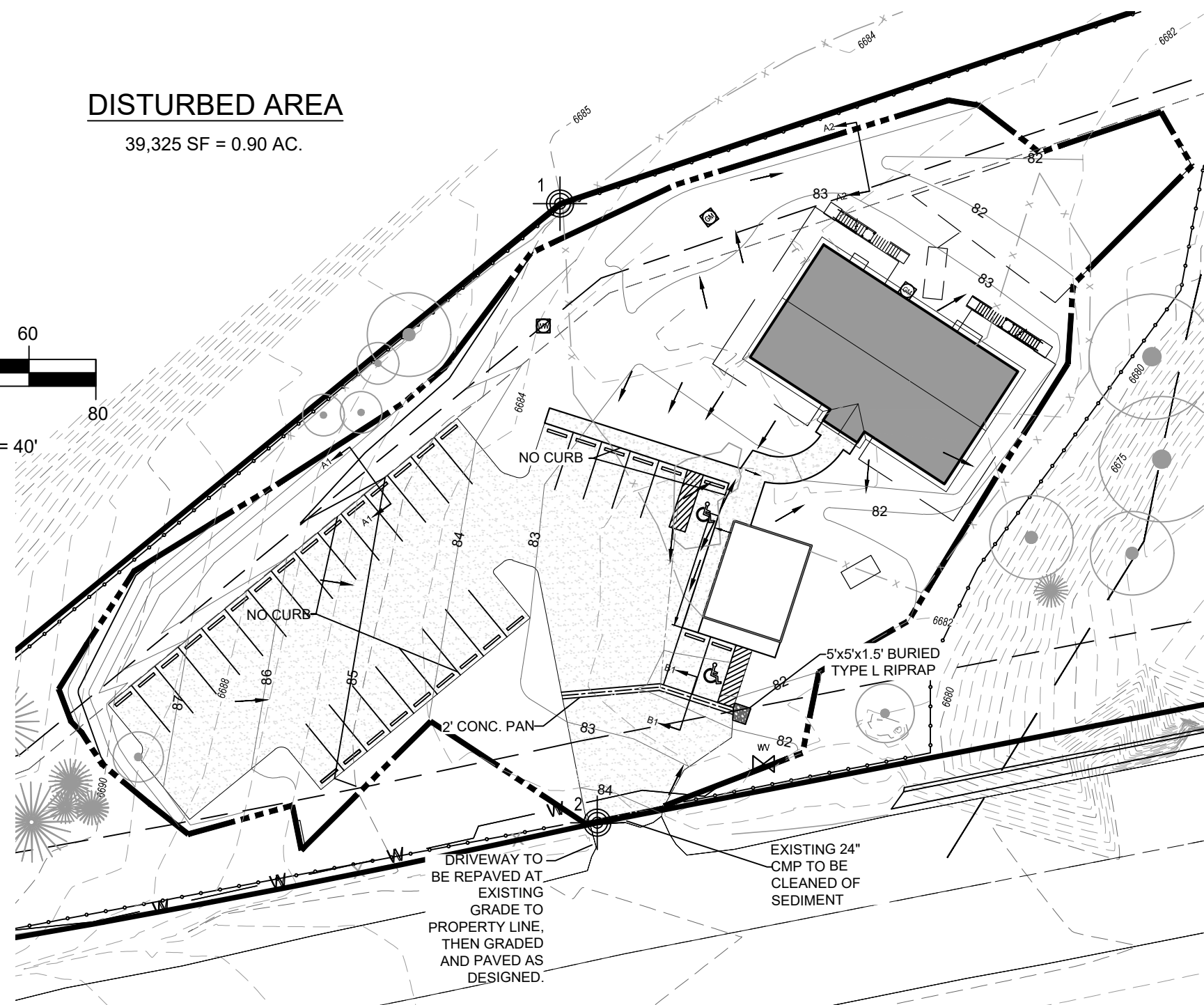
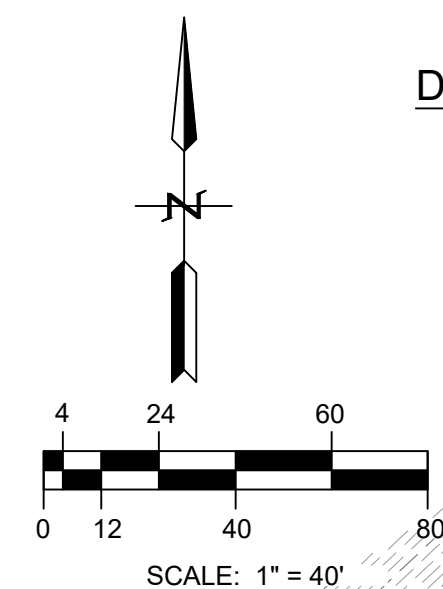
DES. PT.	BASIN	AREA (AC.)	5-YR FLOW (cfs)	100-YR FLOW (cfs)
1	O1	2.83	1.05	6.54
	A1	0.14	0.05	0.38
2	O1+A1	2.97	1.00	6.26
	A2	0.29	0.24	1.05
3	O1 + A1 + A2	3.22	1.25	6.54
4A	B1A	0.14	0.53	1.05
	B1B	0.26	0.87	1.79
4B	B1A + B1B	0.40	1.40	2.82
	B2	0.16	0.28	0.76
5	B1A+B1B+B2	0.56	1.68	3.61
	A1 - B2	0.99	1.68	4.23
	O1 + A1 - B2	3.82	2.23	9.01

DRAINAGE LEGEND

- DRAINAGE BOUNDARY
- BASIN DESIGNATION
- IMPERVIOUSNESS
- 100-YEAR RUNOFF COEFFICIENT
- DIRECTIONAL FLOW ARROW
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- ZONE AE FLOODPLAIN LIMITS FOR KETTLE CREEK - F.I.R.M. NO. 08041C0506G, DEC. 7, 2018



DISTURBED AREA  
39,325 SF = 0.90 AC.



The concentrated flow at this location may degrade/erode the channel bank. Provide a flow spreader at this location or provide protection along the channel bank.

O1  
2.83 5.2  
0.36

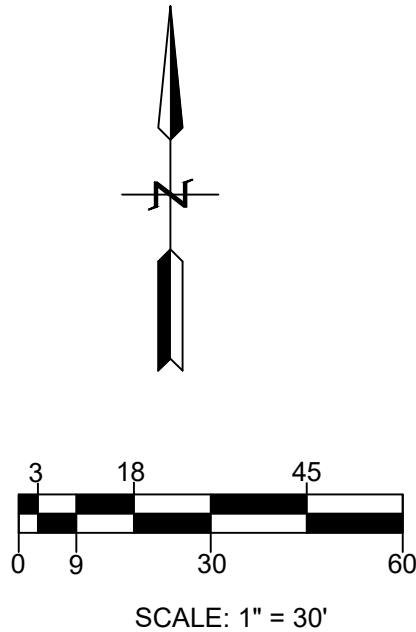
A2  
0.29 13.4  
0.41

A1  
0.14 2.0  
0.35

B1B  
0.26 71.9  
0.78

B1A  
0.14 82.5  
0.85

B2  
0.16 36.3  
0.54



BEFORE YOU DIG CALL UTILITY NOTIFICATION CENTER OF COLORADO 811 CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU BEGIN ANY EXCAVATION. BEFORE MARKING OF UNDERGROUND UTILITIES	
NO.	DATE
REVISIONS	
DESCRIPTION	DATE
CITY COMMENTS	
08-25-20	
CITY COMMENTS	
1	
PREPARED BY: TRUE WEST CO., LLC 16352 E Bates Drive Aurora, CO 80013 303-523-3664 truewest@twusa.net	
FINAL DRAINAGE PLAN HOTCHKISS COMMERCIAL OFFICES 2290 OLD RANCH ROAD	
PREPARED FOR: JOHN HOTCHKISS 9161 ESTEBURY CIRCLE COLORADO SPRINGS, CO 80920-7580	
ENGINEERS SEAL:	
DESIGNED BY: CLE	
DRAWN BY: CLE	
CHECKED BY: CLE	
DRAWER NUMBER:	
DATE: 8/5/2019	
SCALE: AS NOTED	
SHEET NUMBER: 2 OF 2	