



MASTER DRAINAGE REPORT

FOR

FAIRWAY CENTER

REVISION NO. 1

RECEIVED
PUBLIC WORKS/ENGINEERING
COLORADO SPRINGS, COLO.

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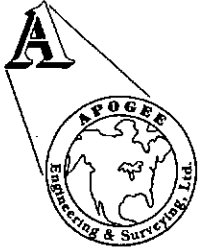
Prepared For:

MR. GEORGE ZOOROB

March 1986

Prepared By:

APOGEE ENGINEERING & SURVEYING, LIMITED



Apogee Engineering & Surveying, Ltd.

Engineers

Surveyors

March 1986

City of Colorado Springs
Department of Public Works
Engineering Division
P. O. Box 1575
Colorado Springs, CO 80901

Attn: Mr. Dave Lethbridge

Dear Mr. Lethbridge:

Please find enclosed the Master Drainage Report for the Fairway Center development for your review and approval. This report has been revised to address your comments.

If you have any questions regarding the information contained in this report, please feel free to contact our office.

Sincerely,

Apogee Engineering & Surveying, Ltd.

A handwritten signature in cursive script that reads 'Keith R. Bushdiecker'.

Keith R. Bushdiecker, E.I.T.

KRB/tk

Telephone 303-636-2232

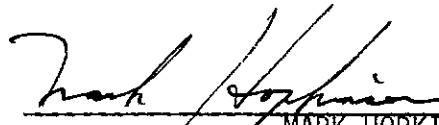
Colorado Springs, Colorado 80909

15 North Iowa Avenue

FAIRWAY CENTER
DRAINAGE REPORT
CERTIFICATIONS AND APPROVALS

REGISTERED ENGINEER:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria as established by the City for drainage reports and said report is in general conformity with the Master Plan of the drainage basin. I accept responsibility for any liability caused by negligent acts, errors, or omissions on my part in preparing this report.

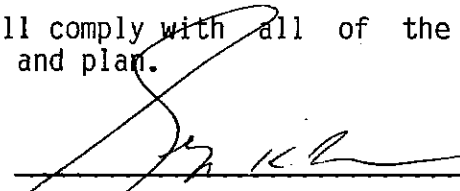


MARK HOPKINSON
Colorado P.E. No. 22635




OWNER OR DEVELOPER OF SITE:

The developer has read and will comply with all of the requirements specified in this drainage report and plan.

BY: 

TITLE: OWNER

Filed in accordance with Section 15-3-906 of the Code of the City of Colorado Springs, 1980, as amended.

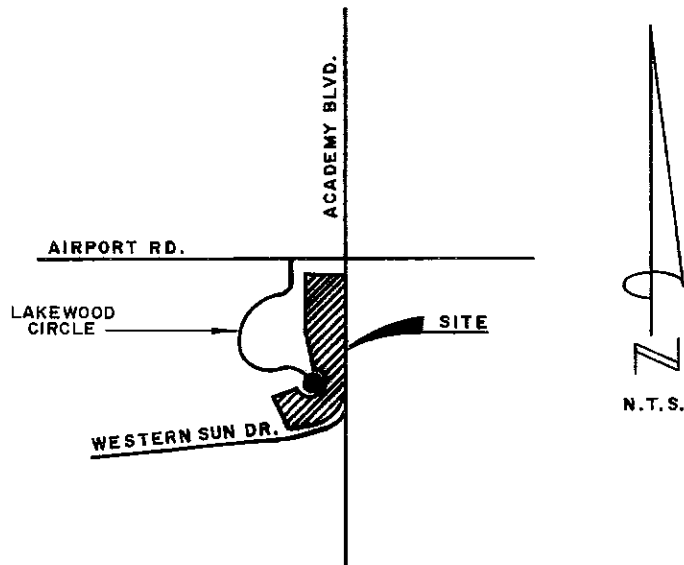


City Engineer

6/23/86
Date

Condition:

Spring Creek Channel section
and design flow is subject to
review and change upon final design.



VICINITY MAP

DATE:
11/7/85

PROJECT NO.
85-06-08

DRAWN BY:
CAH

FAIRWAY VILLAGE



Apogee Engineering & Surveying, Ltd.

15 North Iowa
Colorado Springs, Colorado 80909

Telephone 808-686-8888

GENERAL:

This Master Drainage Report is intended to serve as a Master Plan for the three parcels of land that are included within the Fairway Center development. Should the owner choose to develop and plat a portion of this Master Plan, or make adjustments in a specific site plan, a specific Drainage Letter will be submitted.

LOCATION:

The Fairway Center development is located in the Northeast Quarter of the Northeast Quarter of Section 22, Township 14 South, Range 66 West of the 6th P.M., in the City of Colorado Springs, El Paso County, Colorado. The property is divided into three parcels which combine to form a "C" shape (refer to attached vicinity map). Parcel 1 is bordered by Early Sun Drive on the South, Parcel 2 is bordered by Academy Boulevard on the East and Parcel 3 is bordered by Airport Road on the North. The three parcels contain approximately 2.69 acres, 5.00 acres, and 2.72 acres respectively.

SOILS:

The Soil Conservation Service survey has identified two soil types typical to the area, of which there are two hydrologic groups. The "Midway" (54) clay loam is of the hydrologic Group D and represents most of the soil on the property. The remainder of the soil is a "Nelson" (56) fine sandy loam complex. This complex is made up of 45% Group D soil, 30% Group B soil, and 25% others which have conservatively been assumed to be of Group D. Weighted curve numbers for various land uses and hydrologic soil groups have been calculated and are included in the appendix to this report.

METHOD:

The method used for computation is the USDA-SCS Synthetic Hydrograph Method as prescribed by the City of Colorado Springs within "Determination of Storm Run-off Criteria" (March 1977). Since the 100-year frequency storm does not produce greater than 500 CFS at any point, the 6-hour, 5-year storm is used for this drainage report.

DRAINAGE CHARACTERISTICS:

Eight internal sub-basins and six external sub-basins that affect Fairway Center have been determined. The run-off from Sub-basins I3, I4, and E4 will be carried as sheet flows across the parking lot of Parcel 1 of Fairway Center, discharge through curb openings and be conveyed to Spring Creek via the Valli-Hi Golf Course drainage way (following historic run-off patterns). Rip-rap has been proposed at the outfall onto the golf course to prevent erosion.

The run-off from Sub-basin E8 will be conveyed in the street gutter and right driving lane of Academy Boulevard (refer to enclosed calculations). This basin will receive no run-off from Fairway Center. The increased run-off due to the addition of the deceleration lane is minimal and is considered negligible by the Highway Department. The run-off will then be intercepted by an existing inlet at the southwest corner of Academy Boulevard and Airport Road and piped to the Spring Creek Drainageway via a 42" diameter RCP. This inlet appears to be inadequate to receive the flow on Academy Boulevard, which results in some ponding in the intersection. This overflow historically has been received by the (sump) inlets in Lakewood Circle.

Sub-basins I1 and I2 consists of approximately 5.6 acres of proposed business development. The storm flows from these basins and basin E3 will be conveyed as sheet flows across the parking lot to the north end of Parcel 2. At this point, the flows will be collected by inlets and piped to the west under Lakewood Circle and across Parcel 3, ultimately discharging into Spring Creek.

Sub-basin E5 historically has discharged onto the site of the Fairway Center and has been collected in an open pipe at the northwest corner of Parcel 2. To accommodate this run-off, a grass-lined swale is proposed to carry the flow to a concrete swale and inlet, and into the proposed sewer system under Lakewood Circle.

Because the existing sewer system under Lakewood Circle is inadequate to carry the developed flows, it will need to be removed and replaced as shown on the Drainage Plan. The proposed replacements have been designed to accept all on and offsite flows expected (this includes Sub-basins E6 and E7). A grass-lined swale is proposed parallel to the south property line of Parcel 3 to carry surface flows and overflows from these inlets to Spring Creek.

The run-off from Sub-basins I5 and I6 will be collected by inlets on (the relocated) Lakewood Circle. These flows will then be piped to Spring Creek and discharged. A grass-lined swale is proposed to carry overflows from these inlets. The flows from Sub-basins I7 and I8 will be conveyed across parking lots and surface swales to Spring Creek.

DRAINAGE CHARACTERISTICS: (continued)

The existing 42" diameter pipe from the inlet at the intersection of Airport Road and Academy Boulevard that is adjacent to the south edge of Airport Road will be extended to discharge directly into Spring Creek. A drainage easement will be dedicated for this purpose at the time of platting.

Spring Creek itself must be lined per the Master Study. The Drainage Report for Satelitte Square No. 7 (by G. L. Williams) shows a 100-year storm flow of approximately 3,000 CFS in Spring Creek, which will be used for our calculations. All but the northern most 100 feet of the west side of the channel has previously been lined with rip-rap. Therefore, only that 100 feet of the west side will need additional protection. The east side of the channel will also be lined with rip-rap, and the bottom will remain earth. A typical channel cross-section and calculations are included in the appendix of this report. A more detailed design of the channel will be required at the time of development to determine the transition out of the Airport Road box culverts.

PHASED DEVELOPMENT:

The proposed drainage facilities shown on the Drainage Plan are for the final developed condition. Since a phased development is anticipated, the following alternate construction sequence is recommended:

If Parcel 2 (adjacent to Academy Boulevard) is developed prior to Parcel 3 (adjacent to Airport Road), the existing pipe that will come out of Manhole No. 1 should be replaced with 30" diameter RCP at a slope of 0.428% and should discharge into the existing drainage ditch. When Parcel 3 is developed, the pipe coming out of Manhole No. 1 should be realigned to parallel the South property line and discharge directly into Spring Creek.

Inlet No. 3 should be removed or abandoned in place and Inlets No. 4 and 5 should be constructed only when Lakewood Circle is realigned. Manhole No. 1 should be constructed when pipe improvements are made, intially with a grated lid to receive flows in the gutter. When Lakewood Circle is realigned, the grate should be replaced with a standard storm manhole lid.

FLOODPLAIN STATEMENT:

All proposed development lies outside of the FEMA 100-year floodway, but some portions of Parcel 3 are within the FEMA 100-year floodfringe. All floors are elevated above the base flood elevation.

DRAINAGE BASIN FEES:

The 1986 Drainage Fees for Spring Creek Basin are \$3,880.00 per acre. Therefore, the Drainage Fees for Fairway Center are \$40,390.80 (based on 10.41 acres).

Mr. George Zoorob will submit a Letter of Credit to cover the cost of drainage facilities construction and will obtain three competitive bids for the construction of drainage facilities for review by the City Engineer prior to commencing construction. Copies of paid invoices for the construction work will be provided to the City Engineer when the construction is complete to determine the final drainage credit due to Mr. George Zoorob for the above facilities.

The potential reimbursement due Mr. Zoorob (based on the cost estimates outlined on the following page) is:

| | | |
|--|---|--------------------|
| Cost of Reimbursable Public Improvements | = | \$59,619.45 |
| Drainage Fees | = | <u>-40,390.80</u> |
| Estimated Reimbursement | = | <u>\$19,228.65</u> |

COST ESTIMATE OF PROPOSED DRAINAGE FACILITIES

The Drainage Facilities proposed for construction at Fairway Center and the costs are detailed below:

| <u>Description</u> | <u>Quantity</u> | <u>Unit</u> | <u>Unit Cost</u> | <u>Total Cost</u> |
|--|-----------------|-------------|------------------|--------------------|
| <u>Public Improvements:</u> | | | | |
| REIMBURSABLE | | | | |
| 4' D10R inlet | 2 | each | \$1,600.00 | \$ 3,200.00 |
| Storm Manhole | 3 | each | 1,500.00 | 4,500.00 |
| 18" dia. RCP, class 3 | 95 | L.F. | 22.00 | 2,090.00 |
| 30" dia. RCP, class 3 | 601 | L.F. | 37.00 | 22,237.00 |
| 42" dia. RCP, class 3 | 250 | L.F. | 52.00 | 13,000.00 |
| Spring Creek Channel | | | | |
| 6" rip-rap lining | 300 | C.Y. | 30.00 | 9,000.00 |
| 1½' concrete curb | 345 | L.F. | .50 | 172.50 |
| Sub-total | | | | \$54,199.50 |
| Engineering & Contingency at 10% | | | | 5,419.95 |
| TOTAL - Public Improvements (reimbursable) | | | | <u>\$59,619.45</u> |
| NON-REIMBURSABLE | | | | |
| 4' D10R inlet | 2 | each | \$1,600.00 | \$ 3,200.00 |
| Remove & reinstall 18" dia. RCP, class 3 | 7.5 | L.F. | 11.00 | 82.50 |
| Fit 24" dia. RCP to existing catch basin | 1 | L.S. | 200.00 | 200.00 |
| Remove 18" dia. RCP and replace with 24" dia. RCP, class 4 | 34 | L.F. | 30.00 | 1,020.00 |
| Remove existing catch basin | 1 | each | 150.00 | 150.00 |
| Sub-total | | | | \$ 4,652.50 |
| Engineering & Contingency at 10% | | | | 465.25 |
| TOTAL - Public Improvements (non-reimbursable) | | | | <u>\$ 5,117.75</u> |
| <u>Private Improvements:</u> | | | | |
| 8' D10R inlet | 1 | each | \$2,200.00 | \$ 2,200.00 |
| 6' D10R inlet | 1 | each | 2,000.00 | 2,000.00 |
| 18" dia. RCP, class 3 | 100 | L.F. | 22.00 | 2,200.00 |
| Rip-Rap, D-50 = 6" | 3 | C.Y. | 30.00 | 90.00 |
| Concrete swale | 50 | S.F. | 2.00 | 100.00 |
| Sub-total | | | | \$ 6,590.00 |
| Engineering & Contingency at 10% | | | | 659.00 |
| TOTAL - Private Improvements | | | | <u>\$ 7,249.00</u> |
| TOTAL COST OF DRAINAGE FACILITIES (Public & Private) | | | | <u>\$71,986.20</u> |

12-11-00
4830

A P P E N D I X

WEIGHTED CURVE NUMBERS

Basin I1:

50% Nelson Soil (56), 50% Midway Soil (54)

Nelson Soil:

45% Nelson (group B)

30% Tassel (group D)

25% Other (assume group D for conservative value)

Midway Soil:

100% Midway (group D)

Land use designation will be 100% commercial / business (85% impervious).

Weighted CN = .50 [.45 (CN-B) + .30 (CN-D) + .25 (CN-D)] + .50 [1.00 (CN-D)]

= .50 [.45 (92) + .30 (95) + .25 (95)] + .50 [1.00 (95)]

Weighted CN-I1 = 94

Basin I2:

100% Midway Soil (54) - group D

Land use designation will be 95% paved roads, roofs, etc. and 5% open space.

Weighted CN = .95 (CN-D paved) + .05 (CN-D grass)

= .95 (98) + .05 (80)

Weighted CN-I2 = 97

Basin E3:

100% Nelson Soil (56) - groups B & D

Land use designation is 100% paved.

CN-E3 = 98

BASIN I3 and I4:

100% Midway Soil (54) - group D

Land use designation is 100% business.

CN-I3 & CN-I4 = 95

Basin E4:

100% Midway Soil (54) - group D

Land use designation is 100% residential 1/8 acre or less.

CN-E6 = 92

Basin E5:

100% Midway Soil (54) - group D

Land use designation is 90% paved and 10% is open space.

Weighted CN = .90 (CN-D paved) + .10 (CN-D grass)

= .90 (98) + .10 (80)

Weighted CN-E5 = 96

WEIGHTED CURVE NUMBERS (continued)

Basin E6:

100% Midway Soil (54) - group D
Land use designation is residential; 1/8 acre lots.
CN-E6 = 92

Basin E7:

100% Midway Soil (54) - group D
Land use designation is 90% paved and 10% open space.
Weighted CN = .90 (CN-D paved) + .10 (CN-D grass)
 = .90 (98) + .10 (80)
Weighted CN-E7 = 96

Basin E8:

Land use designation is 100% paved.
CN-E8 = 98

Basin I5:

100% Midway Soil (54) - group D
Land use designation is 100% business.
CN-I5 = 95

Basin I6:

100% Midway Soil (54) - group D
Land use designation is 100% business.
CN-I5 = 95

Basin I7:

100% Midway Soil (54) - group D
Land use designation is 100% business.
CN-I5 = 95

Basin I8:

100% Midway Soil (54) - group D
Land use designation is 100% business.
CN-I5 = 95

SYNTHETIC HYDROGRAPH CALCULATIONS

Calc. by: KRL
 Date: 12/18/85
 Sheet: 1 of

JOB NO: 85-06-08 PROJECT: FAIRWAY VILLAGE

| Basin | AREA | | | Length of Water Course (Ft) | Elevation Difference | Time of Concn. (hrs.) | Peak Factor | CN | P 5 (inch) | P 100 (inch) | Q 5 (cfs) | Q 100 (cfs) | |
|----------------|--------|---------|----------|-----------------------------|----------------------|-----------------------|-------------|----|------------|--------------|-----------|-------------|-----------|
| | Sq in. | ACRES | | | | | | | | | | | Sq. Miles |
| | | Prelim. | Adjusted | | | | | | | | | | |
| I ₁ | | 4.4559 | 0.0070 | 1325 | 23 | 0.157 | 1140 | 94 | 1.49 | - | 11.9 | - | |
| E ₃ | | 0.3742 | 0.0006 | 275 | 4 | 0.050 | 1280 | 98 | 1.87 | - | 1.4 | - | |
| I ₂ | | 1.1662 | 0.0018 | 1075 | 22 | 0.126 | 1200 | 97 | 1.77 | - | 3.8 | - | |
| E ₅ | | 2.2682 | 0.0035 | 1075 | 22 | 0.126 | 1200 | 96 | 1.67 | - | 7.0 | - | |
| E ₆ | | 0.3260 | 0.0005 | 250 | 1.5 | 0.066 | 1280 | 92 | 1.33 | - | 0.9 | - | |
| E ₇ | | 0.6015 | 0.0009 | 225 | 3 | 0.044 | 1280 | 96 | 1.67 | - | 1.9 | - | |
| I ₃ | | 1.0675 | 0.0017 | 325 | 22 | 0.032 | 1280 | 95 | 1.58 | - | 3.4 | - | |
| I ₄ | | 1.5404 | 0.0024 | 475 | 20 | 0.051 | 1280 | 95 | 1.58 | - | 4.9 | - | |
| E ₄ | | 0.3214 | 0.0005 | 300 | 15 | 0.033 | 1280 | 92 | 1.33 | - | 0.9 | - | |
| E ₈ | | 1.7493 | 0.0027 | 1485 | 20 | 0.189 | 1090 | 98 | 1.87 | - | 5.5 | - | |
| I ₅ | | 0.8770 | 0.0014 | 275 | 2 | 0.065 | 1280 | 95 | 1.58 | - | 2.8 | - | |
| I ₆ | | 0.3444 | 0.0005 | 325 | 7 | 0.049 | 1280 | 95 | 1.58 | - | 1.0 | - | |
| I ₇ | | 1.3062 | 0.0020 | 560 | 10 | 0.080 | 1280 | 95 | 1.58 | - | 4.0 | - | |
| I ₈ | | 0.3765 | 0.0006 | 145 | 7 | 0.019 | 1280 | 95 | 1.58 | - | 1.2 | - | |

HYDRAULIC CALCULATIONS

Inlet #1

8' D10R, $Q_{max} = 18.4$ CFS (sump); $Q_{req'd} = 13.3$ CFS

From Inlet #1 to Inlet #2

$Q_{des} = 13.3$ CFS
With 18" dia. RCP, $S_{min} = 1.595\%$

Inlet #2

6' D10R, $Q_{max} = 12.8$ CFS (sump); $Q_{req'd} = 10.8$ CFS

From Inlet #2 to Existing Inlet #3

$Q_{des} = 24.1$ CFS
With 18" dia. RCP, $S_{min} = 5.236\%$

Existing Inlet #3

2.0' X 6.0' Grated Inlet, $Q_{max} = 7.6$ CFS (sump); $Q_{req'd} = 1.4$ CFS

From Inlet #3 to Inlet #4

$Q_{des} = 25.5$ CFS
With 24" dia. RCP, $S_{min} = 1.264\%$

Inlet #4

4' D10R, $Q_{max} = 7.9$ CFS (sump); $Q_{req'd} = 1.4$ CFS

From Inlet #4 to Manhole #1

$Q_{des} = 25.5$ CFS
With 24" dia. RCP, $S_{min} = 1.264\%$

Manhole #1 - Grated Lid

26" dia. grated lid, $Q_{max} = 1.4$ CFS (sump); $Q_{req'd} = 1.4$ CFS

HYDRAULIC CALCULATIONS (continued)

From Manhole #1 to Inlet #5

Qdes = 25.5 CFS
With 30" dia. RCP, Smin = 0.384%

Inlet #5

4' D10R, Qmax = 7.9 CFS (sump); Qreq'd = 1.4 CFS

From Inlet #5 to Manhole #2

Qdes = 26.9 CFS
With 30" dia. RCP, Smin = 0.428%

Inlet #6

4' D10R, Qmax = 7.9 CFS (sump); Qreq'd = 2.8 CFS

From Inlet #6 to Inlet #7

Qdes = 2.8 CFS
With 18" dia. RCP, Smin = 0.071%

Inlet #7

4' D10R, Qmax = 7.9 CFS (sump); Qreq'd = 1.0 CFS

From Inlet #7 to Manhole #2

Qdes = 3.8 CFS
With 18" dia. RCP, Smin = 0.130%

From Manhole #2 to Discharge

Qdes = 30.7 CFS
With 30" dia. RCP, Smin = 0.491%

SPRING CREEK CHANNEL CALCULATIONS

USE $Q_{100} = 3000$ CFS
 $S_{CHANNEL} = 0.20\%$
 $n_{EARTH} = 0.025$
 $n_{RIP-RAP} = 0.045$
 $n_{CONC.} = 0.015$

MANNING'S EQUATION:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

$$A = bD + 1.5D^2 \quad (1/2:1 \text{ SIDES})$$

$$P = b + 2\sqrt{(1.5D)^2 + D^2} = b + D\sqrt{13}$$

$$R = \frac{A}{P} = \frac{bD + 1.5D^2}{b + D\sqrt{13}}$$

SET CHANNEL BOTTOM WIDTH
 AT 45.0 FT AND SOLVE BY TRIAL & ERROR:

| CHANNEL LINING | ASSUME COMPOSITE n | TRY D (FT) | b (FT) | Q (CFS) | A (FT ²) | P (FT) | ACTUAL n |
|-------------------------------------|--------------------|------------|--------|---------|----------------------|--------|----------------|
| RIP-RAP, BOTH SIDES | | | | | | | |
| EARTH BOTTOM | 0.030 | 7.44 | 45.0 | 3000 | 417.8 | 71.83 | 0.032 |
| | 0.033 | 7.85 | 45.0 | 3000 | 445.7 | 73.30 | 0.033 ← CHECKS |
| RIP-RAP, W. SIDE, CONC. E. SIDE, | | | | | | | |
| EARTH BOTTOM | 0.025 | 6.70 | 45.0 | 3000 | 368.8 | 69.16 | 0.027 |
| | 0.027 | 7.00 | 45.0 | 3000 | 388.5 | 70.24 | 0.027 ← CHECKS |

USING RIP-RAP LINING ON BOTH SIDES:

$$\text{TOTAL CHANNEL DEPTH} = 1.3 \times \text{WATER DEPTH}$$

$$= 1.3 \times 7.85$$

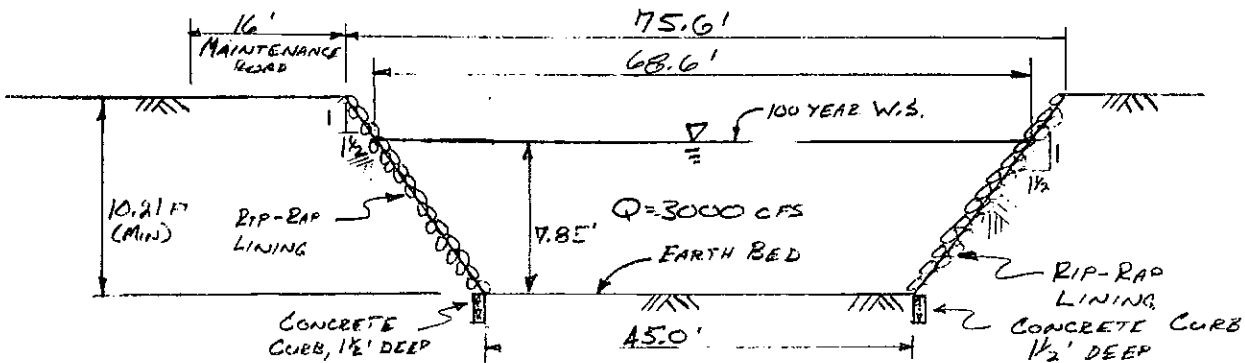
$$\text{TOTAL CHANNEL DEPTH} = \underline{10.21 \text{ FT}}$$

$$\text{VELOCITY (V)} = \frac{Q}{A}$$

$$= \frac{3000}{445.7}$$

$$\text{VELOCITY (V)} = \underline{6.7 \text{ FPS}}$$

⇒ THEREFORE 6" DIA STONE REQ'D FOR RIP-RAP (1 FT THICK, MIN.)



CHANNEL CROSS-SECTION

SCALE: HORIZ. - 1" = 20'

ACADEMY BLVD. - DEPTH OF FLOW IN STREET

FAIRWAY VILLAGE
DRAINAGE
85-06-08

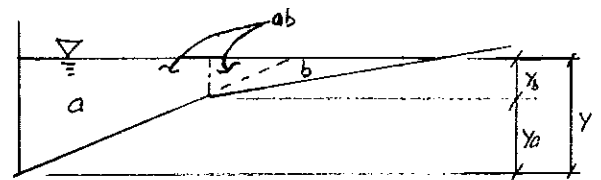
$$Z_a = \frac{1}{12} = 12$$

$$\frac{Z_a}{n_a} = \frac{12}{0.015} = 800$$

$$Z_b = \frac{1}{0.015} = 66.67$$

$$\frac{Z_b}{n_b} = \frac{66.67}{0.019} = 3509$$

STREET SLOPE = $\frac{K'}{520'} = 0.0192 = 1.92\%$



$Q_{DES} = 5.5 \text{ CFS}$

MAX DEPTH TO KEEP IN ONLY ONE DRIVING LANE = $(\frac{2''}{12'/ft}) + (12' \times 0.015) = 0.35'$

TRY $Q_{ab} = 3.7 \text{ CFS}$

$y = 0.35 \text{ FT}$ (FROM NOMOGRAPH)

$y_b = 0.35 - y = 0.18 \text{ FT}$

$Q_b' = 0.6$ (FROM NOMOGRAPH w/ $y = 0.18 \text{ FT}$, $\frac{Z}{n} = 800$, $S = 0.0192$)

$Q_a = Q_{ab} - Q_b' = 3.7 - 0.6 = 3.1 \text{ CFS}$

$Q_b = 2.6 \text{ CFS}$

$Q_{TOTAL} = Q_a + Q_b = 3.1 \text{ CFS} + 2.6 \text{ CFS}$

$Q_{TOTAL} = 5.7 \text{ CFS} > Q_{DES} = 5.5 \text{ CFS} \quad \leftarrow$

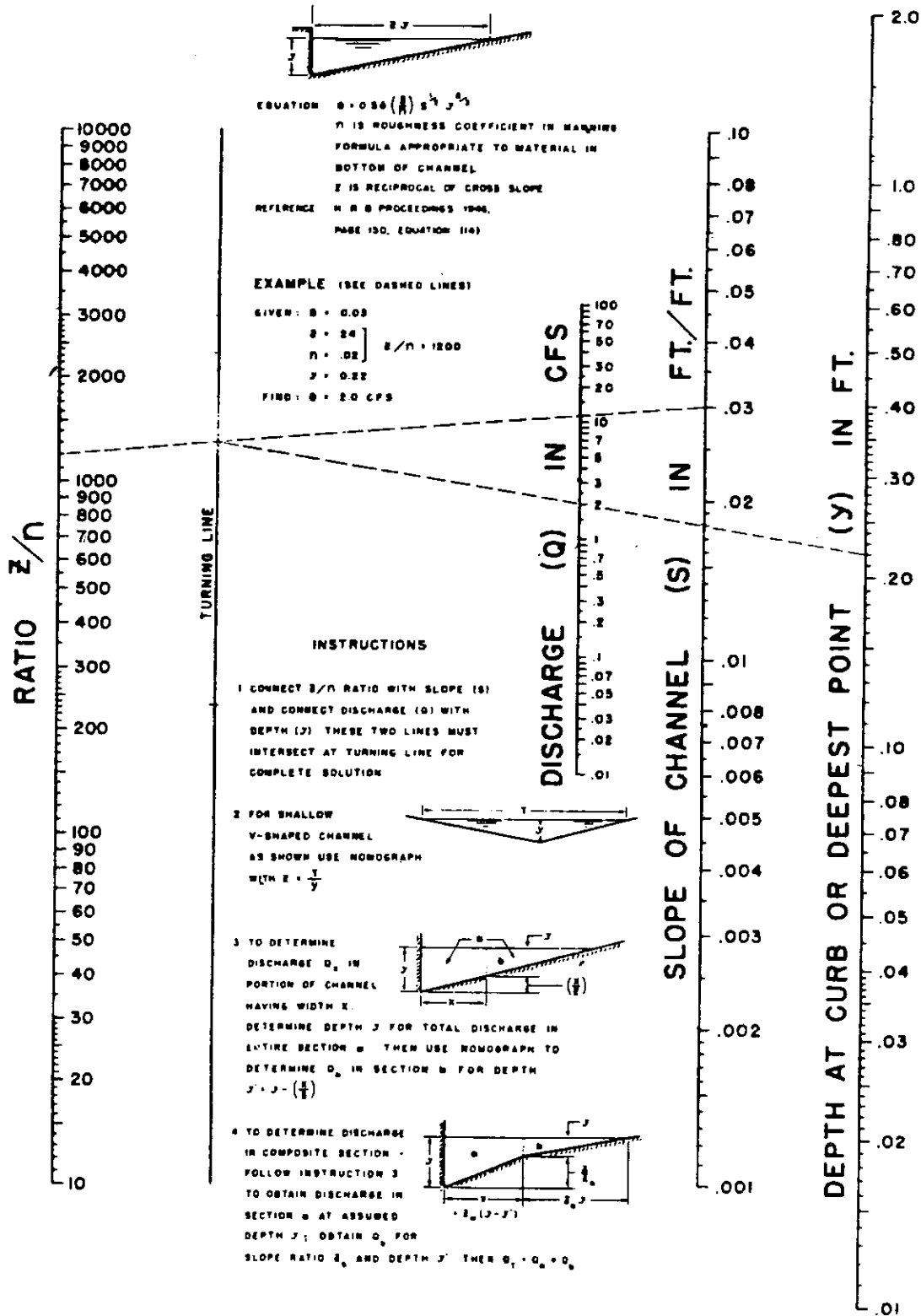
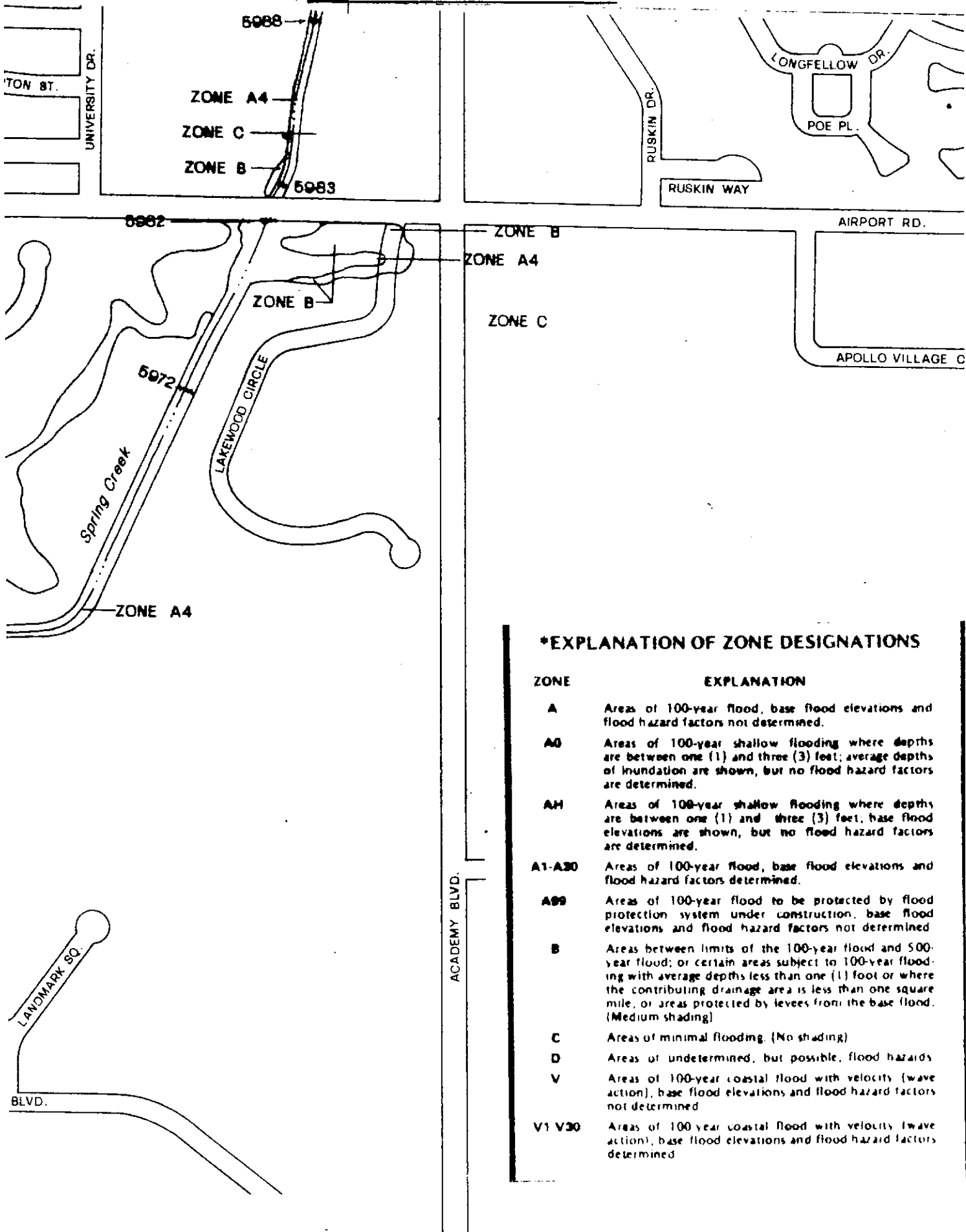


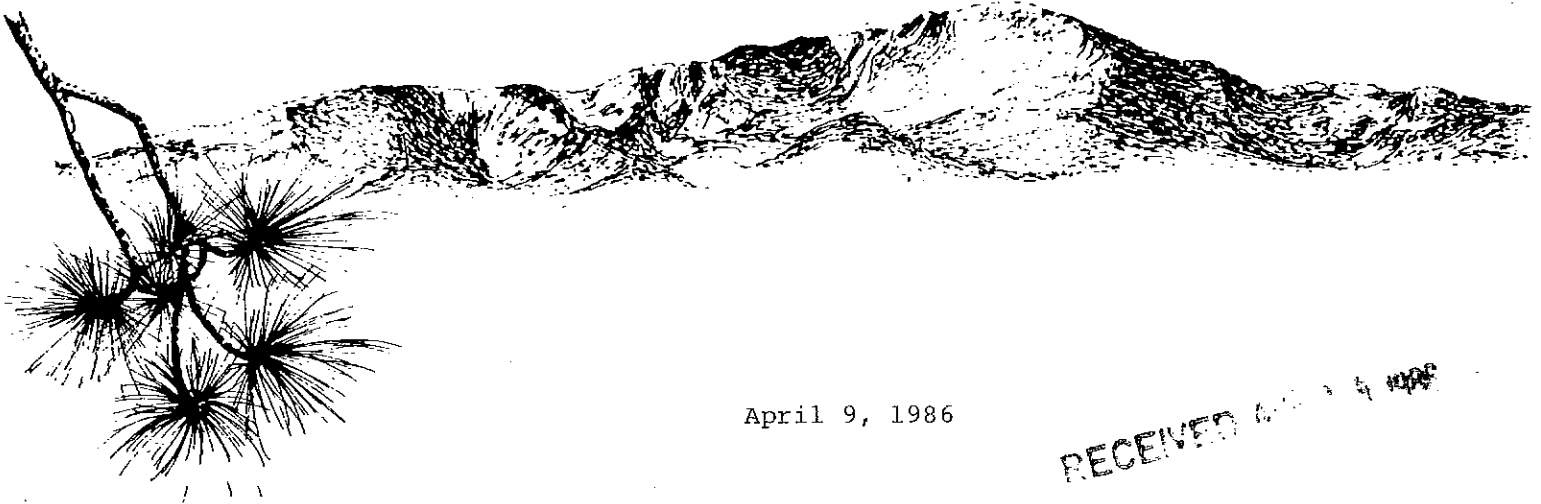
FIGURE IV-2 NOMOGRAPH FOR FLOW IN TRIANGULAR GUTTERS.

FLOODPLAIN LIMITS



*EXPLANATION OF ZONE DESIGNATIONS

| ZONE | EXPLANATION |
|--------|--|
| A | Areas of 100-year flood, base flood elevations and flood hazard factors not determined. |
| A0 | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined. |
| AH | Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined. |
| A1-A30 | Areas of 100-year flood, base flood elevations and flood hazard factors determined. |
| A99 | Areas of 100-year flood to be protected by flood protection system under construction, base flood elevations and flood hazard factors not determined. |
| B | Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile, or areas protected by levees from the base flood. (Medium shading) |
| C | Areas of minimal flooding. (No shading) |
| D | Areas of undetermined, but possible, flood hazards. |
| V | Areas of 100-year coastal flood with velocity (wave action), base flood elevations and flood hazard factors not determined. |
| V1 V30 | Areas of 100 year coastal flood with velocity (wave action), base flood elevations and flood hazard factors determined. |



April 9, 1986

RECEIVED APR 14 1986

Apogee Engineering & Surveying
15 North Iowa
Colorado Springs, CO 80909

ATTN: Mr. Mark Hopkinson, P.E.

Dear Mr. Hopkinson:

Referencing your March 4, 1986, letter concerning the master drainage plan for Fairway Centre Subdivision, the Park and Recreation Department will accept the increase in storm runoff from your site onto the Valley Hi Golf Course property provided that the following provisions are met.

1. The property owner shall be required to repair any erosion damage on the golf course caused by the concentration of developed flows on the Fairway Centre property for a period of one year after completion of the parking lot and curb openings. Said maintenance shall include the installation of additional rip-rap in any eroded areas on the golf course adjacent to the property line.
2. Any increase to the golf course grounds water-ponding problem at this location which is caused by the trickle of sprinkler water from the Fairway Centre Subdivision shall be corrected.
3. The above conditions will be judged by the City's Golf Course Manager.

Sincerely,

William H. Stookey
Superintendent of Parks/Golf

Gary R. Haynes
City Engineer

WHS:GRH/mfh



COLORADO SPRINGS
PARK AND RECREATION DEPARTMENT

1401 Recreation Way, Colorado Springs, CO 80905 (303) 578-6640