

PRELIMINARY AND FINAL DRAINAGE PLAN AND REPORT

Fletes Plastering Subdivision

A subdivision Southwest Quarter of the Northwest Quarter of Section 13,
Township 14 South, Range 66 West of the 6th P.M

October 13, 2020

prepared for

Cesar Jesus Fletes and Albino Fletes

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

Fletes Plastering Subdivision
Preliminary and Final Drainage Plan and Report

OLIVER E. WATTS, PE-LS

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Celebrating over 41 years in business

October 13, 2020

City Engineering
Development Review Division
30 South Nevada Ave
Suite 402
Colorado Springs, CO 80903

ATTN:

SUBJECT: Preliminary and Final Drainage Plan and Report
Fletes Plastering Subdivision

Gentlemen

Transmitted herewith for your review and approval is the drainage plan and report for the Fletes Plastering Subdivision.

The purpose of the report is to “identify on-site and offsite drainage patterns, storm sewer, culvert and inlet locations, areas tributary to the site, and to safely route developed storm water to adequate outfalls”

Please contact me if I may provide any further information.

Oliver E. Watts, Consulting Engineer, Inc.

BY: _____
Oliver E. Watts, President

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1. ENGINEER'S STATEMENT:

This report and plan for the drainage design of Fletes Plastering Subdivision was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said drainage report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. 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 date

2. DEVELOPER'S STATEMENT:

Cesar Jesus Fletes and Albino Fletes hereby certify that the drainage facilities for Fletes Plastering Subdivision shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and / or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of Fletes Plastering Subdivision, guarantee that final drainage design review will absolve Cesar Jesus Fletes and Albino Fletes and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design

Gary Harder

By: _____
Cesar Jesus Fletes and Albino Fletes, owners date
208 Troy Hill Road
Colorado Springs, CO 80916

3. CITY OF COLORADO SPRINGS STATEMENT:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

for City Engineer date

Conditions:

4. LOCATION AND DESCRIPTION:

The Fletes Plastering Subdivision is a portion of the Southwest Quarter of the Northwest Quarter of Section 13, Township 14 South, Range 66 West of the 6th P.M, City of Colorado Springs, El Paso County, Colorado. The 3.97 acre site is zoned PIP2, AO, and APZ1 and is devoid of building but used as a contractors yard. It is located at 208 Troy Hill Road; on the southwest corner of Troy Hill and Bijou. The Assessor's Parcel Number is 6413000039.

The site is bounded on the north by Bijou and an unplatted parcel. The Trax Construction Subdivision is on the west boundary of the site. The drainage report for this was prepared by ADP, and approved by the City on 2-24-97. A copy of this plan is enclosed. The property south of the site was platted as the Trisha Lynn Subdivision. Weiss Consulting did the drainage report for this subdivision, approved by the City 3-26-99. A copy of this plan is enclosed. The new Fed Ex site, Suncap Industrial Filing No. 1 is across Troy Hill Road to the east. Kimley Horn did that drainage report, approved by the City 2-19-15 This site is composed of Drainage Basins "A" and "C" in said Boulevard Subdivision drainage report. A copy of the calculations and an 11" x 17" of the drainage plan from the report are enclosed for reference.

We propose to plat the site into a commercial lot and construct a 12,390 square foot building on the site.

All public improvements and utilities are in place in / on Troy Hill Road, save a sidewalk to service the site. Bijou is paved and has utility mains in it but lack curb, gutter and sidewalk.

5. DRAINAGE CRITERIA AND SOILS CONDITIONS:

The method used for all computations is that specified in the City of Colorado Springs Drainage Criteria Manual, using the rational method for areas of the size of the subdivision and the SCS method for the review of the major basin involved. All computations are enclosed for reference and review.

The local USDA/SCS office has mapped the soils in the subdivision. A soils map and interpretation sheet are enclosed for reference. All soils in this area are of the Truckton Series, having hydrologic group "B".

6. DESCRIPTION OF RUNOFF:

EXISTING DRAINAGE CONDITIONS

A small portion of the existing right of way of Bijou street will runoff into the north boundary of this subdivision, shown as basin O-1 on the drainage plan, creating 0.5 cfs / 1.1 cfs (5-year / 100 year runoffs). This will combine with Basin B (having a range land cover) to outflow into the Trax Construction site as dictated by existing topography, with a total existing runoff of 1.0 cfs / 4.6 cfs. It can be seen that this existing runoff exceeds the expected developed runoff for the Trax subdivision for this basin of 0.8 cfs / 1.9 cfs.

The remainder of the subdivision consists of Basin A, and will runoff into the Trisha Lynn Subdivision to the south. A small portion of asphalt paving exists in the southwest corner. The remainder of the existing basin consists of range land, creating an existing runoff of 0.4 cfs / 2.7 cfs.

PROPOSED DRAINAGE CONDITIONS

The existing drainage basin configurations described will remain and runoff will be increased to the extent of the proposed building and parking lot shown on the plan. The resulting impervious percentage is much less than could be expected, based on the zoning, since much of the lot will remain historically natural.

Basin O-1 will combine with basin B to create 2.4 cfs / 5.6 cfs at the outfall point into the Trax Construction Subdivision. The runoff will not be concentrated due to the intervening range land. Basin A will have a total developed runoff of 1.2 cfs / 3.8 cfs, outfall into the Trisha Lynn Subdivision to the South, which exceeds the estimated runoff of 0.7 cfs shown on that drainage plan, which is enclosed for reference.

This development will have no affect on the runoff in Troy Hill Road, which has been previously studied for the SunCap Industrial Park. A copy of that drainage plan is enclosed and the existing facilities are shown on subject drainage plan.

WATER QUALITY

The following process has been followed to minimize adverse impacts of urbanization

Runoff Reduction: The scope of the development has been minimized consistent with zoning requirements to present the minimum footprint in providing the proposed commercial development. The undisturbed portions are to remain in their natural range land state to reduce the impervious percent, creating a substantially lower rate than normally expected.

Treat and Slowly Release: The above described range land surrounding the developed portion of the lot will buffer the peak runoffs to provide a measure of water quality treatment and a reduced rate of discharge from the development.

Channel Stabilizing: The site will be graded to route the runoff channel over improved street and curb installations to provide channel stabilizing in the natural erosive material over the site. Discharge from the developed portion will be in two areas with minor runoffs and riprap energy dissipation. The adjacent range land will provide additional buffering prior to discharge onto adjacent properties. There will be no adverse affect on downstream developments as a result of this subdivision

Source Controls: This is a low impact commercial site, so source control problems will be a minimum. During construction, standard site specific state of the art BMP's will be employed to minimize and mitigate erosive problems.

7. FLOOD PLAIN STATEMENT:

This subdivision is not within the limits of a flood plain or flood hazard area, according to FEMA map panels number 08041C0753 G, dated December 7, 2018, a copy of which is enclosed for reference.

8. FEES: 2020 Sand Creek Drainage Basin Fees:

Drainage Fees: 3.97 Acres @ \$13,309 per acre = \$52,836.73

Bridge Fees: 3.97 Acres @ \$791 per acre = \$3,140.27

Pond Land Fees: 3.97 Acres @ \$1,070 per acre = \$4,247.90

Pond Facility Fees: 3.97 Acres @ \$3,823 per acre = \$15,177.31

Surcharge: 3.97 Acres @ \$1,386 per acre = \$5,502.42

TOTAL FEES: \$80,904.63

9. COST ESTIMATE: All facilities are private.

Item No.	Description	Quantity	Unit Cost	Cost
1	Curb Outlets	2 ea	\$ 600.00	\$ 1200.00
2	Riprap	1.2 cy	100.00	200.00
Subtotal Construction Cost				\$ 1400.00
Engineering			10%	140.00
Total Estimated Cost				\$ 1540.00

10. SUMMARY

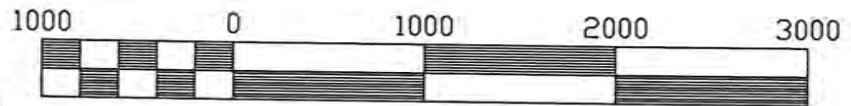
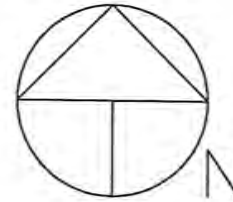
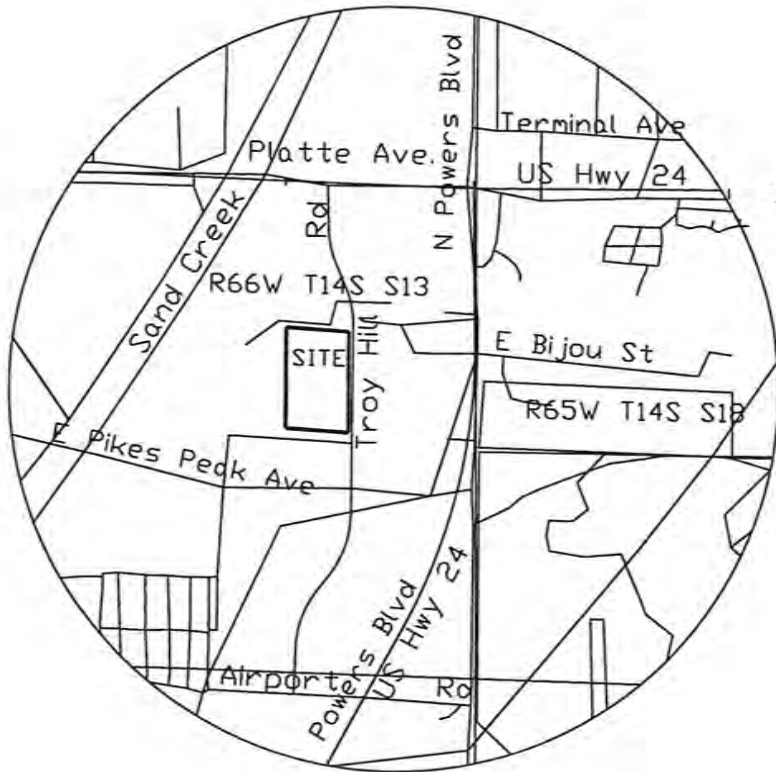
The Fletes Plastering Subdivision is a proposed 1-lot, commercial subdivision containing 3.97 acres. The proposed drainage facilities will adequately convey, detain and outfall runoff from the site to existing sufficient downstream facilities. Site runoff and storm drain and appurtenances will not adversely affect the downstream and surrounding developments.

The drainage analysis has been prepared in accordance with the current City of Colorado Springs Drainage Criteria Manual. Supporting information and calculations are included in this report.

This report and findings is in general conformance with the MDDP or Preliminary Drainage Report or other pertinent studies

References

1. City of Colorado Springs Drainage Criteria Manuel, Volumes 1 and 2, May, 2014
2. Master Drainage Development Plan – Defense Office Park – Prepared by Oliver E. Watts, Consulting Engineer, Inc.; Dated April 7, 2008 and Revised March 6, 2009.
3. Sand Creek Master Drainage Planning Study, City of Colorado Springs & El Paso County – Prepared by Simons, Li & Associates, Inc.; Dated July 1985.
4. Trax Construction Subdivision Drainage Report – Prepared by ADP; Dated 2-24-97
5. Trisha Lynn Subdivision Drainage Report – Prepared by Weiss Consultants; Dated 3-26-99
6. Suncap Industrial Filing No. 1 Drainage Report – Prepared by Kimley Horn; Dated 2-19-15



Scale 1" = 1000'

DRAWN BY: O.E. WATTS	REVISIONS	PROJECT	SHT. NAME	SHT. NO.
DATE: 10-13-20		FLETES PLASTERING SUBDIVISION	VICINITY MAP	1 OF 1
APPROVED BY:				

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc MIN	I in./hr.		SOIL GRP	DEV. TYPE	C		FLOW		RETURN PERIOD		
		PLANIM READ	ACRES	LENGTH -FT.-	HEIGHT -FT.-		5-ry qp -CFS-	100-yr qp -CFS-			-years-	-years-					
SAND CR	0-1	COGO	0.27	270	3	15	3.4	6.0	B	80% IMP	0.59	0.70	0.5	1.1	5	100	
HISTORIC	A	COGO	1.93	300	4.5	25			B	R/L	0.08	0.35					
			V=1.22	+200	3	+5											
						30	2.4	4.0					0.4	2.7	5	10	
	B	COGO	2.03	300	6.5	25			B	R/L	0.08	0.35					
			V=0.35	+100	0.5	+5											
						30	2.4	4.0					0.4	2.8	5	100	
	0-1 + B	COGO	V=1.65	+200	5.5	+4											
		TOTAL	2.3	19		19	3.0	5.1	B	MIX	0.140	0.391	1.0	4.6	5	100	
DEVELOPED	A	COGO	0.57	300	4.5	24			B	70%IMP							
			V=1.22	+200	3	+3				AC 100%							
			0.44							R/L							
		TOTAL	1.93			27	2.6	4.2		27% IMP	0.232	0.464	1.2	3.8	5	100	
	B	COGO	0.84	300	6.5	20			B	70% IMP							
			V=0.71	+100	0.5	+2				AC 100%							
			1.03							R/L							
		TOTAL	2.03							39% IMP	0.295	0.427	1.7	4.1	5	100	
	01+B	COGO	V=1.65	+200	5.5	+2											
		TOTAL	2.3			17	3.2	5.4	B	MIX	0.330	0.450	2.4	5.6	5	100	
HYDROLOGICAL COMPUTATION – BASIC DATA																PAGE 1 OF 1	
PROJ: 208 TROY HILL				BY: O.E. WATTS				OLIVER E. WATTS, CONSULTING ENGINEER, INC. 614 ELKTON DRIVE COLORADO SPRINGS, CO 80907									
RATIONAL METHOD				DATE: 10/13/20													

National Flood Hazard Layer FIRMette



104°43'50"W 38°50'20"N



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 I

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

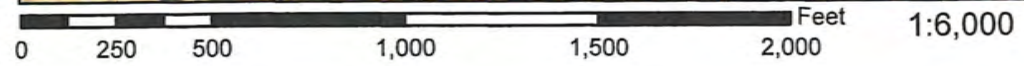
- MAP PANELS**
 - Digital Data Available
 - No Digital Data Available
 - Unmapped



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 **10/5/2020 at 5:01 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.



USGS The National Map: Orthoimagery. Data refreshed April 2020

104°43'13"W 38°49'52"N

OLIVER E. WATTS
CONSULTING ENGINEER, INC.
COLORADO SPRINGS

Fletes Plastering Subdivision
SCS SOILS MAP
1"=2000'



TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth In	Hardness	
Tomah: 192, 193: Tomah part-----	B	None-----	---	---	>60	---	Moderate.
Crowfoot part--	B	None-----	---	---	>60	---	Moderate.
Travessilla: 194: Travessilla part-----	D	None-----	---	---	6-20	Hard	Low.
Rock outcrop part-----	D	---	---	---	---	---	---
Truckton: 95, 96, 97-----	B	None-----	---	---	>60	---	Moderate.
198: Truckton part--	B	None-----	---	---	>60	---	Moderate.
Blakeland part-	A	None-----	---	---	>60	---	Low.
199, 1100: Truckton part--	B	None-----	---	---	>60	---	Moderate.
Bresser part---	B	None-----	---	---	>60	---	Low.
Ustic Torrifluvents: 101-----	B	Occasional---	Very brief---	Mar-Aug	>60	---	Moderate.
Valent: 102, 103-----	A	None-----	---	---	>60	---	Low.
Vona: 104, 105-----	B	None-----	---	---	>60	---	Moderate.
Wigton: 106-----	A	None-----	---	---	>60	---	Low.
Wiley: 107, 108-----	B	None-----	---	---	>60	---	Low.
Yoder: 109, 110-----	B	None-----	---	---	>60	---	Low.

1This map unit is made up of two or more dominant kinds of soil. See map unit description for the composition and behavior characteristics of the map unit.

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													
Parks	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													
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_r) 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.

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

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.

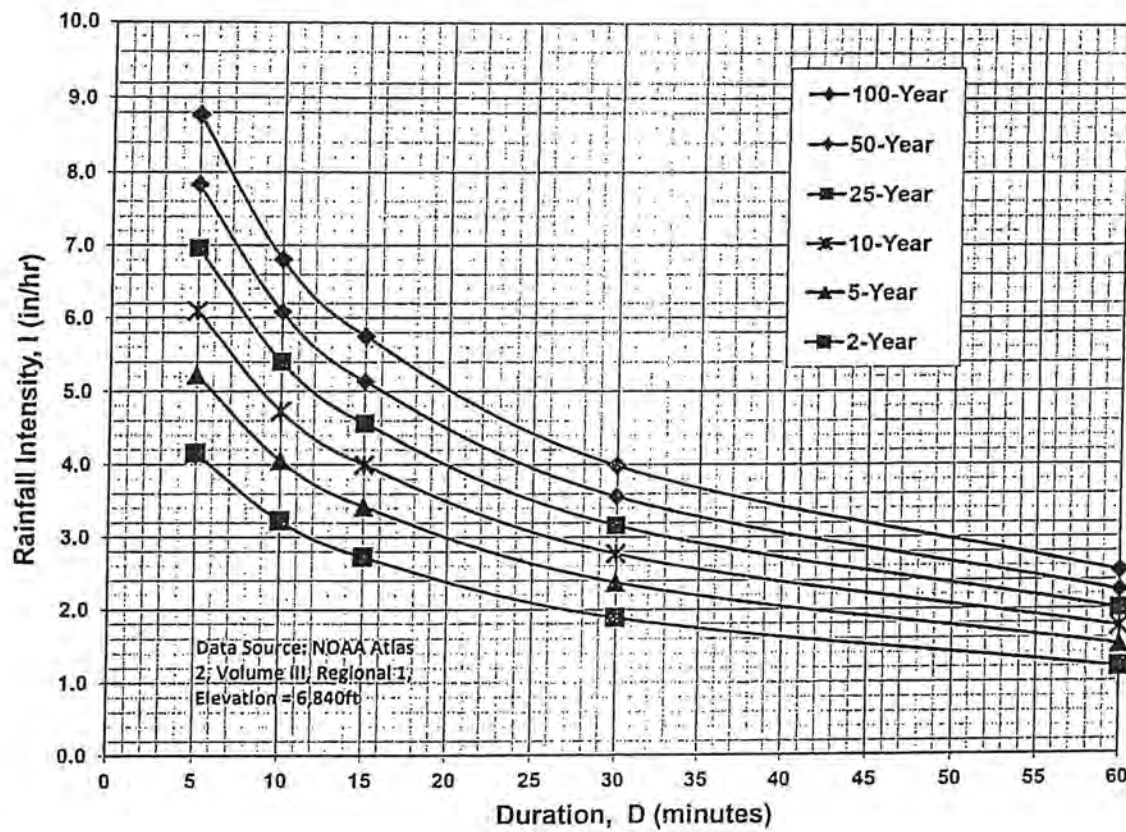
3.2.4 Minimum Time of Concentration

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

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

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

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

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

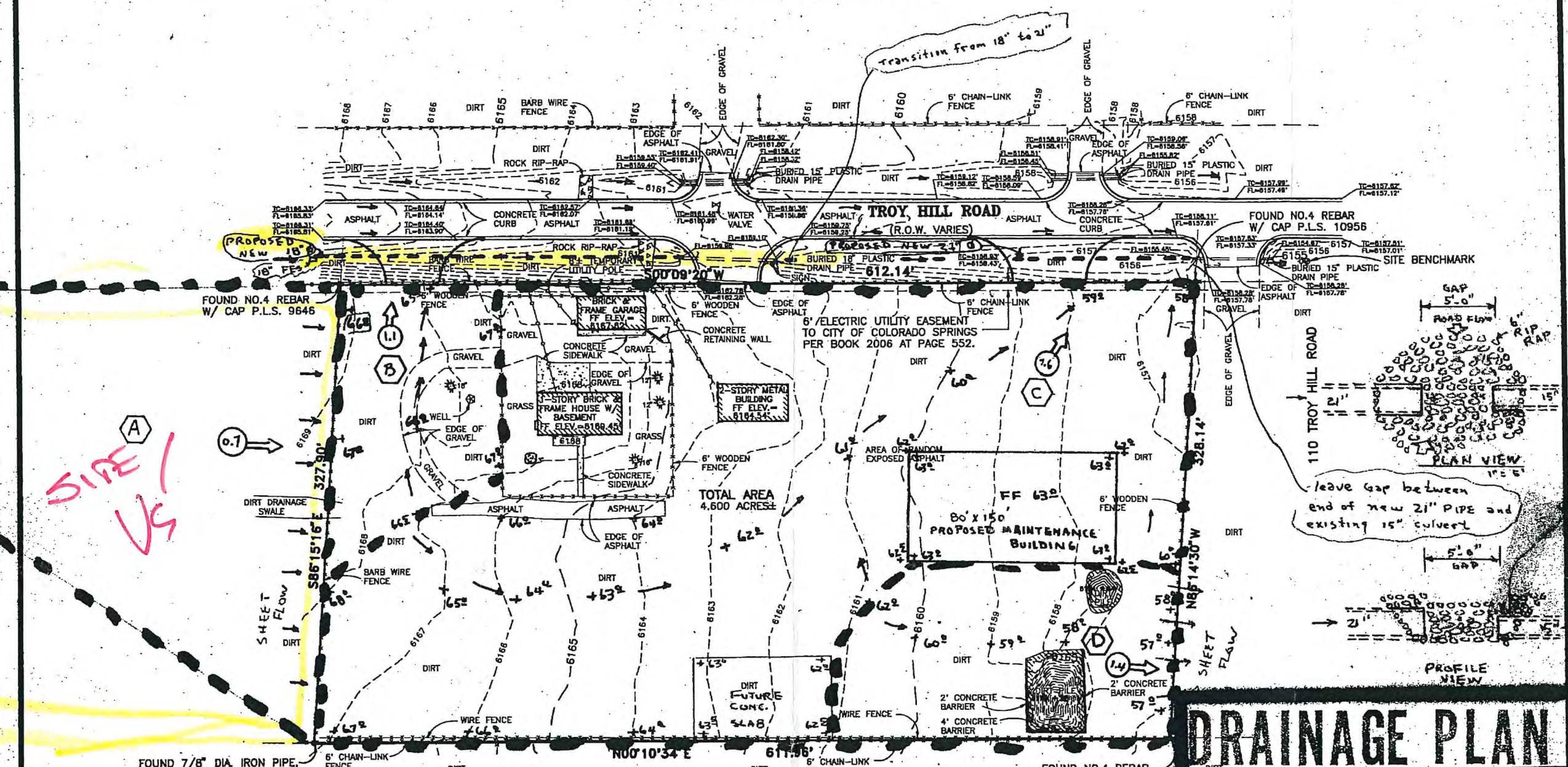
$$I_5 = -1.50 \ln(D) + 7.583$$

$$I_2 = -1.19 \ln(D) + 6.035$$

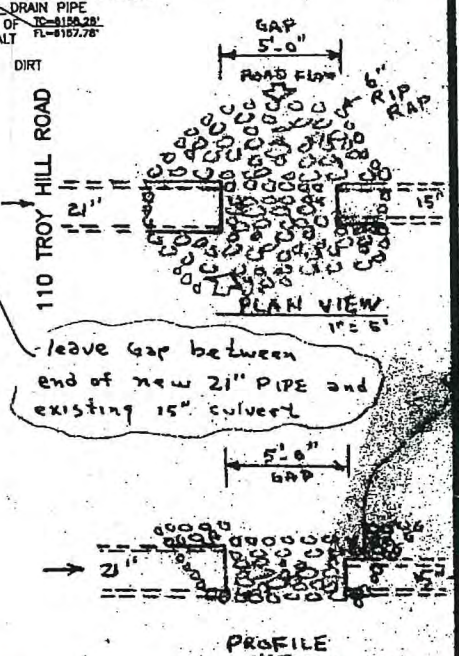
Note: Values calculated by equations may not precisely duplicate values read from figure.

TOPOGRAPHIC MAP

TRISHA LYNN SUBDIVISION



SIDE
VS

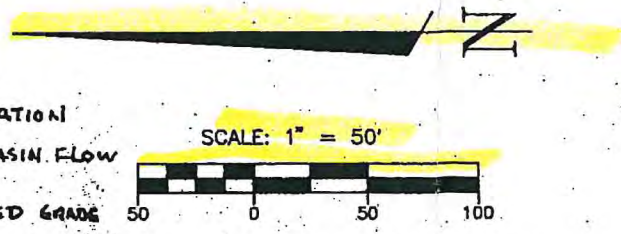


DRAINAGE PLAN

TRISHA LYNN SUBDIVISION
 PE-PLS 4125 01-29-99
WEISS CONSULTING ENGINEERS, INC.
 COLORADO SPRINGS, COLORADO

LEGEND:

- DECIDUOUS TREE W/ TRUNK DIA.
- CONIFEROUS TREE W/ TRUNK DIA.
- OVERHEAD UTILITY LINES
- UTILITY POLE
- CONCRETE
- STONE RIP-RAP
- FENCE
- B** BASIN DESIGNATION
- 11** SYR BASIN FLOW
- + 66.2 PROPOSED GRADE
- BASIN BOUNDARY



BENCHMARK:

BENCHMARK: 2-1/2" ALUMINUM CAP, STAMPED "CSU FIMS CONTROL PW19" AT THE NORTHSIDE OF A TRAFFIC SIGNAL POLE PEDESTAL AT THE NW CORNER OF THE INTERSECTION OF AIRPORT ROAD AND POWERS BOULEVARD. ELEVATION = 6143.425'

SITE BENCHMARK: SPIKE STEP IN POWER POLE #020257, 30± SOUTHERLY OF ENTRANCE TO 110 TROY HILL ROAD. ELEVATION = 6157.66'

REV 03-21-99
Added notes GJW
REV 03-25-99
Added ditch GAP
DETAIL GJW

W.K. CLARK & ASSOCIATES, LLC
 5180 N. UNION BLVD.
 COLORADO SPRINGS, COLORADO

C:\DWG398\98-124\8124T.DWG

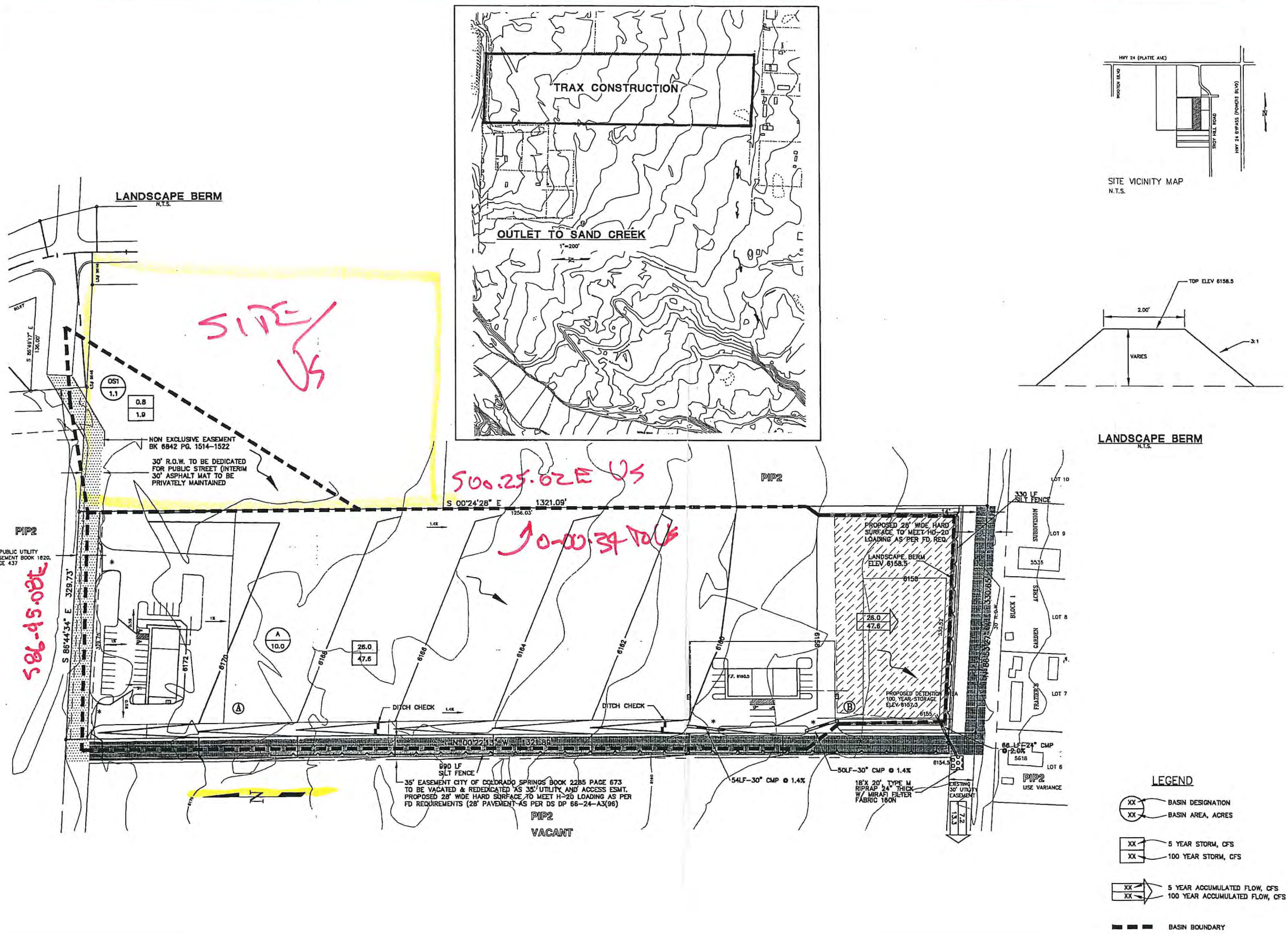
DESIGNED BY: MAB
 PROJECT ENGINEER: MAB
 PROJECT MANAGER: MAB
 DATE: 2/13/97
 JOB NO.: 90962
 CAD FILE NO.: TRAX_SDP.DWG
 SCALE: HORIZ. 60'
 VERT. 1"=10'
 DRAWN BY: JAN

PREPARED BY:
ADP
 118 North Tejon Street
 Suite 400
 Colorado Springs, CO 80903
 (719) 533-8822
 Fax: (719) 533-2539

NO.	DATE	REVISION	BY
1	1/27/98	REV FOR LOG 1/27/97	MAB

TRAX CONSTRUCTION
CITY OF COLORADO SPRINGS, COLORADO
DRAINAGE PLAN

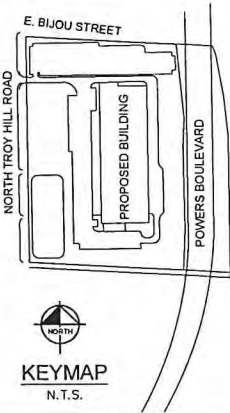
SCANNED
 SHEET
 1 of 1



SIDE

DRAINAGE NOTE:
 PLAN REVIEW BY CITY OF COLORADO SPRINGS IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH DESIGN CRITERIA. THE CITY OF COLORADO SPRINGS IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE CITY OF COLORADO SPRINGS, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

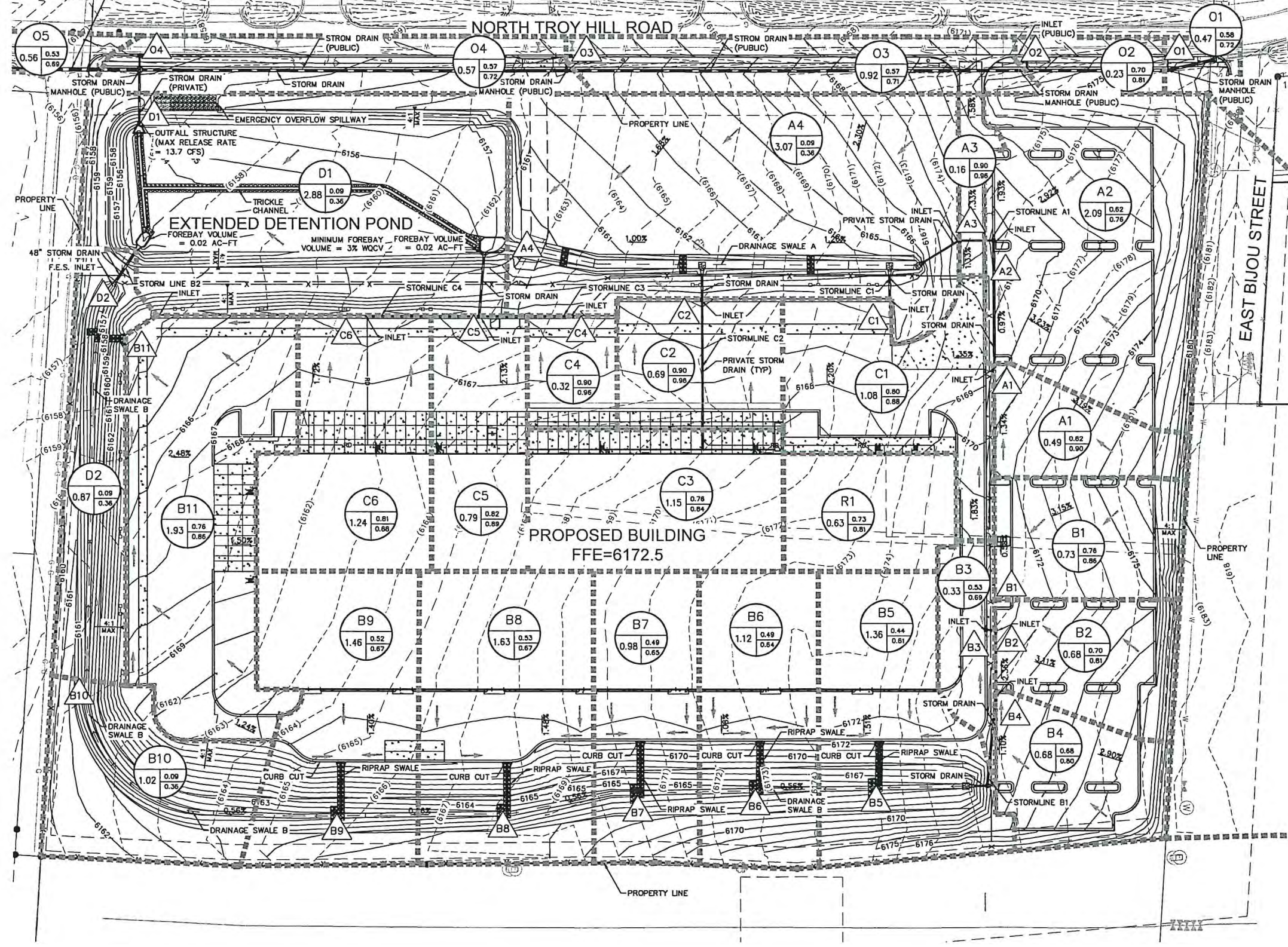
EXTENDED DETENTION BASIN DATA	
EURY = 2.27 AC-FT	TOP OF POND ELEV = 6159.5
V ₁₀₀ = 2.83 AC-FT	OVERFLOW SPILLWAY ELEV = 6158.41
MAX. RELEASE RATE = 13.7 CFS	Q ₁₀₀ = 108.9 CFS
WSEL ₁₀₀ = 6157.41	WOCV = 0.5 AC-FT



USER:
FedEx
 Ground


DEVELOPER:
SunCap
 PROPERTY GROUP


DESIGNER:
Kimley-Horn
 2015 KIMLEY-HORN
 990 South Broadway, Suite 200
 Denver, Colorado 80209 (303) 228-2300




LEGEND

- PROPERTY LINE
- - - - - EXISTING LOT LINE/ROW
- ▣ BASIN BOUNDARY
- (6220) - EXISTING CONTOURS
- 6220 — PROPOSED CONTOURS

 A - DRAINAGE BASIN
 B - BASIN ACREAGE
 C - 5-YEAR RUNOFF COEFF.
 D - 100-YEAR RUNOFF COEFF.

 DESIGN POINT

 FLOW ARROW

NOTES:

- ELEVATIONS ARE FINISHED GRADE UNLESS OTHERWISE NOTED.
- ALL STORM DRAIN AND STRUCTURES ARE PRIVATE UNLESS OTHERWISE NOTED.

BENCHMARK:
 FMS MONUMENT F_83, BEING A BERNSTEN ROAD WITH 3-1/4" ALUMINUM CAP SET IN ROAD BOX ON THE NORTH SIDE OF U.S. HIGHWAY 24 APPROXIMATELY 920 FEET EAST OF THE CENTERLINE OF WOOTEN ROAD, HAVING A PUBLISHED ELEVATION OF 6177.09 FEET, NGVD 1929.

Site Runoff Summary

DESIGN POINT	DRAIN BASIN	AREA AC	Direct Flows		Cumulative Flows	
			Q ₅ CFS	Q ₁₀₀ CFS	Q ₅ CFS	Q ₁₀₀ CFS
A1	A1	0.49	1.9	3.5		
A2	A2	2.09	5.2	10.5	6.8	13.5
A3	A3	0.16	0.7	1.3	7.3	14.5
A4	A4	3.07	1.0	6.7	18.8	40.3
B1	B1	0.73	2.5	4.7		
B2	B2	0.68	2.1	4.1	4.6	8.8
B3	B3	0.33	0.9	1.9	5.4	10.5
B4	B4	0.68	2.2	4.4	7.4	14.5
B5	B5	1.36	2.3	5.3	8.6	17.8
B6	B6	1.12	2.1	4.6	10.7	22.4
B7	B7	0.98	1.8	4.0	12.5	26.4
B8	B8	1.63	3.3	7.1	15.8	33.4
B9	B9	1.46	2.9	6.3	18.7	39.6
B10	B10	1.02	0.3	2.3	19.0	42.0
B11	B11	1.93	6.4	12.1		
C1	C1	1.08	4.3	7.7		0.0
C2	C2	0.69	3.2	5.7	9.5	17.4
C3	C3	1.15	4.4	8.2	6.5	12.0
C4	C4	0.32	1.5	2.7		
C5	C5	0.79	3.1	5.6	9.1	16.6
C6	C6	1.24	4.7	8.6		0.0
D1	D1	2.88	1.0	6.6	49.2	108.9
D2	D2	0.87	0.3	1.9	24.2	53.1
R1	R1	0.63	2.2	4.2		
OFFSITE BASINS						
O1	O1	0.47	1.2	2.5		
O2	O2	0.23	0.8	1.5		
O3	O3	0.92	1.9	3.9		
O4	O4	0.57	1.2	2.6		
O5	O5	0.56	1.4	3.1		

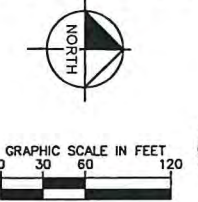
4/2006	REVISED SIGNATURE SUBMITTAL
3/1/20	SECOND CITY SUBMITTAL
2/1/15	PPRBD RESUBMITTAL

PROJECT TITLE:
SUNCAP INDUSTRIAL FILING NO. 1
125 N TROY HILL RD.
COLORADO SPRINGS
COLORADO

Issue Date: 12/22/2014
 Scale: AS SHOWN
 Drawn By: DBH

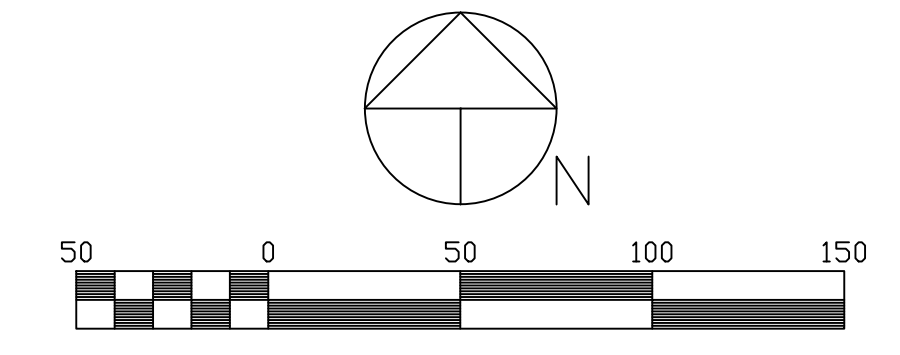
DRAINAGE PLAN

DRAWING NUMBER:
DR1.0



DRAINAGE PLAN FLETES PLASTERING SUBDIVISION

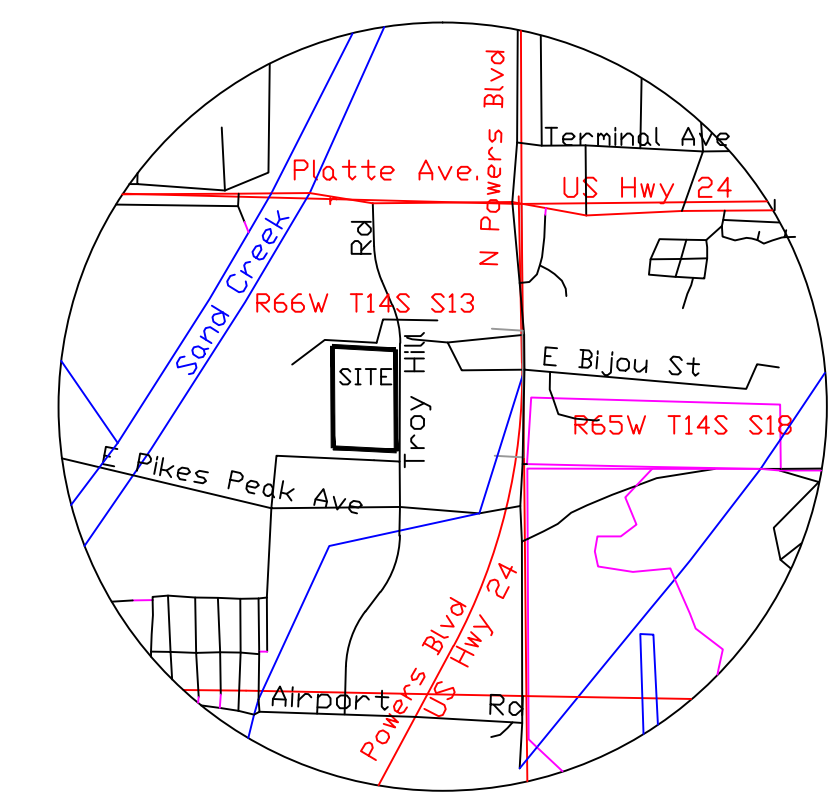
A SUBDIVISION OF PART OF THE SW1/4 NE1/4 SECTION 13, T.14S., R.66W. OF LTHE 6TH P.M.
IN THE CITY OF COLORADO SPRINGS
EL PASO COUNTY, COLORADO



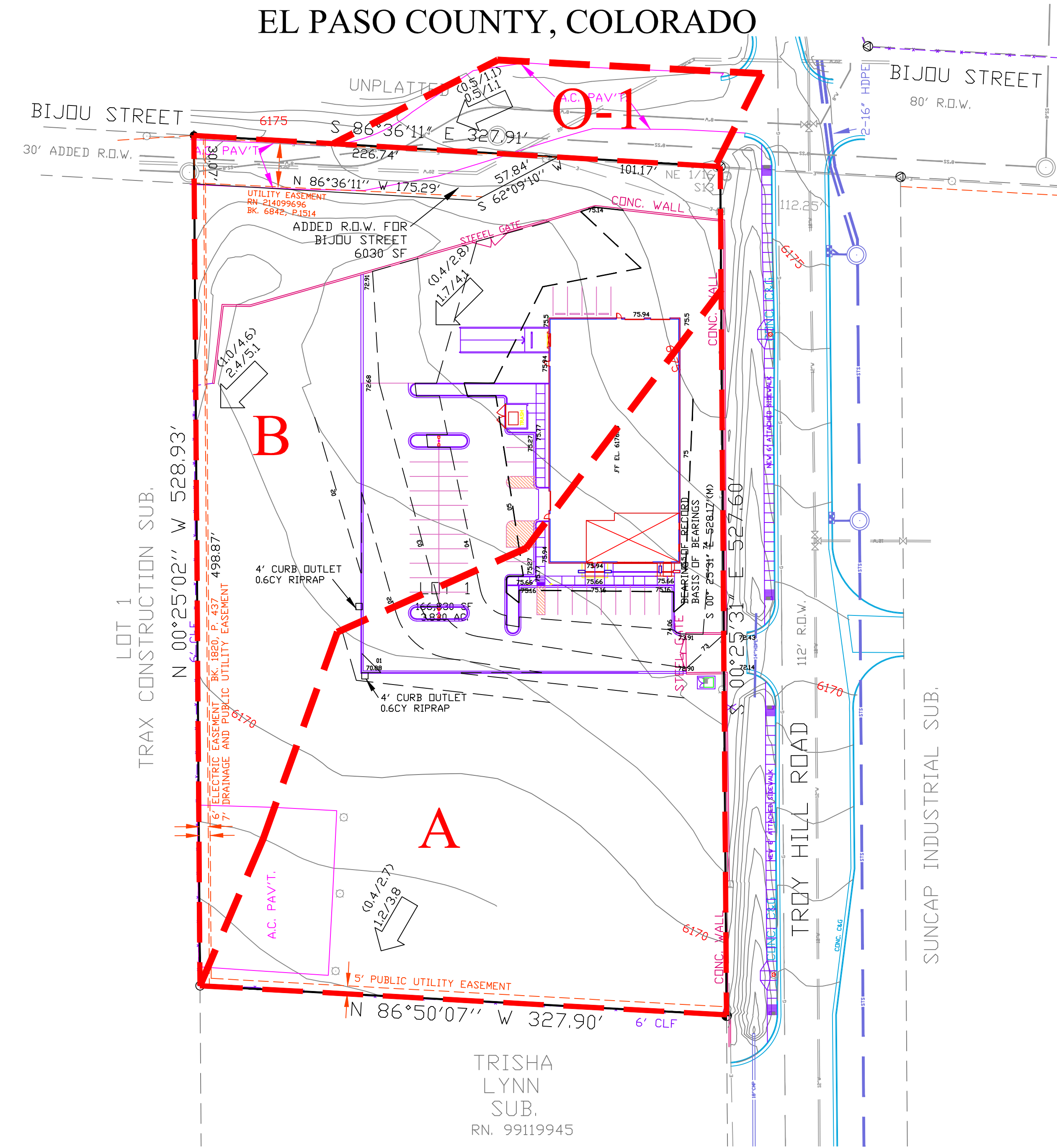
Scale 1" = 50'
Contour Interval: 1'
NGVD, 1929 ADJUSTMENT

LEGEND:

- SET #9853 AL. CAP ON #5 REBAR
- FOUND #10384 AL. CAP PER MON. RECORD
- ⊙ FOUND 3-1/4" AL. CAP, DOT, #9014
- ◆ FOUND 7/8" DIA. IRON PIPE
- ◁ FOUND YELLOW #11624 CAP ON #4 REBAR
- ◇ FOUND #5 REBAR
- ⊙ SEWER MANHOLE
- ⊞ STREET LIGHT VAULT
- ⊞ WATER VALVE
- ⊙ FIRE HYDRANT
- ⊙ STREET LIGHT POLE
- ⊙ POWER POLE
- ⊞ ELECTRICAL VAULT
- ⊞ TELEPHONE PEDESTAL
- ⊞ STREET LIGHT VAULT
- 8"SS — PUBLIC UTILITY, PER CITY RECORDS AND VISIBLE EVIDENCE



VICINITY MAP
1"=1000'



- LEGEND:**
- ⊞ (0.5/5.6) RUNOFF IN CFS 5-YEAR/100-YEAR DEVELOPED
 - ⊞ (10.5/20.4) RUNOFF IN CFS 5-YEAR/100-YEAR DEVELOPED (HISTORIC)
 - A — LIMIT OF DRAINAGE BASIN AND DESIGNATION
 - B — EXISTING STORM SEWER AS LABELED
 - C — PROPOSED STORM SEWER AS LABELED
 - D — LIMIT OF SOILS TYPE AND GROUP

PREPARED BY THE OFFICE OF:
OLIVER E. WATTS PE-LS
CONSULTING ENGINEER
614 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
(719) 593-0173
oliewatts@aol.com
Celebrating over 41 years in business