

REPORT

RE-EVALUATION OF COSTS FOR A PORTION OF

SAND CREEK DRAINAGE BASIN

COLORADO SPRINGS, COLORADO

FEBRUARY 1973

PEAK ENGINEERING COMPANY

CONSULTING ENGINEERS

2860 SOUTH CIRCLE DRIVE

COLORADO SPRINGS, COLORADO

TABLE OF CONTENTS

Title Sheet	1
Letter of Transmittal	2
Certification Letter.	3
Report Section.	4
Cost Summary.	5
Basin Map	6


Mr. DeWitt Miller
Director of Public Works
City of Colorado Springs
Colorado Springs, Colorado

Dear Mr. Miller:

Transmitted herein is the updated cost analysis of the Sand Creek Drainage Basin located in the eastern portion of the City of Colorado Springs. If you have any questions in regard to same, please give us a call or contact us at your convenience.

Thank you.


Respectfully yours,


Keith Martin, P.E.
Peak Engineering Co.

Report

Re-Evaluation of Costs for a Portion of
Sand Creek Drainage Basin
Colorado Springs, Colorado

I, Keith Martin, a registered engineer in the State of Colorado, hereby certify that the attached Report was prepared under my direction and supervision and is correct to the best of my knowledge and belief. I further certify that said Report is in accordance with all City of Colorado Springs ordinances, specifications and criteria.


Keith Martin

Colorado P.E. No. 5497



SCOPE & PURPOSE:

This study and report of the Sand Creek Drainage Basin was undertaken and compiled to re-evaluate and update the overall basin costs. The original Sand Creek Basin Study was submitted to the City in 1962. A re-study was made in 1968. Due to changes in construction methods and increased costs it was the opinion of all concerned that a new evaluation be made of this particular drainage basin and that a new and more realistic cost per acre analysis be made, based on new and up-dated material, labor and construction costs. We were not requested nor did we re-evaluate flows or revise any of the proposed facilities shown on the original Sand Creek Study.

BASIN DESCRIPTION:

The Sand Creek Drainage Basin Area, as stated in the original report, contains approximately 52 square miles, starting at its termination point at Fountain Creek, it extends generally in a North and Easterly direction into the Black Forest area. The area used in this report covers the lower portion of this basin and extends north and east to a cut-off line beginning at the intersection of the existing city limits and the west line of Section 30, just north of the west one-quarter corner; thence south-easterly to a point just east of the south one-quarter of said Section 30; thence easterly on the section line between Sections 30 and 31 and Sections 29 and 32 to the approximate north-

east corner of said Section 32; thence southerly to a point just south of the east one-quarter corner of said Section 32, all in Township 13 South, Range 65 West; thence south and south-easterly to intersect the south-easterly basin line at approximately the center of Section 4, Township 14 South, Range 65 West, all in El Paso County, Colorado, excluding that portion known as Cimarron Hills. The area in the above described Sand Creek Basin contains 6,995 acres unplatted at this time. The area outside the city, excluding Cimarron Hills, contains 2,939 acres, leaving a balance of 4,056 acres unplatted within the City of Colorado Springs.

DRAINAGE FACILITIES COSTS:

There are four categories used in our cost analysis listed as follows: major channel improvements, major bridge structures, minor channel improvements and enclosed storm sewer systems. These various systems are indicated on the Basin Map included in the back of this report. It was assumed that the Academy Bridge will be constructed by the Colorado State Highway Department, the cost of which has not been included in this report. All of the other major structures required and shown on the Basin Map have been included in our total cost. There are two facilities in platted areas outside our study limits that were included in our total costs. These are designated with an asterik in the cost breakdown and are designated on the Basin Map as S-12 and S-13. S-12 System is estimated to cost \$21,360.00 and S-13 is estimated at \$46,270.00.

UNIT PRICES:

Our unit prices are based on the latest cost figures available, taken from bids of similar projects in the area, and are set forth as follows:

Channel Construction

Excavation	\$.50 cu. yd.
Slope Stabilization	\$ 1.00 sq. ft.
Velocity Checks (1000 LF Interval)	\$ 30.00 lin. ft.
Concrete Toe Walls	\$ 5.00 lin. ft.

Major Channel Structures

Deck Area (Price includes relocation of utilities)	\$ 22.50 sq. ft.
--	------------------

Storm Sewer

30" RCP	\$ 19.00 lin. ft.
36" RCP	\$ 22.50 lin. ft.
42" RCP	\$ 28.00 lin. ft.
48" RCP	\$ 34.00 lin. ft.
54" RCP	\$ 38.00 lin. ft.
60" RCP	\$ 44.00 lin. ft.
66" RCP	\$ 54.00 lin. ft.
72" RCP	\$ 63.00 lin. ft.

84" RCP

\$ 75.00 lin. ft.

Concrete Curb Inlets

4'

\$ 750.00

6'

\$ 900.00

8'

\$ 1,050.00

MAJOR CHANNELS

	FROM	TO	CHANNEL LENGTH	REQUIRED BRIDGE STRUCTURES	CHANNEL WIDTH R.O.W.	CHANNEL WIDTH BASE	CHANNEL DEPTH	REQUIRED FREEBOARD	2:1 SLOPE SQ FT OF SLOPE BOTH SIDES	CONCRETE CURBS 3½' DEPTH	VELOCITY CHECKS	COST OF CHANNEL LF	TOTAL COST
<u>A1</u>	Fountain Creek	Point XVII	5000'	Las Vegas Cut-Off	200'	156'	5'	1'	28.82	Yes	Yes	\$60.84	\$304,200
<u>A2</u>	Point XVII	Hancock Blvd	2880'	Hancock Bridge	200'	140'	5'	1'	28.82	Yes	Yes	\$58.74	\$169,172
<u>A3</u>	Hancock	Academy Blvd	3680'	Academy Blvd	200'	155'	4.5'	1'	26.58	Yes	Yes	\$57.43	\$211,343
<u>A4</u>	Academy Blvd	Fountain Blvd	4960'	Chelton Rd Fountain Blvd	200'	155'	4.5'	1'	26.58	Yes	Yes	\$57.07	\$283,068
<u>A5</u>	Fountain Blvd	Intersection Of East-West Channels	1040'	None	200'	155'	4.5'	1'	26.58	Yes	Yes	\$61.32	\$63,773

WEST FORK - MAJOR CHANNELS

<u>A6</u>	Intersection Of East-West Channels	Airport Road	4320'	Airport Rd	140'	97'	4.5'	2'	31.06	Yes	Yes	\$55.45	\$239,544
<u>A7</u>	Airport Road	Intersection Of East-West Channels	3600'	Pikes Peak Avenue	140'	96'	4.5'	2'	31.06	Yes	Yes	\$55.81	\$200,916
<u>A8</u>	Intersection Of East-West Channels	Highway 24 - Platte Avenue	3680'	Platte Ave Structure Completed	110'	73'	5.0'	2.5'	35.34	Yes	Yes	\$57.87	\$212,962

SHEET 2 - MAJOR CHANNELS
WEST FORK - MAJOR CHANNELS

				2:1 SLOPE								
FROM	TO	CHANNEL LENGTH	REQUIRED BRIDGE STRUCTURES	CHANNEL WIDTH R.O.W.	CHANNEL WIDTH BASE	CHANNEL DEPTH	REQUIRED FREEBOARD	SQ FT OF SLOPE BOTH SIDES	CONCRETE CURBS 3½' DEPTH	VELOCITY CHECKS	COST OF CHANNEL LF	TOTAL COST
A9	Highway 24 - Platte Avenue	Galley Road	2480'	None	120'	79'	5.0'	2.5'	35.34	Yes	Yes	\$59.21 \$146,840
A10	Maizeland Road	Valli Vista Drive	640'	None	100'	79'	3.0'	1.5'	22.12	Yes	Yes	\$42.42 \$27,148
E A S T F O R K O F T H E W E S T F O R K - M A J O R C H A N N E L S												
A11	Intersection Of East-West Channels	Highway 24 - Platte Avenue	2720'	Platte Ave Completed	125'	70'	4.5'	2.0'	31.00	Yes	Yes	\$51.77 \$140,815
A12	Highway 24 - Platte Avenue	Galley Road	3200'	Galley Rd	125'	70'	4.0'	1.5'	26.58	Yes	Yes	\$45.04 \$144,128
A13	Galley Road	City Limits	3040'	None	100'	62'	4.5'	2.0'	31.06	Yes	Yes	\$50.97 \$154,949
A14	City Limits	Powers Blvd	1360'	Powers Blvd	100'	62'	4.5'	2.0'	31.06	Yes	Yes	\$51.26 \$69,714
A15	City Limits	Basin Boundary	6000'	Carefree Rd	100'	62'	4.5'	2.0'	31.06	Yes	Yes	\$50.38 \$302,280
E A S T F O R K - M A J O R C H A N N E L												
B1	Intersection Of East-West Channels	Intersection Of East-West Channel	5200'	None	125'	76'	4.5'	2.0'	31.06	Yes	Yes	\$52.84 \$274,768
W E S T F O R K O F T H E E A S T F O R K - M A J O R C H A N N E L												
B2	Intersection Of East-West Channels	Airport Road	1120'	Airport Rd	75'	44'	3.0'	2.0'	24.36	Yes	Yes	\$40.80 \$45,696

SHEET 3 - MAJOR CHANNELS
WEST FORK OF THE EAST FORK - MAJOR CHANNEL

								2:1 SLOPE					
		CHANNEL	REQUIRED	CHANNEL	CHANNEL	CHANNEL	REQUIRED	SQ FT OF	CONCRETE	VELOCITY	COST OF	TOTAL	
FROM	TO	LENGTH	BRIDGE	WIDTH	WIDTH	DEPTH	FREEBOARD	SLOPE	CURBS	CHECKS	CHANNEL	COST	
			STRUCTURES	R.O.W.	BASE			BOTH SIDES	3½' DEPTH		LF		
B3	Airport Road	Powers Blvd	4960'	Pikes Peak Ave and Powers Blvd	75'	44'	3.0'	2.0'	24.36	Yes	Yes	\$39.77	\$197,260
B4	Powers Blvd	U.S. Hwy 24	1760'	U.S. Hwy 24	55'	22'	3.0'	1.5'	22.12	Yes	Yes	\$34.81	\$61,266
B5	U.S. Hwy 24	Galley Road	2880'	Galley Road Completed	55'	22'	3.0'	1.5'	22.12	Yes	Yes	\$34.65	\$99,792
E A S T F O R K O F T H E E A S T F O R K - M A J O R C H A N N E L													
B6	Intersection Of East-West Channels	Powers Blvd	3600'	Powers Blvd	125'	70'	4.5'	2.0'	31.06	Yes	Yes	\$51.82	\$186,552
B7	Powers Blvd	U.S. Hwy 24	6720'	Airport Rd - Hwy 24 - Completed	125'	70'	4.5'	2.0'	31.06	Yes	Yes	\$51.68	\$347,290
B8	City Limits	City Limits	2400'	Peterson Rd (Cimarron)	100'	64'	4.5'	2.0'	31.06	Yes	Yes	\$52.12	\$125,088
B9	City Limits	Western Drive	2560'	Western Dr 48" diam	50'	24'	3.0'	1.0'	19.88	Yes	Yes	\$32.52	\$82,276
B10	Western Drive	C.R.I. & P. Railroad	4000'	None	30'	18'	2.5'	1.0'	17.66	Yes	Yes	\$29.87	\$119,480
B11	City Limits	Intersection Of 2.5 x 8 Ditch	4320'	None	60'	40'	4.0'	1.5'	26.58	Yes	Yes	\$42.05	\$181,656

SHEET 4 - MAJOR CHANNELS
EAST FORK OF THE EAST FORK - MAJOR CHANNEL

		CHANNEL LENGTH	REQUIRED BRIDGE STRUCTURES	CHANNEL WIDTH R.O.W.	CHANNEL WIDTH BASE	CHANNEL DEPTH	REQUIRED FREEBOARD	2:1 SLOPE	CONCRETE CURBS 3½' DEPTH	VELOCITY CHECKS	COST OF CHANNEL LF	TOTAL COST
FROM	TO							SQ FT OF SLOPE BOTH SIDES				
B12	Intersection Of 2.5' x 8' Ditch	4560'	Mark Sheffel Drive - 84" diam	60'	30'	4.0'	1.5'	26.58	Yes	Yes	\$40.63	\$185,273
B13	B-11 Channel Intersection	3680'	Mark Sheffel Road	100'	60'	4.0'	2.5'	31.06	Yes	Yes	\$50.24	\$184,884
												\$4,762,133

Note: For typical section of concrete curb and velocity checks, see section at back of report.

LOCAL DRAINAGE CHANNELS

	LOCATION		SAND CREEK	CHANNEL TYPE	DEPTH	WIDTH	1½:1 SLOPE	SQ FT/LF	PER SQ FT	PER LF	LENGTH	TOTAL COST
	FROM	TO	REPORT BASIN NO.									
(1)	Santa Fe Railroad	Main Channel	138	Standard Residential	2'	6'	X	15.2	.90	\$13.68	1840'	\$ 25,171.20
(2)	Unnamed Street	Channel #1	137	Standard Residential	2'	3'	X	12.2	.90	10.98	900'	9,882.00
(3)	Unnamed Street	Channel #1	137	Standard Residential	2'	4'	X	13.2	.90	11.88	350'	4,158.00
(4)	Academy Boulevard	Main Channel	136	Standard Residential	2.5'	6'	X	17.0	.90	15.30	1650'	25,245.00
(5)	Academy Boulevard	Main Channel	133	Standard Residential	2.5'	5'	X	16.0	.90	14.40	400'	5,760.00
(6)	Academy Boulevard	Channel #7	132	Standard Residential	2.5'	6'	X	17.0	.90	15.30	3440'	52,032.00
(7)	Channel #6	Fountain Boulevard	132	Standard Residential	2'	5'	X	14.2	.90	12.78	1600'	20,448.00
(8)	48" S.S. On Fountain	Main Channel	129	Standard Residential	2'	10'	X	19.2	.90	17.28	560'	9,676.80
(9)	72" S.S.	Main Channel	129	Standard Residential	2.5'	5'	X	16.0	.90	14.40	320'	4,608.00
(10)	North Of Peterson Field Runway	Main Channel	128	Standard Residential	1.5'	10'	X	17.4	.90	15.66	2300'	36,018.00

SHEET 2 - LOCAL DRAINAGE CHANNELS

	LOCATION		SAND CREEK REPORT		CHANNEL TYPE	DEPTH	WIDTH	1½:1 SLOPE	SQ FT/LF	PER SQ FT	PER LF	LENGTH	TOTAL COST
	FROM	TO	BASIN	NO.									
(11)	48" Storm Sewer	Main Channel	127		Standard Residential	2'	4'	X	13.2	.90	\$11.88	150'	\$ 1,782.00
(12)	Along CRI & P Railroad	South To End Of Channel	46		Standard Residential	2'	3'	X	12.2	.90	10.98	1000'	10,980.00
(13)	Unnamed Road	B9 Channel	45		Standard Residential	2'	4'	X	13.2	.90	11.88	400'	4,752.00
(14)	Along CRI & P Railroad	South To End Of Channel	45		Standard Residential	2'	3'	X	12.2	.90	10.98	400'	4,392.00
(15)	Mark Sheffel Road	Main Channel B11	44		Standard Residential	2'	5'	X	14.2	.90	12.78	300'	3,834.00
(16)	Mark Sheffel Road	Main Channel B12	42		Standard Residential	2.5'	8'	X	19.0	.90	17.10	1800'	30,780.00
(17)	Channel #19	South Along CRI & P Railroad	94		Standard Residential	2'	8'	X	17.2	.90	15.48	950'	14,706.00
(18)	South Along CRI & P Railroad	South to End of Channel	94		Standard Residential	2'	4'	X	13.2	.90	11.88	800'	9,504.00
(19)	Basin Boundary Line	CRI & P Railroad	94		Standard Residential	2.5'	25'	X	36.0	.90	32.40	2600'	84,240.00
(20)	Unnamed Road	Main Channel B1	129		Standard Residential	2'	3'	X	12.2	.90	10.98	300'	3,294.00
(21)	Unnamed Road	Main Channel A6	130		Standard Residential	2'	4'	X	13.2	.90	11.88	350'	4,158.00
(22)	Whippoorwill Lane	Main Channel A7	126		Standard Residential	2.5'	7'	X	18.0	.90	16.20	400'	6,480.00

SHEET 3 - LOCAL DRAINAGE CHANNELS

	LOCATION		SAND CREEK REPORT		CHANNEL TYPE	DEPTH	WIDTH	1½:1 SLOPE	SQ FT/LF	PER SQ FT	PER LF	LENGTH	TOTAL COST
	FROM	TO	BASIN	NO.									
(23)	Powers Boulevard	Main Channel A 12	101		Standard Residential	2'	4'	X	13.2	.90	\$11.88	150'	\$ 1,782.00
(24)	Powers Boulevard	Main Channel A 12	101		Standard Residential	2'	5'	X	14.2	.90	12.78	100'	1,278.00
(25)	Powers Boulevard	Main Channel A 12	101		Standard Residential	2'	3'	X	12.2	.90	10.98	200'	2,196.00
(26)	Palmer Park Boulevard	Main Channel A 13	101		Standard Residential	2'	6'	X	15.2	.90	13.68	150'	2,052.00
(27)	West Along CRI & P Rail- road	Powers Boulevard	90		Standard Residential	3'	12'	X	24.8	.90	22.32	750'	16,740.00
(28)	End of Channel #29	Wooten Lane	90-87		Standard Residential	2'	16'	X	25.2	.90	22.68	700'	15,876.00
(29)	Powers Road	Channel #28	82		Standard Residential	2'	6'	X	15.2	.90	13.68	800'	10,944.00
(30)	Unnamed Street	CRI & P Railroad	91		Standard Residential	2'	3'	X	12.2	.90	10.98	560'	6,148.80
(31)	Unnamed Street	Main Channel #A-14	91		Standard Residential	2'	8'	X	17.2	.90	15.48	720'	11,145.60
(32)	Unnamed Street	Main Channel #A-14	91		Standard Residential	2'	4'	X	13.2	.90	11.88	400'	4,752.00
(33)	Unnamed Street	Main Channel #A-14	92		Standard Residential	2'	3'	X	12.2	.90	10.98	320'	3,513.60
(34)	Unnamed Street	Main Channel #A-14	92		Standard Residential	2'	8'	X	17.2	.90	15.48	300'	4,644.00

100%

LOCATION		SAND CREEK REPORT	CHANNEL	DEPTH	WIDTH	1½:1 SLOPE	SQ FT/LF	PER SQ FT	PER LF	LENGTH	TOTAL COST
FROM	TO	BASIN NO.	TYPE								
(35)	1100' East	Unnamed Street	93	Standard Residential	2'	10'	X	19.2	.90	\$17.28	1100' \$ 19,008.00
(36)	Unnamed Street	Main Channel A14	93	Standard Residential	3'	10'	X	22.8	.90	20.52	400' 8,208.00
(37)	850' West	Main Channel A14	83	Standard Residential	3'	8'	X	20.8	.90	18.72	850' 15,912.00
(38)	Clark Place	Main Channel A9	124	Standard Residential	3'	10'	X	22.8	.90	20.52	200' 4,104.00
											\$ 500,805.00

STORM SEWERS

[illegible]

SHEET 2 - STORM SEWERS

	LOCATION	SAND CREEK REPORT BASIN NO.	PIPE DIAMETER (inches)	COST OF PIPE PER L.F. (CONCRETE)	LENGTH OF PIPE	NUMBER & SIZE OF INLETS	COST OF INLETS (Each)	TOTAL COST
	FROM TO							
<u>S8</u>	Carefree Main Channel A14	92	36" 42"	\$22.50 28.00	500' 440'	2 - 6' Inlets 2 - 6' Inlets	\$900 900	\$ 13,050 <u>14,120</u> \$ 27,170
<u>S9</u>	Unnamed Street Near Const.	82	30" 42" 48"	\$19.00 28.00 34.00	550' 480' 600'	4 - 4' Inlets 3 - 6' Inlets 2 - 6' Inlets	\$750 900 900	\$ 13,450 16,140 <u>22,200</u> \$ 51,790 (Delete this item)
<u>S10</u>	Carefree Dr.	83/84	36" 42" 48" 54" 66" 72"	\$22.50 28.00 34.00 38.00 54.00 63.00	900' 720' 1300' 850' 800' 800'	4 - 4' Inlets 5 - 4' Inlets 4 - 6' Inlets 4 - 6' Inlets 3 - 6' Inlets 3 - 8' Inlets	\$750 750 900 900 900 1050	\$ 23,250 23,910 47,800 35,900 45,900 <u>53,550</u> \$230,310
<u>S11</u>	Geiger Road	104	36" 48" 54"	\$22.50 34.00 38.00	640' 430' 600'	4 - 4' Inlets 4 - 4' Inlets 3 - 6' Inlets	\$750 750 900	\$ 17,400 17,620 <u>25,500</u> \$ 60,520
*								
<u>S12</u>	Mears Road	104	30" 42"	19.00 28.00	400' 320'	4 - 4' Inlets 2 - 6' Inlets	\$750 900	\$ 10,600 <u>10,760</u> \$ 21,360
*								
<u>S13</u>	Bent Bar Road	86/87	36" 48" 54"	\$22.50 34.00 38.00	500' 300' 440'	4 - 4' Inlets 4 - 6' Inlets 2 - 4' Inlets	\$750 900 750	\$ 14,250 13,800 <u>18,220</u> \$ 46,270
								\$905,210
								- 51,790
								\$853,420

* NOTE: These systems are not constructed and lie within a platted subdivision.

MAJOR CHANNEL STRUCTURES

LOCATION	EXISTING FACILITIES	REQUIRED FACILITIES	S.Q. OF OPENING REQUIRED	APPROXIMATE ROADWAY WIDTH	APPROXIMATE LENGTH	COST SQ/FT OF STRUCTURE	TOTAL COST
<u>A.</u> Las Vegas Cut-Off	Road Dip	Bridge	900 S.F./8'	60'	112'	\$22.50	\$ 151,200
<u>B</u> D & RGW Railroad	Bridge	None	-	-	-	-	-
<u>C</u> AT & SF Railroad	Bridge	None	-	-	-	-	-
<u>D</u> Hancock	2-30" Diam. CMP	Bridge	900 S.F./10'	100'	90'	\$22.50	\$ 202,500
<u>E</u> *Academy	1-84" Diam. CMP	Bridge	850 S.F./10'	150'	85'	\$22.50	(\$ 286,875)
(*Cost not included in total cost)							
<u>F</u> Chelton	None	Bridge	850 S.F./10'	80'	85'	\$22.50	\$ 153,000
<u>G</u> Fountain	2-54" Diam. CMP	Bridge	800 S.F./8'	120'	100'	\$22.50	\$ 270,000
<u>H</u> Airport	None	Bridge	670 S.F./8'	100'	84'	\$22.50	\$ 189,000
<u>I</u> Pikes Peak	None	Bridge	670 S.F./8'	100'	84'	\$22.50	\$ 189,000

WEST FORK OF WEST FORK - MAJOR CHANNEL STRUCTURES

<u>J</u> Platte Avenue	Bridge	None	-	-	-	-	-
------------------------	--------	------	---	---	---	---	---

EAST FORK OF WEST FORK - MAJOR CHANNEL STRUCTURES

<u>K</u> Platte Avenue	Bridge	None	-	-	-	-	-
------------------------	--------	------	---	---	---	---	---

SHEET 2 - MAJOR CHANNEL STRUCTURES
EAST FORK OF WEST FORK

LOCATION	EXISTING FACILITIES	REQUIRED FACILITIES	S.Q. OF OPENING REQUIRED	APPROXIMATE ROADWAY WIDTH	APPROXIMATE LENGTH	COST SQ/FT OF STRUCTURE	TOTAL COST
<u>L</u> Galley Road	2 - 54" CMP	Bridge	330 S.F./6'	100'	55'	\$22.50	\$ 123,750
<u>M</u> Palmer Park	Bridge	None	-	-	-	-	-
<u>N</u> Powers Blvd	-	Bridge	320 S.F./6'	210'	55'	\$22.50	\$ 259,875
<u>O</u> North Carefree	-	Bridge	340 S.F./6'	100'	56'	\$22.50	\$ 126,000
<u>E A S T F O R K - M A J O R C H A N N E L S T R U C T U R E S</u>							
<u>P</u> Airport Road	None	Bridge	155 S.F./5'	100'	31	\$22.50	\$ 69,750
<u>Q</u> Pikes Peak Ave	None	Bridge	125 S.F./5'	100'	25'	\$22.50	\$ 56,250
<u>R</u> Powers Blvd	None	Bridge	110 S.F./5'	210'	22'	\$22.50	\$ 103,950
<u>S</u> U.S. Hwy 24	4 X 4 Box	90 S.F. Opening Bridge	90 S.F. of Additional 4' Opening	210'	22'	\$22.50	\$ 103,950
<u>T</u> Powers Blvd	None	Bridge	380 S.F./8'	210'	48'	\$22.50	\$ 226,800
<u>U</u> Airport Road	None	Bridge	380 S.F./8'	100'	48'	\$22.50	\$ 108,000
<u>V</u> U.S. Hwy 24	Bridge	None	-	-	-	-	-
<u>W</u> Peterson Road	County Texas Culvert	-	-	-	-	-	-
<u>X</u> Western Drive	None	48" Diam. Culvert	-	80'	80'	\$34.00 LF	\$ 2,720

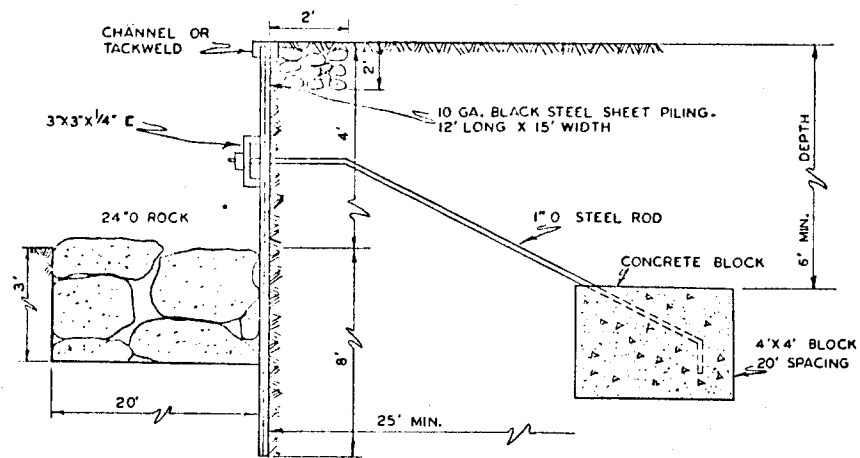
SHEET 3 - MAJOR CHANNEL STRUCTURES
EAST FORK OF WEST FORK

LOCATION	EXISTING FACILITIES	REQUIRED FACILITIES	S.Q. OF OPENING REQUIRED	APPROXIMATE ROADWAY WIDTH	APPROXIMATE LENGTH	COST SQ/FT OF STRUCTURE	TOTAL COST
<u>Y</u> Mark Sheffel Dr.	None	84" Diam. Cul- vert	-	60'	60'	\$75.00 L.F.	\$ 4,500
<u>Z</u> Mark Sheffel Rd	None	Bridge	300 S.F./6'	210'	50'	\$22.50	\$ 236,250
							<hr/>
							\$2,576,495
							<hr/>
							<u>\$8,692,853</u>

TOTAL COST \$8,692,853

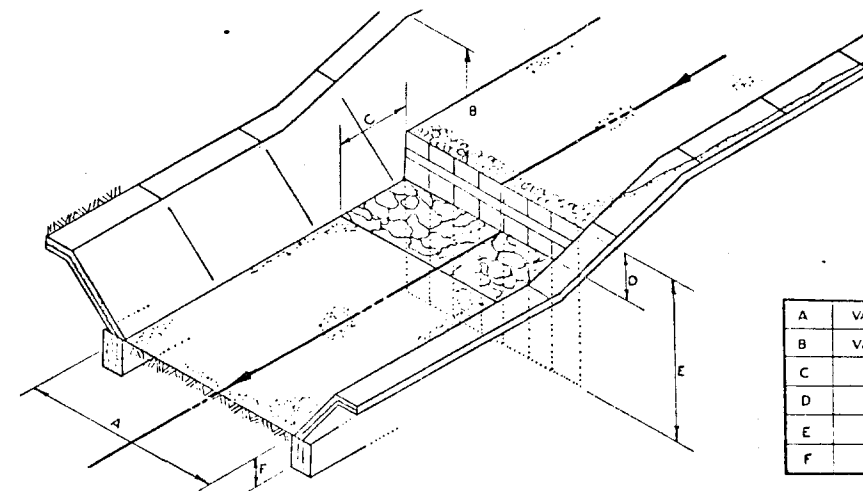
TOTAL ACRES
WITHIN STUDY 6,995
AREA

Cost per Acre \$1,242.72



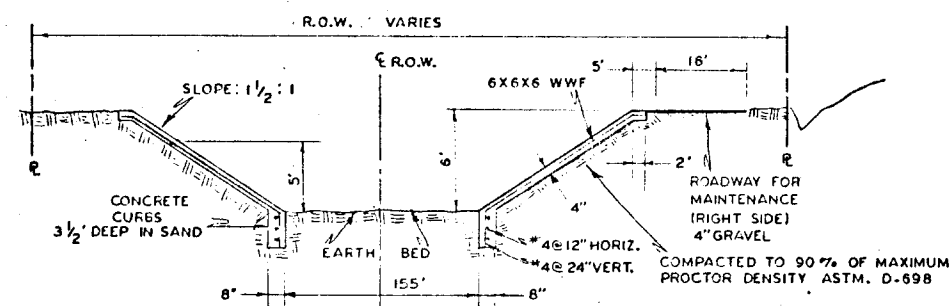
—TYPICAL DROP STRUCTURE SECTION—

— NO SCALE —



—TYPICAL STEEL SHEETING DROP STRUCTURE—

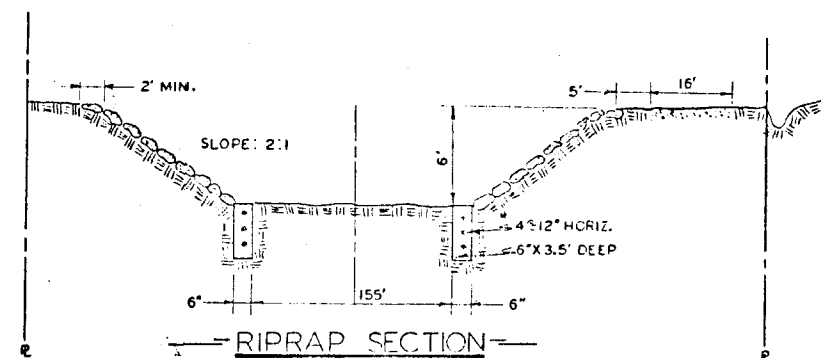
-NO SCALE-



— CONCRETE SECTION —

TYPE - 1

-NO SCALE-



— RIPRAP SECTION —

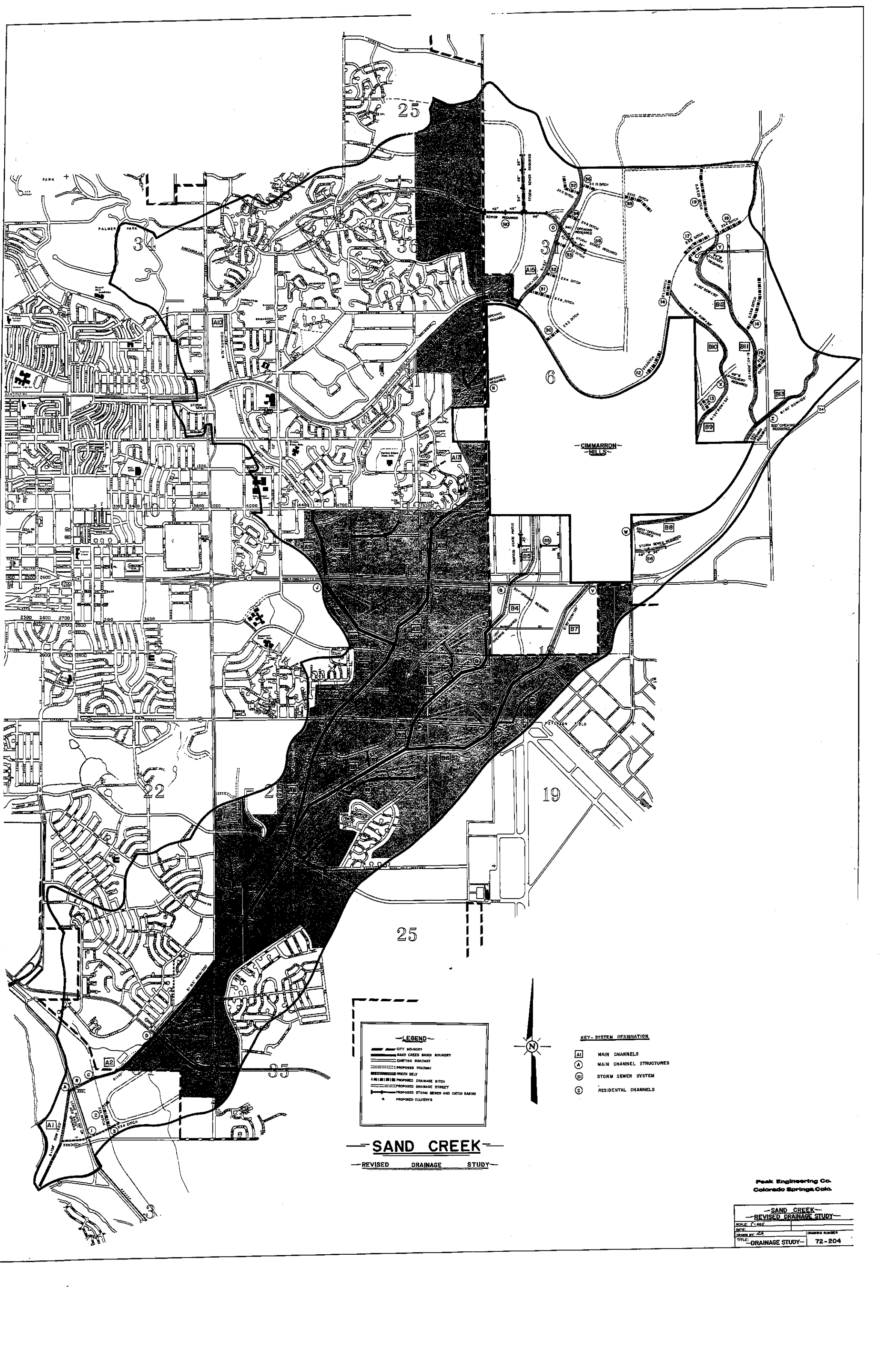
- TYPE - 2 -

—NO SCALE—

Peak Engineering Co.
Colorado Springs, Colo.

<p align="center">— SAND CREEK DRAINAGE STUDY —</p>	
SCALE NONE	DRAWN BY <i>SM</i>
DATE 2-19-73	DRAWING NUMBER 72 - 204
<p align="center">— TYPICAL DITCH SECTION —</p>	

FILE NO. 72-204



LEGEND

- CITY BOUNDARY
- SAND CREEK MAIN BOUNDARY
- EXISTING ROADWAY
- PROPOSED ROADWAY
- EXISTING OPEN DITCH
- PROPOSED DRAINAGE DITCH
- PROPOSED DRAINAGE STREET
- PROPOSED STORM SEWER AND CATCH BASINS
- PROPOSED CULVERTS



KEY - SYSTEM DESIGNATION

- A1 MAIN CHANNELS
- A MAIN CHANNEL STRUCTURES
- SI STORM SEWER SYSTEM
- 2 RESIDENTIAL CHANNELS

SAND CREEK
REVISED DRAINAGE STUDY

Peak Engineering Co.
Colorado Springs, Colo.

SAND CREEK
REVISED DRAINAGE STUDY

SCALE: 1" = 500'	DRAWING NUMBER
DRAWN BY: J.R.	72-204
TITLE: DRAINAGE STUDY	