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COLORADO SPRINGS COLO.

**MAR 14 1984**  
**AM** **7,8,9,10,11,12,1,2,3,4,5,6** **PM**

DRAINAGE REPORT  
FOR  
SUNBIRD TERRACE

Prepared for  
M.L. PROPERTIES, INC.

Revision No.1  
March 1984

Prepared by  
GROWTH TECHNOLOGIES CORPORATION

**GROWTH TECHNOLOGIES CORPORATION**  
Planners, Consultants, Engineers

235 N. PINE ST., SUITE 201 • COLORADO SPRINGS, CO 80905 • (303) 578-0551



March 7, 1984

Mr. Dewitt Miller  
Director of Public Works  
City of Colorado Springs  
30 South Nevada  
Colorado Springs, CO 80901

RE: Drainage Report for Sunbird Terrace, Revision No. 1

Submitted herewith is the revised Drainage Report and Plan for Sunbird Terrace for your review and approval.

If you have any questions regarding this report, please contact our office.

Sincerely,

GROWTH TECHNOLOGIES CORPORATION

A handwritten signature in black ink, appearing to read "Mark Hopkinson".

Mark Hopkinson  
Project Engineer

MH/jm

**GROWTH TECHNOLOGIES CORPORATION**

Planners, Consultants, Engineers

235 N. PINE ST., SUITE 201 • COLORADO SPRINGS, CO 80905 • (303) 578-0551

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.



*Michael J. Vinson*  
MICHAEL J. VINSON  
Colorado P.E. No. 15237

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: *John P. M. S. Dacey*  
TITLE: *authorizing agent for zones*

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

*Adam City*  
City Engineer  
Date *3/29/84*

To Whom it May Concern:

Please be advised that GROWTH TECHNOLOGIES CORPORATION has authorization to represent M. L. PROPERTIES, INC. in regards to Engineering and Planning for SUNBIRD TERRACE.

Sincerely,

George Hallstein

State of Colorado )  
County of El Paso ) SS

The foregoing instrument was acknowledged before me this 14th day of December, 1983, by George C. Hallstein.

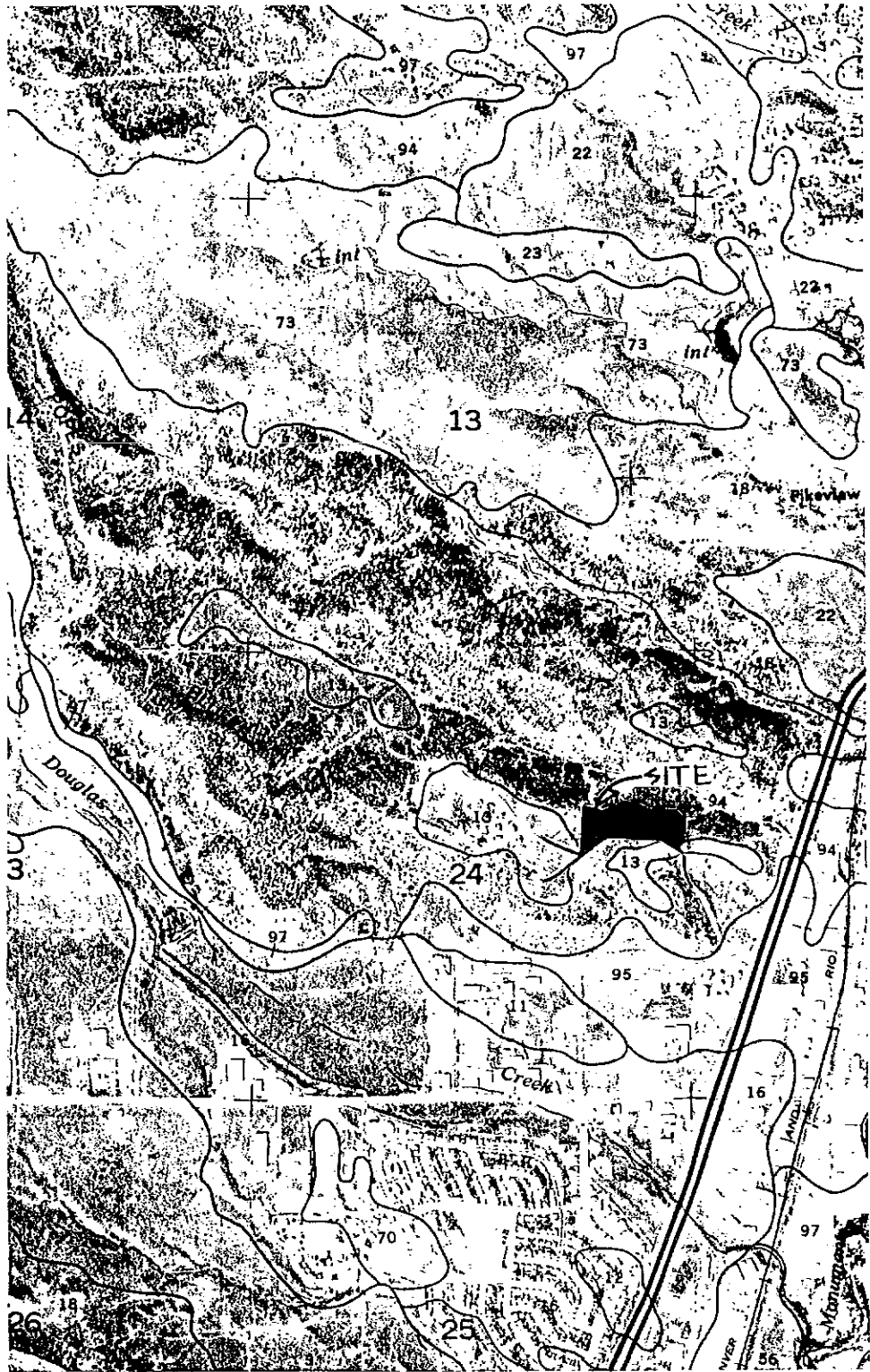
My Commission expires: Feb. 19 1986

Witness my hand and Official Seal

Sylvia Weisberg  
(Notary Public)

1912 Eastlake Blvd  
(Address)

Colo. Spgs., Co 80910



## SUNBIRD TERRACE

### DRAINAGE REPORT

#### 1. LOCATION

Sunbird Terrace is located in the southeast quarter of Section 24, Township 13 South, Range 67 West of the Sixth Principal Meridian, and contains 8.959 acres more or less. The property is on top of Pope's Bluff, north of Point Of The Pines Drive and opposite the Sunbird Cliffs Drive intersection.

#### 2. SOILS

Soils within the filing have a SCS description of Travessilla-Rock outcrop complex. The typical composition of 45% Travessilla soil, 30% Rock outcrop, and 25% other soils of Sandy Loam or Loamy-Sand Characteristics. The hydrologic classification given to this soil complex is D.

#### 3. ZONING AND DEVELOPMENT

The site is zoned PUD and development plans are for construction of Townhomes. A predominance of basement walkout units in the architectural plans allow for a better grading conformance with the sloping nature of the property. Landscaped areas will be replanted with drought resistant vegetation, consistent with the growth indigenous to the area. To ensure a successful vegetation program, an automated irrigation system will be installed.

#### 4. FLOWS

The method used for computations is the USDA-SCS Synthetic Hydrograph Method as prescribed by the City of Colorado Springs, Determination of Storm Runoff Criteria. All flows are based upon a "5-year" reoccurrence of interval storm.

Weighted curve numbers have been calculated for each of the on site basins and used for the runoff calculations. The same curve number has been used for both the undisturbed areas and the landscaped areas because of revegetation plans discussed in the previous section. A table of the weighted curve numbers and the runoff calculation sheet are enclosed for your reference.

This revised report reflects a decrease in both the density and parking lot surface as compared with the original submittal. Therefore, the weighted curve numbers and runoff values have been recalculated.

Since Basin A extends 1500 feet in length, its 4.9 cfs will discharge as a sheet flow of approximately 1 cfs per 300 feet across undisturbed vegetation. The 0.1 cfs of exterior Basin X<sub>3</sub> will join the Basin F flow of 0.7 cfs and be released through a parking lot curb opening. Similarly, 1.1 cfs of Basin B will be released to the north.

A flaired rip rap section will be installed at the curb opening of Basin C to dissipate the 9.4 cfs flow toward the natural drainage swale to the east. The exterior Basin X<sub>2</sub>, at 0.2 cfs will be collected with the 2.1 cfs of Basin E and the 7.1 cfs of Basin C to be ultimately discharged.

The major flow through the property is the runoff historically collected from the adjacent Pinecliff Subdivision. In a 1970 drainage report, the Pinecliff discharge of 27.9 cfs has been calculated based upon a SCS, 2 inch, 1 hour, 50 year frequency storm. Based upon the R-1 zoning, a curve number of 89 has been applied to the 16.7 acres to yield a 5 year, 6 hour storm runoff of 35.3 cfs, entering Basin D.

In addition to the Pinecliff discharge of 35.3 cfs, the exterior Basin X<sub>1</sub> flow of 0.1 cfs will also contribute to the 2.6 cfs generated by Basin D. The entire 5 year flow of 38.0 cfs will collect and flow through an existing 30 inch RCP, which is within the "inlet control" capacity of approximately 45 cfs. The 100 year storm, however, will overflow the driveway low point with a 0.5 foot depth to continue down a rip rap protected slope towards the historic discharge point.

The net changes in runoff between developed and historic flows are primarily concentrated at two existing drainage swales, as previously discussed. The net increase to the east is 5.5 cfs for a 5 year storm, and 8.0 cfs for a 100 year storm. Similarly, the increase in the historic Pinecliff channel is 1.2 cfs for a 5 year storm, and 2.1 cfs for a 100 year storm. Energy absorbing rip rap will be placed to dissipate the flow and minimize any erosion so that no significant impact on either historic collector is expected.

##### 5. PUBLIC IMPROVEMENTS AND FEES

There are no Public Improvements subject to reimbursement. The private drainage improvements are estimated as follows:

$$150 \text{ CY } 12" \text{ rip rap } @\$25/\text{CY} = \$3,750.00$$

A letter of credit for the private improvements will be filed in conformance with the Hillside Ordinance.

The Popes Bluff 1984 Drainage Basin Fees will be paid at the time of plat filing in the following amounts:

$$\begin{aligned} \text{Drainage Fees: } & 8.959 \text{ acres } @\$1359/\text{acre} = \$12,175.28 \\ \text{Bridge Fees: } & 8.959 \text{ acres } @ \$231/\text{acre} = \$2,069.53 \end{aligned}$$

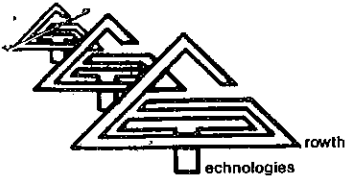
SUNBIRD TERRACE  
WEIGHTED CURVED NUMBERS

Revision No. 1

DRAINAGE BASIN	PHYSICAL DESCRIPTION	AREA (ACRES)	AREA (%)	CURVE NO.	PRORATED PRODUCT
A1	Undisturbed	1.784	55.8	78	43.5
A2	Lanscaped	0.665	20.8	78	16.2
A3	Roof & Pavement	0.750	23.4	98	22.9
Basin A	Average	3.199	100	83	82.6
B1	Lanscaped	0.097	24.7	78	19.3
B2	Roof & Pavement	0.296	75.3	98	73.8
Basin B	Average	0.393	100	93	93.1
C1	Lanscaped	1.177	39.4	78	30.7
C2	Roof & Pavement	1.812	60.6	98	59.4
Basin C	Average	2.989	100	90	90.1
D1	Undisturbed	0.158	12.6	78	9.8
D2	Lanscaped	0.476	38.0	78	29.6
D3	Roof & Pavement	0.618	49.4	98	48.4
Basin D	Average	1.252	100	88	87.8
E1	Lqnsaped	0.302	36.5	78	28.5
E2	Roof & Pavement	0.526	63.5	98	62.2
Basin E	Average	0.828	100	91	90.7
F1	Lanscaped	0.104	34.9	78	27.2
F2	Roof & Pavement	0.194	65.1	98	63.8
Basin F	Average	0.298	100	91	91.0







3/26/84  
Date

GROWTH TECHNOLOGIES CORP.  
235 N. Pine St.  
Colorado Springs, Colorado 80905  
(303) 578-0551

**RECEIVED**  
PUBLIC WORKS ENGINEERING  
COLORADO SPRINGS, COLO.  
MAR 26 1984  
AM 7:18:00 PM 7:18:00

Letter of Transmittal

TO: CITY ENGINEERING

ATTN: DAVE LETHBRIDGE

REGARDING: SUNBIRD TERRACE DRAINAGE

PLEASE FIND ENCLOSED A COPY OF A LETTER FROM  
THE PROPERTY OWNERS "DOWNSTREAM" OF THE SUNBIRD  
TERRACE DEVELOPMENT. THIS INCLUDES THEIR  
ACCEPTANCE OF THE PROPOSED RUNOFF.

MARK HOPKINSON  
Signed

cc:

**GROWTH TECHNOLOGIES CORPORATION**  
Planners, Consultants, Engineers

235 N. PINE ST., SUITE 201 • COLORADO SPRINGS, CO 80905 • (303) 578-0551

35 East Broad Oaks  
Houston Texas 77056  
March 15, 1984

City of Colorado Springs  
Department of Public Works  
Colorado Springs Colo.

Gentlemen:

We have been contacted by R. Keith Hook and Assoc. regarding their review of a drainage plan for the Sunbird Terrace Subdivision in the Pinecliff area. We are owners of property adjacent to this proposed subdivision. It is our understanding that you require a letter from us stating our position on the subdivision and the potential impact surface runoff will have on our property. We are advised that no additional erosion or detrimental damage to our property should result from approval of this development. Based on this advice we have no objection to the proposal.

We do wish to make clear that if we are to allow any incremental drainage to occur that we do not assume any liability for any resulting damage nor would we accept any obligation resulting from improvements necessary to allow adequate containment of surface runoff. As you may know, considerable discussion has taken place between various City agencies and ourselves concerning the construction by others of a roadway in the canyon immediately north of the proposed subdivision. It is our position that we will be held harmless to any effect of drainage conditions from these potential roadway improvements. Should you have any questions on this or related matters we can be reached at the above address or at my office 713-656-2378.

Sincerely,

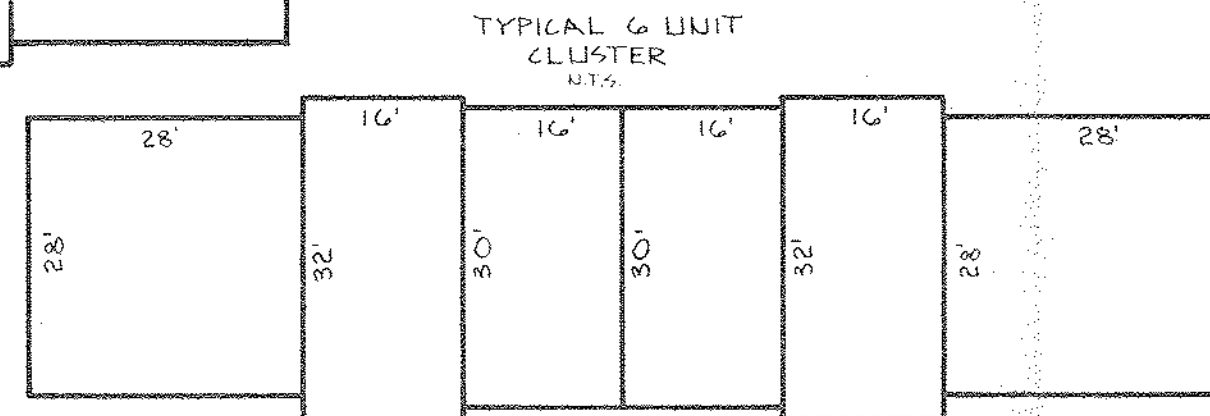
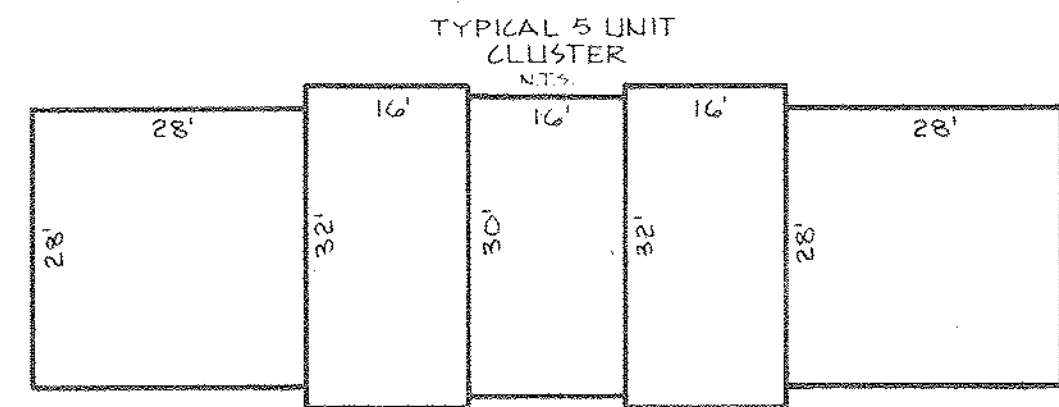
*George Coryell*

George M. Coryell for  
Byron F. Coffman and  
Cheryl Coryell

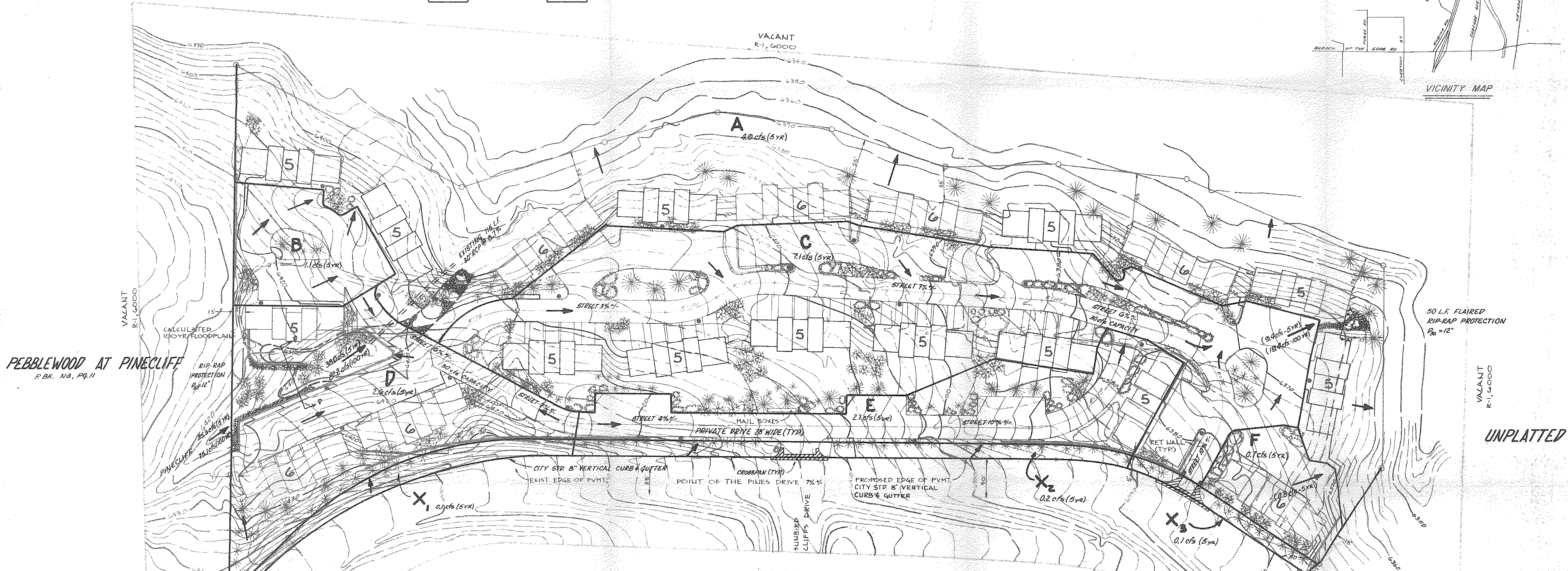
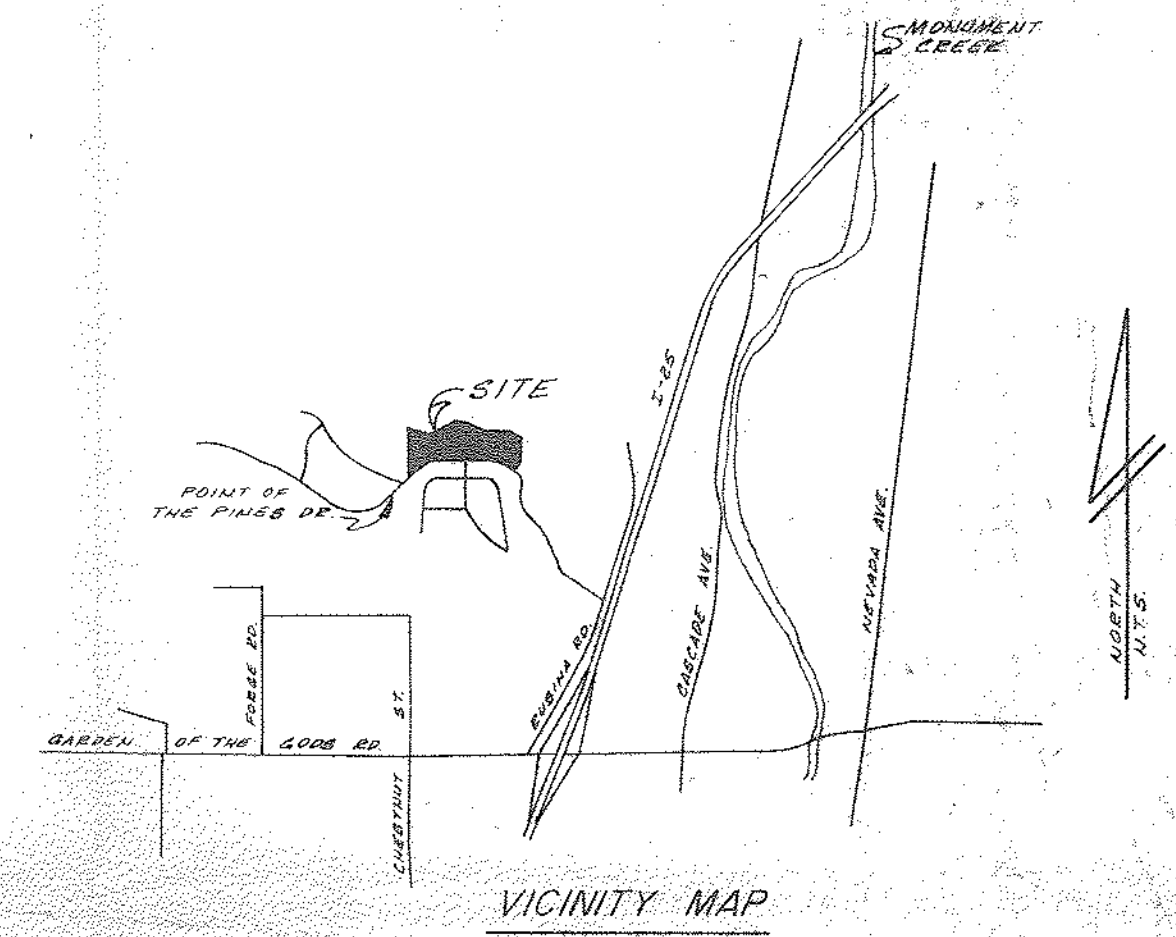
cc: Byron Coffman



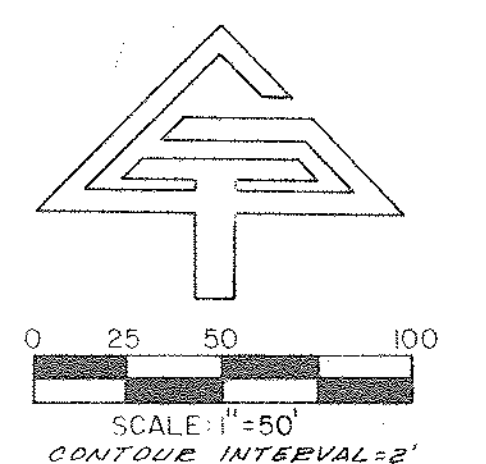
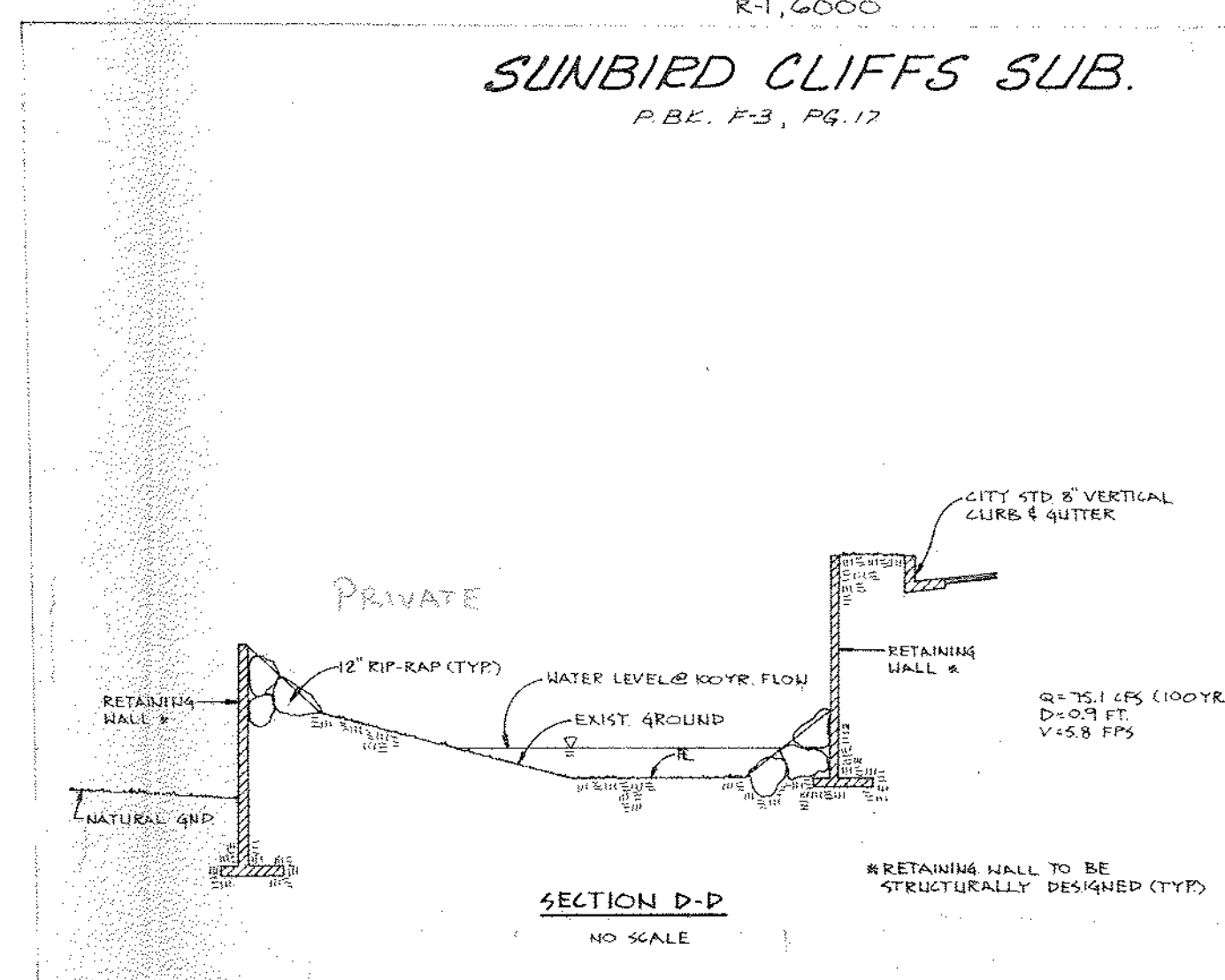
# Sunbird Terrace DRAINAGE PLAN



UNPLATTED

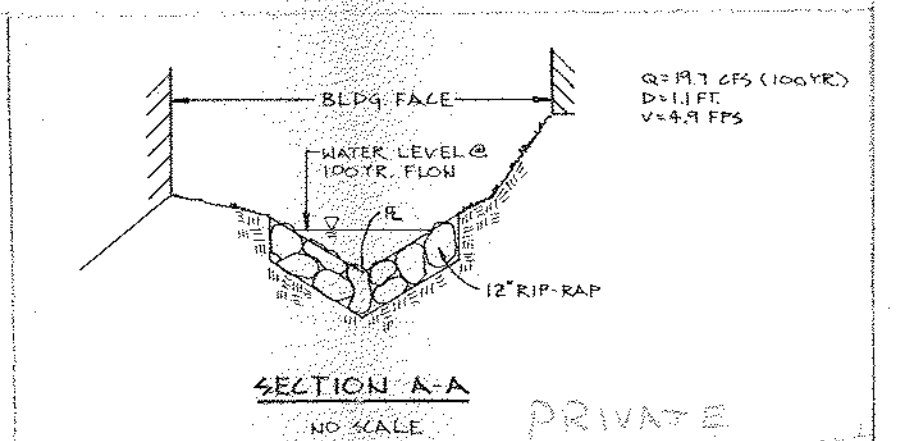


OWNER:  
 M.L. PROPERTIES  
 1150 ELKTON DR. SUITE 1400  
 COLORADO SPRINGS, COLORADO 80907



NOTE: CONSTRUCTION ANTICIPATED TO BEG. 1-APRIL-1984

TOPOGRAPHY FLOWN JULY 3, 1983 BY ANALYTICAL SURVEYS



GROWTH TECHNOLOGIES CORP  
 255 N PINE STREET, SUITE 201  
 COLORADO SPRINGS, COLORADO