Info Only: EPC Engineering comments are indicated in blue text.

DRAINAGE LETTER

7280 N. NEVADA LANE

AN UNPLATTED PARCEL IN THE NW1/4 NE1/4, SECTION 8, T. 13 S., R. 65 W. 6TH P.M.
EL PASO COUNTY, COLORADO

PCD File: PPR2411

November 3, 2003

prepared for

GREENER PASTURES LLC
Jeff Weisburg
4450 Mark Dabling Blvd
Colorado Springs, CO 80907

Oliver E. Watts, Consulting Engineer, Inc.
Colorado Springs, Colorado

OLIVER E. WATTS, PE-LS
OLIVER E. WATTS, CONSULTING ENGINEER, INC.
CIVIL ENGINEERING AND SURVEYING
614 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907
(719) 593-0173
fax (719) 265-9660
olliewatts@aol.com
Celebrating over 44 years in business

Since 2008, there has been a decent amount of development on this site, possibly more than 1 ac of non-excluded disturbances.

Please address post-2008 development on this site as it pertains to the need for water quality treatment and stormwater detention. All non-excluded disturbances due to development since March 10, 2008 counts cumulatively towards the need for a PBMP once the total exceeds 1ac.

Also, in regards to an ESQCP, much of the site is unvegetated bare soil from the past development. These areas will need to be stabilzed.

November 3, 2023

El Paso County Planning and Community Development
2880 International Circle
Colorado Springs, CO 80910

ATTN: *Joshua Palmer, P.E.*

SUBJECT: Drainage Letter, 7280 N. Nevada Lane

Transmitted herewith for your review and approval is the drainage letter for 7280 N. Nevada Lane, to accompany the zone change submittal on subject property.

There will be no construction involved and no change in the runoff as a result of this zone change request, so this letter reflects current conditions. Please contact our office if we may provide any further information.

Oliver E. Watts, Consulting Engineer, Inc.

BY: _____
Oliver E. Watts, President

Encl:
Drainage Letter 2 pages
Computations 2 pages
Soils Map and Interpretation Sheet
Backup Information, 4 pages
FEMA Flood Panel 08041C0529 G, December 7, 2018
Sand Creek Drainage Basin (1977) Sheet 44
Offsite Drainage Map
Drainage Plan Dwg 23-5924-04

1. 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.

Oliver E. Watts, Consulting Engineer, Inc.

_____
Oliver E. Watts Colo. PE-LS No. 9853

2. OWNERS / DEVELOPER'S STATEMENT:

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

Greener Pastures, LLC

By: _____
Jeff Weisburg
4450 Mark Dabling Blvd
Colorado Springs, CO 80907
(719) 291-0291

3. EL PASO COUNTY:

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

_____ _____
Joshua Palmer, P.E. Date
County Engineer / ECM Administrator

Conditions:

Please include information of all adjacent roadways or properties (including Plat name if applicable) border the project.

4. LOCATION AND DESCRIPTION:
7280 N. Nevada Lane is located south of Woodmen Road, East of Black Forest Road and West of Sand Creek, as shown on the enclosed vicinity map. It occupies 4.984 acres in the Sand Creek Drainage basin in part of the Northwest quarter of the Northeast Quarter of Section 8, Township 13 South, Range 65 West of the 6th P.M. in El Paso County. The Assessor's Parcel No. is 5308000074. It is an unplatted parcel for which a zone change is being processed, which is the reason for this drainage letter.

Please use the current El Paso Criteria: City of Colorado Springs "Drainage Criteria Manual, Volumes 1 and 2," Revised October 31, 2028 El Paso County "Engineering Criteria Manual." Revised December 13, 2016

5. FLOOD PLAIN STATEMENT:
This subdivision is not within the limits of a designated flood plain or flood hazard area, as identified on FEMA panel no. 08041C0533 G, dated December 7, 2018, a copy of which is enclosed for reference.

6. CRITERIA AND METHOD:
All computations are based on the rational method described in Volume 1 of the City – County drainage criteria. Computations are enclosed, along with pertinent criteria backup information. All soils in the area are of the Blakeland Complex, hydrologic group "A", and a soils map and interpretation sheet are enclosed.

Please include the type of runoff (sheet flow or concentrated flow) and how the offsite runoff could impact the project area.

6. DESCRIPTION OF RUNOFF:
As shown on the enclosed offsite drainage map, 1.89 acres of the adjacent northerly lot will drain into subject property. No other inflows exist. The routing across the property is delineated on the enclosed drainage plan. Basin D in the southeast corner is isolated from the remainder of the parcel by a dike and area grading and the 0.63 office parcel drains 0.1 cfs / 0.3 cfs (5-year / 100- year runoffs) in concentrated form into California Drive. The remainder of the property is graded around a number of shop buildings to drain into California Drive over the westerly 360 feet of the South boundary with no specific outfall structure, total ling 3.8 cfs/12.2 cfs. The streets in this area are unpaved or lightly graveled and further routing may be seen in a southerly direction, primarily on Wyoming Lane, some 3800 feet to the Sand Creek channel. No specific routing has been addressed in the Sand Creek study. Sheet 44 of the study in enclosed for reference.

7. FEES:
This site is unplatted and no construction is proposed in subject zone change request. Drainage fees are not applicable until the site is subdivided.

Please provide excerpt of this study. Please highlight all relevant information to the subject project.

How to prevent erosion from the concentrated flows from basin D to California Dr.?

Please discuss the existing drainage and proposed drainage conditions. A comparison of the flows leaving the site for both conditions is needed.

Please provide engineering cost estimate if applicable.

Please include a summary section. Will this proposed project have adversely impact adjacent properties or stormwater runoff. if not, please state.

Please include reference section.

Please discuss grading erosion, water quality, and water detention within this project.
Note that If/when the site disturbs >1ac of soil, a stormwater quality treatment facility (PBMP) will be needed for the runoff from the non-excluded areas. Exclusions can be found in our PBMP Applicability Form and ECM Appendix I.7

MAJOR BASIN	SUB BASIN	AREA 1"=30'		BASIN		T_c MIN	I in./hr.		SOIL GRP	DEV. TYPE	C		FLOW 5-ry	FLOW 100-yr	RETURN PERIOD -years-	
		PLANIM READ	ACRES	LENGTH -FT.-	HEIGHT -FT.-								qp -CFS-	qp -CFS-		
SAND CREEK	O-1	5.93	0.49	100	7.5	7.8			A	BARE	0.30	0.50	C=7		5	100
		1.25	0.10	+254	14.5	+1.8				R/L	0.08	0.35	C=10	V=2.4		
		TOTAL	0.59			9.6	4.2	7.0		MIX	0.265	0.475	0.65	2.0	5	100
	O-2	4.62	0.38	100	8	8.7				BARE	0.30	0.50	C=7			
		11.15	0.962	+314	22	+2.0				R/L	0.08	0.35	C=10	V=2.6		
		TOTAL	1.30			10.7	4.3	6.8		MIX	0.144	0..39	0.80	3.5	5	100
	A	COGO	0.018	100	6.5	8.7			A	ROOF	0.73	0.81				
			0.010	+180	11	+2.4				CONC	0.89	0.96	C=5	V=1.24		
			0.700							R/L	0.08	0.35				
			0.680							BARE	0.30	0.50				
		TOTAL	1.41			11.1	4.0	6.7		MIX	0.200	0.422				
	O-1 +A			+280	17.5	+2.7							C=7	V=1.7		
`	DP1	TOTAL	2.00			12.3	3.0	6.4		MIX	0.218	0.438	1.3	5.6	5	100
	B	COGO	0.227	100	2.5	9.7			A	ROOF	0.73	0.81				
			0.028	+290	6.5	+4.6				CONC.	0.90	0.96	C=7	V=1.05		
			1.285			14.3	3.6	6.0		BARE	0.30	0.50				
		TOTAL	1.54							MIX	0.374	0.554	2.1	5.1	5	100
	DP2		2.84	+390	9	+8.6							C=7	V=0.76		
	B+O2					19.2	3.2	5.3	A	MOX	0.318	0.588	2.8	8.5	5	100

HYDROLOGICAL COMPUTATION – BASIC DATA
PROJ: 7280 N. NEVADA LANE BY: O.E. WATTS
RATIONAL METHOD DATE: 11-3-23

OLIVER E. WATTS, CONSULTING ENGINEER, INC.
614 ELKTON DRIVE COLORADO SPRINGS, CO 80907

MAJOR BASIN	SUB BASIN	AREA		BASIN		T_c MIN	I in./hr.		SOIL GRP	DEV. TYPE	C		FLOW 5-ry qp -CFS-	FLOW 100-yr qp -CFS-	RETURN PERIOD -years-	
		PLANIM READ	ACRES	LENGTH -FT.-	HEIGHT -FT.-											
SAND CREEK	C	COGO	0.068	100	2	12.7			A	BARE	0.30	0.50			5	100
			0.035	+100	2	+1.9				CONC	0.90	0.96	C=5	V=0.87		
			0.043							ROOF	0.73	0.81				
			1.264							R/L	0.08	0.35				
		TOTAL	1.41			14.6	3.4	6.0		MIX	0.130	0.386	0.6	3.5	5	100
01+O2+A-C	DP3			+200	5	+4.2							C=5	V=0.79		
		TOTAL	4.95			18.5	3.2	5.4			0.242	0.459	3.8	12.2	5	100
	D	COGO	0.033	100	3	13.1			A	ROOF	0.73	0.81				
			0.017	+155	4	+3.2				CONC	0.90	0.96	C=5	V=0.80		
			0.096							A.C.	0.90	0.96				
			0.058							L/S	0.08	0.35				
			0.426							BARE	0.30	0.50				
		TOTAL	0.63			16.3	3.4	5.7		MIX	0.052	0.074	0.1	0.3	5	100

HYDROLOGICAL COMPUTATION – BASIC DATA
PROJ: 7280 N NEVADA LN BY: O.E. WATTS
RATIONAL METHOD DATE: 11-3-23

OLIVER E. WATTS, CONSULTING ENGINEER, INC.
614 ELKTON DRIVE COLORADO SPRINGS, CO 80907

TABLE 16.--SOIL AND WATER FEATURES

[Absence of an entry indicates the feature is not a concern. See "flooding" in Glossary for definition of terms as "rare," "brief," and "very brief." The symbol > means greater than]

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Hardness	
					In		
Alamosa: 1	C	Frequent	Brief	May-Jun	>60	---	High.
Ascalon: 2, 3	B	None	---	---	>60	---	Moderate.
Badland: 4	D	---	---	---	---	---	---
Bijou: 5, 6, 7	B	None	---	---	>60	---	Low.
Blakeland: 8	A	None	---	---	>60	---	Low.
[1]9: Blakeland part	A	None	---	---	>60	---	Low.
Fluvaquentic Haplaquolls part	D	Common	Very brief	Mar-Aug	>60	---	High.
Blendon: 10	B	None	---	---	>60	---	Moderate.
Bresser: 11, 12, 13	B	None	---	---	>60	---	Low.
Brussett: 14, 15	B	None	---	---	>60	---	Moderate.
Chaseville: 16, 17	A	None	---	---	>60	---	Low.
[1]18: Chaseville part	A	None	---	---	>60	---	Low.
Midway part	D	None	---	---	10-20	Rippable	Moderate.
Columbine: 19	A	None to rare	---	---	>60	---	Low.
Connerton: [1]20: Connerton part	B	None	---	---	>60	---	High.
Rock outcrop part	D	---	---	---	---	---	---
Cruckton: 21	B	None	---	---	>60	---	Moderate.
Cushman: 22, 23	C	None	---	---	20-40	Rippable	Moderate.
[1]24: Cushman part	C	None	---	---	20-40	Rippable	Moderate.
Kutch part	C	None	---	---	20-40	Rippable	Moderate.
Elbeth: 25, 26	B	None	---	---	>60	---	Moderate.
[1]27: Elbeth part	B	None	---	---	>60	---	Moderate.

See footnote at end of table.

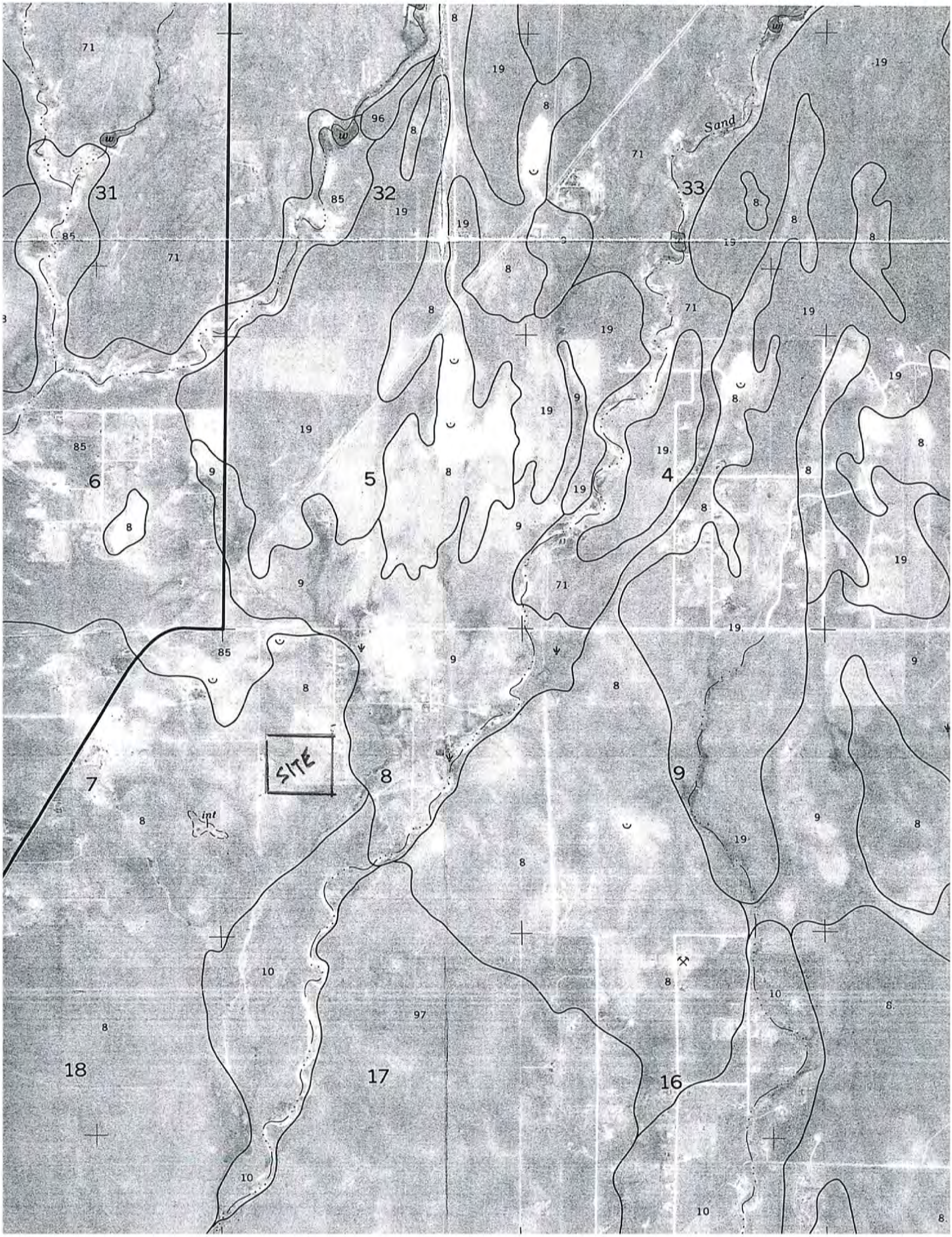

SITE
Sand
31
32
33
6
5
4
7
8
9
18
17
16

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.

$$t_c = t_i + t_t \quad \text{(Eq. 6-7)}$$

Where:

t_c = time of concentration (min)

t_i = overland (initial) flow time (min)

t_t = travel time in the ditch, channel, gutter, storm sewer, etc. (min)

3.2.1 Overland (Initial) Flow Time

The overland flow time, t_i, may be calculated using Equation 6-8.

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \quad \text{(Eq. 6-8)}$$

Where:

t_i = overland (initial) flow time (min)
C_5 = runoff coefficient for 5-year frequency (see Table 6-6)
L = length of overland flow (300 ft maximum for non-urban land uses, 100 ft maximum for urban land uses)
S = average basin slope (ft/ft)

Note that in some urban watersheds, the overland flow time may be very small because flows quickly concentrate and channelize.

3.2.2 Travel Time

For catchments with overland and channelized flow, the time of concentration needs to be considered in combination with the travel time, t_t, which is calculated using the hydraulic properties of the swale, ditch, or channel. For preliminary work, the overland travel time, t_t, can be estimated with the help of Figure 6-25 or Equation 6-9 (Guo 1999).

$$V = C_v S_w^{0.5} \quad \text{(Eq. 6-9)}$$

Where:

V = velocity (ft/s)

C_v = conveyance coefficient (from Table 6-7)

S_w = watercourse slope (ft/ft)

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

*For buried riprap, select C_v value based on type of vegetative cover.

The travel time is calculated by dividing the flow distance (in feet) by the velocity calculated using Equation 6-9 and converting units to minutes.

The time of concentration (t_c) is then the sum of the overland flow time (t_i) and the travel time (t_t) per Equation 6-7.

3.2.3 First Design Point Time of Concentration in Urban Catchments

Using this procedure, the time of concentration at the first design point (typically the first inlet in the system) in an urbanized catchment should not exceed the time of concentration calculated using Equation 6-10. The first design point is defined as the point where runoff first enters the storm sewer system.

$$t_c = \frac{L}{180} + 10 \qquad \text{(Eq. 6-10)}$$

Where:

t_c = maximum time of concentration at the first design point in an urban watershed (min)

L = waterway length (ft)

Equation 6-10 was developed using the rainfall-runoff data collected in the Denver region and, in essence, represents regional "calibration" of the Rational Method. Normally, Equation 6-10 will result in a lesser time of concentration at the first design point and will govern in an urbanized watershed. For subsequent design points, the time of concentration is calculated by accumulating the travel times in downstream drainageway reaches.

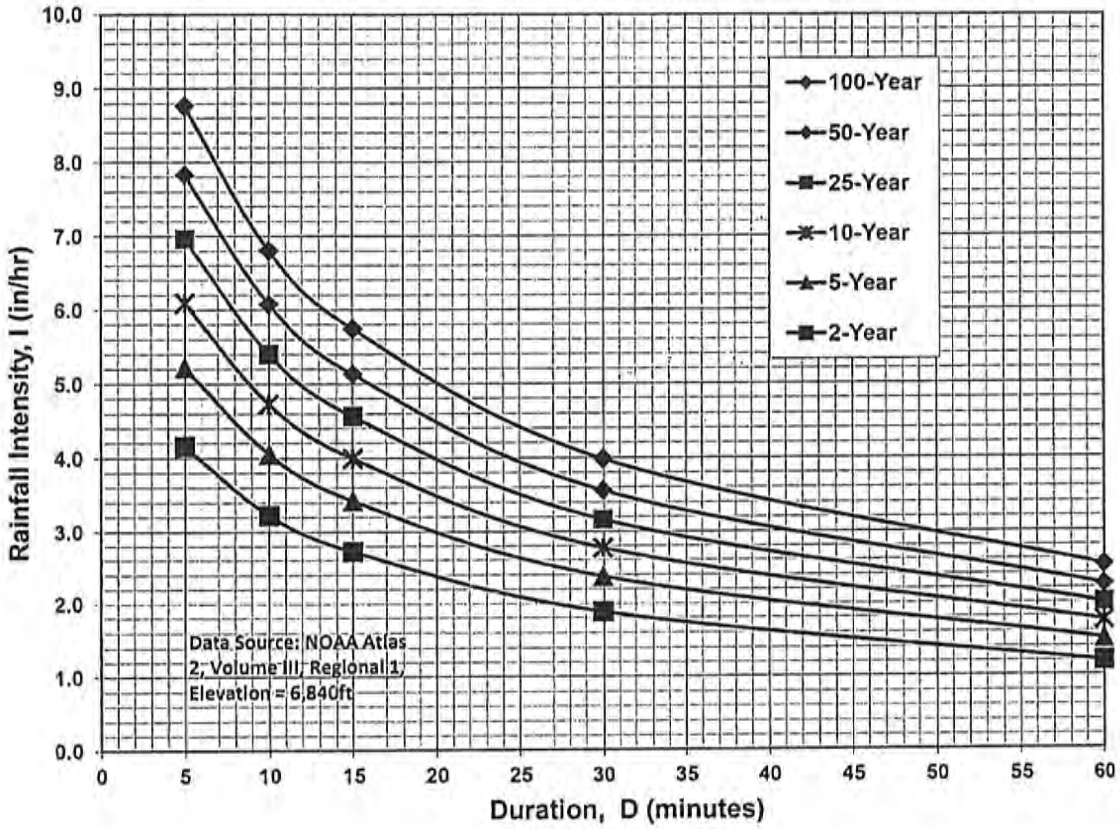
3.2.4 Minimum Time of Concentration

If the calculations result in a t_c of less than 10 minutes for undeveloped conditions, it is recommended that a minimum value of 10 minutes be used. The minimum t_c for urbanized areas is 5 minutes.

3.2.5 Post-Development Time of Concentration

As Equation 6-8 indicates, the time of concentration is a function of the 5-year runoff coefficient for a drainage basin. Typically, higher levels of imperviousness (higher 5-year runoff coefficients) correspond to shorter times of concentration, and lower levels of imperviousness correspond to longer times of

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations

$I_{100} = -2.52 \ln(D) + 12.735$

$I_{50} = -2.25 \ln(D) + 11.375$

$I_{25} = -2.00 \ln(D) + 10.111$

$I_{10} = -1.75 \ln(D) + 8.847$

$I_{5} = -1.50 \ln(D) + 7.583$

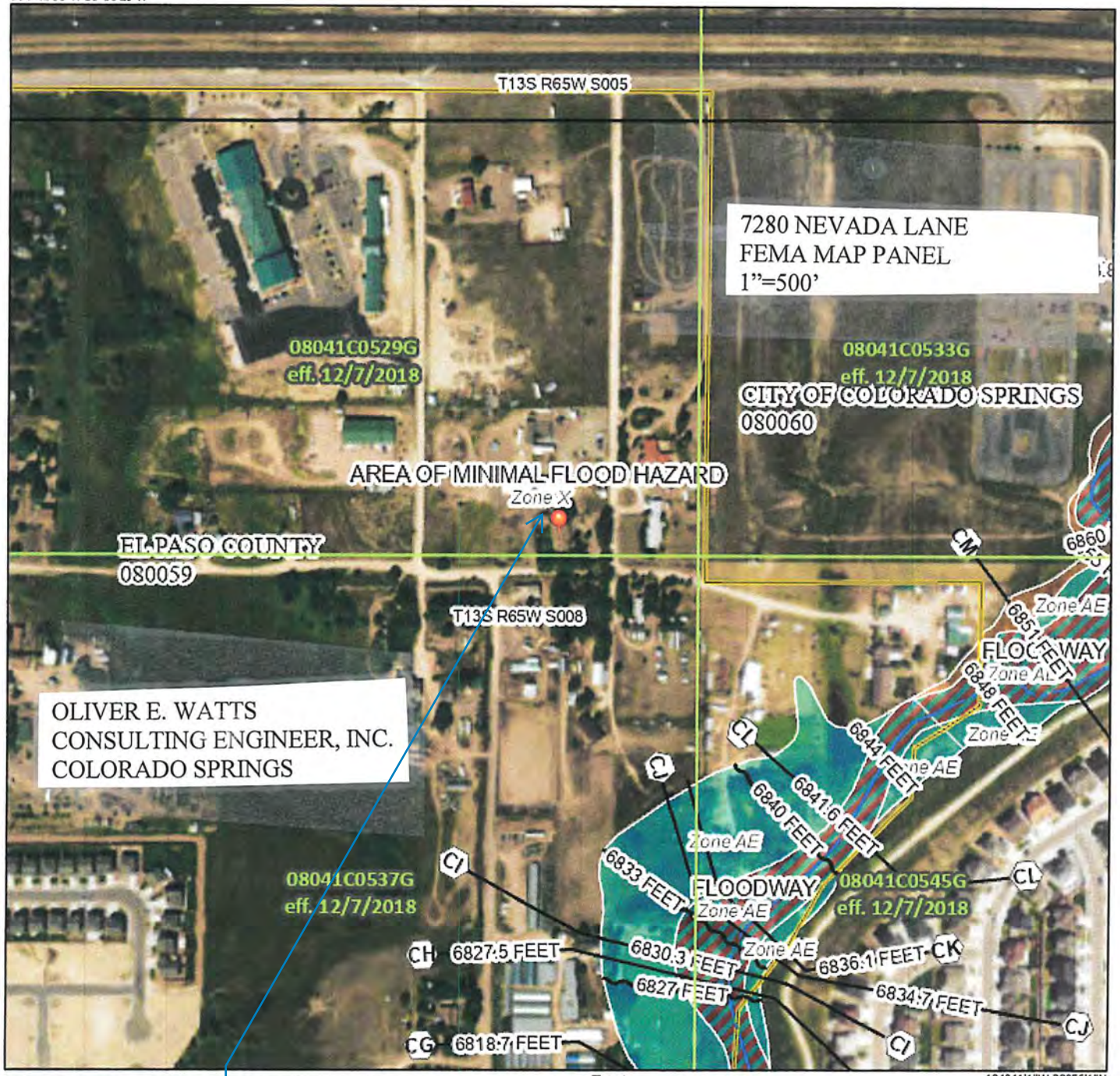
$I_{2} = -1.19 \ln(D) + 6.035$

Note: Values calculated by equations may not precisely duplicate values read from figure.

National Flood Hazard Layer FIRMette

FEMA

104°41'38"W 38°56'29"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

104°41'1"W 38°56'1"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Please delineate the proposed project on FEMA map.

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
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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 3/30/2023 at 4:55 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.

MATCH SHT 46 B

MATCH SHT 46

MATCH SHT 44 A

MATCH STA 696 + 10 SHT 45

MATCH STA 684 + 50 SRT 43

THIS DRAWING IS A MASTER PLANNING SHEET REPRESENTING PRELIMINARY AND CONCEPTUAL ENGINEERING. IT SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.

IMPROVED GRASSLINED CHANNEL
BW=20', d=2', S=1.9%
Q100 = 180 cfs

NEW 4'H x 8'W CBC
10-YR. CAPACITY

PROVIDE OUTLET STRUCTURE

MAINTAIN EX. EMBANKMENTS

FOR CHANNEL DATA, SEE SHT 42

STA 696+00 CHECK

STA 690+00 CHECK

STA 686+00 CHECK

PRESERVE EX FLOODPLAIN & VEGETATION

OI-POND-66

OI-POND-67

OI-POND-68

REACH SC-7

SAND CREEK

EL PASO CO.

CHANNEL IMPROVEMENTS		
SEGMENT NO.	BOTTOM WIDTH (FT)	CHANNEL TYPE
148-1	N/A	SELECTIVE RIPRAP LININGS AND GRADE CONTROL
148-2		

FOR PROFILE SEE SHEET P-12

OLIVER E. WATTS
CONSULTING ENGINEER, INC.
COLORADO SPRINGS

7280 NEVADA LANE
SAND CREEK DRAINAGE MAP
1"=200'

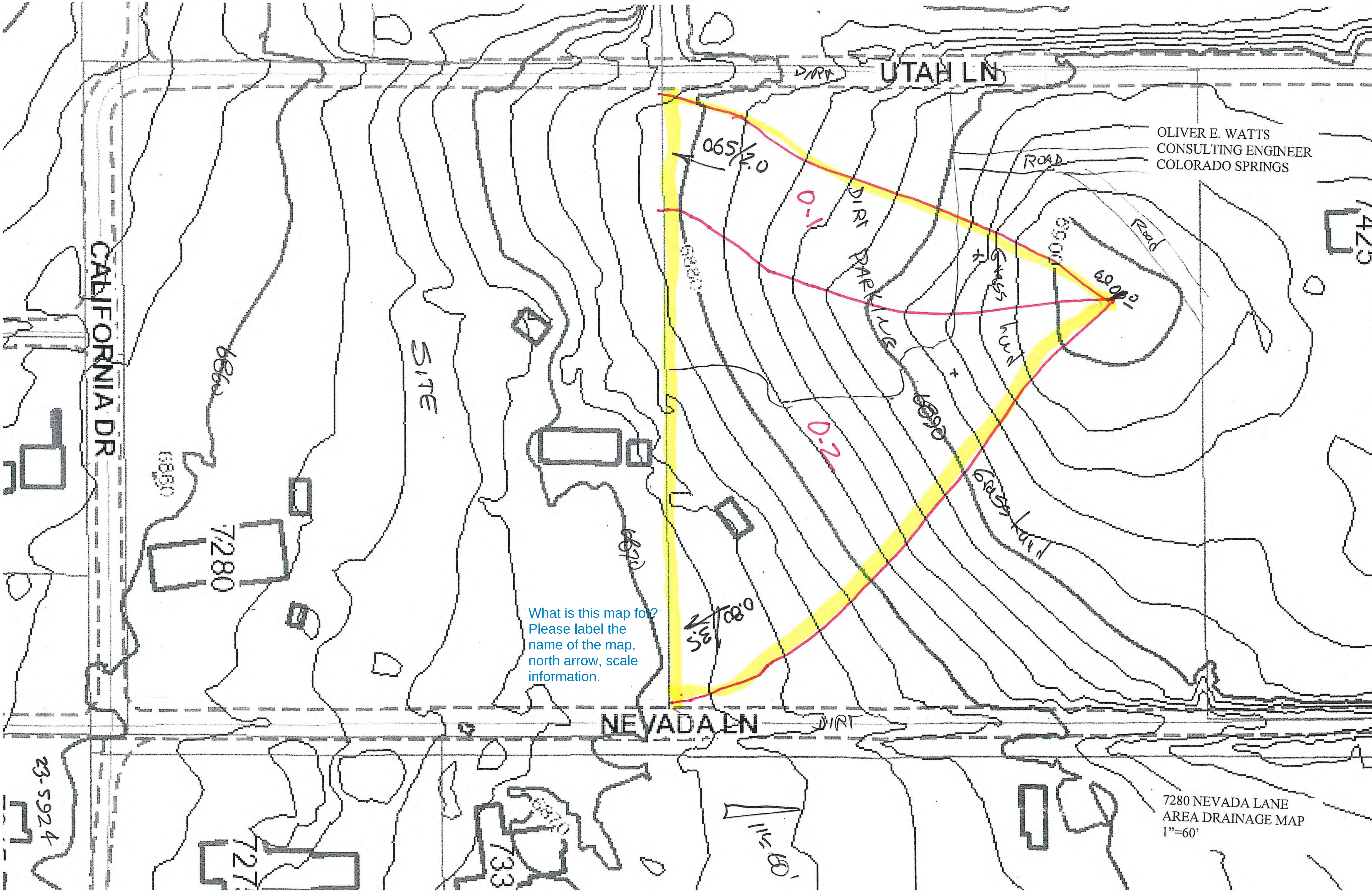
0' 200' 400'

Kiowa Engineering Corporation
418 W. Bijou Street
Colorado Springs, Colorado

SAND CREEK DRAINAGE BASIN PLANNING STUDY
PRELIMINARY DESIGN PLANS

Project No.	90-0
Date:	9-92
Design:	RMW
Drawn:	EAK
Check:	RMW
Revisions:	

44


UTAH LN
DIRT
OLIVER E. WATTS
CONSULTING ENGINEER
COLORADO SPRINGS
ROAD
Road
7425
CALIFORNIA DR
SITE
7280
DIRT PARKING
0.1
0.2
Grass land
NEVADA LN
DIRT
What is this map for? Please label the name of the map, north arrow, scale information.
7280 NEVADA LANE
AREA DRAINAGE MAP
1"=60'
1"=60'
23-5924

An existing drainage map is required.

From recent aerial imagery, the northwest corner of Basins B appears to be gravel, not bare soil. Please review and revise this map and calculations above where appropriate.

Please display and label the curb and gutter.

Please add more flow direction runoff arrows to the map.

Please label proposed and existing contours.

Please discuss proposed storm sewer in the text.

It appears that there is no proposed storm on the proposed drainage map. Please verify.

Please show ROW.

Please rearrange this lable so that it can be seen.

All proposed drainage basins, and design points need to be discussed in the text.

Please show all design points on the maps.

Is this concentrated flows? If so please address how erosion can be prevented at the downstream.

How erosion can be prevented at the downstream?

FOR DETAILS IN THIS AREA, SEE OFFSITE DRAINAGE PLAN

O-1

O-2

A

B

C

D

Scale 1" = 30'

LEGEND:

- 10.5/20.4 — RUNOFF IN CFS 5-YEAR/100-YEAR
- A — LIMIT OF DRAINAGE BASIN AND DESIGNATION
- EXISTING STORM SEWER AS LABELED
- PROPOSED STORM SEWER AS LABELED
- B — LIMIT OF SOILS TYPE AND GROUP
- GROUND COVER
- DIRECTION OF RUNOFF

DRAINAGE BASIN SUMMARY

BASIN	AREA -AC.-	RUNOFF IN CFS 5-YEAR	100-YEAR
O-1	0.59	0.65	2.0
O-2	1.30	0.80	3.5
A	1.41	1.1	4.0
B	1.54	2.1	5.1
C	1.41	0.6	3.2
D	0.63	0.1	0.3
DESIGN POINTS			
1	2.00	1.3	5.6
2	2.84	2.8	8.5
3	4.95	3.8	12.2

VICINITY MAP
1"=1000'

DRAWN BY: O.E. WATTS	APPROVED BY:	REVISIONS	OLIVER E. WATTS CONSULTING ENGINEER COLORADO SPRINGS
DATE: 11-2-23	PROJ. NO.		PROJECT: 7280 NEVADA LANE P NW1/4, NE1/4 S.8, T.13S., R.65W. 6TH P.M. EL PASO COUNTY
DWG. NO.: 23-5924-04	DWG.		SHT. NAME: DRAINAGE PLAN
BASE PLAN BY: EDWARD-JAMES SURVEYING 2-8-21			SHT. NO.: 1 OF 1