MAKE A FILE

ENGINEERS

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Approved Subject to the exclusion of The Park Site west side.
R.U. Martin by J...
14 Feb 73

REVISED

GREENCREST AREA

MASTER DRAINAGE REPORT

UNITED ENGINEERS

planners · consultants · engineers

Suite 200
4525 Northpark Drive
Colorado Springs, Colo. 80907

(303) 598-3222

December 19, 1972

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

Subject: Greencrest Master Drainage Plan

Dear Deke:

Transmitted herewith is subject drainage plan, which has been revised in accordance with the City Drainage Board meeting of November 16, 1972.

You will recall that "this item was tabled until the area is replatted and will not come back to the Drainage Board if the drainage plan for the replatted area meets with the approval of the City Engineer.", according to the minutes of the board meeting.

After further field investigation we feel this master drainage plan to be the best solution and request approval. Details of the main greenbelt protection may best be resolved when the detailed plans pertaining to future platting are known.

Please call me if I may answer any questions.

Respectfully submitted,

UNITED WESTERN ENGINEERS

O. E. Watts
Engineering Director

/cel

Enclosure

GREENCREST MASTER
DRAINAGE PLAN

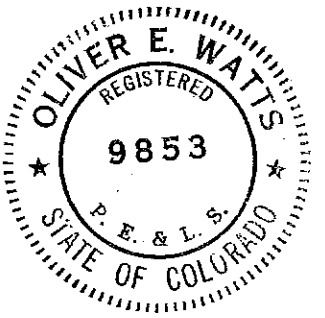
Certifications and Approvals

Registered Engineer

I, Oliver E. Watts, 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.

Oliver E. Watts

Colorado P.E. - L.S. No. 9853



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 W. M. Wells

Title President

Approved:

City of Colorado Springs, Department of Public Works

City Engineer

Date

1. Description of Location:

a. The Greencrest Subdivision is located as shown on the vicinity map on the enclosed drainage plan, occupying a portion of the South half of Section 27, Township 13 South, Range 66 West of the 6th P.M., in the City of Colorado Springs. It lies South of Templeton Gap, West of Academy Boulevard, and North of Palmer Park.

b. The total area enclosed by the subdivision is approximately 148.586 acres.

c. The development lies entirely in the North Shooks Run - Templeton Gap Drainage Basin. The master drainage basin report has been consulted and this report is in compliance.

d. The natural drainage is as shown on the enclosed plan defined by the topography, generally to the West and North.

2. Method of Runoff Computations:

a. Method: The basis of the computations in this report is the soil conservation service synthetic hydrograph method of hydrology. The 50-year storm of two-inch intensity, duration of one hour was used in all computations. Runoff computation sheets are included in this report for the previously unplatted areas. Drainage reports for Greencrest Filings 1 and 3 were approved on September 1965 and September 11, 1969 respectively; these reports have been consulted and this report is generally in compliance therewith.

b. Soil Types: There are two main soil types encountered in the development as shown on the enclosed drainage plan. The R7-BD soil type in the Northeast portion of the development is of the Blakeland Series, which consists of a deep, dark, coarse textured loamy sand or sandy loam. The underlying material is a light colored loamy sand or sand extending to 60 inches or more. This type is of the "A" hydrologic group.

The RBI soil type ranges from loamy sand to sandy loam in texture to a depth of 10 to 30 inches over sand stone and/or shale. About 20 to 30 percent of the area is rock outcrop. This type is of the "D" hydrologic group.

In addition to the two main soil types, there are two others along the Northerly edge of the subdivision, as shown on the attached drainage plan. The T8 soil type is a loamy clay and belongs to the "C" hydrologic grouping.

The R4 soil type is a sandy loam and belongs to the "B" hydrologic grouping.

3. External Water Entering the Development

3391 cfs will enter from the unlined channel at the Northeast corner of the development and 484 cfs will enter from its Southern tributary also on the Northeast of the development. 40 cfs will enter along the Easterly boundary near the intersection of David Circle and East David Lane. 159 cfs will enter from the unlined channel at the Southeast corner of the development, and 11.2 cfs will enter from Palmer Park in sheet flows from the West. 20.0 cfs will enter at the Northwest corner to be handled by the 21" RCP under Brenner Place.

These figures were compiled from the North Shooks Run - Templeton Gap Floodway master report, Greencrest Filing No. 1 and Greencrest Filing No. 3 drainage reports all of which have previously been approved. Also, 91.9 cfs enters across Templeton Gap Road in the Northeast of the development according to the R. Keith Hook & Associates report of April 6, 1971, for the Shoppers World Area.

4. Flow Through the Development

All flows within the development are routed to the Templeton Gap greenbelt. The greenbelt that lies in the unplatted area is to be concrete lined as shown on the attached plan. That portion of the greenbelt that lies outside of the development and that which is in Greencrest Filing No. 1; as approved September 25, 1965, is considered to be stabilized and needs no concrete lining. The end of the lining is in sandstone outcrop as shown on the attached plan, and needs no protection. A 90 foot drainage easement will be provided along the Northern limits of the development: as previously platted in Greencrest Filing No. 1, and a 30 foot and 50 foot easement on the North and East, as shown on the attached plan. A 40 foot drainage easement was platted in Filing No. 1 in the Northwest corner of the development from Brenner Place to the greenbelt.

5. Description of the Outfall Point:

The outfall point is the greenbelt in the Northwest corner of the development, in which a concrete lined channel is under present construction by others. The design flow at this point, according to the master basin report is 3681 cfs.

6. Internal Design Computations:

a. Streets: Runoff is handled by the streets of the development which are supplemented when necessary by street drain facilities and open channel ditches.

The streets in filing No.'s. 1 and 3 have previously been approved and have been or are being constructed.

Those streets outside filing No.'s 1 and 3 all may have ramp type curbs except Brenner Circle which will have 8" vertical curbs with minimum slope of 0.6%, the maximum flow being 30.6 cfs and its capacity 32.3 cfs.

b. Channels: All channels are to be concrete lined, n = 0.015, as shown on the sections on the enclosed plan. The design information is as follows:

Section	Size	Slope	Design Flow	Capacity
A-A	8'x7'	2.959%	3391 CFS	4345 CFS
B-B	4'x4'	1.852%	484	705
C-C	4'x3'-6"	3.289%	484	762
E-E	4'x3'-6"	5%	18	939

Easements widths are shown on the plan to include a maintenance road with, 10 foot for minor channels and 16 foot for the major channel.

c. Concrete Pipe. A 66-inch concrete pipe is shown across Brenner Circle at the minor greenbelt on a 2.50% slope. It is designed for 484 CFS and will have a capacity of 531 CFS.

d. Metal Pipe: Metal pipe is to be CMP of standard corrugations and bands, n = 0.024, and will have a gage corresponding to requirements of resistivity testing, which will be shown on the plan and profile sheets. Minimum cover shall be one foot.

7. Cost Estimate:

	Item	Quantity	Unit Price	Cost	
	4' Catch Basin	1 each	$ 700.00	$ 700.00	
	3.5' Curb Opening	1 each	150.00	150.00	
	6' Curb Opening	2 each	175.00	350.00	
	8' Curb Inlet	1 each	200.00	200.00	
*	10' Curb Opening	3 each	250.00	750.00	
**	16' Curb Outlet	1 each	**300.00	300.00	
	25' Curb Inlet	1 each	800.00	800.00	AREA 'D'
*	24-inch CMP	370 LF	11.15	4125.50	
	36-inch CMP	80 LF	13.73	1098.40	AREA 'C'
***	42-inch CMP	338 LF	17.00	5746.00	AREA 'D' #3 REPLAT P.U.E.
*	21-inch RCP	120 LF	9.00	1080.00	
	66-inch RCP	80 LF	62.00	4960.00	
**	68"x43" RCP with riprap & headwalls	LS	3000.00	3000.00	
**	15' Concrete Inlet	LS	1200.00	1200.00	
*	Concrete Lined Swale	410 LF	4.00	1640.00	
	Concrete Lined Channels:				
	8'x7'	980 LF	21.81	21373.80	
	4'x4'	270 LF	12.13	3275.10	
	4'x3'-6"	1010 LF	11.11	11221.10	
	6' Conc. Slope Protection	320 LF	11.61	3715.20	
	66" RCP Headwalls	2 each	1054.00	2108.00	
	Subtotal			$ 67793.10	
	10% Engr'g. & Cont.			6779.31	
	TOTAL			$ 74572.41	

FUTURE

8. Fees: (Templeton Gap Basin)

Filings	Year	Acreage	Unit Fees	Fees
1, 2 & 3	1969	72.690	$ 400.00	$ 29076.00
Unplatted	1972	60.908	509.00	31002.17
Park *	----	14.988	-0-	-0-
Total		148.586	$ 455.68	$ 60078.17

* To remain unplatted - to be deeded to the City.

Total Over-run of structures $ 14494.24
Net Per Acre Cost of Structures (platted ground) $ 558.19/Acre

#1 = 32.6108 AC

#2 = REPEAT OF #1

#3 = 57.7024 AC

1. TOTAL #1,2,3 = 90.3124 AC x 400.00 = $36,124.96
2. PARK 14.9980 FEES BY THE CITY

TOTAL 1 & 2 = 105.3104 AC

UNPLATTED 50.6300 FUTURE DEVELOPMENT (FEES AT TIME OF DEVELOPMENT)

TOTAL AC. 155.9404 TOTAL ACREAGE

RB1 - Hyd Gr. - C

MAJOR BASIN	SUB BASIN	AREA Planim. Read	AREA 1" = 100' MILE	BASIN LENGTH	BASIN HEIGHT	Tc	DITCH LENGTH	DITCH SLOPE	V	TPO	FLOW Q	FLOW qp	Tb
I	A	14.22	.0051	680	34	.058				0.535	1.67	5.3	
	B	19.35	.0069	930	32	.090				0.554	1.67	7.6	
	C	7.18	.0026	500	36	.042				0.525	1.67	3.0	
	D	30.45	.0109	910	48	.075				0.545	1.67	16.2	

HYDROLOGIC COMPUTATION – BASIC DATA

PROJ: Greenrest Master

By: JCA

Date: 9-12-72

UNITED WESTERN ENGINEERS
planners · consultants · engineers
Suite 200
4525 Northpark Drive
Colorado Springs, Colo 80907

Culvert & Channel Calculations

Greenbelt Calc's.

Conc: d/b = 1 z = 1 $b^{8/3} =$ $Q = 0.015 / 1.935^{1/2}$ $A = 2b^2$

R-prep: d/b = 0.30 z = 2 $b^{8/3} =$ $Q = 0.030 / 0.248 S^{1/2}$ $A = 0.486b^2$

CMP or Conc. pipe $b^{8/3} = Q = 0.013 / 0.463 S^{1/2}$

AREA	LOCATION & DISTANCE	ELEV & S%	S 1/2	Q50	b 8/3	b	S F AREA	USE DITCH	CULVERT ETC.	TIME HRS Capacity
Main GB I-A	Begin Channel	6385								
	980'	2.959 %	0.1721	3391	153.14	6.60	87.12	8'x7' Conc.		4345
	End Channel	6356								
Minor GB 1A	Begin Channel	6392								
	760'	3.289%	0.1814	484	2a74 Con 322.8 RR	3.12 8.73	19.47 36.58	1'x3'-6" Conc 9'x3'-6" RipRap		762 918
	Beg. Culvert	6367								
	80'	2.50%	0.1581	484	158.7 CMP 85.96 Conc	6.69 CMP 5.32 RCP			66" RCP	531
	End Culvert	6365								
	270'	1.852%	0.1361	484	27.69	3.47	24.08	4'x4' Conc		705
	Main Channel	6360								

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Project Greencrest Master Drainage Page 2 of 3

Calc. by D. Edwards date 12-4-72

Checked by _____ date _____

Street and Storm Sewer Calculations

STREET	LOCATION	DIST ft	ELEVATION & SLOPE	TOTAL RUNOFF	STREET FLOW CAPACITY	PIPE FLOW	TYPE PIPE, CATCH BASIN & SLOPE %
Wesley Circle 28'	Wesley Drive Bubble	380	6390 4.73% 6372	20.2	V. Curb: 30.2/50.4	—	—
Brenner Circle 36'	Brenner Lane Conc. Channel	400	6400 5.50% 6378	30.4	V. Curb: 30.2/97.8	—	—
Brenner Lane 30'	Property Line East Brenner Circle	600	6400 10.5% 6397	7.6	Ramp Curb: 7.6/71.6	—	—

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Project _____ Page ____ of ____

Calc. by _____ date _____

Checked by _____ date _____