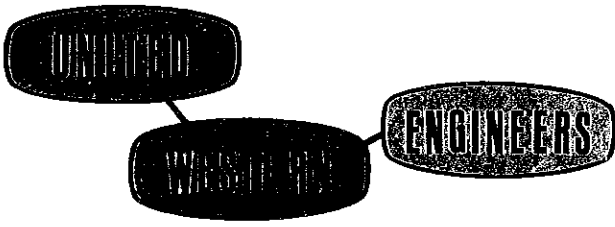


Approved *BJ* 1-6-72



planners · consultants · engineers

HOMESTEAD MASTER DRAINAGE STUDY



planners · consultants · engineers
Suite 200
4525 Northpark Drive
Colorado Springs, Colo. 80907
(303) 598-3222

December 29, 1971

Mr. DeWitt Miller
City Hall
P.O. Box 1575
Colorado Springs, Colorado

Dear Deke:

Transmitted herewith is the master drainage study on that portion of the Homestead Subdivision which lies immediately East of the Village Seven area and which includes Homestead Subdivisions No. 1 through No. 4.

Included is descriptive information, calculations, and cost estimates for the respective drainage basins.

If you have any questions, please do not hesitate to call.

Sincerely,


O. H. Watts
Project Engineer

OEW/cel

Approved:

George Jury
City Engineer

Date

INDEX

Location

Method

General Description

Cost Estimate

Computations

Detailed Drawings

Drainage Plan

LOCATION:

The Homestead Subdivision is located in the portion of Section 25, Township 13 South, Range 66 West in the City of Colorado Springs, Colorado.

It lies immediately East of the Holly Hills No. 1 and No. 2 Subdivisions and immediately North of Village Seven Heights Subdivision, all of which are part of the Village Seven development.

This development lies partly in the Templeton Gap Drainage Basin and partly in the Sand Creek Drainage Basin. Detailed break downs of the acreages and cost of facilities in the respective basins are included with the cost estimates.

SOIL TYPES:

Three main types of soil are encountered in the development area. Approximately the West quarter and the Southeastern most portion of Section 25 is comprised of the Truckton Sandy Loam. The South central portion of Section 25 is comprised of the Stapleton Sandy Loams. The North and Northeastern portion of Section 25 is comprised of the Stapleton part of the Stapleton-Baller complex of soils. All of the above soil types has a hydrologic classification of B.

COMPUTATION METHOD:

The basis of the computations in this report is the soil conservation service synthetic hydrograph method of hydrology. No major greenbelts are encountered within the development and the standard Colorado Springs storm of duration one hour and intensity of two inches is used.

Runoff is handled within the streets of the development which are supplemented when necessary by street drain facilities and open channel ditches. The major streets within the development, being Carefree Circle, Oroblanco Drive, and Barnes Road are limited to 30 CFS of surface runoff. Other streets are allowed to contain runoff to nearly the capacities shown on the Colorado Springs chart. These street capacities are modified in some instances where sudden alignment changes of the streets

would not permit this quantity of runoff.

All storm drainage culverts are designed to flow full under no head. All catch basins are designed of the capacity shown on Colorado Springs standard drawing number D-10 R. These capacities have been lowered in some instances where street slopes are considered excessive. All open channel ditches are considered to be concrete lined and are designed to flow with the minimum of six inches free board.

Included are detailed computation sheets for the various facilities designed as well as our hydrologic computation sheets.

DESCRIPTIVE INFORMATION:

The critical feature regarding this design is the existing facilities which have been built downstream. In the Holly Hills Subdivision, four existing concrete lined channels have been built and culverts across Orroblanco Drive are in place at each of these locations. These ditches have been arbitrarily numbered from the North and their capacities have been calculated to be as follows:

Ditch Number	Capacity-CFS
1	158
2	182
3	343
4	141

The above four ditches constitute the entire runoff in the Templeton Gap Basin. It may be seen that the limited capacity of channel number 2 created the necessity to divert the flow from Portrait Place Southerly to discharge into ditch number 3.

Drainage along Barnes Road is handled in a storm sewer, taking runoff from both sides of the road as shown on the attached plan. Ditch number 1 is nearly at capacity. Future developers North of Barnes Road will be required to provide additional facilities near Oroblanco Drive.

Drainage to the South flows onto the Village Seven Heights Subdivision which is in the Sand Creek Drainage Basin. This flow is concentrated into an existing greenbelt with the exception of flows concentrated from major basin VII and minor basins V, K, L, M, and N. Runoff from major basin VII occurs in two locations for which downstream structures have not been provided. The flow existing from Basin V N is concentrated into an existing 36 inch RCP.

HOMESTEAD MASTER DRAINAGE

COST SUMMARY

Area	Templeton Gap Basin	Sand Creek Basin
Filing No. 1	64009.00	-----
Filing No. 2	38910.52	-----
<u>Filing No. 3</u>	6568.54	13860.00
Filing No. 4	63723.00	-----
Subtotal	\$173,211.06	\$13,860.00
Total platted acres	158.513	23.00
Total 1971 fees	\$ 74,025.57	\$15,870.00
Unplatted	20,119.00	39,535.21
TOTAL (platted & unplatted)	\$193,330.06	\$53,395.21

Requested Letters of Credit:

Templeton Gap Basin \$99,185.49 over-run
 Sand Creek Basin \$ 2,010.00 over-run

HOMESTEAD DRAINAGE COST ESTIMATE

FILING NO. 1

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
4' Catch Basin	1 each	\$ 350.00	\$ 350.00
10' Catch Basin	2 each	600.00	1200.00
12' Catch Basin	4 each	700.00	2800.00
16' Catch Basin	3 each	775.00	2325.00
18" CMP	10 LF	8.00	80.00
27" CMP	80 LF	11.00	880.00
30" CMP	530 LF	12.00	6360.00
36" CMP	1035 LF	17.00	17595.00
42" CMP	990 LF	20.00	19800.00
48" CMP	140 LF	25.00	3500.00
54" CMP	110 LF	30.00	3300.00
	Subtotal		\$58190.00
	10% Engr. & Cont		5819.00
	TOTAL-----		\$64009.00

Drainage Fees (1971):

TEMPLETON GAP 66.353 acres x \$467.00 = \$30,986.85

HOMESTEAD DRAINAGE COST ESTIMATE

FILING NO. 2

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
12' Catch Basin	5 each	\$ 700.00	\$ 3500.00
16' Catch Basin	2 each	775.00	1550.00
30" CMP	360 LF	12.00	4320.00
36" CMP	60 LF	17.00	1020.00
42" CMP	180 LF	20.00	3600.00
48" CMP	160 LF	25.00	4000.00
54" CMP	90 LF	30.00	2700.00
3-0x2'-6" Conc. Ditch	920 LF	15.96	<u>14683.20</u>
		Subtotal	\$35373.20
		10% Engr & Cont	<u>3537.32</u>
		TOTAL-----	\$38910.52

Drainage Fees (1971):

TEMPLETON GAP (27.538 acres) x \$467.00 = \$12,860.25

HOMESTEAD DRAINAGE COST ESTIMATE

FILING NO. 3

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>	
			<u>Templeton Gap</u>	<u>Sand Creek</u>
4' Catch Basin-1 each		\$ 350.00	\$ 350.00	-----
16' Catch Basin-1 each		775.00	775.00	-----
18" CMP	10 LF	8.00	80.00	-----
30" CMP	40 LF	12.00	480.00	-----
2'-0x1'-3" Conc. Ditch	470 LF	9.12	4286.40	-----
8' Catch Basin-3 each		450.00	-----	\$ 1350.00
10' Catch Basin-1 each		600.00	-----	600.00
21" CMP	360 LF	9.00	-----	3240.00
24" CMP	730 LF	10.00	-----	7300.00
27" CMP	10 LF	11.00	-----	110.00
			<u>\$5971.40</u>	<u>\$ 12600.00</u>
			10% Engr & Cont 597.14	1260.00
			<u>TOTAL-----</u>	<u>\$ 13860.00</u>

Drainage Fees (1971):

Templeton Gap: 32.53 acres x 467.00 = \$15,191.51

Sand Creek: 23.00 acres x 690.00 = 15,870.00

\$31,061.51

HOMESTEAD DRAINAGE COST ESTIMATE

FILING NO. 4

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
6' Catch Basin	2 each	\$ 400.00	\$ 800.00
8' Catch Basin	4 each	450.00	1800.00
10' Catch Basin	2 each	600.00	1200.00
12' Catch Basin	1 each	700.00	700.00
21" CMP	80 LF	9.00	720.00
24" CMP	160 LF	10.00	1600.00
27" CMP	80 LF	11.00	880.00
36" CMP	540 LF	17.00	9180.00
42" CMP	1040 LF	20.00	20800.00
60" CMP	540 LF	37.50	20250.00
Subtotal			\$57930.00
10% Engr & Cont			5793.00
TOTAL-----			\$63723.00 ⁺

Drainage Fees (1971):

Templeton Gap: 32.092 acres x \$467.00 = \$14,986.96

⁺ This estimate includes storm sewer development in Barnes Road from Oroblanco Easterly to a point approximately 540 feet East of Iron Horse Trail's intersection with Barnes. This portion of Barnes is adjacent to Filing No. 4.

UNPLATTED AREA
ON
MASTER PLAN

<u>Item</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Templeton Gap</u>	<u>Cost</u>	<u>Sand Creek</u>
8' Catch Basin	2 each	\$ 450.00	\$ 900.00		-----
10' Catch Basin	2 each	600.00	1200.00		-----
12' Catch Basin	2 each	700.00	1400.00		-----
24" CMP	620 LF	10.00	6200.00		-----
27" CMP	80 LF	11.00	880.00		-----
30" CMP	430 LF	12.00	5160.00		-----
36" CMP	150 LF	17.00	2550.00		-----
4' Catch Basin	2 each	350.00	-----		\$ 700.00
10' Catch Basin	2 each	600.00	-----		1200.00
12' Catch Basin	2 each	700.00	-----		1400.00
18" CMP	80 LF	8.00	-----		640.00
27" CMP	80 LF	11.00	-----		880.00
30" CMP	620 LF	12.00	-----		7440.00
36" CMP	180 LF	17.00	-----		3060.00
Curb Outlets	2 each	300.00	-----		600.00
2'-0x1'-0 Conc. Ditch	110 LF	8.13	-----		894.30
2'-0x2'-6 Conc. Ditch	420 LF	14.38	-----		6039.60
3'-0x2'-6 Conc. Ditch	820 LF	15.96	-----		13087.20
	Subtotal		\$18290.00		\$35941.10
	10% Engr & Cont		1829.00		3594.11
	TOTALS-----		\$20119.00-----		\$39535.21

Drainage Fees: (1972):

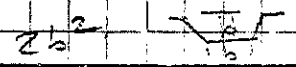
Templeton Gap: 105.64 acres x 509.00 = \$53,770.76
Sand Creek: 66.33 acres x 752.00 = \$49,880.16
\$103,650.92

Culvert & Channel Calculations

$$1.93 = \frac{Q_n}{S^{2/3} S^{1/2}}$$

$$b^{2/3} = \frac{Q_n}{1.93 S^{1/2}}$$

$$n = 0.015$$



AREA	LOCATION & DISTANCE	ELEV & S%	S 1/2	Q50	b 8/3	b	S F AREA	USE DITCH	CULVERT ETC.	TIME HRS
VI	...	6510	...	27.1	0.857	0.95	1.31	
...	...	6526	...	1.2	
...	...	6510	
...	...	6510	
...	...	6570	
				REPLACED WITH CMP						
				1-5-72 KFA						
IVP	CMP Inlet	6568								
	135'	S=2.2%	0.1490	149.8	7.81	2.17	9.41	3-0x2-6"(6")		
	CMP Outlet	6564		+79.0						
	740	S=4.32%	0.2079	228.8	8.55	2.24	10.03	3-0x2-6"(6")		
	Oro Blanco	6532								
VIJ	Caulero Blvd	6570								
	420	S=4.76%	0.2181	847	3.02	1.52	4.62	2-0x2-6"(13")		
	Ditch Inlet (H&H)	6550								
	590'	S=5.1%	0.2254	115.4	3.97	1.68	5.64	3-0x2-6"(14")		
	Ditch Inlet (H&H)	6520								
	720	S=7.8%	0.2797	138.9	3.86	1.66	5.51	3-0x2-6"(14")		
	South P Outlet	6502								
VII	Inspiration Dr.	Assume 6552								
	110'	S=1.8%	0.1348	10.1	0.582	0.82	1.34	2-0x1-0(6")		
	Outlet Ditch	6550								

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Project **HOMESTEAD DRAINAGE** Page 1 of
 Calc. by **KFA**
 Checked by date **12-30-71**

Culvert & Channel Calculations

$$1.485 = \frac{Q_{max}}{0.455^2}$$

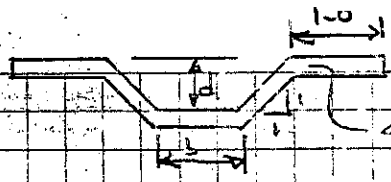
$$1.485 = \frac{Q_{min}}{0.455^2}$$

AREA	LOCATION & DISTANCE	ELEV & S%	S 1/2	Q50	b 8/3	b	S F AREA	USE DITCH	CULVERT ETC.	TIME HRS
V H2	Smoke house 110' Outlet Ditch	6527 S=13.6% 6512	0.2692	23.5	0.495	0.77	1.19	2-0x1-0 (6")		
VI B	Start Ditch 465' 16' CBS @ Oro Sluice	6544 S=6.0% 6516	0.2453	29.2	0.924	0.97	1.88	2-0x1-3 (7")		
VI C	Start Ditch	6508	0.1129	10.0	1.32	1.35	6.53	2-0x1-3 (7")		
VI D	Start Ditch	6571	0.1000	12.0	1.32	1.35	6.53	2-0x1-3 (7")		
VI E	Start Ditch	6510	0.2521	35.0	0.22	1.35	6.53	2-0x1-3 (7")		
VI F	Start Ditch	6540	0.2521	35.0	0.22	1.35	6.53	2-0x1-3 (7")		

REPLACED WITH CMP
1-5-72 KFA

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Project _____
Calc. by KFA
Checked by _____
date 12-30-71



DITCH SECTIONS
COST ESTIMATE

4" conc w/ 6x6 6/6 wood

SECTION	b	d	ft ² /ft		CY/ft = 9	@10.00	ft ³ /ft			CY/ft = 27	@5.00	TOT	LF	COST
			bx + 2(1/2 d ² x)	+ 2(1 x) = ft ² /ft			dx x 1	+ d ² x 1 = ft ³ /ft	+ ft ³ /ft					
A-A	2.0	1.0	2	2.83	2	6.83	7.58	7.58	2	3	11	55	8.13	
B-B	2.0	1.3	2	3.53	2	7.53	8.37	8.37	2.5	4.06	11.5	17.5	9.12	
C-C	2.0	1.6	2	4.24	2	8.24	9.15	9.15	3	5.25	14.9	24.7	10.12	
D-D	2.0	1.9	2	4.95	2	8.95	9.94	9.94	3.5	6.56	18.4	33.1	11.15	
E-E	2.0	2.6	2	7.07	2	11.07	12.30	12.30	5	11.25	32.2	63.8	14.38	
F-F	3.0	2.6	3	7.07	2	12.07	13.41	13.41	7.5	13.75	42.5	85.5	15.96	
G-G	3.0	2.3	3	6.36	2	11.36	12.62	12.62	6.75	11.81	37.3	74.3	14.80	
Check*	2.0	3.0	2	8.485	2	12.485	13.87	13.87	6	15.0	55	107.7	16.65	
H-H	3.0	2.6	3	7.07	2	12.07	13.41	13.41	7.5	13.75	42.5	85.5	15.96	

*outlet D. let
in Village Sewer

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Project **CONC. CHANNEL COST ESTIMATES** Page **3**
 Calc. by KTA date 12-28-71
 Checked by _____ date _____

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
BARNES RD 60' A.P.	Rd East @ East 804	1350	6716 S=5.9%	0	0/30	0	Ditch=21.0
	1350 West @ East	610	6636 S=5.2%	27.1	0/30	27.1	Ditch=41.2
	Iron Horse Trail	490	6607 S=2.1%	56.8	0/30	56.8	Ditch=65.8
	INGESMT @ Barnes	400	6570 S=1.0%	65.8	0	65.8	Ditch=55.8
	Cross Lot	Ditch East	530	6574 S=6.4%	65.8	0	Ditch=55.8
	East @ Oro Blanco	Ditch West @ Oro Blanco	530	6540 S=1%	87.8	0	87.8
SPLITRAIL DR. E. 36' Res	SPLITRAIL CT	650	6660 S _{min} =4%	7.4	17.1 / 32.5 R	17.1	S=3.1% 12" Pipe Catch
Splitrail Dr. N 36' Res	Iron Horse Trail	680	6607 S _{min} =4%	17.0	39.1 / 83.4 8"	39.1	S=4.7% 8" Catch
	Splendid Circle N.	350	6565.93 S _{min} =4%	39.1	43.3 / 83.4 8"	43.3	S=4.8% 8" Catch
	Splitrail Place	280	6548 S _{min} =0.89%	43.3	0 / 43.3	43.3	2-12" @ 1.5% S=0.97% 41" Pipe @ 0.97%
	Splendid Circle S		6545.52	47.9	4.6 / 3.7 Ramp	47.9	
Splendid Circle S 36' Res	Splitrail Dr N	266'	44.32 S _{min} =4%	52.0	10.7 / 13.7 Ramp	43.3	S=8.14% 30" Pipe @ 8%
	Oro Blanco		25.80	54.0			

SEE PAGE 7

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Project **LOWESTEAD DRAINAGES - MASTER**
 Checked by _____ date _____
 Colc. by _____ date _____
 Page **1** of **1**

Street and Storm Sewer Calculations

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WESTERN
ENGINEERS

Project _____
Calc. by _____
Checked by _____
date _____ date _____
Page 2-1 of _____

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
SOUNDOW LANE	School Site		6692	20.2			
36' Res		36'	S=5.5%	20.2	20.2	0	DIPS LAPS ACROSS Catchment
	Opp Side Creek Basin		6690	26.9			
		720'	S=3.6%	43.4	179.1 8"		8" Curb
	Sod Buster Trail		6664	43.4	0	+43.4	2-12CBS w/36" Cmp
						43.4	
Sod Buster Trail	Soundow Lane		6664	53.5	10.6		
36' Res		330'	S _{min} =4%	57.5	14.1 / 32.8 Ramp	43.4	S=3.8% Ramp; 30" Cmp @ 6.6%
	Creeper Banelin		6642	83.1	15.7	+24	2-8" w/ 24" Cmp
		150'	S _{min} =4%		15.7 / 32.8 Ramp	67.4	S=8% Ramp; 36" Cmp @ 6.6%
	Pony Soldier Dr.		6629.9	94.8	27.4		
		470'	S _{min} =4%	111.2	37.2 / 83.4 8"	67.4	S=5.3% 8" 36" Cmp @ 5.4%
	Iron Horse Trail		6609.85	117.3	49.9		
		620'	S _{min} =2.82%		59.1 / 69.8 8"	67.4	S=2.98% 8" 36" Cmp @ 2.98%
	Portrait Place		6578.86	149.8	0	+23.3+59.1	2-12CBS w/36" 2-16CBS w/36"
						149.8	
Portrait Place	Sod Buster		6578.86				
		130'	S=6.12%		0	149.8	48" Cmp @ 6.12%
	Ditch Turn		6572.0				
Wagon Master Dr.	Chaper Banel Circle		6690	0			
36' Res		670'	S=7.0%	15.7	15.7 / 43.4 Ramp		Ramp
	Iron Horse Trail		6643	36.2			
		1220'	S _{min} =4%	62.9	62.9 / 83.4 8"		8" Curb
① →	Bank House Drive		6587	79.0			
		325'	S _{min} =4%		79.0 / 83.4 8"		8" Curb
② →	Sod Buster Trail		6569	83.8		+79	2-16CBS w/42" Cmp
		430'	S _{min} =4%		15.8 / 83.4 8"		36" Cmp @ S=5.3%
	Artists Circle		6546	126.4			

Insert

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
① Portland Place	Start Ditch Turn		6572				
	Dzylight @ Ditch	200'	S=2% 6568	149.8	—	149.8	54" C.M.P @ 2%
② Wagon Water Drive	Backhouse Dr.	240'	6584 S _{main} =4%	79.0	35/88.4-8"	+44 44	2-2'03" 1/40" C.M.P. S=5.4% 30" C.M.P @ 5.4%
② Wagon Water Drive	Sod Buster Trail	180'	6571 S=3.88%	83.3	4.3/88.4-8"	+35 79	2-12'05" 1/30" C.M.P. 42" C.M.P @ 3.8%
	Backlot Line Ditch		6564				Outlet @ Ditch

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 WESTERN
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Project _____
 Calc. by _____
 Checked by _____
 date _____

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
				126.4			
Artistic Circle 36' Res	Bunk House Dr.		6572	24.2			
	Wagon Master Dr.	620	S _{min} = 4.0%	31.6	3.8/30 R		S = 4.2% Ramp
	ORO BLANCO Dr.	430	S _{min} = 4.0%	47.4	52.9/33A B"		S = 4.6% 8" Curb
			6526	52.9	0	+52.9	2.16' CB 1/36" CMP
						52.9	
ORO BLANCO 60' RET.	Splendid Cir N.		6541.5	14.3			
		780	2%	21.2	21.2/30		27.05' tra
	Splendid Cir South		6525.70	75.2	31.9/30		
	Outlet Ditch 2	130V	2%			43.3	36" CMP @ 2.0%
			6523.0	77.5	34.2/30		Pop. 4 Ex. CB 1/16" Add 4' CB 1/10"
	Parfait Place			27.8	0/30	27.8	
	Outlet Ditch 2	530	S = 1.5%	33.4	5.6/30		36" CMP @ 1.5%
	Pipe under St @ Ditch 2		S = 1.5%			119.9	Exist 42" ECP @ 1.5%
	Ditch opposite B			52.9			Capacity OK
	Artistic Circle		S = 1.0%		12.2/30	52.9	42" CMP @ 1.0%
	Outlet Ditch 3			52.9	22.8/30		16' CB
	Pipe under St @ Ditch 3		S = 2.0%	251.6	5.6/30	+246.0	2' CB @ Ditch outlet 2-48" CMP @ 2.0%
					(5.6 in 4' exist CB)		

UNITED
WESTERN
ENGINEERS

Project _____
 Calc. by _____
 Checked by _____
 date _____

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Cuefrac Circle	Picturisque Cir	1000'	6574	25.5	25.5/30	0	—
	Oro Blanco		6524				
Oro Blanco	Cuefrac		S=1.0%	25.5	25.5/30	0	—
	Outlet Ditch 4				0/30		Exist 8'CB; Add 4'CB
	Pipe Under St @ Ditch 4			54.7			(EXIST 30" RCP @ 1.0%)

UNITED
WESTERN
ENGINEERS

Project _____
 Calc. by _____
 Checked by _____
 date _____
 date _____

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Portrait Place	Driv + use Mail		6620.25	18.7	18.7		
30' 22' -		520	S = 0.14%		18.7 / 46.7 Rimp		S = 5.8%
	Sud Baska Trail		6580.11	23.3	0	+ 23.3	2-12" CSW / 30" cap
		130	S min = 3.0%		0	149.8	S = 6.12% 48" @ 6.2%
	Ditch Turn		6572	149.8		149.8	
		150	S min = 4.0%		16.2 / 32.8 Rimp	0	S = 6.12% Rimp Catch
	Cunningham Way		6564.32	16.2			
		280	S min = 4.0%		16.2 / 32.8 Rimp	0	S = 4.6% Rimp
	Splendid Circle So.		6551.18	21.3			
		430	S min = 4.0%		27.8 / 30.8 Rimp	0	S = 4.92% Rimp
	Cro Bianca		6528.80	27.8	0		2-10" CSW / 27" cap

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 date _____
 date _____

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Uniform Circle	Smoke House Lane		6588	46.0	17.1/30	+28.9	2-10CB w/27" CMP
		250	S= $\frac{18}{100}$ 2.6%			28.9	30" CMP @ 2.6%
	Inspiration Dr.		6588	55.4	26.5/30	+28.9	
		280	S= $\frac{18}{100}$ 2.6%			23.7	30" CMP @ 2.6%
	Artists Circle		6588	69.0	26.5+2.4	+11.2	2-4CB w/18" CMP
		170	S= $\frac{18}{100}$ 2.6%		28.9/30	+14.0	25" CMP @ 2.6%
	CB's @ Ditch		6570	80.0	40.8/30	+40.8	2-12CB w/30" CMP
					0/30	32.9	Ditch & inlet
	Edy Basin IK & DL		6576	0			
		450	S=2.6%		17.1/30		
	CB's near picturesque		6564	17.2	0/30	+17.2	2-8CB w/24" CMP
		360	S=6.4%			17.2	2" CMP @ 6.4%
	Cross Lot 8' CB		6541	27.3		+10.1	3' CB w/24" CMP
		640	S=6.4%			27.3	1" CMP @ 6.4%
Outlet Pipe	Cross Lot & S. R.		6500	41.9		+14.6	10' CB w/27" CMP
		150	S=3%			41.9	Prop 36" ZCP CAP=100 cfs, n=0.05
	Sand Creek Greenbelt						

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Street and Storm Sewer Calculations

STREET	LOCATION	DIST.	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Carlinville	Amesqueville		6574	0			
	Oro Blanco	1000'			25.5/30		
	Oro Blanco	430	6524 S=1.0% Ass.	25.5		+24.0 24	2-8' CBS 1/24" CMP @ 36" CMP @ S=1.0%
Oro Blanco	Outlet Ditch 4			25.5	1.5/30		
BASIN VITE	Ditch Dilet		6544	10.0			
		470'	S=		0	D.I.L.O.=29.2	
	CB @ Oro Blanco	50'	6516 S=1.0% Assumed	29.2		+29.2 29.2	16' BS 4 1/2" CMP @ Ditch Outlet 36" CMP @ S=1.0%
	CB @ Oro Blanco & Ditch	30'	S=1.0% Ass.	30.7	1.5/30	+1.5	2-4' CBS 1/18" CMP
	Oro Blanco	30'	S=1.0% Ass.	54.7		30.7 54.7	36" CMP @ S=1.0% 36" RCP @ S=1.0% EXISTING (Cap. 0.0)

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date _____ of _____

Street and Storm Sewer Calculations

STREET	LOCATION	DIST	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
BARNES 20A17 (60' Awt)	Rd Cst @ Est Bdy		6716	0	0	0	---
	Catch Basins	870	S=5.0%		30/30	0	---
		540	S=6.3%	30	0/30	+30	2-10' CB 27" CMP
	Catch Basins		S=6.3%	60	30/30	30	24" CMP @ 6.3%
		540	S=5.7%		0/30	+30	2-10' CB 27" CMP
	From Horse Trail		S=5.7%	99.1	23.5/30	60	36" CMP @ 5.7%
		510	S=5.1%		0/30	+15.6+23.5	2-8' CB 24" CMP 2-6' CB 21" CMP
	DNG Estmt @ Barnes		S=5.1%	121.1	21/30	39.1	42" CMP @ 5.1%
		460	S=1.5%		0/30	+21.0	2-8' CB 24" CMP
Cross Lot	Pipe Band		S=1.5%	121.1	---	121.1	60" CMP @ S=1.0%
		530	S=6.4%		---	121.1	42" CMP @ 6.4%
	CB @ Oro Blanco		S=6.4%	142.1	---	+22.0	1-12' CB
		80'	S=1.3%		---	142.1	60" CMP @ 1.3% <small>(existing)</small>
	Ditch W Side Oro Blanco			142.1	---		48" CLD

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Project **HOMESTEAD DEVELOPMENT** Page **7** of **7**
 Calc. by **RFA** date **1-5-72**
 Checked by _____ date _____

$1''=100'$ $PF = 3.58 \times 10^{-4}$

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	DITCH		V	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		LENGTH	SLOPE			Q	ap	
I	A	50.1	.079	1200	96	.075				.545	1.70	27.1	
	B	26.0	.0093	1100	88	.072				.543	1.70	14.1	
	C	28.7	.0102	910	60	.070				.542	1.70	15.6	
	D _{TOT}	30.9	.0110	770	56	.058			87	.535	0.80	9.0	
	D _{PUD}	25.9 84%					PUD	B	94 79				
	D _{Park}	5.0 16%					Park	B	50 8				
	E	16.8	.0060	720	42	.06				.536	1.70	9.3	
	F	39.6	.0142	730	62	.054				.532	1.70	22.0	

Z=97.1

<p>HYDROLOGIC COMPUTATION - BASIC DATA PROJ: HOMESTEAD FILING NO. 2 By: KFA Date: 12-21-71</p>	<p>UNITED ENGINEERS WESTERN</p> <p>planners · consultants · engineers Suite 200 4525 Northpark Drive Colorado Springs, Colo. 80907</p>	<p>Page 1 of Pages</p>
---	--	---

1" = 100' PF = 3.58 x 10⁻⁴

MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	DITCH		V	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		LENGTH	SLOPE			Q	qp	
II	A	16.0	.0057	780	56	.06				.536	1.42	7.4	
	B	20.9	.0075	690	53	.054				.532	1.42	9.7	
	C	18.7	.0067	1100	85	.075				.545	1.42	8.5	
	D _{TOT}	32.3	.0115	970	60	.075	COMPOSITE		89	.545	1.05	10.8	
	D _{PARK}	3.8 / 12%					PARK	B	50 / 6				
	D _{PUD}	7.8 / 24%					PUD	B	97 / 23				
	D _{SF}	20.6 / 64%					SF	B	94 / 60				
	E _{TOT}	28.5	.0102	950	86	.064	COMPOSITE		96	.538	1.55	14.3	
	E _{SF}	9.8 / 34%					SF	B	94 / 32				
	E _{PUD}	18.7 / 66%					PUD	B	97 / 64				
	F	5.7	.0020	450	48	.034				.520	1.42	2.7	
	G	6.5	.0023	520	40	.056				.534	1.42	3.0	
	H	5.6	.0020	400	30	.036				.522	1.42	2.6	
	I	7.0	.0025	500	14	.064				.538	1.42	3.2	
	J	8.1	.0029	400	23	.040				.524	1.42	3.8	
	K	6.6	.0024	460	22	.048				.529	1.42	3.1	

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MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	DITCH		V	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		LENGTH	SLOPE			Q	qp	
II	L	8.8	.0032	470	27	.046				.528	1.42	4.1	
	M	4.2	.0015	300	26	.027				.516	1.42	2.0	
	N	4.8	.0017	400	35	.034				.520	1.42	2.3	
III	A	36.4	.0130	1130	62	.086				.552	1.42	16.3	
	B	14.3	.0051	540	34	.046				.528	1.42	6.7	
	C	36.2	.0129	660	52	.050				.530	1.70	20.2	
	D	26.4	.0094	1400	86	.095				.557	1.42	11.7	
	E	36.2	.0129	820	48	.070				.542	1.42	16.5	
	F	21.7	.0077	660	60	.048				.529	1.42	10.1	
	G	8.4	.0030	370	29	.034				.520	1.42	4.0	
	H	20.4	.0073	1100	90	.072				.543	1.42	9.3	
	I	18.9	.0068	810	64	.060				.536	1.42	8.7	
	J	6.6	.0023	380	23	.038				.523	1.42	3.1	
	K	9.8	.0035	520	48	.040				.524	1.42	4.6	
	L	7.7	.0027	450	54	.034				.520	1.42	3.6	

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MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	DITCH		V	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		LENGTH	SLOPE			Q	ap	
III	M	33.3	.0119	1100	80	.075				.545	1.42	15.1	
	N	9.8	.0035	520	36	.044				.526	1.42	4.6	
	O	13.8	.0049	580	34	.052				.531	1.42	6.4	
	P	5.9	.0021	400	25	.038				.523	1.42	2.8	
	Q	13.2	.0047	720	44	.060				.536	1.42	6.1	
	R	16.1	.0057	1100	64	.085				.551	1.42	7.2	
	S	6.7	.0024	300	19	.030				.508	1.42	3.2	
	T	6.1	.0022	470	30	.044				.526	1.42	2.9	
	U	6.1	.0022	360	20	.038				.523	1.42	2.9	
	V	10.9	.0039	520	26	.052				.531	1.42	5.1	
	W	14.1	.0051	680	32	.064				.538	1.42	6.5	
	X	6.8	.0024	440	34	.038				.523	1.42	3.2	
	Y	5.0	.0018	390	26	.037				.522	1.42	2.4	

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MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	DITCH		V	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		LENGTH	SLOPE			Q	cp	
<u>IV</u>	A	10.6	.0038	450	42	.036				.522	1.42	5.0	
	B	34.8	.0124	1170	92	.075				.545	1.42	15.7	
	C	25.3	.0090	1110	86	.075				.545	1.42	11.4	
	D	9.0	.0032	720	46	.058				.535	1.42	4.1	
	E	21.5	.0077	1170 1170	78	.080				.548	1.42	9.7	
	F	20.0	.0071	950	64	.070				.542	1.42	9.1	
	G	16.5	.0059	840	56	.065				.539	1.42	7.5	
	H	13.8	.0049	810	60	.060				.536	1.42	6.3	
	I	8.2	.0029	690	58	.050				.530	1.42	3.8	
	J	13.9 13.9	.0049	700	46	.056				.534	1.42	6.4	
	K	18.4	.0066	730	56	.055				.533	1.42	8.5	
	L	34.6	.0124	1040	75	.075				.545	1.42	15.7	
	M	16.0	.0057	590	40	.05				.530	1.42	7.4	
	N	24.7	.0088	840	24	.09				.554	1.42	11.0	
	O	10.6	.0038	840	36	.075				.545	1.42	4.8	
	P	23.8	.0085	970	92	.085				.551	1.42	10.6	

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MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	DITCH		V	TPO	FLOW		Td
		Planim. Read	MILE	LENGTH	HEIGHT		LENGTH	SLOPE			Q	QP	
IV	Q	11.7	.0042	520	27	.049				.529	1.42	5.5	
	R	25.6	.0092	920	50	.075				.545	1.5	12.2	
V	A	38.4	.0138	1500	116	.090				.554	1.42	17.1	
	B	64.2	.0230	1300 1300	116	.080				.548	1.42	28.9	
	C	14.0	.0050	700	30	.065				.539	1.70	7.7	
	D	22.8	.0081	1040	47	.085				.561	1.42	10.2	
	E	22.4	.0080	850	34	.080				.548	1.42	10.1	
	F	20.4	.0073	830	80	.056				.534	1.42	9.4	
	G	30.0	.0107	1080	90	.070				.542	1.42	13.6	
	H1	8.3	.0029	560	26	.055				.533	1.42	3.8	
	H2	11.1	.0039	300	5	.05				.530	1.42	5.2	
	I	12.0	.0043	600	50	.046				.528	1.42	5.6	
	J	28.0	.0100	770	50	.06				.536	1.70	15.4	
K	21.2	.0076	550	50	.04				.524	1.70	11.9		

ENRKA 7

Σ=158.9

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MAJOR BASIN	SUB BASIN	AREA		BASIN		Tc	DITCH		V	TPO	FLOW		Tb
		Planim. Read	MILE	LENGTH	HEIGHT		LENGTH	SLOPE			Q	QP	
V	L	31.4	.0112	970	81	.065				.539	1.70	17.2	
	M	18.0	.0064	440	28	.040				.524	1.70	10.1	
	N	30.3	.0108	750	42	.065				.539	1.50	14.6	
VI	A	50.2	.0180	1100	72	.077				.546	1.60	25.5	
	B	61.4	.0220	1025	56	.080				.548	1.50	29.2	Σ 54.7
VII	A	19.9	.0071	630	54	.048				.529	1.50	9.8	
	B	25.7	.0092	540	50	.040				.524	1.50	12.8	Σ 22.6

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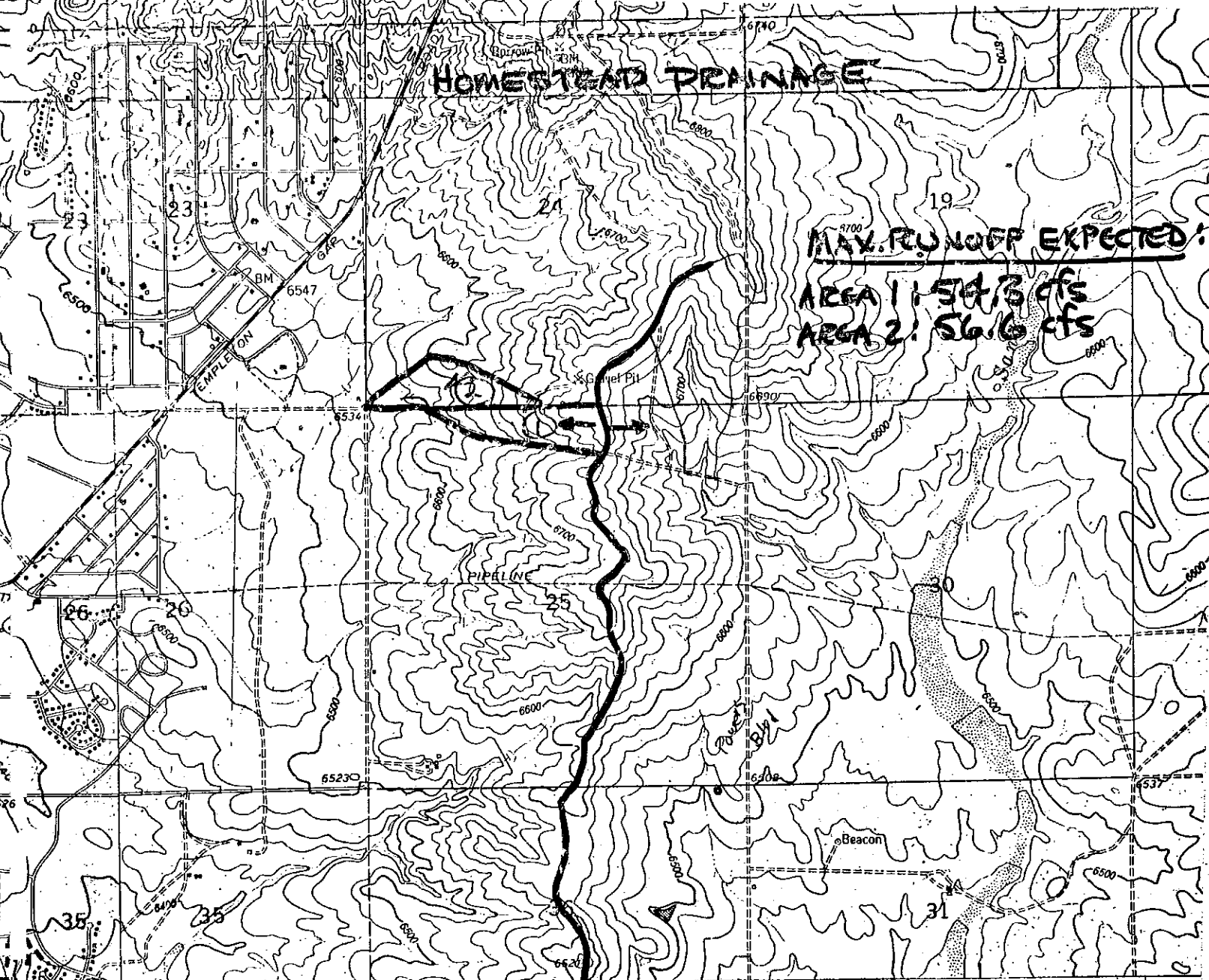
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HOMESTEAD DRAINAGE

MAX. RUN OFF EXPECTED:

AREA 1: 54.3 cfs
AREA 2: 56.6 cfs



Mapped, edited, and published by the Geological Survey
in cooperation with U. S. Corps of Engineers

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs
taken 1947. Field checked 1948. Revised from aerial
photographs taken 1960. Field checked 1961

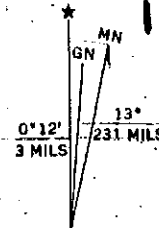
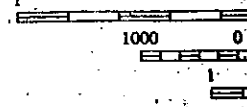
State Route

Polyconic projection. 1927 North American datum
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks,
zone 13, shown in blue

Fine red dashed lines indicate selected fence lines

Revisions shown in purple compiled by the Geological Survey from
aerial photographs taken 1969. This information not field checked

1" = 2000'



UTM GRID AND 1969 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

THIS
FOR SALE BY U. S. GEOL
A FOLDER DESC

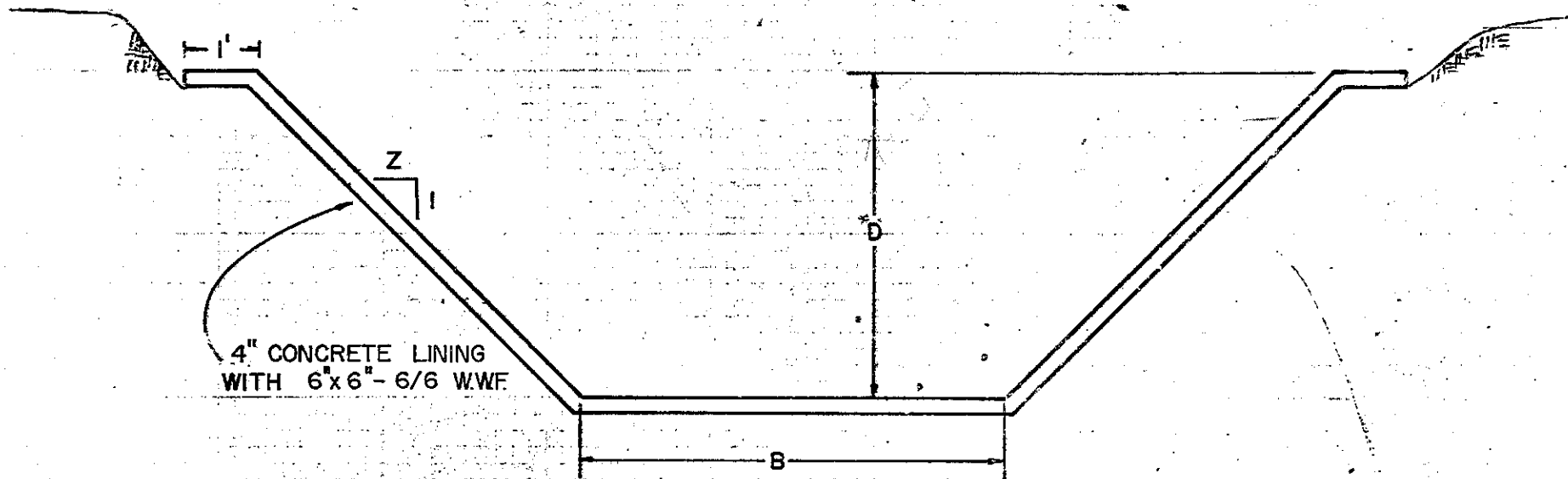
W. COLO.

145/7.5

61
D 1969
E SERIES V877

PIKEVIEW CO
COLORADO-EL
7.5 MINUTE SERIAL

8002 III SE
MONTMINENT



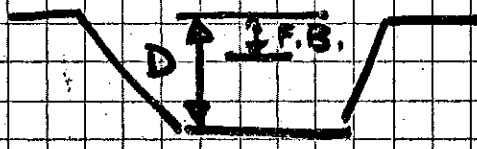
SECTION OF PROPOSED CONCRETE DITCH LINING

FIG. 66

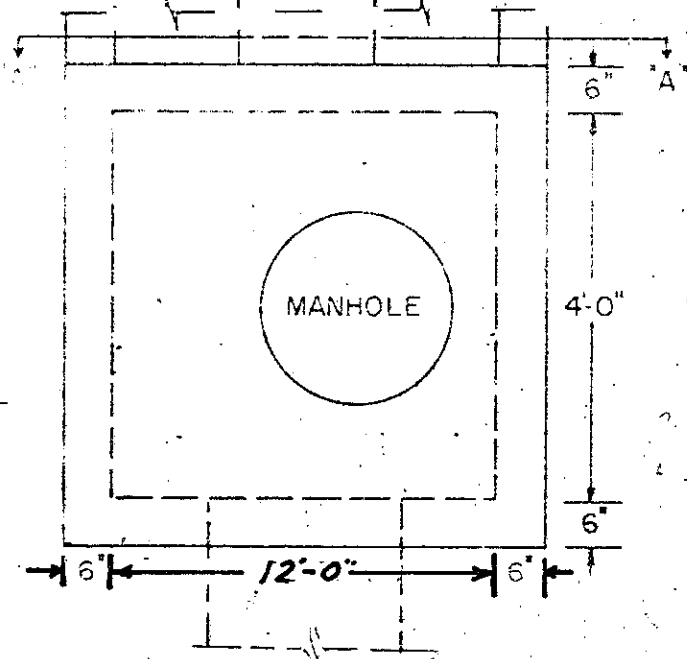
SUMMARY
OF
DITCH SECTIONS

SECTION	B	D	Z	FB (MIN) PROVIDED
A-A	2'-0	1'-0	1	6"
B-B	2'-0	1'-3"	1	6"
C-C	2'-0	1'-6"	1	6"
D-D	2'-0	1'-9"	1	6"
E-E	2'-0	2'-6"	1	6" 1'-0
F-F	3'-0	2'-6"	1	6" 1'-0
G-G	3'-0	2'-3"	1	6"
H-H	3'-0	2'-6"	1	6"

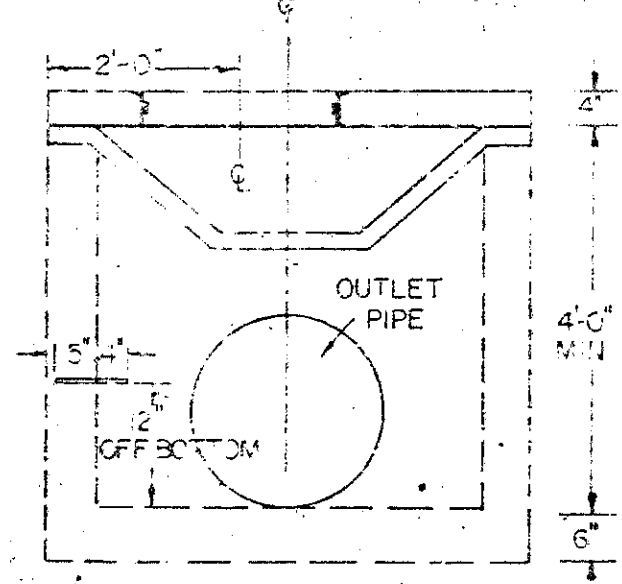
NOTE 1 Dimension D includes Freeboard
i.e.



LINED DITCH

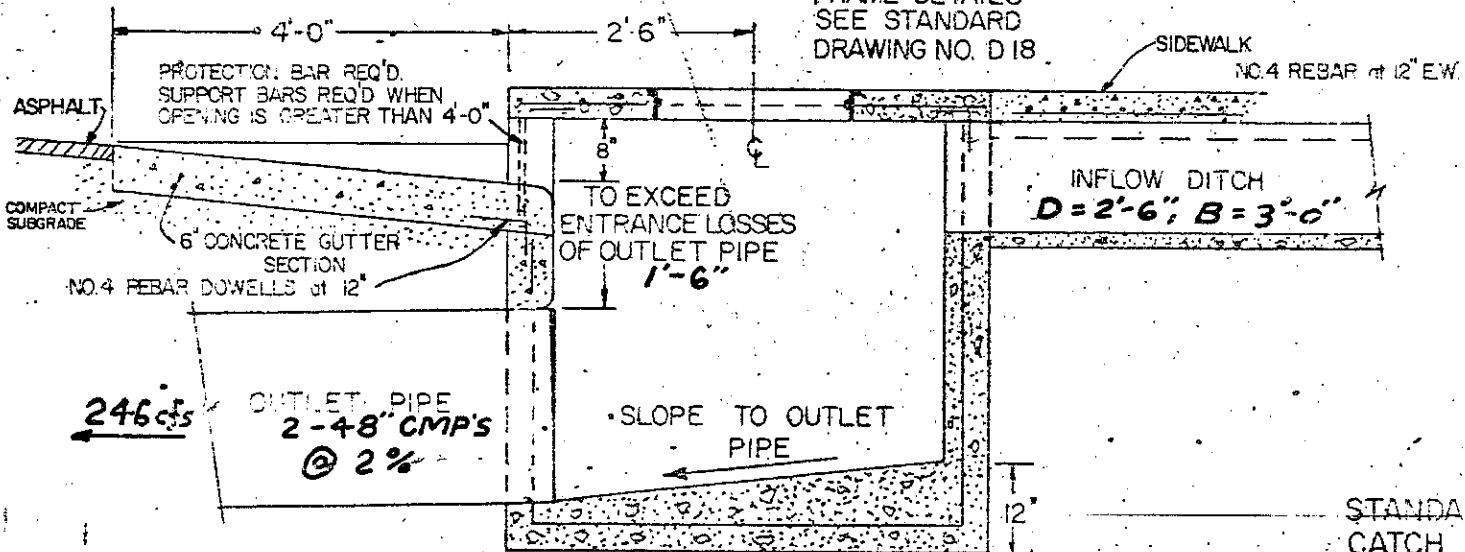


PLAN VIEW



SECTION "A-A"

FOR COVER & FRAME DETAILS SEE STANDARD DRAWING NO. D 18

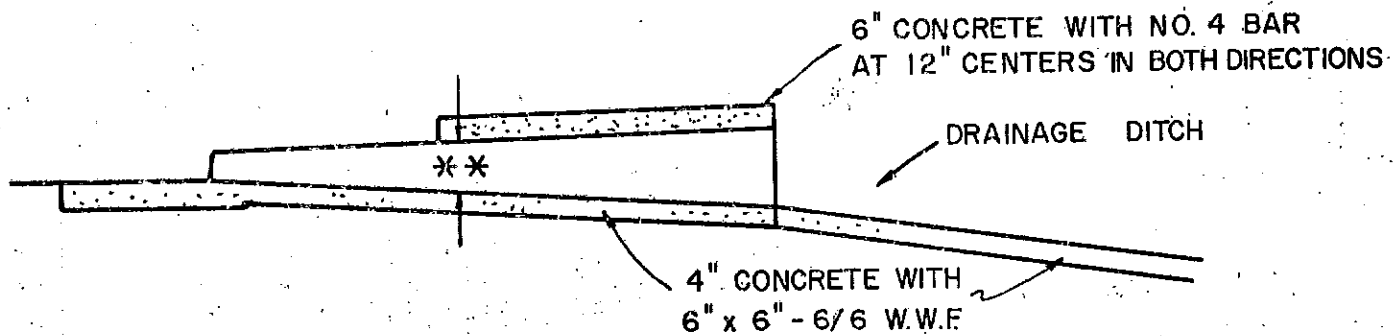
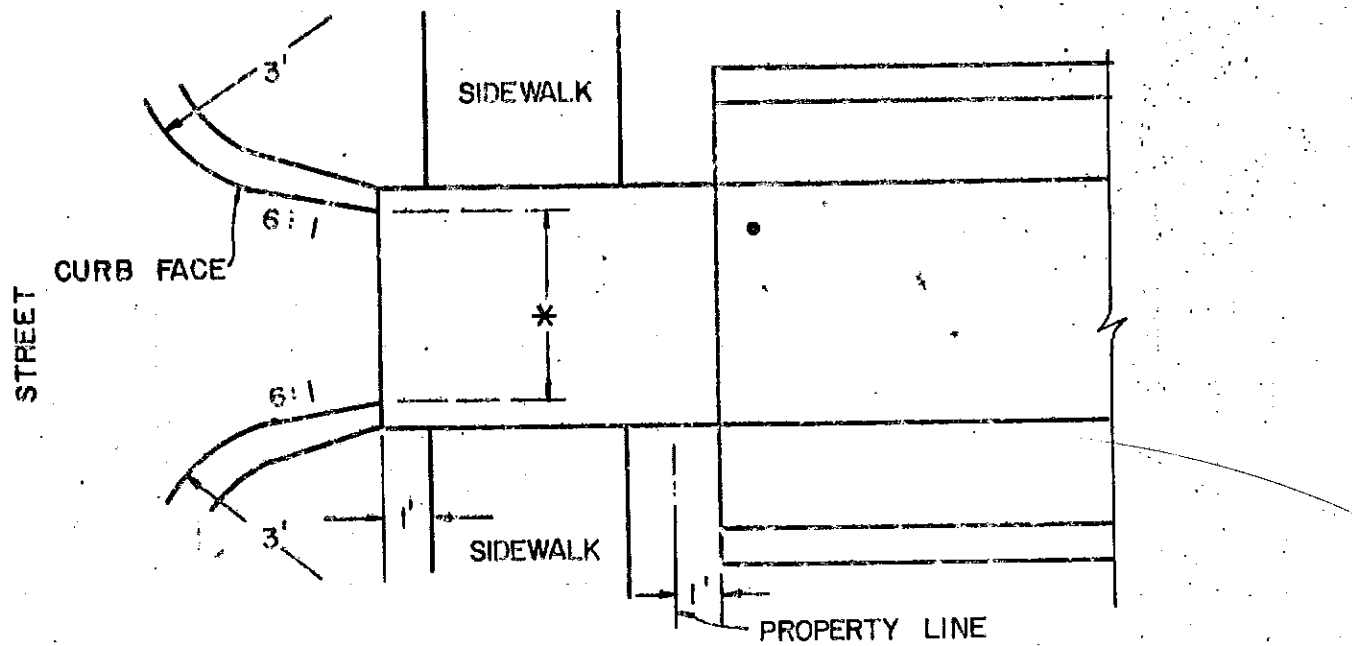


STANDARD CITY OF COLORADO SPRINGS CATCH BASIN-MODIFIED TO RECEIVE DITCH INFLOW TYPE 2

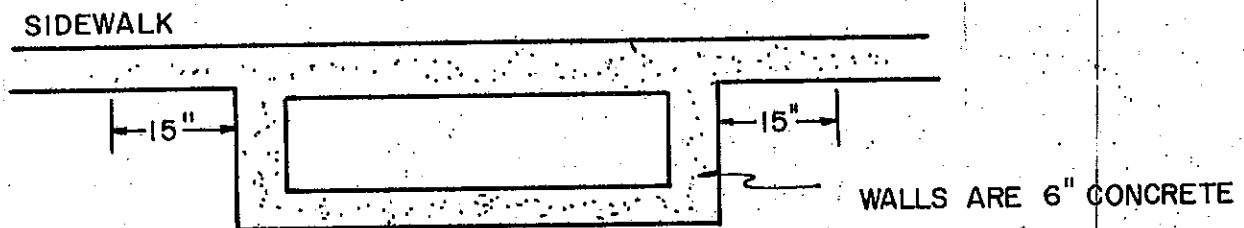
SCALE 1" = 2'

FOR MORE DETAILS SEE CITY DRAWING D-10R

Oro Blanco Dr. Between Crimson Cir. and Artistic Cir.



EXTEND EVERY OTHER BAR 15" INTO SIDEWALK ON BOTH SIDES, BEND EVERY OTHER BAR INTO WALLS



NOTES:

1. SIDEWALK MAY BE PLACED ANYWHERE FROM CURB TO PROPERTY LINE BY EXTENDING THE TOP SLAB TO MATCH THE POSITION OF THE SIDEWALK
2. * VARIABLE DEPENDING ON QUANTITY OF WATER. MINIMUM 4'
- ** VARIABLE DEPENDING ON QUANTITY OF WATER. MINIMUM 1'

CURB OUTLET

FIG. 68