

*Approved R.D. [unclear]  
22 Dec 72 [unclear]*

MASTER DRAINAGE REPORT  
FOR  
Erindale Subdivision Filing Nos.  
6, 7, 8 and 9

H. J. KRAETTLI & SONS

~~29 November 1972~~

22 MARCH 1973



# H. J. KRAETTLI & SONS CONSULTING ENGINEERS

410½ SOUTH TEJON

PHONE: 473-3774

COLORADO SPRINGS, COLORADO 80902

29 November 1972

Mr. Robert Martin  
Colorado Springs City Engineer  
City Hall  
Colorado Springs, Colorado

Dear Sir:

Transmitted herewith is the master Drainage Report of Erindale Subdivision Future Filing Nos. 6, 7, 8 and 9, subdivisions situated in the Easterly half of Section 17, Township 13 South, Range 66 West of the 6th P. M., El Paso County, Colorado. The section describing Erindale No. 6 is a revision of the previous drainage plan which has been approved. It was felt that this would clarify the report to incorporate it with Erindale Nos. 7, 8 and 9.

  
Harold Jack Kraettli  
Certified Engineer No. 24

MASTER DRAINAGE REPORT

FOR

ERINDALE SUBDIVISION  
FILINGS NO. 6, 7, 8, and 9

29 November 1972  
H. J. Kraettli & Sons  
Colorado Springs, Colorado

Prepared by

Harold Jack Kraettli  
Certified Engineer No. 24

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REQUIREMENTS FOR ALL DRAINAGE PLANS AND REPORTS  
SUBMITTED TO THE CITY OF COLORADO SPRINGS

Certifications

a. Registered Engineer

I, Harold Jack Kraettli, a registered engineer in the State of Colorado, hereby certify that the attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. I further certify that said drainage report is in accordance with all City of Colorado Springs Ordinances and specifications and criteria.

Harold J. Kraettli

Colorado P. E. No. 2154

b. Owner or developer of the site

"The developer has read and will comply with all of the requirements specified in this drainage report as approved by the City Engineer."

By David R. Sellen

Title General Partner

## GENERAL INFORMATION:

Future Erindale Subdivision Filings No. 6, 7, 8, and 9 are subdivisions located in the Easterly half of Section 17, Township 13 South, Range 66 West of the 6th P.M., El Paso County, Colorado and contain a total of 99.42 acres.

The terrain comprised within these subdivisions has a major ridge line which separates the drainage; the north portion draining into the Cottonwood Creek Basin and the South portion draining into the Pulpit Rock Basin. Both basins subsequently drain into Monument Creek. The slopes vary from gentle to steep and contain numerous small washes and diversified minor sheds.

Runoff quantities were computed using the SCS synthetic hydrograph method as shown in the Bureau of Reclamation publication "Small Dams". The 50 year 2 inch storm of one hour duration was used as the design basis.

Erindale No. 6 contains a total of 41.00 acres, which lays on a ridge that runs East and West. This ridge divides the runoff of the subdivision with the North portion of 24.85 acres draining into the Cottonwood Creek Basin; and the South portion of 16.15 acres draining into the Pulpit Rock Basin.

Erindale No. 7 contains a total of 8.93 acres, which are comprised of relatively steep slopes that drain East and West to an existing ravine that flows from North to South. After development of the subdivision the drainage handled by this ravine will be contained in and by Castlewood Lane. The South 8.49 acres of this subdivision will drain into the Pulpit Rock Basin. The North 0.44 acres will drain into Cottonwood Creek Basin.

Erindale No. 8 contains a total of 33.39 acres, and is comprised of steep slopes and three major ravines and several small ravines. Two of the major ravines and the small ravines collect interior and exterior water that then drains into the third major ravine. The runoff collected by this ravine, after development of the subdivision, will be contained by Vickers Avenue and associated drainage structures. All of the runoff in Erindale No. 8 drains into the Pulpit Rock Basin.

Erindale No. 9 contains a total of 16.10 acres and lays on the same ridge as mentioned for No. 6 and runs East and West. This ridge divides the runoff of the subdivision with the North portion of 9.21 acres draining into the Cottonwood Creek Basin and the South portion of 6.89 acres draining into the Pulpit Rock Basin.

## COTTONWOOD CREEK BASIN

### Exterior Drainage:

Because of the ridges bordering Erindale Nos. 6 and 7 on the East and bordering Erindale No. 9 on the West, there is only negligible external drainage entering the North portion of Erindale Nos. 6 and 7 on the Easterly side and no external drainage entering the North portion of Erindale No. 9 on the Westerly side.

### Interior Drainage:

As mentioned in the "General Information" section under Erindale Nos. 6, 7, and 9, a ridge divides the subdivisions into North and South portions. The North portions only contribute to the Cottonwood Creek Basin.

#### Erindale Nos. 6 and 7

The North portions of Nos. 6 and 7 have been divided up as follows: areas A and B which make up accumulation point XXV; areas D, E, and F which make up accumulation point XXIV; area C which includes a small area in No. 6 is described under No. 9; areas G, H, and I make up accumulation point XXXII; areas J, K, L and M make up accumulation Point XXXIII; areas L and M include the areas in Erindale No. 7; area N is described under Erindale No. 9; no c.f.s. are given for area O as it generally sheds to the North and has no appreciable accumulation at any one point; areas P, Q, R, S and T are described under Erindale No. 9; no c.f.s. are given for area U as it too generally sheds to the North and does not accumulate in any one point.

Thus, the runoff in the North portions of Erindale No. 6 and No. 7 accumulate at points XXV, XXIV, XXXII, and XXXIII as shown on the Drainage Plan Drawing and includes 25.29 acres.

#### Erindale No. 9

The North portion of No. 9 has been divided up as follows: areas C and P make up accumulation point XXVII; area N only makes up accumulation point XXVIII; areas Q, R, S and T make up accumulation point XXVI.

Thus, the runoff in the North portion of Erindale No. 9 accumulates at points XXVI, XXVII and XXVIII as shown on the Drainage Plan Drawing and includes 9.21 acres.

## Summary

The North portion of Erindale Nos. 6, 7 and 9 comprising 34.50 acres thus contribute a total of 79.1c.f.s. to the Cottonwood Creek Basin. As the quantities at the accumulation points are so small as to not require drainage structures other than curb and gutter and cross pans at some intersections; no cost estimate is given.

## Drainage Fees

The drainage fee for Erindale nos. 6, 7 and 9 as pertains to the Cottonwood Creek Basin is computed as follows:

### 1972 Fees

34.50 acres @ \$674.00/acres = \$23,253.00



## Cottonwood Creek Basin

Sheet 1 of 2

BASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Area XXXIII-J	2.28	0.0036	450	40.0	0.083	0.550	1.5	4.8
Area XXXIII-K	1.18	0.0018	485	25.0	0.083	0.550	1.5	2.4
Area XXXIII-L	4.00	0.0063	960	43.0	0.090	0.554	1.5	8.3
Area XXXIII-M	4.43	0.0069	900	41.0	0.095	0.557	1.5	9.0
Accum. Pt. XXXIII	---	---	---	---	---	---	---	24.5
Area XXXII-H	1.95	0.0031	400	43.0	0.083	0.550	1.5	4.1
Area XXXII-G	1.21	0.0019	285	13.0	0.083	0.550	1.5	2.5
Area XXXII-I	2.49	0.0039	520	49.0	0.083	0.550	1.5	5.2
Accum Pt XXXII	---	---	---	---	---	---	---	11.8
Area XXV-A	0.80	0.0013	300	33.0	0.083	0.550	1.5	1.7
Area XXV-B	0.37	0.0006	380	35.0	0.083	0.550	1.5	0.8
Accum. Pt. XXV	---	---	---	---	---	---	---	2.5
Area XXIV-D	0.76	0.0012	375	38.0	0.083	0.550	1.5	1.7
Area XXIV-E	0.47	0.0007	275	26.5	0.083	0.550	1.5	1.0
Area XXIV-F	2.22	0.0035	465	40.0	0.083	0.550	1.5	4.6



## PULPIT ROCK BASIN

### Exterior Drainage:

Exterior drainage comes from both developed and undeveloped lands to the East. Exterior drainage from undeveloped land comes from the South and Southeast. All exterior drainage effects only Erindale No. 8.

To the East lies the Berkshire Subdivision consisting of apartment buildings, roads and associated parking area. This subdivision also collects and handles the runoff from the Pulpit Rock Basin to the East of Academy Boulevard. Runoff from the Berkshire Subdivision as effects Erindale No. 8 is concentrated at two points: a 48" R.C.P. storm sewer discharges 237.4 c.f.s. at the end of Vickers Drive as platted in Berkshire Subdivision and 13.3 c.f.s. of surface drainage that is discharged from the end of the adjacent street to the South. Both discharges reach the subdivision on a temporary basis by way of a ravine that intersects Vickers Drive at Accumulation Point II. Also an additional 1.34 acres runoff comes in at Accumulation Point I and 3.50 acres from the East that contributes to Accumulation Point XXXI as shown on the Drainage Plan Drawing.

Runoff from the South and Southeast, which is gently sloping land, totals 95.7 c.f.s. and reaches Erindale No. 8 at Accumulation Points IV, V, IX and X as shown on the Drainage Plan Drawing.

### Interior Drainage:

#### Erindale No. 6

The interior drainage of the South portion of Erindale No. 6 has been divided up as follows: areas 1, 2, 3, 4 and 5 make up Accumulation Point XXIX; a small section of area 1 that flows into Accumulation Point XXI; area 1 only that makes up Accumulation Point XIX; a small section of area 1 that flows into Accumulation Point XVIII; a small section of area 1 that flows into Accumulation Point XV; a small section of area 1, a large section of area 2, and area 3 that flow into Accumulation Point XXX; and approximately half of areas 1, 2, 3 and 4 that flow into Accumulation Point VIII.

Thus the runoff in the South portion of Erindale No. 6 accumulates at points VIII, XV, XVIII, XIX, XXI, XXIX and XXX as shown on the Drainage Plan Drawing and includes 16.15 acres.

#### Erindale No. 7

The interior drainage of the South portion of Erindale No. 7 has been divided up as follows: part of area 1 that flows into accumulation Point XXX; area 1 only, which includes some exterior

drainage, makes up Accumulation Point XXXI; areas 1, which includes some exterior drainage, 2, 3, 4 and exterior Accumulation Point I, all of these make up Accumulation Point III; a part of area 1 that flows into Accumulation Point VIII; a small part of 1 that flows into Accumulation Point II; and a small part of 1 that flows into Accumulation Point VII.

Thus the runoff in the South portion of Erindale No. 7 accumulates at Points II, III, VII, VIII, XXX and XXXI as shown on the Drainage Plan Drawing, and includes 8.49 acres which is Interior Drainage area only.

#### Erindale No. 8

The interior drainage of the South portion of Erindale No. 8 has been divided up as follows: part of area 1 that flows into Accumulation Point XVIII; part of areas 1, 2, 3 and 4 that flows into Accumulation Point VIII; part of area 1 which along with exterior runoff from the East makes up Accumulation Point II; area 2, which along with exterior runoff from the East in area 1, make up Accumulation Point IV; area 1, which along with Accumulation Points IV and V make up Accumulation Point VI; areas 1 and 2, both areas include exterior runoff from the South, and which along with Accumulation Point VI make up Accumulation Point IX; areas 1, 2, 3 and 4 which make up Accumulation Point VII; areas 1, 2 and 3 which includes both interior and exterior runoff, makes up Accumulation Point X; areas 1 and 2, which along with Accumulation Point X; make up Accumulation Point XI; areas 1 and 2, which along with Accumulation Points IX and XI, make up accumulation Point XII; area 1, which along with Accumulation Point XII, make up Accumulation Point XIII; areas 1, 2 and 3, which along with Accumulation Point XIII, make up Accumulation XIV; part of area 1 and area 2, which along with Accumulation Points XIV and VIII, make up accumulation point XV; area 1 which includes some exterior runoff that makes up Accumulation Point XVI, and area 1 that makes up Accumulation Point XVII.

Thus the runoff in Erindale No. 8 accumulates at points II, IV, V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI, XVII, XVIII, XIX and XXI as shown on the Drainage Plan Drawing, and includes 33.39 acres which is interior drainage only.

#### Erindale No. 9

The interior drainage of the South portion of Erindale No. 9 has been divided up as follows: area 1, which along with accumulation Point XIX, make up Accumulation Point XX; area 1, which along with Accumulation Point XX, make up Accumulation Point XXI; area 1 flows to Accumulation Point XXII; area 1 flows to Accumulation Point XXIII.

Thus the runoff in the South portion of Erindale No. 9 accumulates at points XX, XXI, XXII and XXIII as shown on the Drainage Plan Drawing, and includes 6.89 acres which is interior drainage area only.

### Summary

The South portions of Erindale No. 6, 7 and 9 and Erindale No. 8 comprise 64.92 acres. Quantities of runoff, which total 450.9 c. f. s. at the Western boundary of Vicker Drive, warrant drainage structures to handle exterior as well as interior runoff. Cross pans and catch basins will be required at some intersections. The cost estimate is as follows:

60" RCP	350' @ \$45.00/l. f.	15,750.00
54" RCP	770' @ \$40.00/l. f.	30,800.00
48" RCP	270' @ \$35.00	9,450.00
36" RCP	15' @ \$30.00/l. f.	450.00
24" RCP	50' @ \$20.00/l. f.	1,000.00
21" RCP	75' @ \$17.50/l. f.	1,312.50
18" RCP	180' @ \$15.00/l. f.	2,700.00
D10R Catch Basin (6' X 8")	2' @ \$1100.00 ea.	2,200.00
D10R Catch Basin (4' X 8")	5 @ \$950.00 ea.	4,750.00
36" Flared End	1 @ \$250.00 ea.	250.00
Ditch, 3' Deep	1340' @ \$15.00/l. f.	20,100.00
Ditch, 2' Deep	390' @ \$13.00/l. f.	5,070.00
TOTAL		\$93,832.50

### Drainage Fees

The drainage fee for the subdivisions are computed as follows:

#### 1972 Fees

Pulpit Rock Basin

64.92 acres @ \$734.00 = \$47,651.28

## Pulpit Rock Basin

Sheet 1 of 8

BASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Area I-1	1.34	0.0021	500	541	0.083	0.550	1.5	2.8
Accum. Pt I	---	---	---	---	---	---	---	2.8
Area II-1	3.55	0.0055	750	87	0.083	0.550	1.5	7.3
Exterior Runoff, East	---	---	---	---	---	---	---	250.7
Accum. Pt II	---	---	---	---	---	---	---	258.0
Area XXX-1	1.25	0.0020	370	33.0	0.083	0.550	1.5	2.6
Area XXX-2	3.30	0.0052	700	56.0	0.083	0.550	1.5	6.9
Area XXX-3	.68	0.0011	250	36	0.083	0.550	1.5	1.4
Accum. Pt. XXX	---	---	---	---	---	---	---	10.9
Area XXXI-1	1.55	0.0024	370	33.0	0.083	0.550	1.5	3.2
Accum. Pt XXXI	---	---	---	---	---	---	---	3.2
Area III-1	4.29	0.0067	800	103	0.083	0.550	1.5	8.8
Area III-2	1.04	0.0016	330	47	0.083	0.550	1.5	2.1
Area III-3	0.71	0.0011	330	48	0.083	0.550	1.5	1.5
Area III-4	1.79	0.0028	550	55	0.083	0.550	1.5	3.7



BASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Area V-1	13.0	0.020	1000	76	0.083	0.550	1.50	26.4
Accum. Pt V	---	-----	---	----	-----	-----	-----	26.4
Area VI-1	0.21	000033	200	26	0.083	0.550	1.5	0.4
Accum. Pt IV	---	-----	---	----	-----	-----	---	44.3
Accum. Pt V	---	-----	---	----	-----	-----	---	26.4
Accum. Pt VI	---	-----	---	----	-----	-----	---	71.1
Area VII-1	2.21	0.0035	500	68	0.083	0.550	1.5	4.6
Area VII - 2	2.14	0.0033	600	71	0.083	0.550	1.5	4.4
Area VII-3	0.62	0.00097	900	73	0.083	0.550	1.5	1.3
Area VII-4	0.63	0.00098	950	74	0.083	0.550	1.5	1.3
Accum. Pt II	---	-----	---	----	-----	-----	---	258.0
Accum. Pt VII	-----	-----	---	----	-----	-----	---	269.6
Area VIII-1	3.94	0.0062	550	68	0.083	0.550	1.5	8.2
Area VIII-2	2.18	0.0034	400	84	0.083	0.550	1.5	4.5
Area VIII-3	3.96	0.0062	900	114	0.083	0.550	1.5	8.2



ASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Area VIII-4	1.47	0.0023	525	112	0.083	0.550	1.5	3.0
Accum. Pt III	---	---	---	---	---	---	---	33.0
Accum. Pt VIII	---	---	---	---	---	---	---	56.9
Area IX-1	5.9	0.0092	1200	143	0.083	0.550	1.5	12.1
Area IX-2	1.60	0.0025	475	38	0.083	0.550	1.5	3.3
Accum. Pt VI	---	---	---	---	---	---	---	71.1
Accum Pt IX	---	---	---	---	---	---	---	86.5
Area X-1	7.2	0.011	1000	117	0.083	0.550	1.5	14.5
Area X-2	1.10	0.0017	375	66	0.083	0.550	1.5	2.2
Area X-3	0.37	0.00058	350	46	0.083	0.550	1.5	0.8
Accum Pt X	---	---	---	---	---	---	---	17.5
Area XI-1	0.14	0.00022	200	12	0.083	0.550	1.5	0.3
Area XI-2	0.26	0.00041	375	46	0.083	0.550	1.5	0.5
Accum. Pt X	---	---	---	---	---	---	---	17.5
Accum Pt XI	---	---	---	---	---	---	---	18.3

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LASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Area XII-1	0.78	0.0012	300	64	0.083	0.550	1.5	1.6
Area XII-2	3.14	0.0049	725	82	0.083	0.550	1.5	6.5
Accum. Pt IX	---	---	---	---	---	---	---	86.5
Accum. Pt XI	---	---	---	---	---	---	---	18.3
Accum. Pt XII	---	---	---	---	---	---	---	112.9
Area XIII-1	2.14	0.0033	475	66	0.083	0.550	1.5	4.4
Accum. Pt XII	---	---	---	---	---	---	---	112.9
Accum. Pt. VII	---	---	---	---	---	---	---	269.6
Accum. Pt XIII	---	---	---	---	---	---	---	386.9
Area XIV-1	0.58	0.00091	550	64	0.083	0.550	1.5	1.2
Area XIV-2	0.41	0.00064	550	68	0.083	0.550	1.5	0.8
Area XIV-3	0.51	0.00080	375	22	0.083	0.550	1.5	1.1
Accum. Pt XIII	---	---	---	---	---	---	---	386.9
Accum. Pt XIV	---	---	---	---	---	---	---	390.0
Area XV-1	1.42	0.0022	550	120	0.083	0.550	1.5	2.9

LASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Area XV-2	0.51	0.00080	250	33	0.083	0.550	1.5	1.1
Accum. Pt VIII	---	-----	---	---	---	---	---	56.9
Accum. Pt XIV	---	---	---	---	---	---	---	390.0
Accum. Pt XV	---	---	---	---	---	---	---	450.9
Area XVI	1.23	0.0019	475	92	0.083	0.550	1.5	2.5
Accum. Pt XVI	---	---	---	---	---	---	---	2.5
Area XVII	0.93	0.0015	550	76	0.083	0.550	1.5	2.0
Accum. Pt XVII	---	---	---	---	---	---	---	2.0
Area XVIII	0.32	0.00050	300	58	0.083	0.550	1.5	0.7
Accum. Pt XVIII	---	---	---	---	---	---	---	0.7
Area XIX - 1	1.42	0.0022	350	54	0.083	0.550	1.5	2.9
Accum. Pt XIX	---	---	---	---	---	---	---	2.9
Area XXIX-1	0.48	0.00075	275	26	0.083	0.550	1.5	1.0
Area XXIX-2	0.97	0.0015	225	20.5	0.083	0.550	1.5	2.0
Area XXIX-3	0.45	0.0007	225	21.5	0.083	0.550	1.5	0.9

BASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Area XXIX-4	1.42	0.0022	340	44.0	0.083	0.550	1.5	2.9
Area XXIX-5	2.27	0.0036	470	56.0	0.083	0.550	1.5	4.8
Accum. Pt XXIX	---	---	---	---	---	---	---	11.6
Area XXIX-1	2.19	0.0034	425	116	0.083	0.550	1.5	4.5
Accum. Pt XXIX	---	---	---	---	---	---	---	11.6

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LASIN	ACRES	SQ. MI.	L. FT.	H(FT)	T <sub>c</sub> (HR)	T <sub>p</sub> (HR)	Q (IN)	Q <sub>p</sub> (CFS)
Accum. Pt XX	---	---	---	---	---	---	---	16.1
Area XXI-1	3.46	0.0054	700	138	0.083	0.550	1.5	7.1
Accum Pt XX	---	---	---	---	---	---	---	16.1
Accum Pt XXI	---	---	---	---	---	---	---	23.2
Area XXII-1	0.79	0.0012	225	67	0.083	0.550	1.5	1.6
Accum Pt XXII	---	---	---	---	---	---	---	1.6
Area XXIII-1	1.06	0.0017	200	58	0.083	0.550	1.5	2.2
Accum. Pt XXIII	---	---	---	---	---	---	---	2.2

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