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Daniel F. Lyon, Vice Chair
Tim Eichenberg, Secretary-Treasurer
Janet Sayers, Asst. Secretary-Treasurer
Danny Hernandez, Director

John P. Kelly, P.E.
Executive Engineer



Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 Prospect N.E., Albuquerque, NM 87107
Phone: (505) 884-2215 Fax: (505) 884-0214

File
J-10/D19

February 22, 2005

Brad Bingham
Section Head
Hydrology Development
600 2nd Street NW
Albuquerque, New Mexico 87102

Tony Deck
Pick at AMAFCA Office

Lynn Mazur
Development Review Engineer
AMAFCA
2600 Prospect NE
Albuquerque, New Mexico 87107

Chris Perea
Wilson & Company
4900 Lang Ave NE
Albuquerque, New Mexico 87109

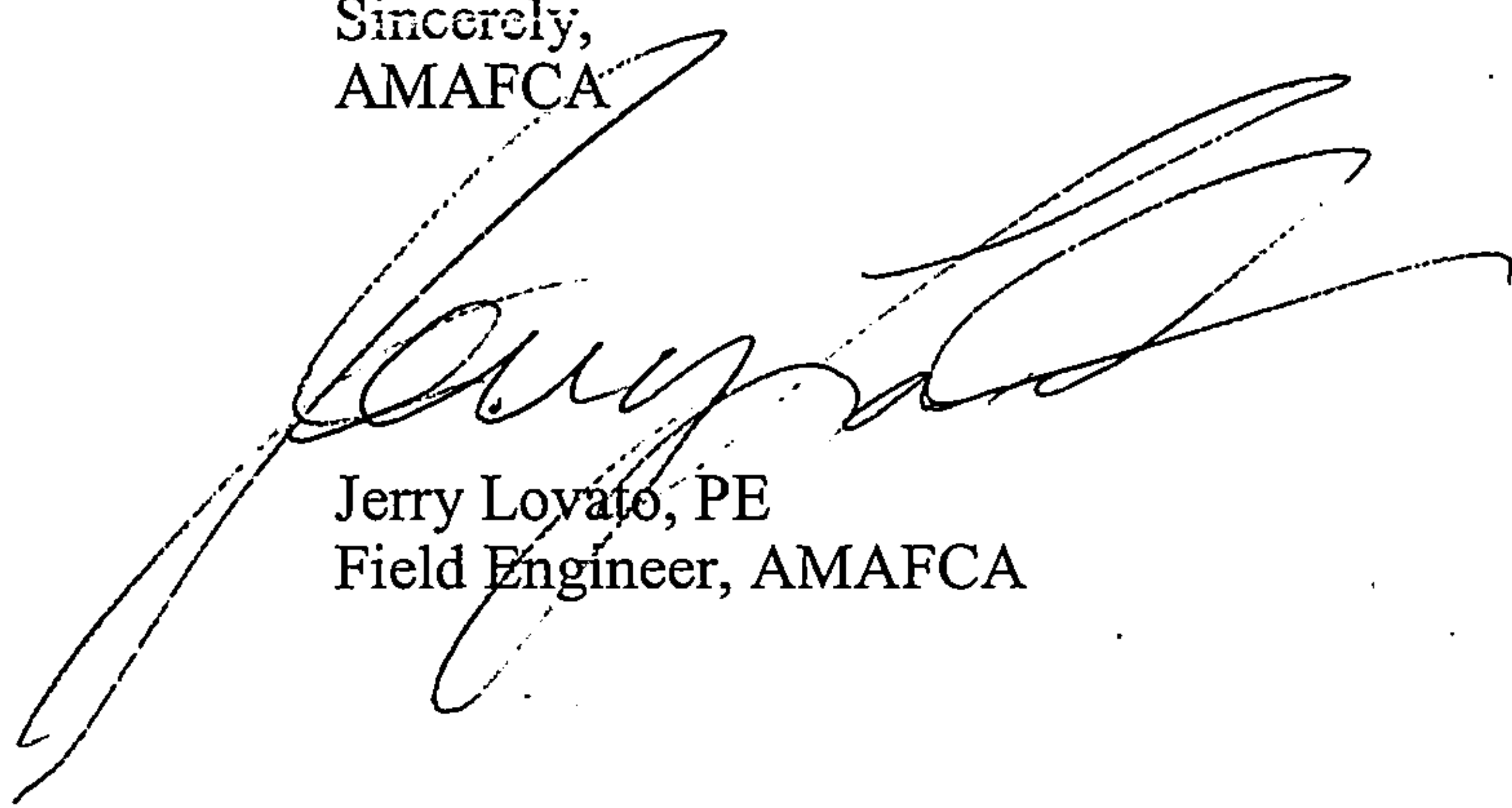
RE: West I-40 Phase Three Diversion Channel Project
Completion of Blossomwood P1 – Inlet Connection Sta 54+54.13

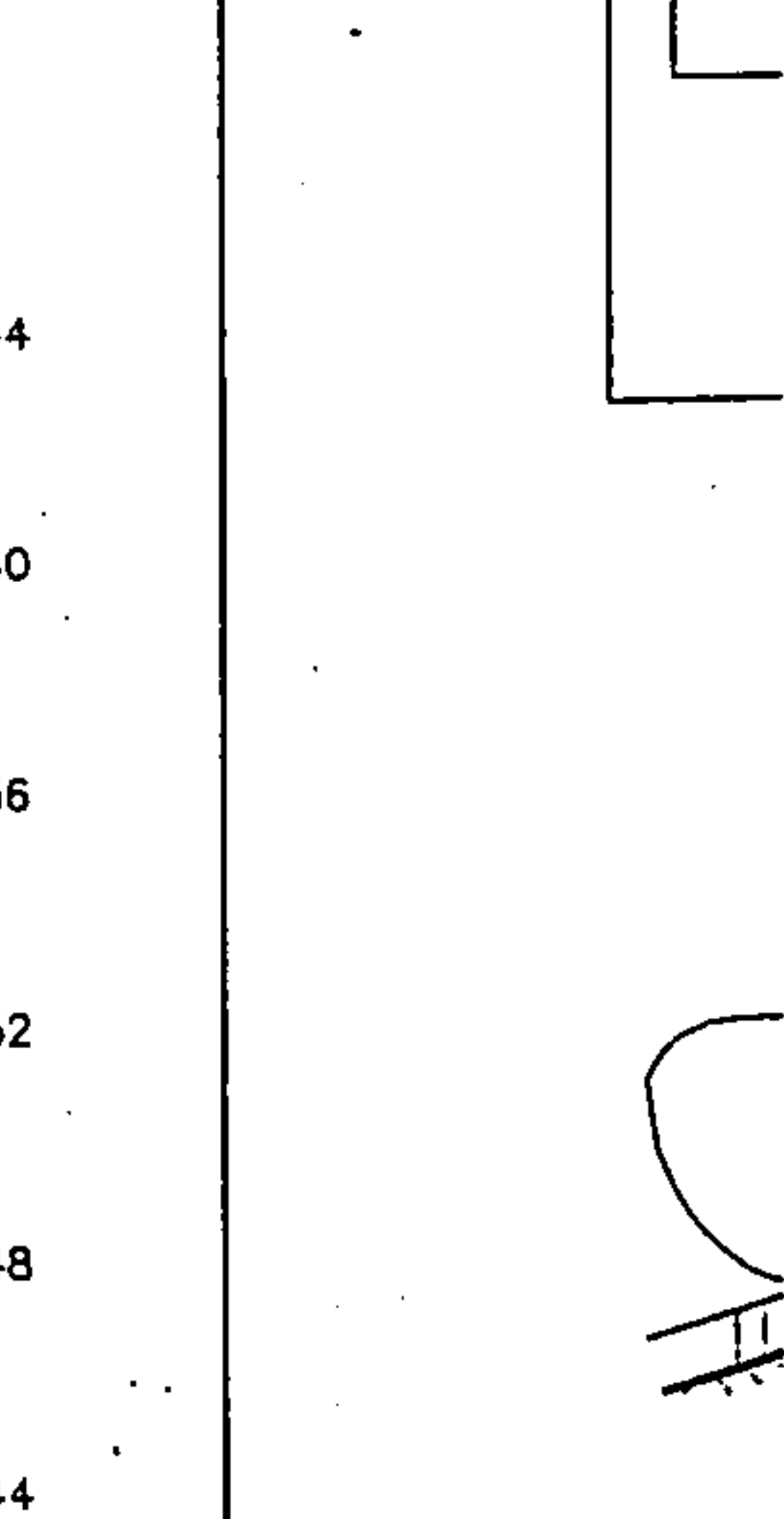
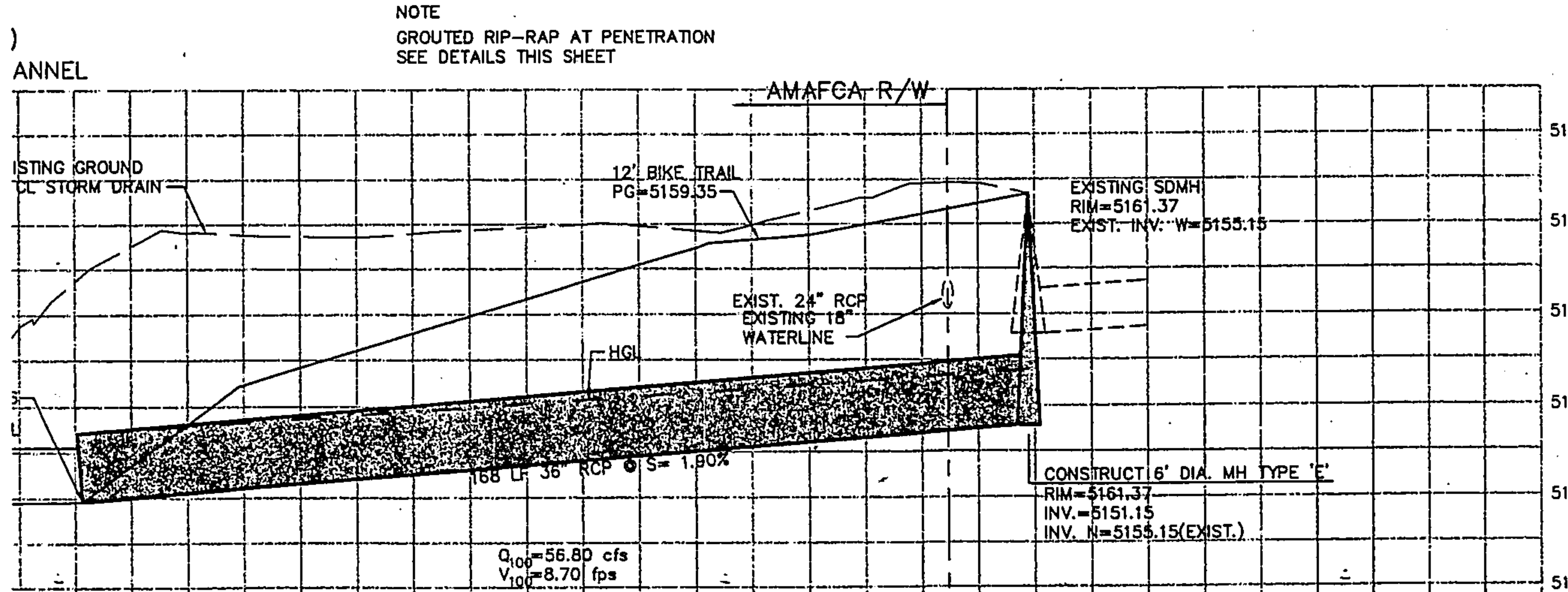
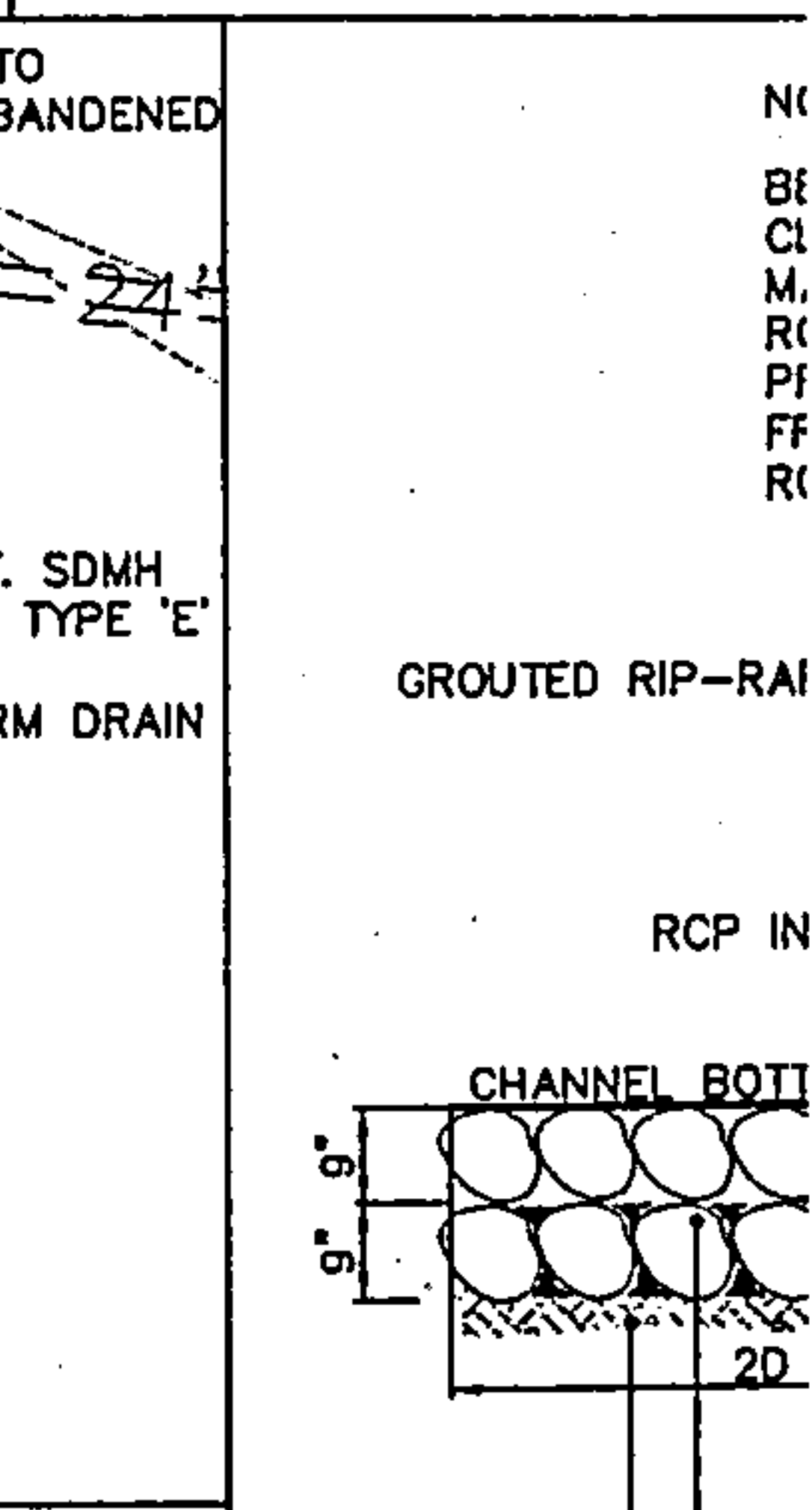
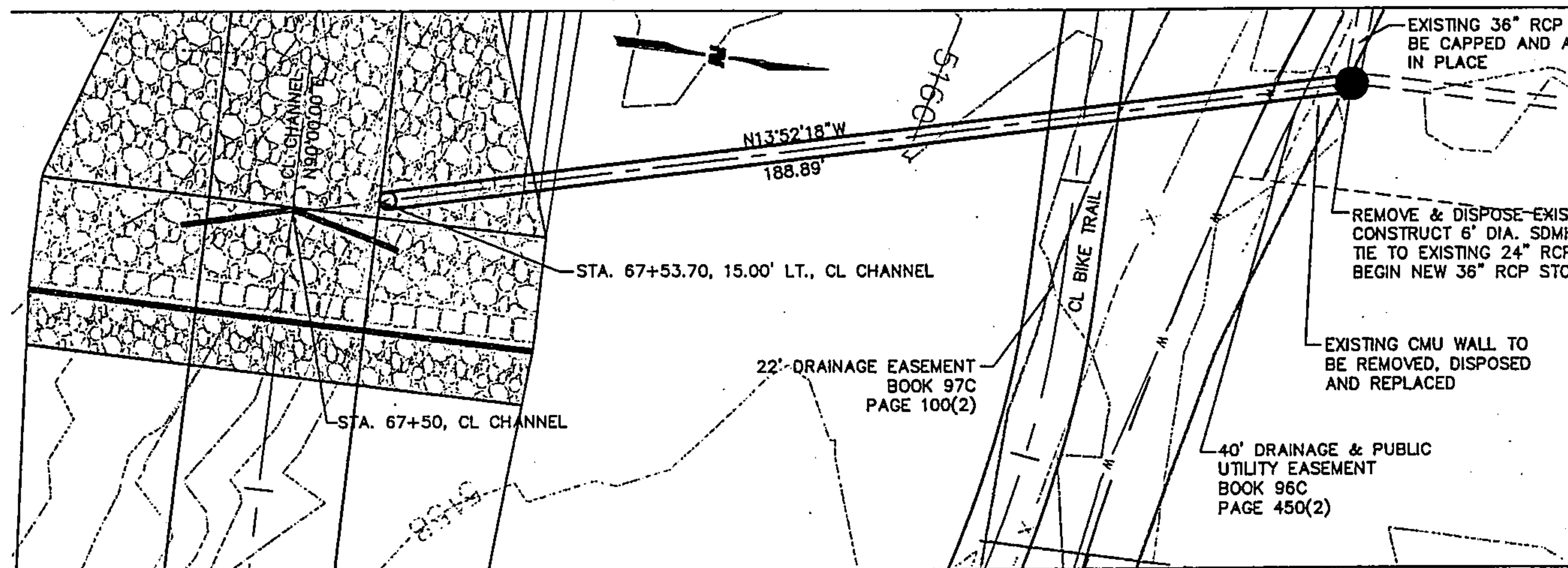
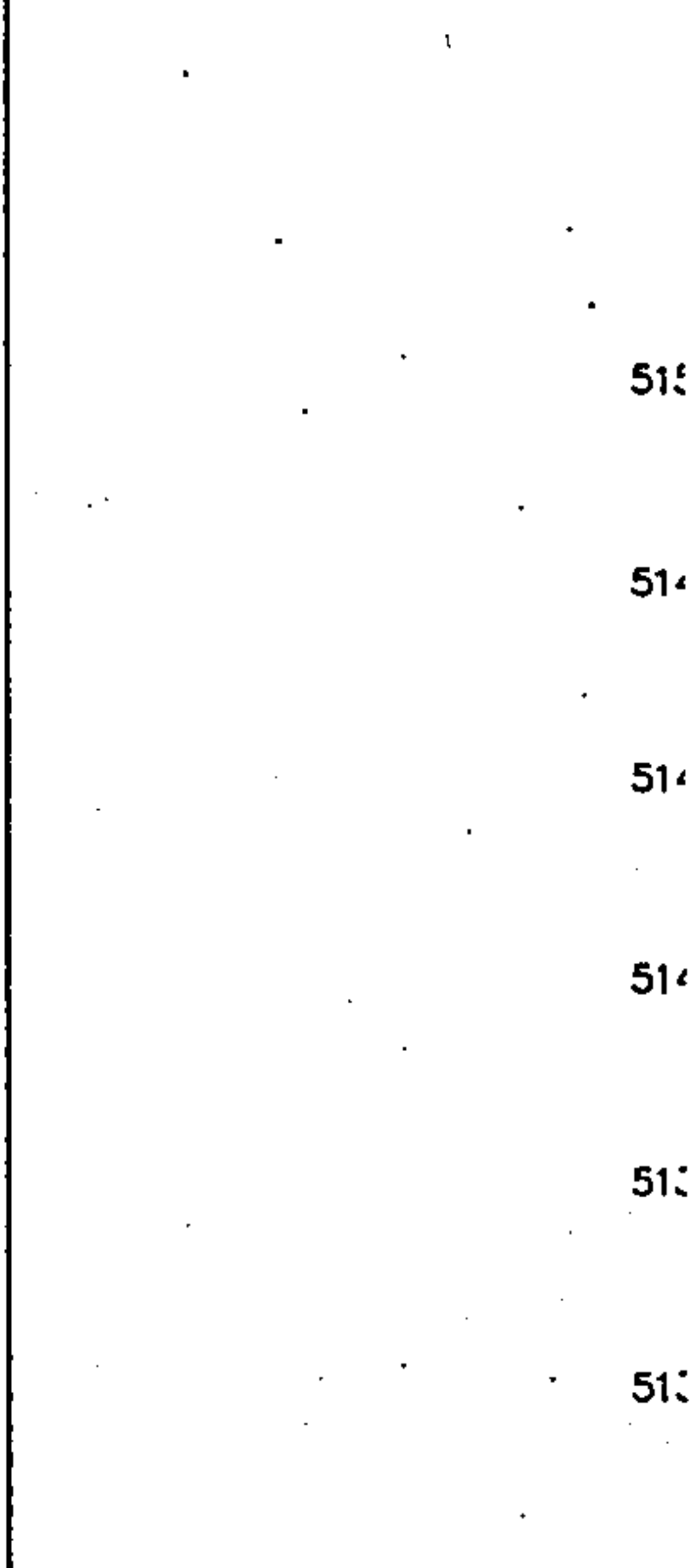
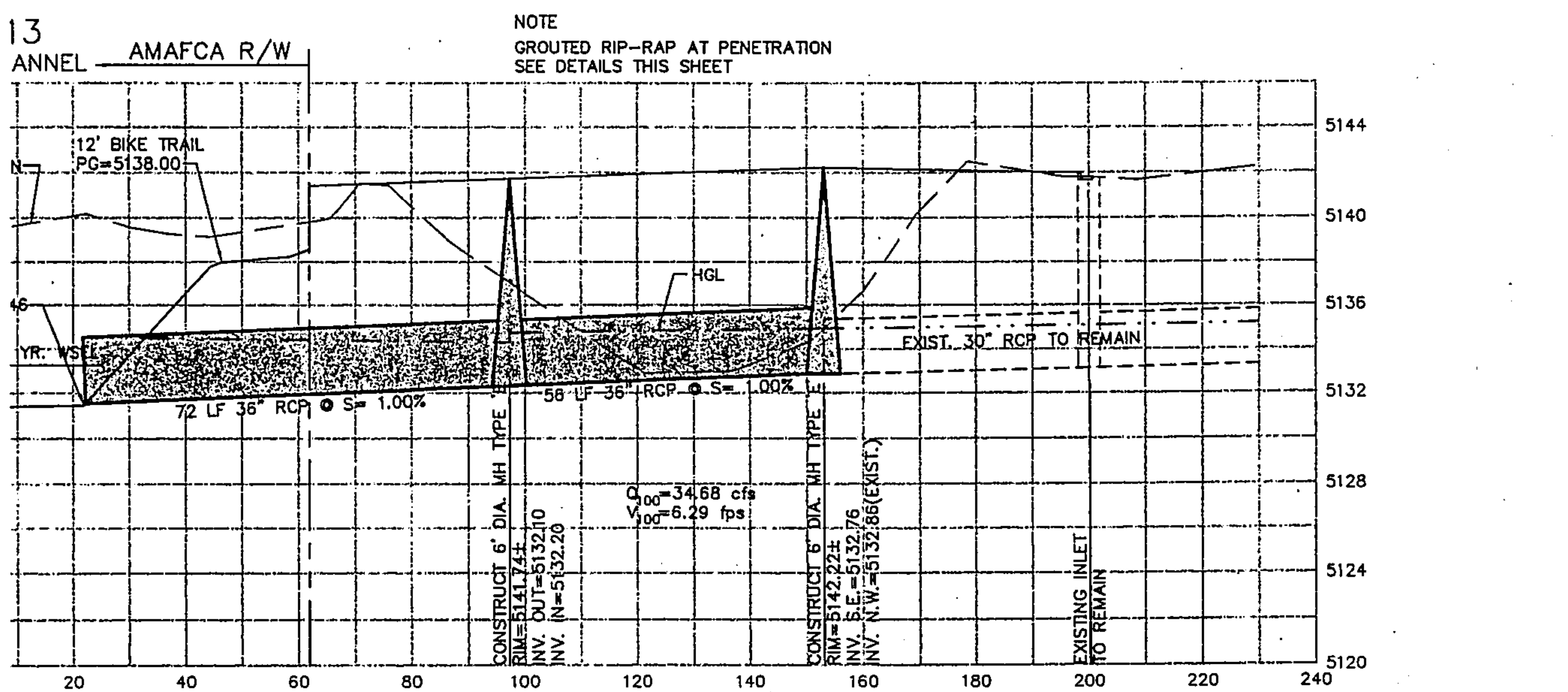
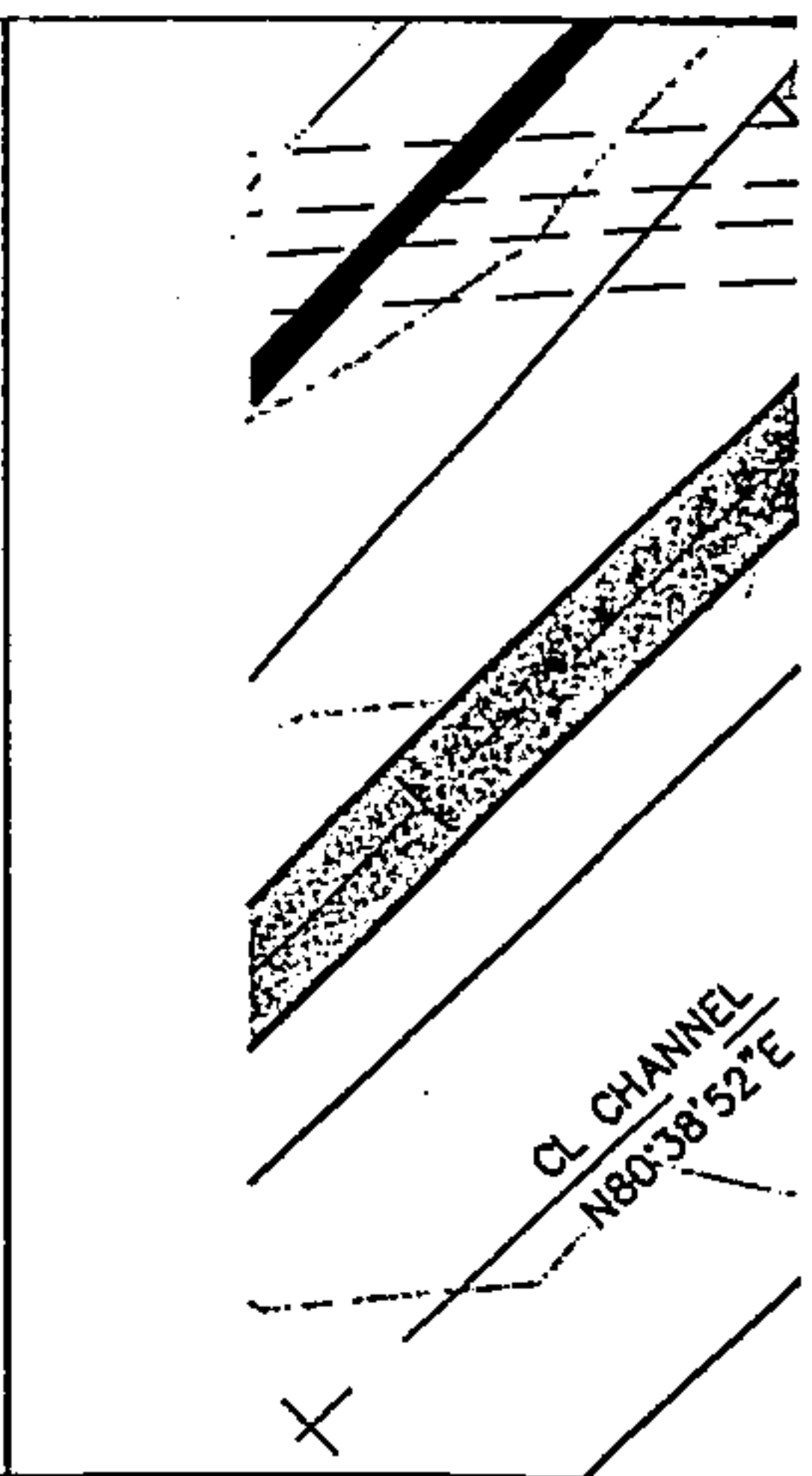
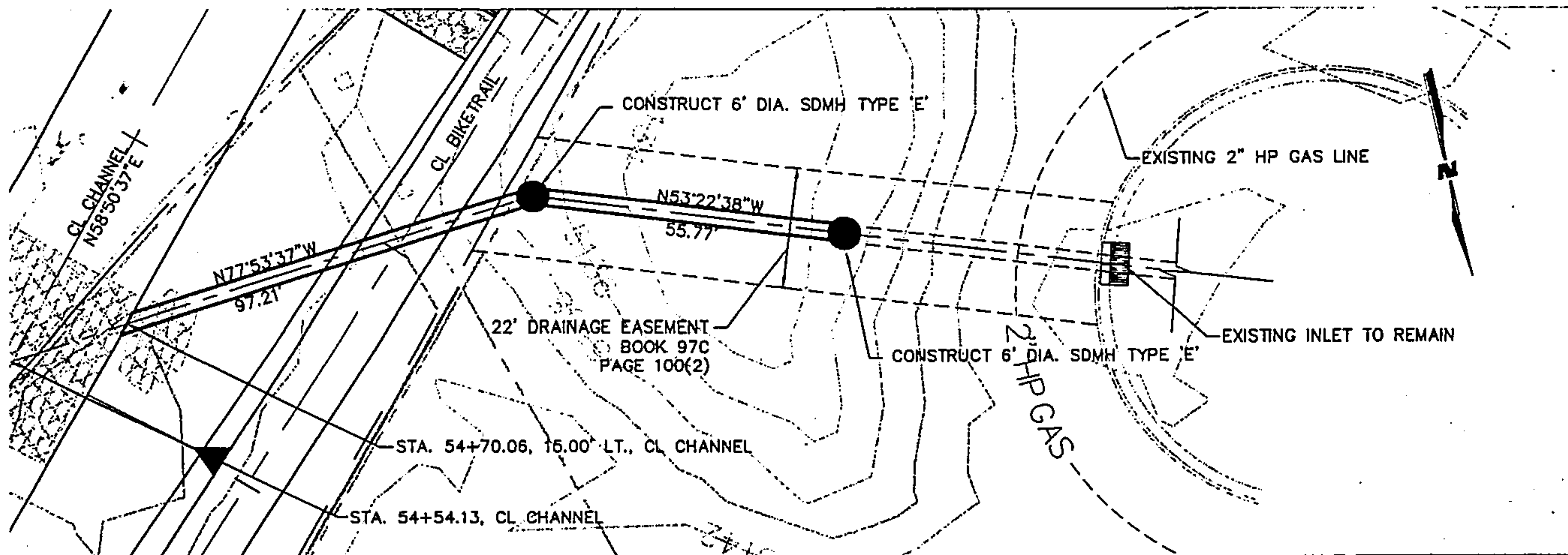
Dear Brad,

This letter shall serve as acceptance of the work done in and around the West I-40 Diversion Channel Phase III Project, at Blossomwood Place. The installation of the new 36-inch storm drain and two manholes has been completed by Albuquerque Excavators as part of their work on the project. Wilson & Company has reviewed the as-built information. This portion of the project has been completed to the satisfaction of AMAFCA.

If you have any questions or issues regarding this project please call me at 884-2215.

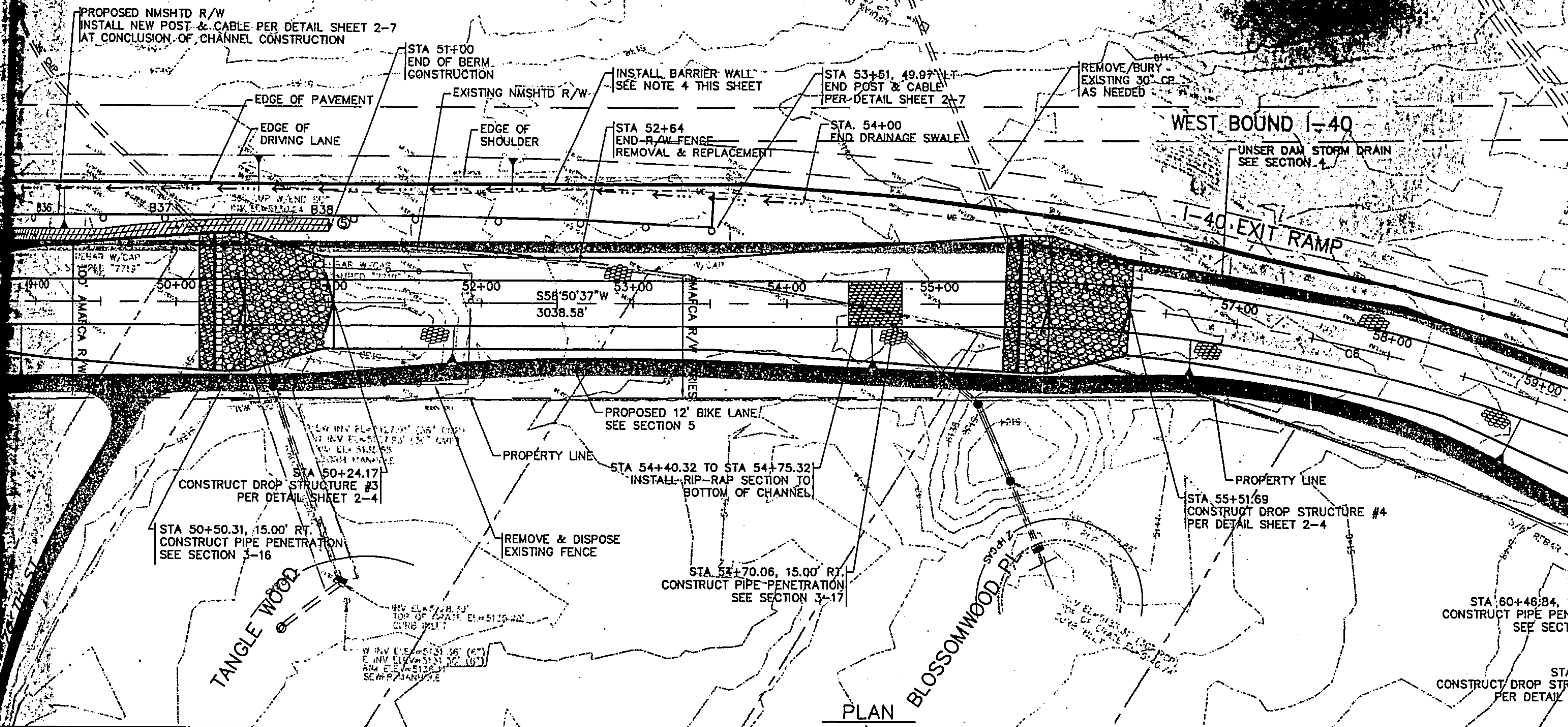
Sincerely,
AMAFCA


Jerry Lovato, PE
Field Engineer, AMAFCA

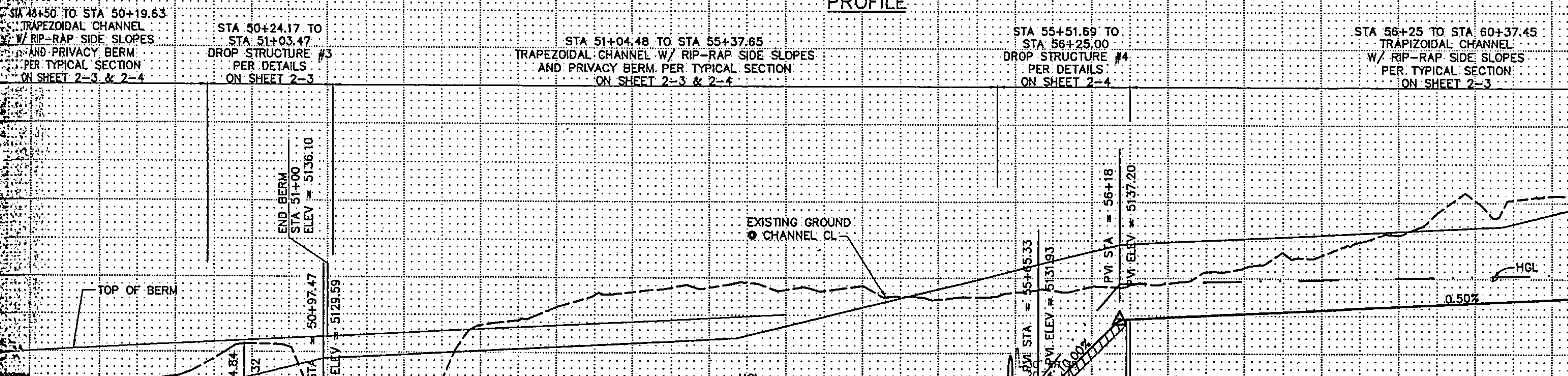


EAST BOUND I-40

WEST BOUND I-40



PROFILE



DRAINAGE REPORT

FOR

ROSEWOOD SUBDIVISION

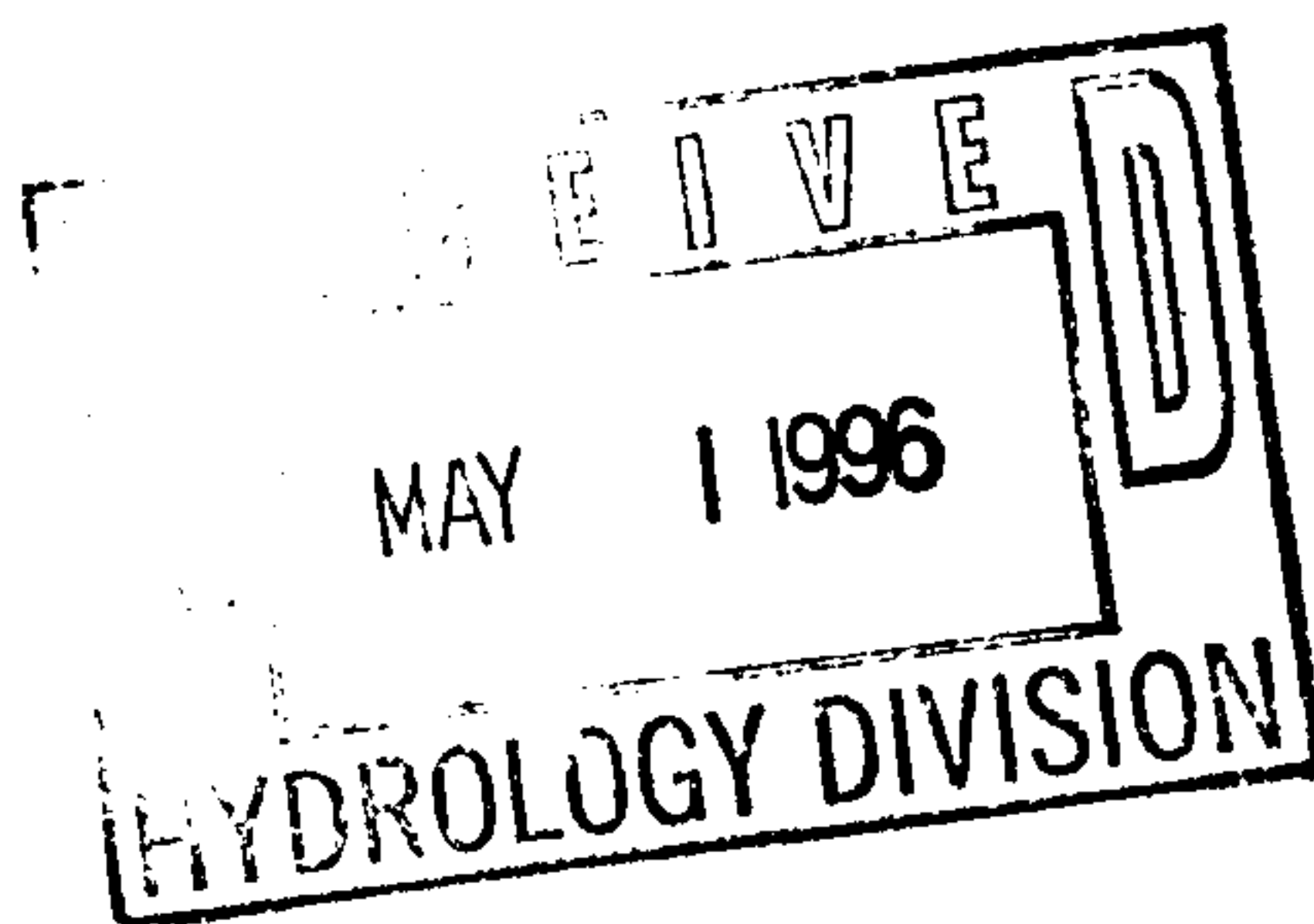
**A 55 LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION**

PREPARED FOR:

**ADIL RIZVI
7049 LUELLA ANNE DRIVE, NE
ALBUQUERQUE, NM 87112**

PREPARED BY:

**PROTEC CONSULTING
PO BOX 27007
ALBUQUERQUE, NM 87125
(505) 833-0177**



APRIL 30, 1996



R.W. Macy
4/30/96

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I. GENERAL

I.1 Legal Description

A certain tract of land, being and comprising lots 234-A, 234-B and 234-C, plat of division of Tract 234, Airport Unit, Tracts allotted from Town of Atrisco Grant, as the same are shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on March 9, 1981 in Vol. B18, Folio 146; together with a portion of Tract 233, Town of Atrisco Grant, as the same is shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on December 5, 1944 in Vol. D, Folio 118, less and excepting that portion of said Tract taken for the right-of-way of the access ramp from I-40 to Unser Boulevard, NW as the same is shown on the New Mexico State Highway Commission Right-of-way Map I-040-3(28)148.

I.2 Engineer

PROTEC Consulting
PO Box 27007
Albuquerque, NM 87125
(505) 833-0177

I.3 Surveyor

Southwest Surveying Co., Inc.
333 Lomas Boulevard, NE
Albuquerque, NM 87102
(505) 247-4444

I.4 Benchmark

ACS "I-J9" located on the Unser Blvd overpass on I-040 approximately 222 feet north of centerline of I-040. Elevation 5199.19

I.5 TBM

SAS MH rim at Hanover Road and 80th Street, NW. Elevation 5153.61

I.6 Zoning

RD (15 Du/Acre max.)

I.7 Proposed

55 Single Family Residential Lots

I.8 Area

9.6161 Acres more or less (418,877.32 square feet, more or less)

I.9 Flood Hazard

The proposed site (Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant) is located within Flood Hazard Zone C (areas of minimal flooding) as designated on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) Community-Panel No. 350002 0027 C (October 14, 1983).

I.10 Location and Description

The proposed 9.6161 acre site is undeveloped and mostly undisturbed at the writing of this Drainage Report. The extreme west edge of the site has been disturbed along the length of the west boundary line as a result of block retaining wall construction for the recently developed Chamisa Encantada Subdivision. Existing ground cover across the site is comprised of sage brush and various native grasses. The proposed site is bounded on the north by Hanover Road, NW, on the south by the Unser Boulevard northbound off ramp from the Unser/I-40 Interchange, on the west by the Chamisa Encantada Subdivision, and on the east by Tract 232 Airport Unit, Town of Atrisco Grant, which is presently undeveloped. Hanover Road is developed and is characterized by a 40' wide paved roadway with standard curb and gutters on either side, a sanitary sewer collection system, water line, and overhead power and telephone lines. There are presently no sidewalks on Hanover Road adjacent to the proposed site. The proposed West Bluff Outfall Channel (West Bluff Storm Interceptor, Phase II) is planned to be located at the south edge of the proposed site inside of existing Unser/I-40 Interchange right-of-way. Plans for the outfall channel improvements are currently in the preliminary design phase, and construction is expected to begin sometime in 1997.

II HYDROLOGIC ANALYSIS**II.1 Existing Conditions**

Hanover Road, NW intercepts offsite flows originating from north of the proposed Rosewood Subdivision and diverts them eastward to the Laurelwood Park Drainage Management Area at the northwest corner of Hanover Road, NW and 72nd Street, NW.

The recently developed Chamisa Encantada Subdivision is immediately west of the proposed site. This subdivision has been designed to carry all storm runoff originating from within it to the south for containment in a temporary earthen drainage basin. This basin will eventually be removed and replaced with the development of residential lots when the West Bluff Outfall Channel is constructed along the north edge of the northbound Unser/I-40 off ramp. At that time, runoff from the Chamisa Encantada Subdivision will drain directly into the West Bluff Outfall Channel.

Runoff originating along the north edge of the Unser/I-40 northbound off ramp is collected within the I-40 right-of-way at the north edge of the roadway. It is conveyed in a roadside ditch to the east for several hundred feet where it is drained into a 30-inch diameter CMP culvert and directed southward to the south side of I-40.

Off-site flows are prevented from entering the proposed Rosewood Subdivision by drainage improvements associated with Hanover Road, NW, the Chamisa Encantada Subdivision and the Unser/ I-40 off ramp.

Presently, runoff originating on the proposed Rosewood Subdivision drains eastward primarily as sheet flow with a gradient of approximately 2%. Based on a review of actual field conditions and recent topography, it appears the northern most 1.25 acres of the 9.6161 acre site will drain either directly onto Hanover Road, NW, or will exit the east edge of the property in a natural swale that subsequently turns north and drains onto Hanover Road, NW within Tract 232. The remaining 8.27 acres drains east to southeast and enters the north edge of the I-40 right of way, where the runoff is collected into a 30-inch CMP culvert and directed southward to the south side of I-40.

II.2 Site Hydrology (Existing Conditions)

The site hydrology as determined herein is based on the methods and criteria presented in the City of Albuquerque Development Process Manual (DPM) - Volume 2, Section 22.2 Hydrology, dated January 1993. The proposed site is in Precipitation Zone 1 (west of the Rio Grande). The P360 (100-year, 6-hour storm event) has a depth of 2.20 inches as shown in Table A-2. Since the proposed site is primarily undeveloped and undisturbed land, then Land Treatment A is applicable. See Table A-2. Excess Precipitation E for this storm is 0.44 inches as shown in Table A-8. The Peak Discharge, Q_p , from the same storm is 1.29 cfs/acre. See Table A-9. The runoff volumes and peak discharge rates from the undeveloped site are determined as follows:

1.25 Acres at the South Edge of Hanover Road, NW

$$\text{Volume(360)} = 0.44 \text{ in} \times 1.25 \text{ ac} \times 1 \text{ ft}/12 \text{ in}$$

$$\text{Volume(360)} = .04583 \text{ ac-ft}$$

$$\text{Volume(360)} = 1,996.5 \text{ cf}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.29 \text{ cfs/acre} \times 1.25 \text{ ac}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.6 \text{ cfs}$$

Remaining 8.37 Acres

$$\text{Volume(360)} = 13,368.6 \text{ ac-ft}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 10.8 \text{ cfs}$$

II.3 Proposed Improvements (Interim)

Initially, it will be necessary to construct a temporary retention basin at the south end of the subdivision to receive on-site runoff. This basin will require the area of two residential lots (Lots 9 and 10 in Block C) plus a portion of the drainage area designated as DA-3b, which will be dedicated for the future West Bluff Outfall Channel.

Lot 1 and a portion of Lot 2 in Block B will drain northward onto Hanover Road, NW. This is a result of developing a water block in Blossom Wood Road, NW at Hanover Road, NW to prevent runoff in Hanover from entering the site. The area draining onto Hanover (DA-1) is approximately 0.365 acres.

Kane Court, NW will be constructed without a street crown, and runoff will be allowed to drain from the north side of the street to the south curb line while being conveyed eastward. This is to diminish the flow of water entering Blossom Wood Road from Kane Court at the extreme northwest quadrant of the intersection, where there would be a possible opportunity for some of the runoff to rise above the water block and drain northward into Hanover Road. The vertical geometry of Blossom Wood Road is such that it must rise high enough near Hanover Road so as to produce a sufficient gradient southward to the knuckle. Furthermore, this must be done without resulting in an undesirably low elevation at the knuckle, which would impair drainage into the future West Bluff Outfall Channel. The need to raise Blossom Wood Road to provide a sufficient gradient along the roadway toward the south, while simultaneously directing runoff from Kane Court southward on Blossom Wood Road away from Hanover, results in tight vertical curve geometry on Blossom Wood Road between Kane Court and Hanover Road, and also prompts the elimination of the street crown in Kane Court.

There is a small area of approximately 0.0634 acres at the extreme east end of Amy Marie Road, NW that will drain directly onto Tract 232 to the east. A water block will be created in this area of Amy Marie Road to prevent runoff in Blossom Wood Road from turning east at Amy Marie Road and draining onto Tract 232.

Baybrook Road, NW will connect Blossom Wood Road with the existing Tarrington Drive, NW in the Chamisa Encantada Subdivision. A water block will be formed in Baybrook Road just east of Tarrington Drive to prevent flows from leaving Tarrington Drive and entering Baybrook Road. The geometry of the water block is such that a small area (approximately 0.0317 acres) of the Chamisa Encantada Subdivision will drain into the Rosewood Subdivision.

Single and Double "C" inlets will be placed along Blossom Wood Road as shown on the Grading and Drainage Plan to prevent street flow for the 100-year, 6-hour event from overtopping the curbs. The curb inlets and storm drain piping are sized to accommodate the runoff from this storm event.

The temporary retention pond will be sized to contain runoff from the 100-year, 6-hour storm event originating from within the Rosewood Subdivision. Only drainage areas DA-1, DA-2, and DA-3a will not contribute runoff into the pond. DA-1 is comprised of Lot 1 and part of Lot 2 in

Block B. As discussed above, this area will drain north into Hanover Road, NW. DA-2 is the extreme east end of Amy Marie Road which will drain into Tract 232. DA-3a is a portion of the land dedicated as future right-of-way for the West Bluff Outfall Channel. The 0.0386 acres of DA-3a will continue to drain into the Unser/I-40 Interchange right-of-way as it does presently. The retention pond will be of earthen construction with 3:1 interior slopes and a 4:1 exterior slope where necessary. It will have dumped riprap where the 30-inch storm drain line enters the pond, and it will be enclosed with a five foot high chain link fence. Total pond depth will be eight feet. It will be equipped with an emergency spillway capable of discharging a flow rate equal to the 10-year, 6-hour runoff from the Rosewood Subdivision. Discharge from the spillway will be into the Unser/I-40 Interchange right-of-way.

II.4 Proposed Improvements (Final Conditions)

In the final conditions, after the West Bluff Outfall Channel is constructed, the temporary retention pond will be removed. Lots 9 and 10 in Block C will be completely developed and a 15-foot wide drainage easement will be located between the lots. The drainage easement will serve three functions. First, it will provide for placement of the 30-inch RCP storm drain that will connect Blossom Wood Road with the future West Bluff Outfall Channel. Second, it will serve as an emergency storm water (surface) outlet from the subdivision in the event the storm drain becomes clogged or a storm with a lower return frequency than the 100-year, 6-hour event is encountered. Finally, it will serve as a pedestrian access to the future trail system planned for construction along the north edge of the future West Bluff Outfall Channel.

All other aspects of the drainage improvements will remain as described in II.3 above.

II.5 General Site Hydrology for Developed Conditions

The total runoff volume and peak discharge from the developed site into the retention pond (DA-4 and DA-5) are determined as follows:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	EXCESS PRECIP (Inches)	PEAK DISCHARGE (cfs)
A	0.00	0.44	1.29
B	2.99	0.67	2.03
C	1.15	0.99	2.87
D	5.05	1.97	4.37

Runoff Volume into the Retention Pond

$$\text{Weighted E} = ((2.99 \times 0.67) + (1.15 \times 0.99) + (5.05 \times 1.97))/9.19$$

$$\text{Weighted E} = 1.425 \text{ inches}$$

$$\text{Volume(360)} = 1.42 \text{ in} \times 9.19 \text{ acres} \times 1 \text{ ft}/12 \text{ in} = 1.0914 \text{ acre-ft}$$

$$\text{Volume(360)} = 1.0914 \text{ acre-ft} \times 43,560 \text{ sf/acre} = 47,543 \text{ cf}$$

Peak Discharge

Total Peak Discharge from combined drainage areas DA-4 and DA-5 into the retention pond is determined as follows:

$$\text{Peak Discharge (100-yr, 6-hr)} = (2.99 \times 2.03) + (1.15 \times 2.87) + (5.05 \times 4.37)$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 31.46 \text{ cfs}$$

II.6 Site Hydrology Street Capacity

Except for the short one block segment of Blossom Wood Road, NW between Kane Court and Hanover Road, all of the roads within the Rosewood Subdivision are 28 feet from face-of-curb to face-of-curb. This one block segment has a street width of 32 feet.

The City of Albuquerque DPM Plate 22.3 D-1 provides a determination of street flow capacity for a 32 foot wide street of varying street slopes and flow depths. It is understood that the capacity within a 28 foot wide street will be less than a 32 foot wide street for depths which exceed the crown height (approximately 0.28 feet). Of particular interest here is the street capacity when the flow is just below the top of curb. It is desirable to place inlets and storm drains into the street system so that the street flow does not exceed the curb tops. This will minimize damage to the planter areas between the back of curb and sidewalk. Since the difference in flow capacity between the 28 foot wide street and 32 foot wide street is primarily due to the difference in flow areas, the results obtained from Plate 22.3 D-1 will be scaled down by a factor equal to the ratio of the area of a 28 foot wide street divided by the area of a 32 foot wide street at a flow depth of 0.6 feet. This factor is approximately equal to 12.88/14.08, or 0.91.

Between Baybrook Road and Kane Court, Blossom Wood Road has a gradient of 0.50 %. At this slope a 28 foot wide road has a half street capacity of 15.5 cfs when the flow depth is 0.6 feet. Flow is subcritical with a velocity of approximately 3 fps. This street segment is the most limiting in terms of capacity, and also carries most of the flow from within the subdivision.

II.7 Site Hydrology Curb Inlets

At the west side of Blossom Wood Road just north of Baybrook Road, the flow in the west half of the street would reach approximately 11.5 cfs during the 100-year, 6-hour event, since an area of approximately 3.37 acres would contribute runoff to that point. This is determined by proportioning the total peak flow of 31.46 cfs from the 9.19 acres. From Plate 22.3 D-6 of the DPM, a Double "C" inlet would be able to remove approximately 6 cfs assuming a flow depth of 0.5 feet. The remaining 5.5 cfs would continue southward past Baybrook Road.

At a point on the west side of Blossom Wood Road just north of the knuckle, the 5.5 cfs from above would be joined by another 5.8 cfs contributed from runoff leaving Baybrook Road. A Single "C" inlet placed just north of the knuckle return would be capable of collecting about 6 cfs assuming a street slope near the vertical curve of approximately 0.2% and a flow depth of about 0.6 feet. The remaining 5.3 cfs would continue to the next inlet at the center of the knuckle on the

west side of Blossom Wood Road. Another 2.7 cfs would contribute to that inlet from the area on the north side of Blossom Wood Court west of the knuckle. The total flow arriving at the depressed inlet would equal approximately 8.0 cfs. Since the runoff collects over the top of the inlet and does not flow past it, it is probable that a Single "C" inlet would collect the 8.0 cfs without exceeding the level of the top of curb.

On the east side of Blossom Wood Road, the flow would reach 4.2 cfs from a contributing area of approximately 1.23 acres at a point opposite the proposed Double "C" inlet discussed above. A Single "C" inlet at this point on the east side of the roadway would have the capacity to remove most of this flow assuming a flow depth of approximately 0.45 feet.

The 7.3 cfs from the remainder of Blossom Wood Road would collect over the depressed inlet on the south side of the street at the center of the knuckle. Again, it is likely a Single "C" inlet would collect this runoff without exceeding the top of curb since the flow does not move past the inlet.

One advantage of the proposed design is that if the inlets or storm drains are partially clogged and operating inefficiently, the 15-foot wide drainage easement is available to collect surface runoff at the knuckle which might exceed the level of the curb tops.

Much of the storm drain along the west side of Blossom Wood Road will be 27-inch RCP. The storm drain crossing Blossom Wood Road north of Baybrook Road will be an 18-inch RCP. All of the storm drain within the area of the knuckle will be 30-inch RCP, as will the storm drain line that connects to the interim retention pond. In the final condition after construction of the West Bluff Outfall Channel, the 30-inch RCP storm drain line will be extended from the defunct retention pond to the new channel within the 15-foot drainage easement.

II.8 Site Hydrology - Emergency Spillway

The retention pond emergency spillway will be capable of passing the 10-year, 6-hour peak discharge flow rate arriving in the pond from the Rosewood Subdivision. Discharge will be into the Unser/I-40 Interchange right-of-way. The determination of the peak flow rate and spillway geometry are determined in the following:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	PEAK DISCHARGE (cfs)
A	0.00	0.24
B	2.99	0.76
C	1.15	1.49
D	5.05	2.89

Peak Discharge

$$\text{Peak Discharge (10-yr, 6-hr)} = (2.99 \times 0.76) + (1.15 \times 1.49) + (5.05 \times 2.89)$$

$$\text{Peak Discharge (10-yr, 6-hr)} = 18.58 \text{ cfs}$$

Trapezoidal (Broad Crested) Weir

$$Q = 3.367 L H^{3/2}$$

where: Q = weir flow rate, 18.58 cfs

L = length of the weir crest, ft

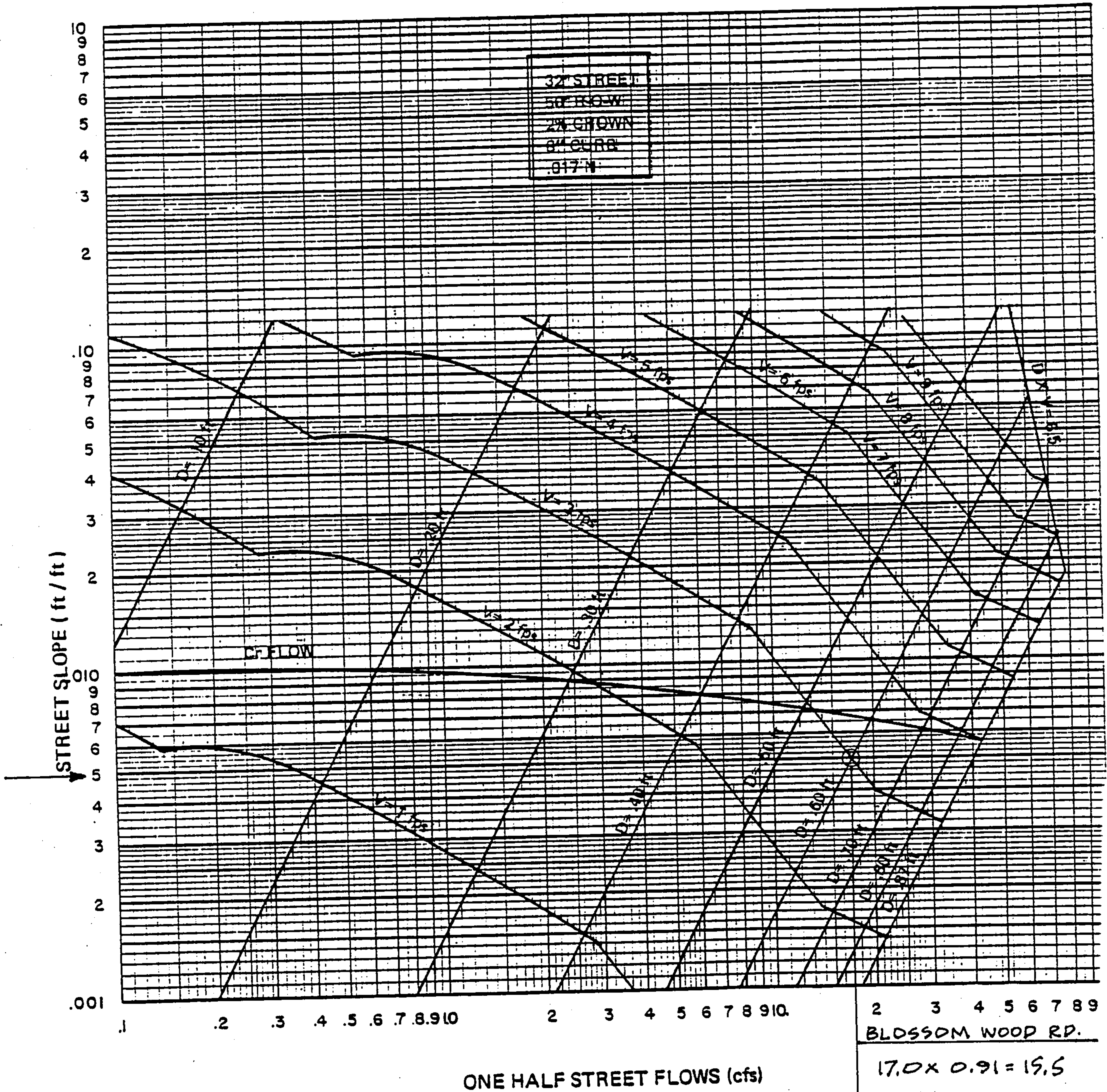
H = head on the weir, 0.5 ft (assumed)

solving L:

$$L = Q / (3.367 H^{3/2})$$

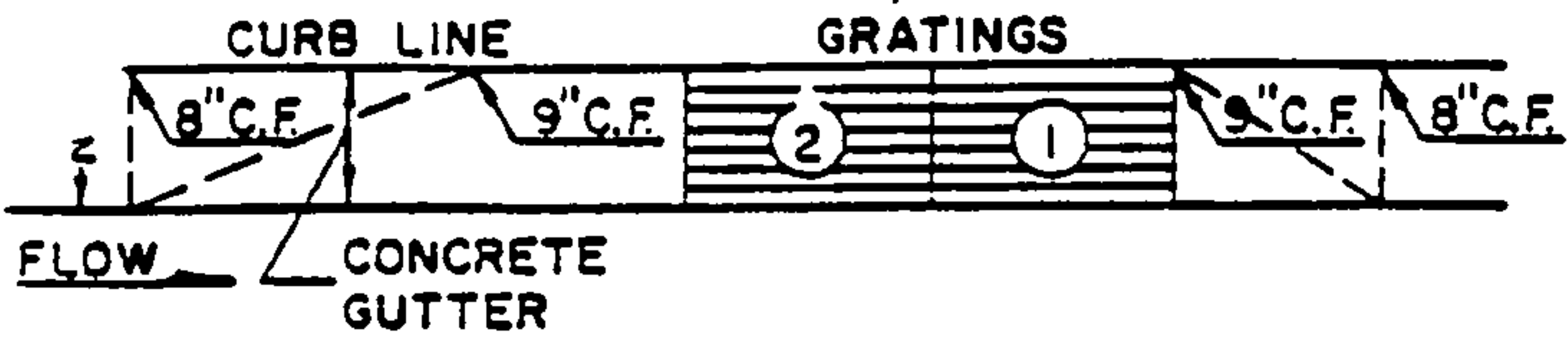
$$L = 15.61 \text{ ft} \quad \text{use 20 ft (minimum)}$$

STREET CAPACITY

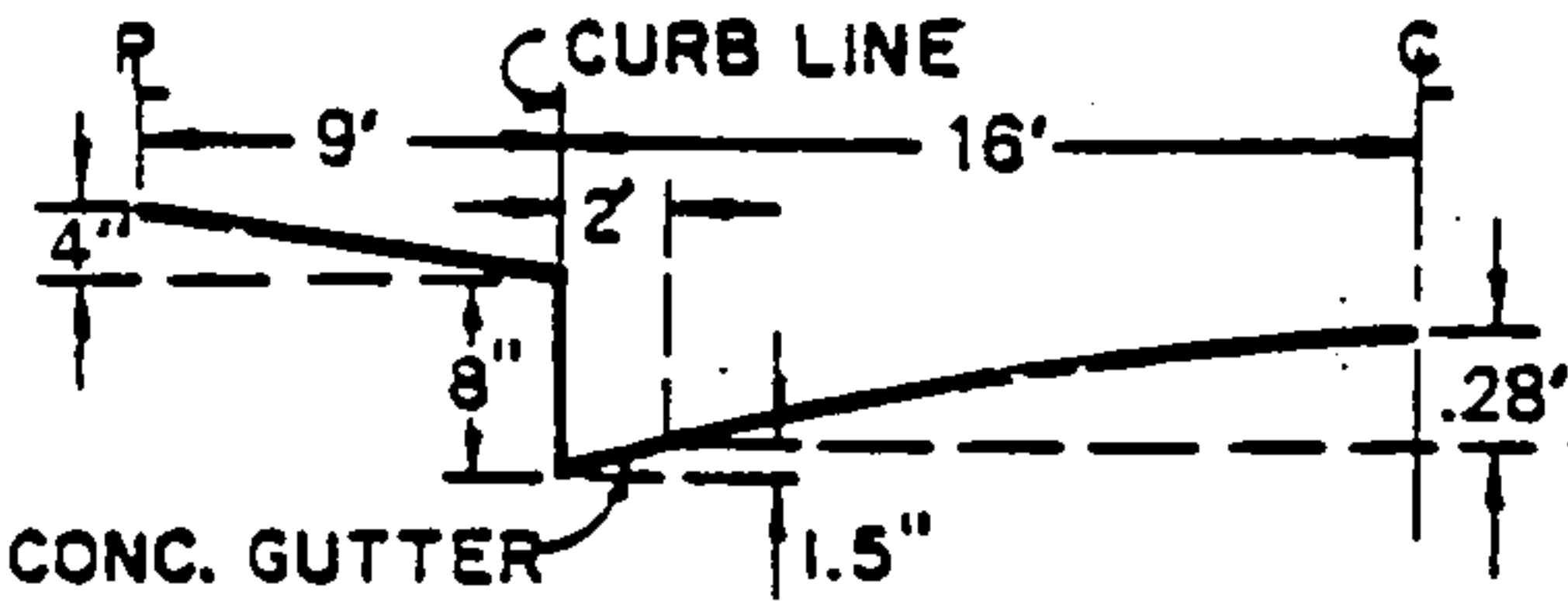


GRATING CAPACITIES FOR TYPE DOUBLE

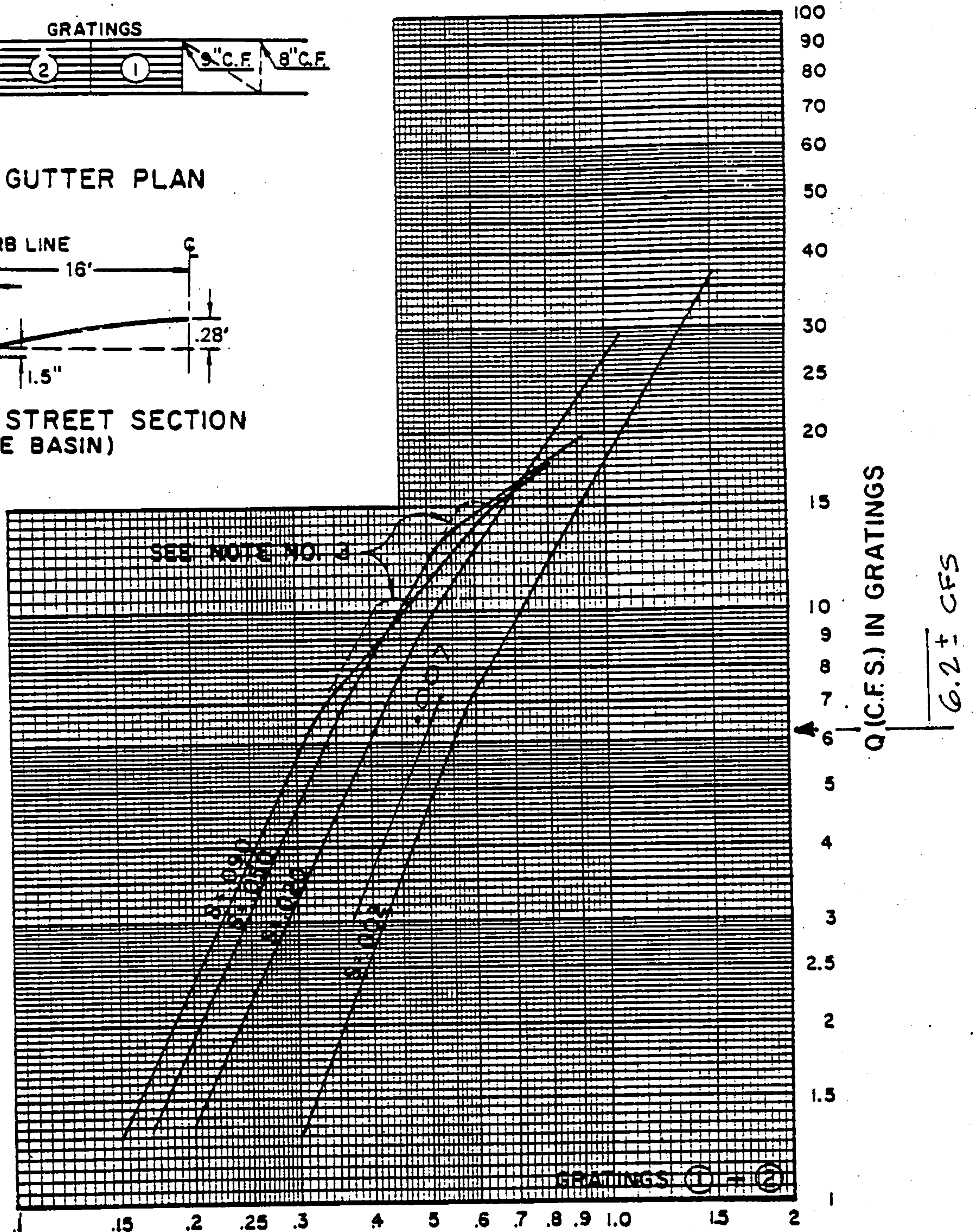
"C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



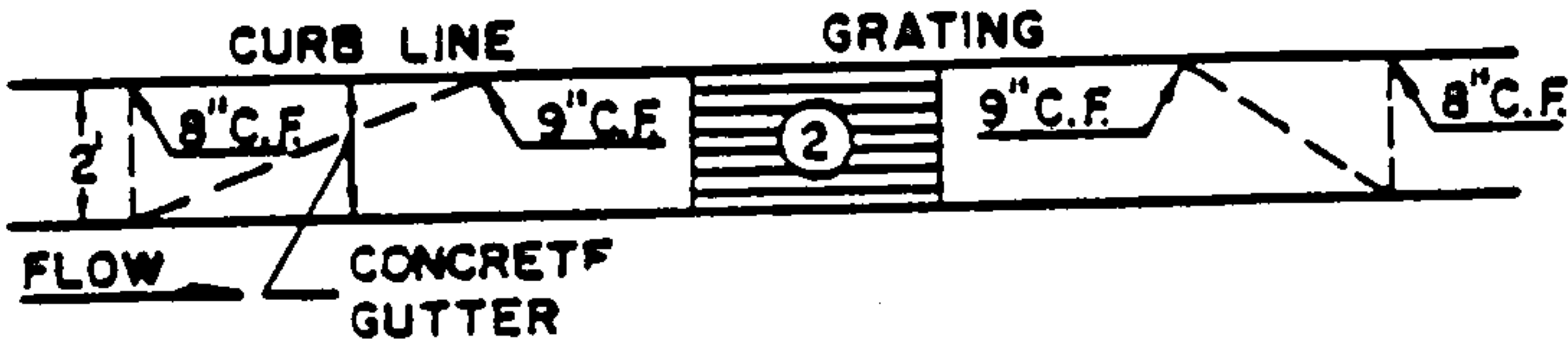
D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

ROSEWOOD SUB'N

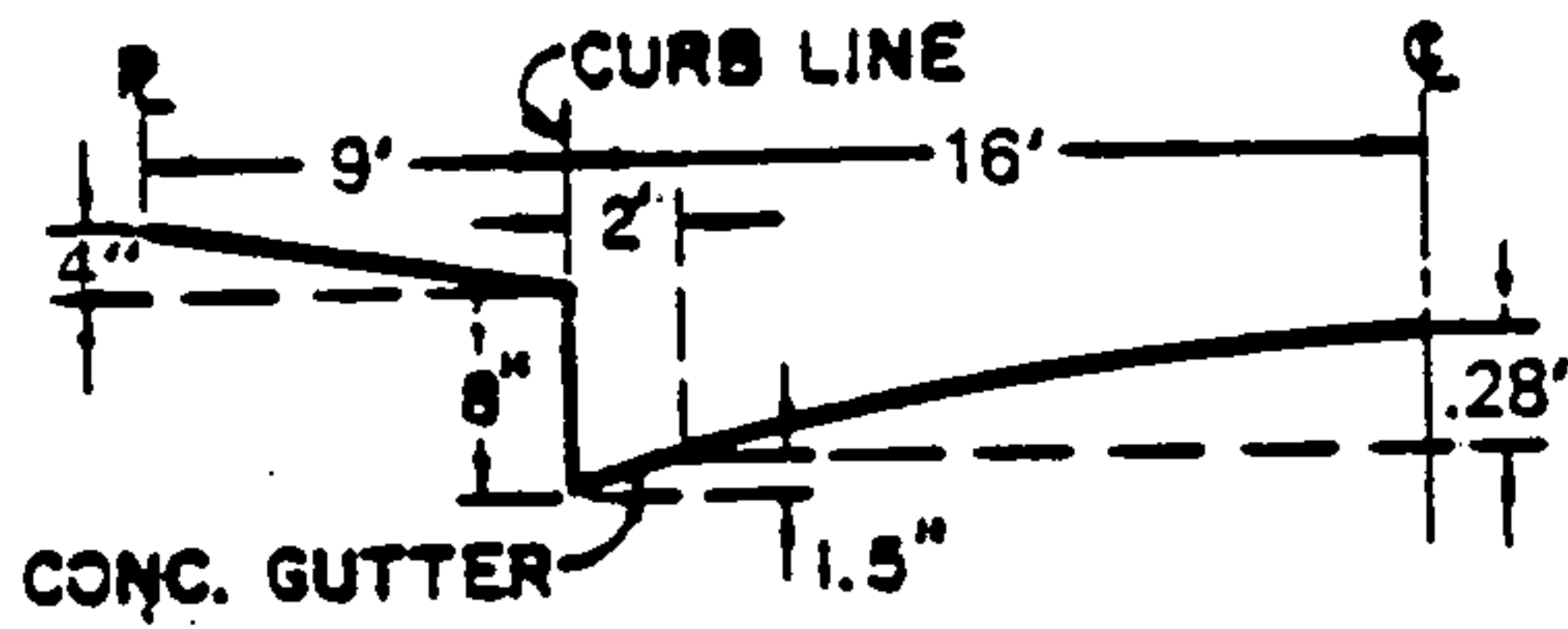
BLOSSOM WOOD RD

0.5' DEPTH @ S = 0.007 FT/FT

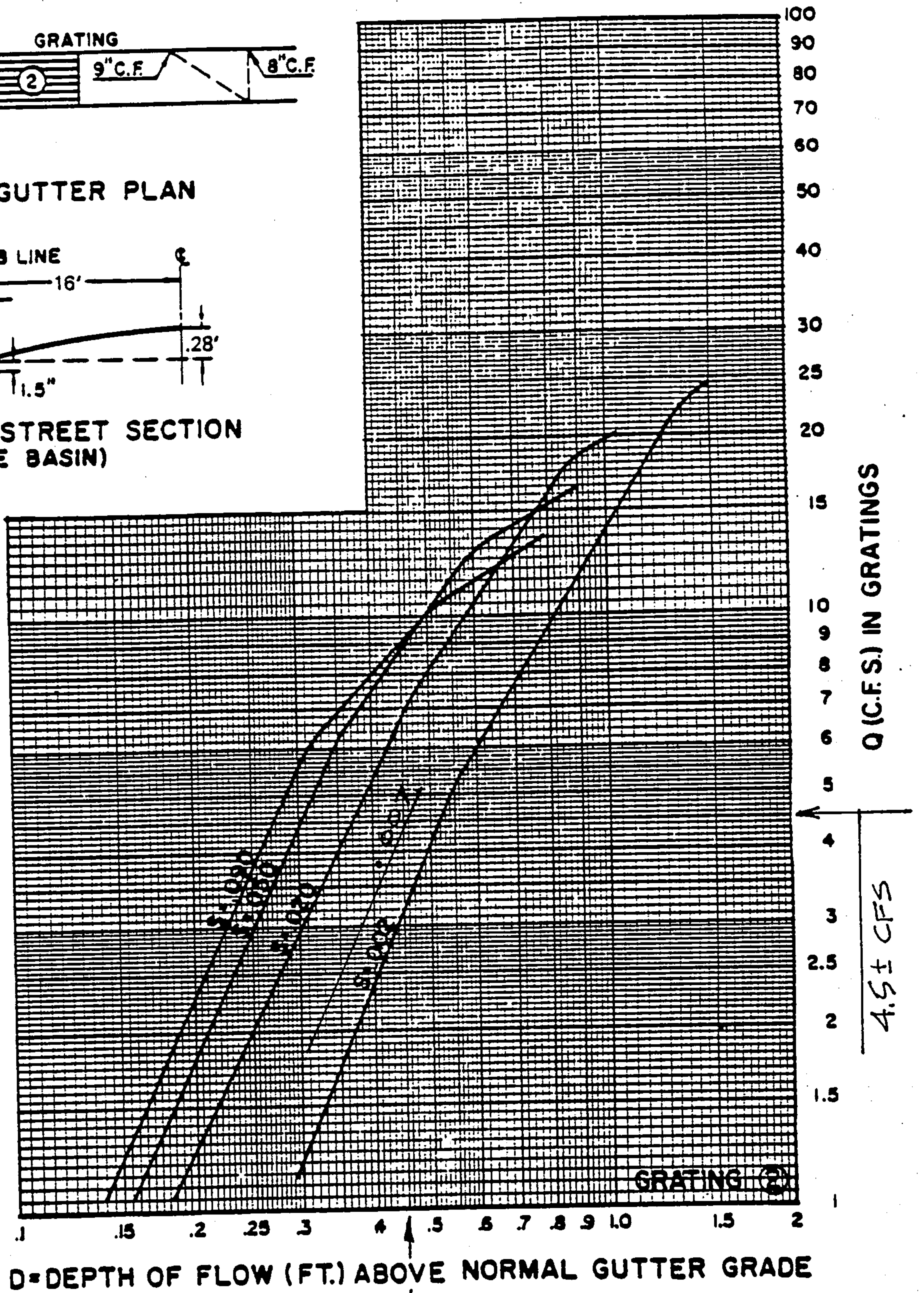
GRATING CAPACITIES FOR TYPE "A", "C" and "D"



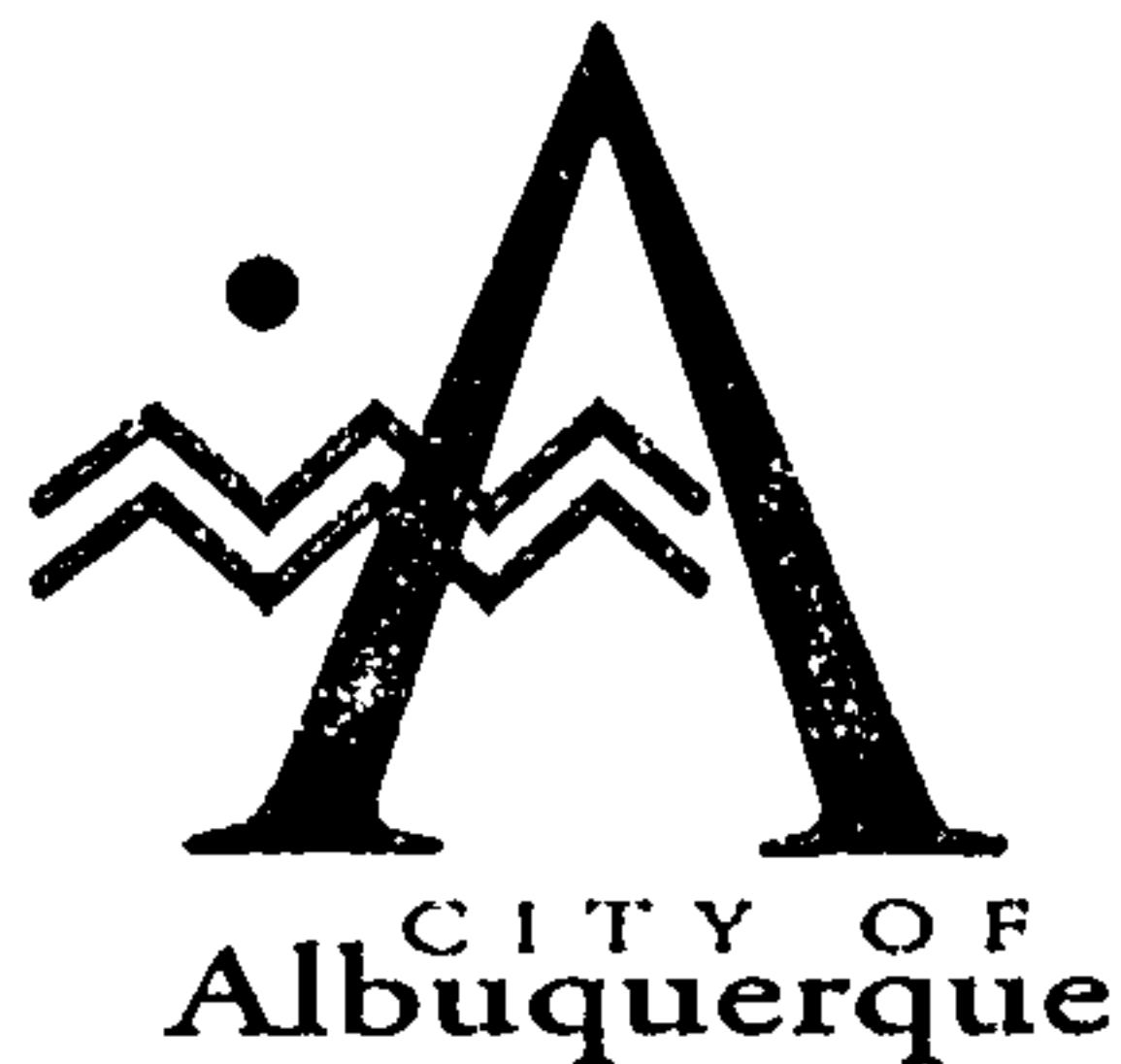
GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



BLOSSOM WOOD RD.
0.45' DEPTH @ S=0.007 FT/FT



September 17, 1997

Martin J. Chávez, Mayor

CERTIFICATE OF COMPLETION AND ACCEPTANCE

Scott Henry
Vice President
Kaufman and Broad of New Mexico, Inc.
7850 Jefferson NE
Albuquerque, NM 87109

RE: ROSEWOOD SUB'D.; CITY PROJECT NO. 550281; MAP NO. J-10

Dear Mr. Henry:

This is to certify that the City of Albuquerque accepts the construction of the infrastructure provided in the Work Order Construction Plans, City Project No. 550281 as compliance with completing the required public infrastructure listed in the Subdivision Improvements Agreement (SIA) between Kaufman and Broad of New Mexico, Inc. and the City of Albuquerque executed on March 20, 1997.

Having satisfied the requirements referenced above, the SIA and any associated Financial Guaranty, held by the City, can now be released. The Contractors one-year warranty period started at the date of acceptance by the Chief Construction Engineer, dated August 27, 1997.

Please be advised this Certificate of Completion and Acceptance shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

Should you have any questions or issues regarding this project, please contact me.

Sincerely,

Ricardo B. Roybal, P.E.
City Engineer
Dev. & Bld. Services Div.
Public Works Department

Good for You, Albuquerque!



Rosewood Sub'd., Proj. #550281

Page 2

September 17, 1997

- c. Ray Macy, Protec Consulting
- Jean Willcox, AIF, Fireman's Fund Insurance Company
- Teresa Martin, Project Administrator, Project Review
- Theresa Lucero, Assistant Project Administrator, PWD
- ~~Fred Aguirre~~, Hydrology, PWD
- Richard Dourte, Transportation Development, PWD
- Roger Green, Utility Development, PWD
- Ed Stang, Planning Section, CIP
- f/Project file



City of Albuquerque

P. O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103
PUBLIC WORKS DEPARTMENT

August 27, 1997

CERTIFICATE OF WORK ORDER COMPLETION

Kaufman & Broad of N.M., Inc.
7850 Jefferson St. NE.
Albuquerque, NM 87109

Re: Rosewood Subdivision Unit 1 PROJECT NO. 5502.81 (MAP NO. J-10)

Dear Sir:

This is to certify that the City of Albuquerque accepts Project No. 5502.81 as being completed according to approved plans and construction specifications. Please be advised this certificate of completion shall only become effective upon final plat approval and filing in the office of the Bernalillo County Clerk's Office.

The project is described as follows:

- **Hanover Road** - Constructed 4' wide sidewalk on the south side of road, also constructed wheel chair ramps at Blossom Wood Place.
- Blossom Wood Place** - 32' f-f residential paving, standard curb and gutter (both sides), 8" waterline, 10" sanitary sewer from Hanover Road to Kane Court.
- Blossom Wood Place** - 28' f-f residential paving, standard curb and gutter (both sides), 8" waterline, 8" sanitary sewer from Kane Court to Blossom Wood Place, also wheel chair ramps at Kane Court.
- Kane Court** - 28' f-f residential paving, mountable curb and gutter (both sides), 6" waterline, 8" sanitary sewer from Blossom Wood Place to Cul-de-Sac.
- Amy Marie Court** - 28' f-f residential paving, mountable curb and gutter (both sides), 8" sanitary sewer, 6" waterline, wheel chair ramps at Blossom Wood Place, from Blossom Wood Place to Cul-de-Sac.
- Baybrook Road** - 28" f-f residential paving, mountable curb and gutter (both sides), 8" waterline from Blossom Wood Place to Tarrington Drive. 8" sanitary sewer from Blossom Wood Place to East side lot 24 Block 'C'.
- Blossom Wood Place** - 28' f-f residential paving, mountable curb and gutter (both sides), 8" waterline, 8" sanitary sewer from Blossom Wood Place to Cul-de-Sac.
- Blossom Wood Place** - 18", 24" and 30" storm drain including all appurtenances,

Rosewood Subdivision
Project No. 5502.81
August 26, 1997
Page 2

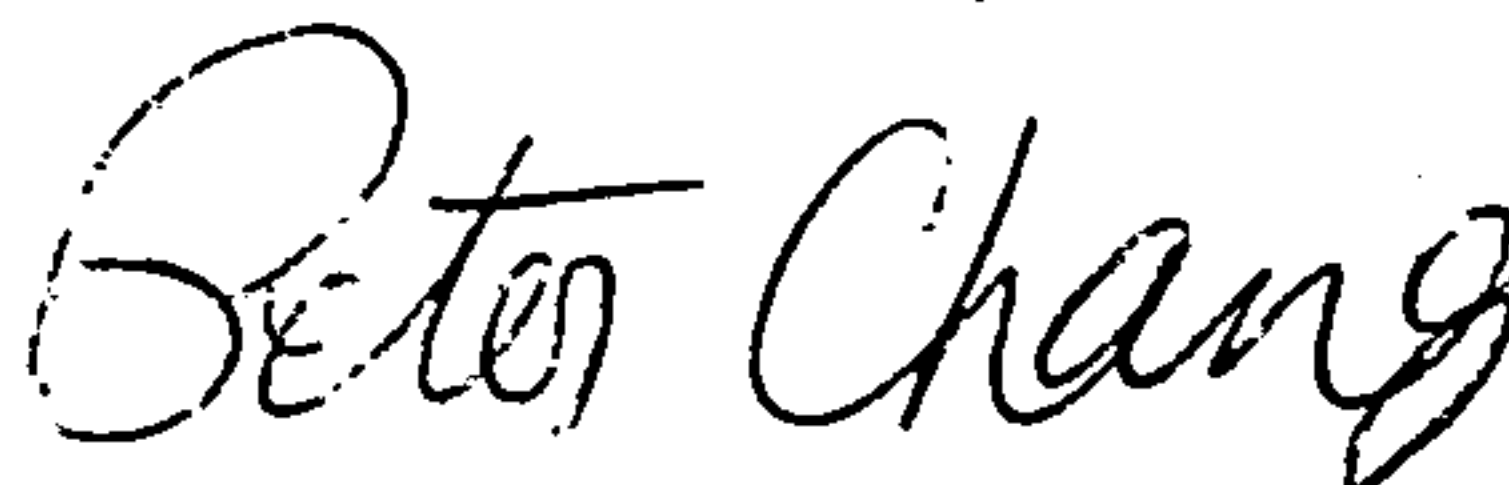
inlets, manholes, from just north of Baybrook Road to 22' wide drainage easement between lots 16 & 17 Block B.

Temporary storm water retention pond on lots 16 & 17 Block 'B'. Included rip rap and chain link fence around pond.

All water lines included fire hydrants, valves, services and appurtenances. Wheel chair ramps were constructed at all intersections.

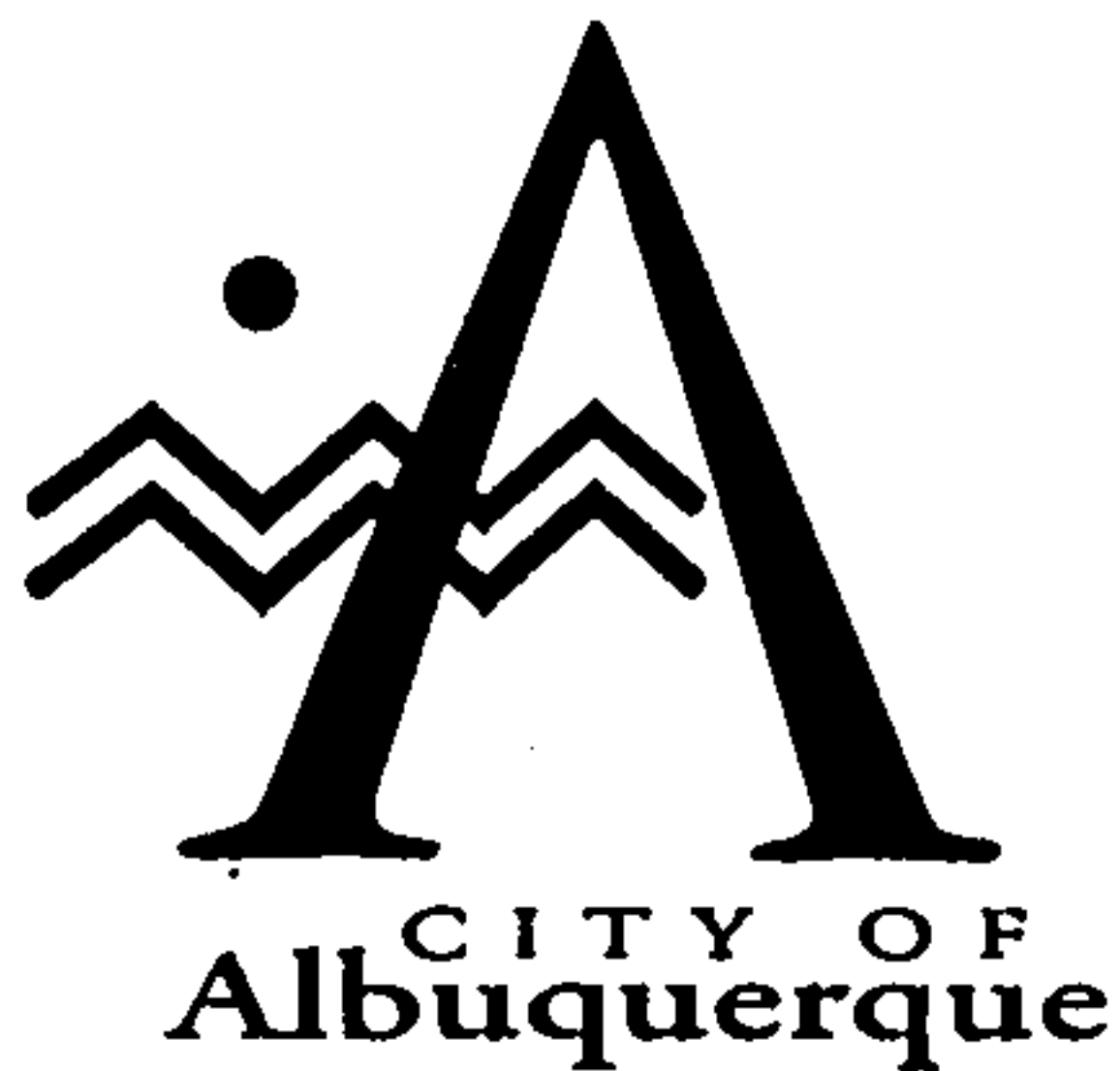
The contractor's correction period began the date of this letter and is effective for a period of one (1) year.

Sincerely,



for Russell B. Givler, P.E.
Chief Construction Engineer,
Engineering Group
Public Works Department

cc: Sundance Mechanical
Rizvi, Adil
Fred Aguirre, Hydrology, PWD
Tina Pohl, Engineering Group, PWD
Terri Martin, Engineering Group, PWD
Martin Barker, Materials Testing Lab
Linda Adamsko, Special Assessments, DFM
Sam Hall, Water Systems, PWD
Jim Fink, Liquid Waste, PWD
Dean Wall, Street Maintenance, PWD
Jack McDonough, Water/Wastewater Group, PWD
Ray Chavez, Traffic Engineering, PWD
Josie Jaramillo, New Meter Sales, Finance Group, PWD
Richard Zamora, Maps and Records, PWD
John Ewing, Risk Management
f/Project No. 5502.81
f/Readers
f/Warranty:Contract



Martin J. Chávez, Mayor
August 26, 1997

Raymond Macy
PROTEC Consulting
P.O. Box 27007
Albuquerque, New Mexico 87125

RE: REVISED ENGINEER CERTIFICATION FOR ROSEWOOD SUBDIVISION FOR
FINANCIAL GUARANTEE RELEASE (J10-D22) CERTIFICATION STATEMENT
DATED 8/14/97 WO 5502.81

Dear Mr. Macy:

Based on the information provided on your August 18, 1997 resubmittal, Engineer Certification for the above referenced site is acceptable.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya CE
Associate Engineer



PROTEC

Consulting

August 15, 1997

Professional Technologies and
Design Development Services

Mr. Bernie J. Montoya
Engineering Associate
City of Albuquerque
Public Works Department
Hydrology Division
P.O. Box 1293
Albuquerque, NM 87103

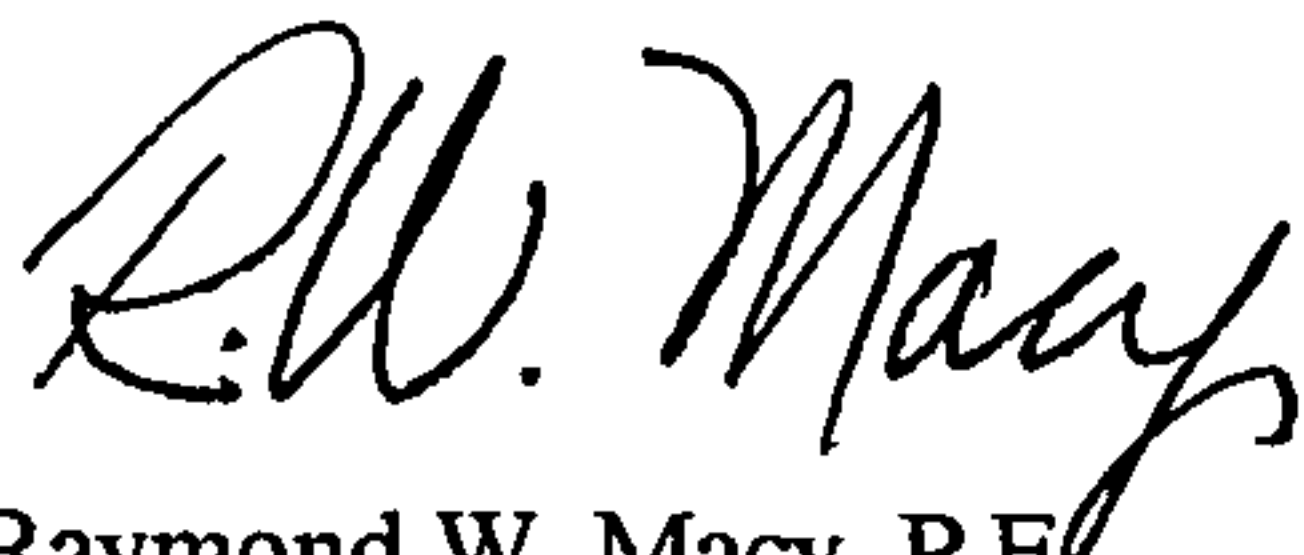
Re: ENGINEER'S CERTIFICATION 8/14/97 - Rosewood Subdivision Grading and Drainage Plan
Engineer's Stamp dated November 29, 1996

Dear Mr. Montoya:

Per your instructions in your letter of August 7, 1997, please find enclosed a copy of the above referenced Grading and Drainage Plan with the revised Engineer's Certification dated August 14, 1997. The lots with rear yard elevations that were in question on the August 1, 1997 Certification have been brought up to acceptable grades and confirmed in the field by the surveyor.

If you have any questions regarding the Engineer's Certification, please do not hesitate to contact me at (505) 833-0177.

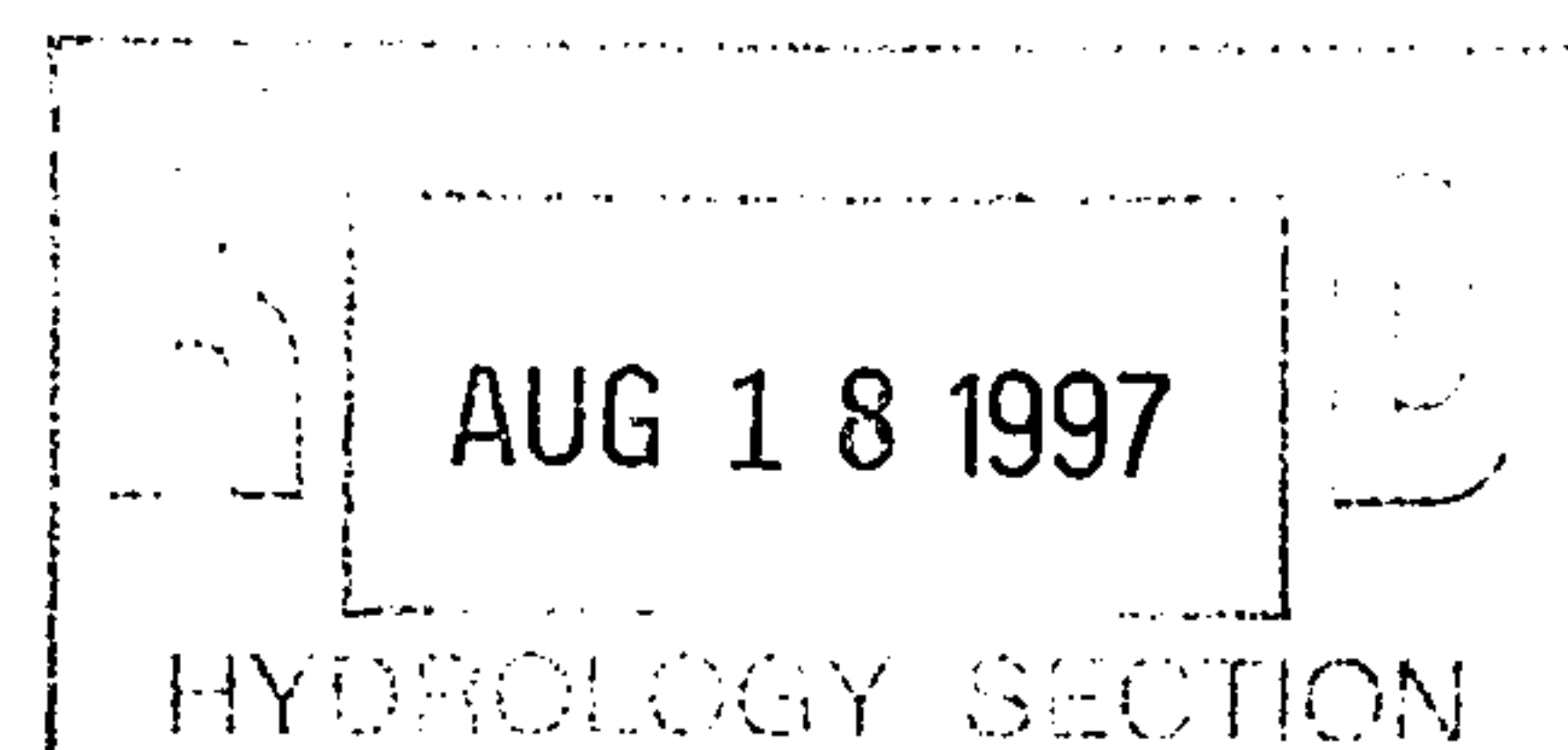
Sincerely,
PROTEC Consulting



Raymond W. Macy, P.E.
Owner

Enclosure

xc: Mr. Jeff Jesionowski, Argus Development Co.



DRAINAGE INFORMATION SHEET

PROJECT TITLE: ROSEWOOD SUBDIVISION ZONE ATLAS/DRNG. FILE #: J-10/D22DRB #: 96-049 EPC #: _____ WORK ORDER #: 550281LEGAL DESCRIPTION: TRACTS 233 234A 234B, & 234C AIRPORT UNIT, TOWN OF
CITY ADDRESS: N/A ATRISCO GRANTENGINEERING FIRM: PROTEC Consulting CONTACT: Ray MacyADDRESS: P.O. Box 27007, Albuq., 87125 PHONE: 505-833-0177OWNER: ARBUS DEVELOPMENT CONTACT: Jeff JesionowskiADDRESS: 6400 Uptown, Suite 200W PHONE: 505-889-3061ARCHITECT: Albuq., NM 87110 CONTACT: _____

ADDRESS: _____ PHONE: _____

SURVEYOR: Albrich Land Surveying CONTACT: Tim AlbrichADDRESS: P.O. Box 30701 Albuq. 87190 PHONE: 505-884-1990CONTRACTOR: Sundance Mechanical- CONTACT: CarlosADDRESS: 5920 Midway Park PHONE: 505-345-2694Albuq., NM 87109

TYPE OF SUBMITTAL: (RESUBMITTAL)

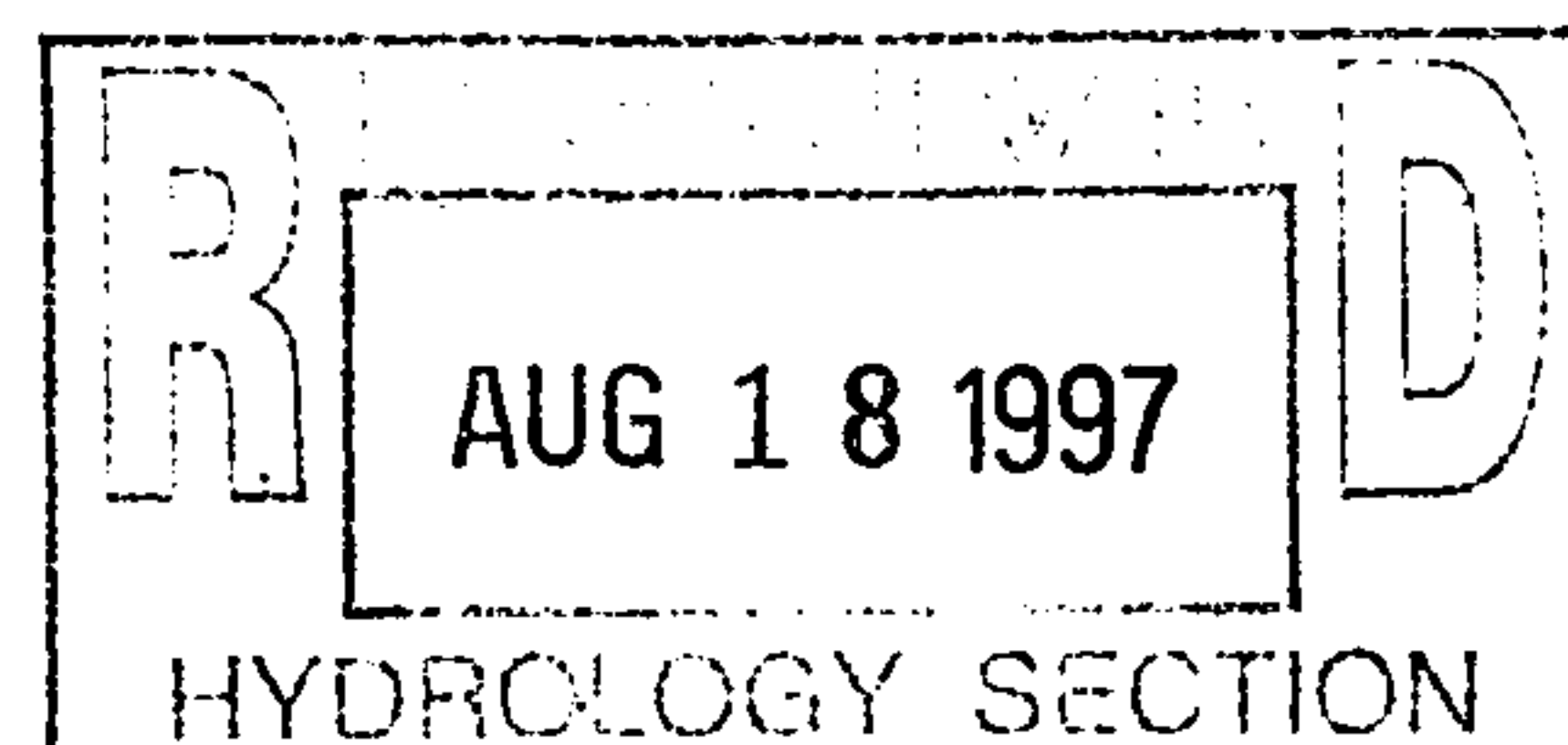
- ☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☒ ENGINEER'S CERTIFICATION
☐ OTHER _____

PRE-DESIGN MEETING:

- ☒ YES
☐ NO
☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D. APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY APPROVAL
☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☐ DRAINAGE REQUIREMENTS
☒ SUBDIVISION CERTIFICATION
☐ OTHER _____ (SPECIFY)

DATE SUBMITTED: August 14, 1997
BY: R.W. Macy

DRAINAGE INFORMATION SHEET

PROJECT TITLE: ROSEWOOD SUBDIVISION ZONE ATLAS/DRNG. FILE #: J-10
DRB #: 96-049 EPC #: _____ WORK ORDER #: 550281
LEGAL DESCRIPTION: TRACTS 233 234A 234B, & 234C AIRPORT UNIT, TOWN OF
CITY ADDRESS: N/A ATRISCO GRANT

ENGINEERING FIRM: PROTEC Consulting CONTACT: Ray Macy
ADDRESS: P.O. Box 27007, Albuq., 87125 PHONE: 505-833-0177

OWNER: ARBUS DEVELOPMENT CONTACT: Jeff Jesionowski
ADDRESS: 6400 Uptown, Suite 200W PHONE: 505-889-3061
Albuq., NM 87110

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____

SURVEYOR: Albrich Land Surveying CONTACT: Tim Albrich
ADDRESS: P.O. Box 30701 Albuq. 87190 PHONE: 505-884-1990

CONTRACTOR: Sundance Mechanical- CONTACT: Carlos
ADDRESS: 5920 Midway Park PHONE: 505-345-2694
Albuq., NM 87109

TYPE OF SUBMITTAL:

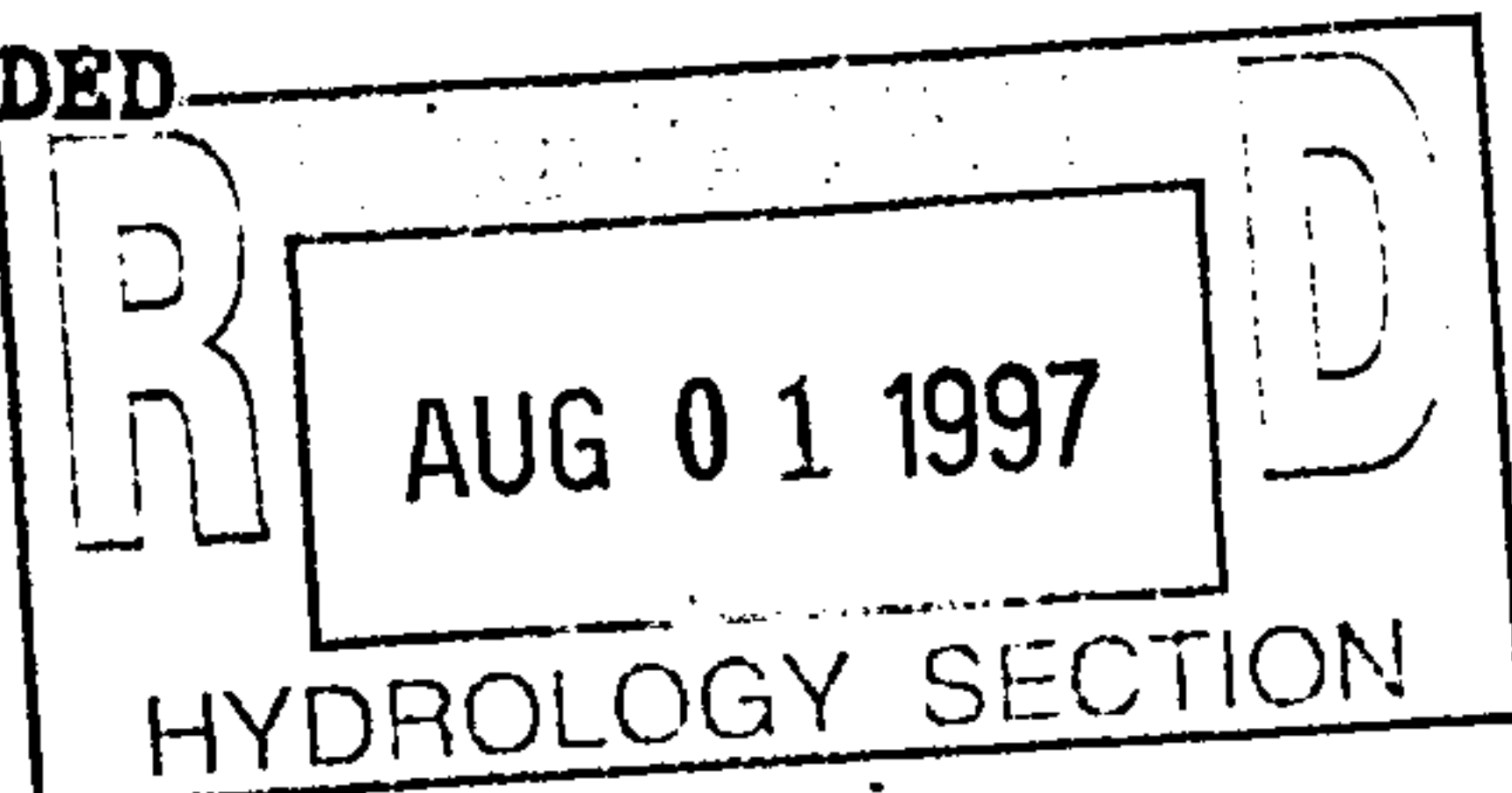
- ☐ DRAINAGE REPORT
☐ DRAINAGE PLAN
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☐ GRADING PLAN
☐ EROSION CONTROL PLAN
☒ ENGINEER'S CERTIFICATION
☐ OTHER _____

PRE-DESIGN MEETING:

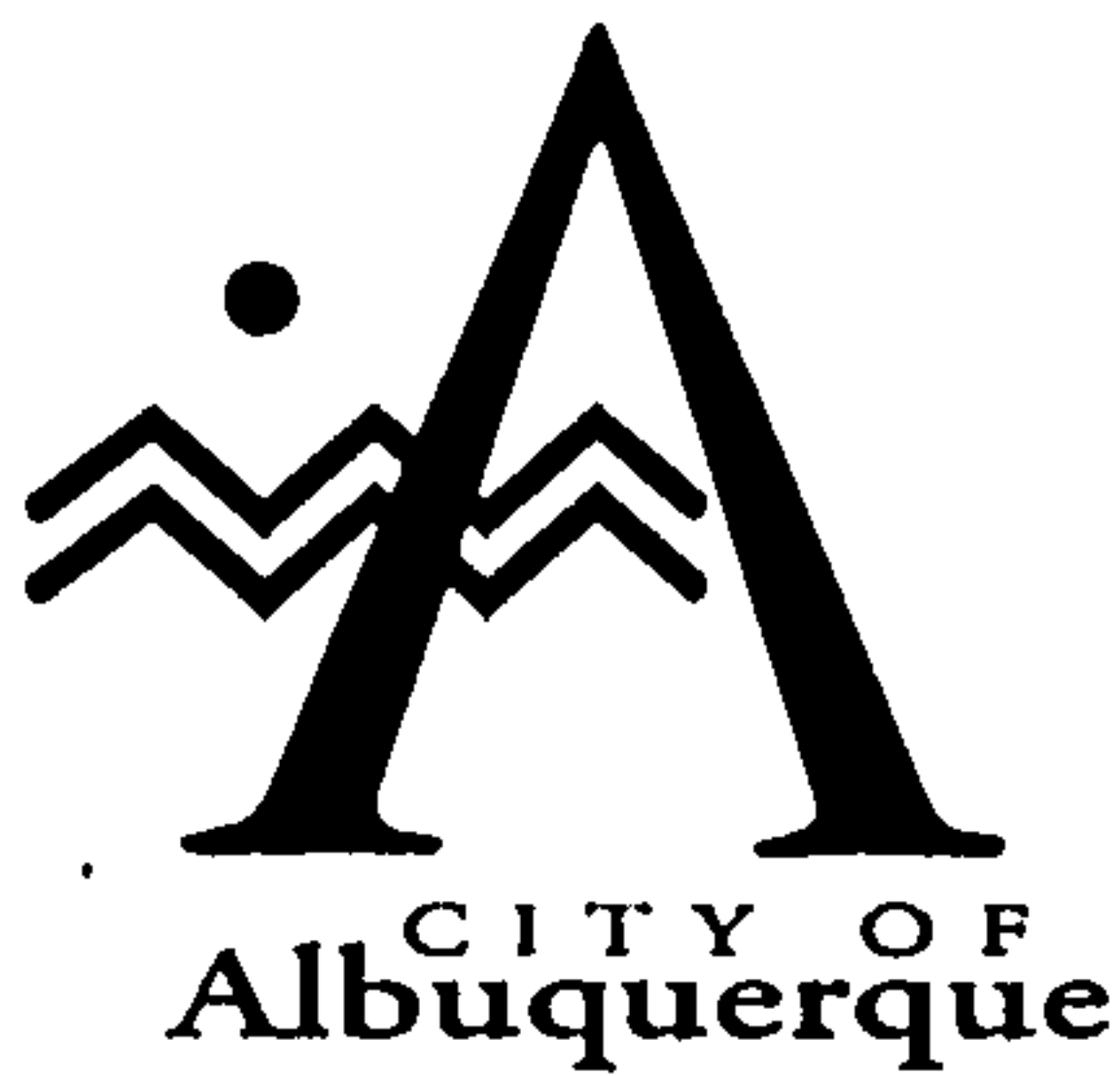
- ☒ YES
☐ NO
☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SKETCH PLAT APPROVAL
☐ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D. APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
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☐ FOUNDATION PERMIT APPROVAL
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☐ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ S.A.D. DRAINAGE REPORT
☒ DRAINAGE REQUIREMENTS
☒ SUBDIVISION CERTIFICATION
☐ OTHER _____ (SPECIFY)



DATE SUBMITTED: August 1, 1997
BY: R.W. Macy



Martin J. Chávez, Mayor

August 7, 1997

Ray Macy
PROTEC
P.O. Box 27007
Albuquerque, New Mexico 87125

RE: ENGINEER CERTIFICATION FOR ROSEWOOD SUBDIVISION (J10-D22)
CERTIFICATION STATEMENT DATED 8/1/97

Dear Mr. Macy:

Based on the information provided on your August 1, 1997 submittal, Engineer Certification for the above referenced site is not acceptable until the lots which you identified as being in noncompliance are corrected and you recertify.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia

File

Sincerely


Bernie J. Montoya CE
Associate Engineer



August 1, 1997

Mr. Bernie J. Montoya
Engineering Associate
City of Albuquerque
Public Works Department
Hydrology Division
P.O. Box 1293
Albuquerque, NM 87103

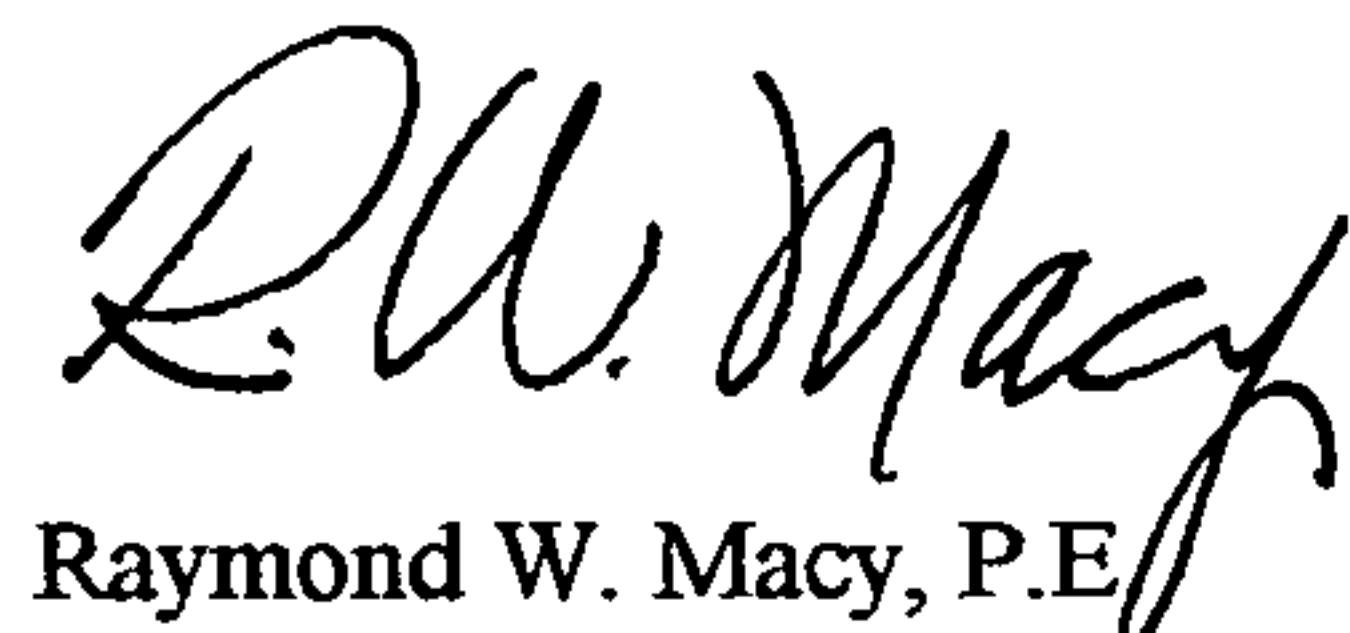
Re: ENGINEER'S CERTIFICATION - Rosewood Subdivision Grading and Drainage Plan
Engineer's Stamp dated November 29, 1996

Dear Mr. Montoya:

Please find enclosed a copy of the above referenced Grading and Drainage Plan with the Engineer's Certification and revisions based on field measurements. Although a few of the house pad elevations are as much as 0.2' to 0.3' lower than called for on the plans, they are within acceptable tolerances for rough grading. The curb line profiles are very close to the intended design, and therefore the front yard elevations and back of sidewalk elevations will also be acceptable once finish grading is completed on each lot. Since several of the backyard elevations appeared to be lower than desired (lots 11 - 14, 18, 19 and 21 in Block B and lot 9 in Block A), the Contractor agreed to provide an additional 0.3' to 0.6' of fill in these lots to facilitate lot drainage upon completion of finish grading.

If you have any questions regarding the Engineer's Certification, please do not hesitate to contact me at (505) 833-0177.

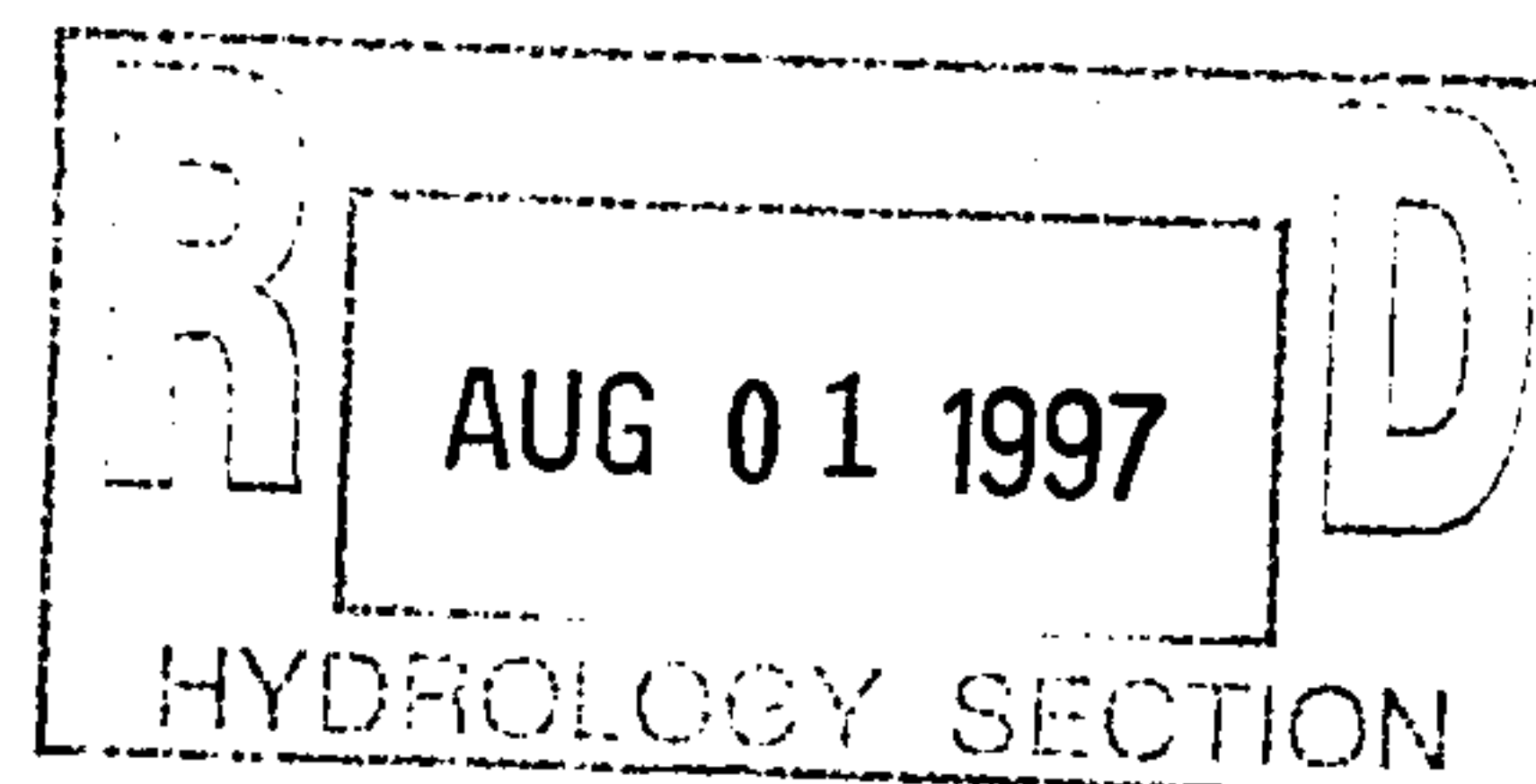
Sincerely,
PROTEC Consulting

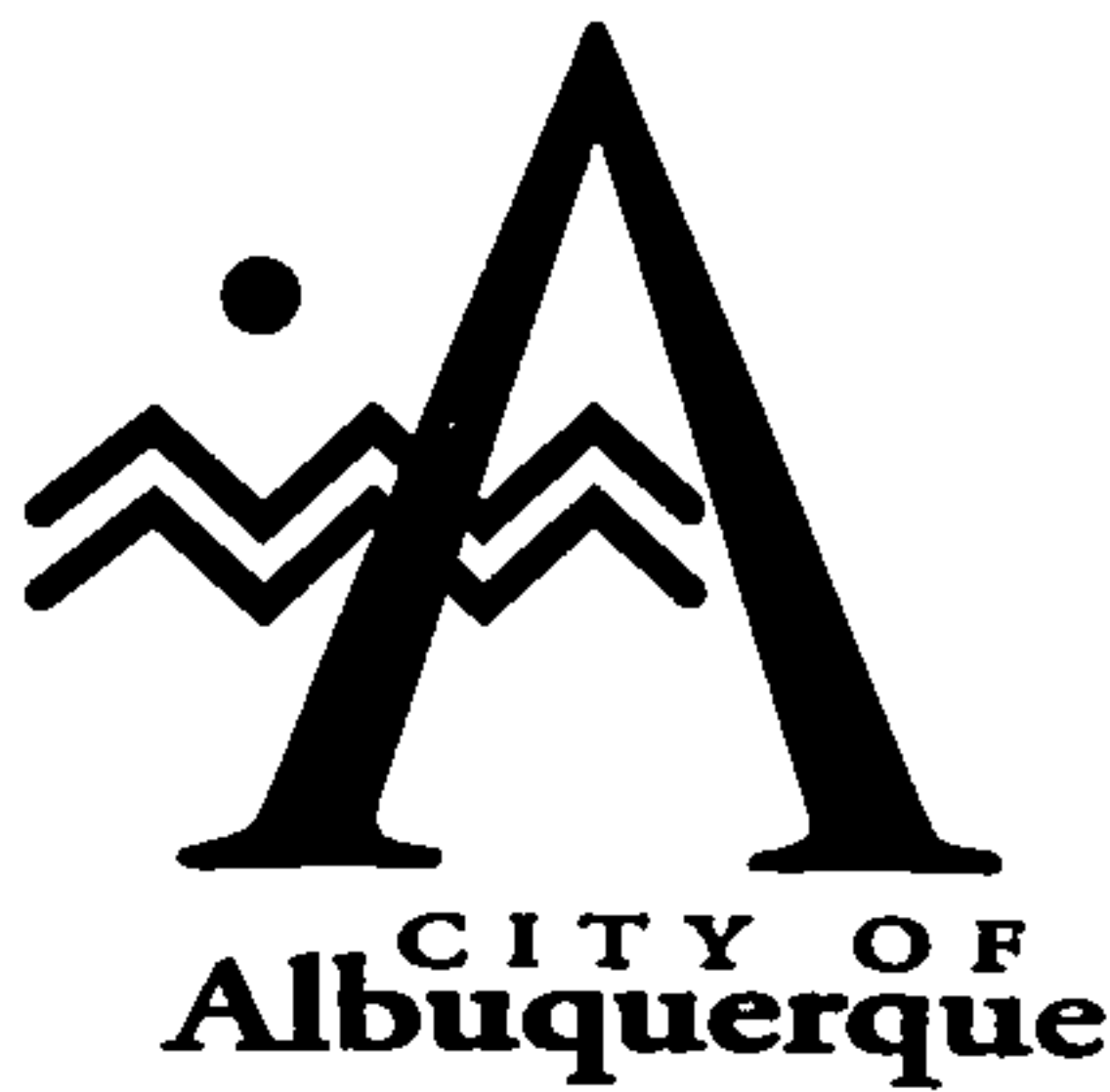


Raymond W. Macy, P.E.
Owner

Enclosure

xc: Mr. Jeff Jesionowski, Argus Development Co.





December 20, 1996

Martin J. Chávez, Mayor

R.W. Macy
Protec Consulting
P.O. Box 27007
Albuquerque, NM 87125

**RE: REVISED DRAINAGE PLAN ROSEWOOD SUBDIVISION (J10-D19)
REVISION DATED 11/29/96.**

Dear Mr. Macy:

Based on the information provided on your December 19, 1996 resubmittal, the above referenced site is approved for final Work Order.

Please be advised that the following must take place prior to final signature on the plat:

1. Resubmittal to D.R.B. because of the change in grading and revised infrastructure list.
2. Filed, executed agreement and covenant for the maintenance of the ponding area.

Please be advised that no Building Permits will be issued until the above listed concerns are taken care of.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
Adil Rizvi
File

Good for You, Albuquerque!



Jeffrey

889-3061

March 4, 1997

COPY

Mr. Adil Rizvi
7049 Luella Ann, NE
Albuquerque, NM 87109

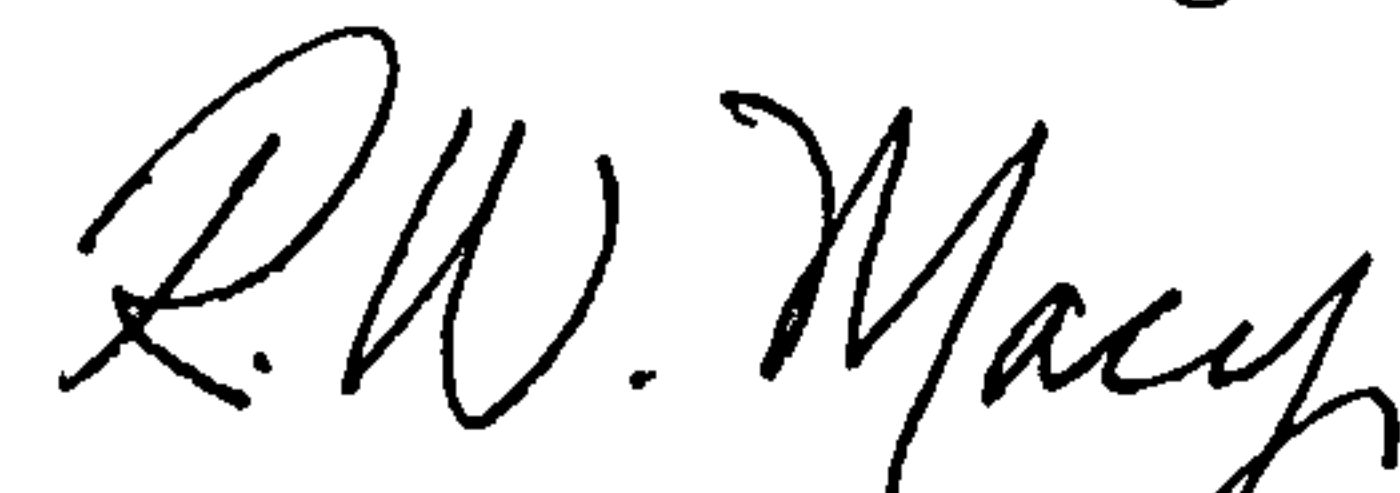
**Re: Rosewood Subdivision
PROTEC Consulting Project No. 95001**

Dear Adil:

I recently became aware of several revisions that will be needed on the approved Rosewood Subdivision plans. The street plan and profile sheets were designed based on street grades that reference the top of curb. However, when some of the curbs were changed from standard curb to mountable curb, a curb height of 6 inches was incorrectly assigned to the mountable curb. The City of Albuquerque mountable curb has a curb height of 4". Consequently, revisions will be required to several of the flow line curb return elevations at intersections where mountable curb joins standard curb. Also, the rim elevations of manholes on streets with mountable curb will need to be revised. A check needs to be made to determine if 4" high mountable curb at the south side of Kane Court is adequate to contain the anticipated runoff. If not, standard curb may be needed for a portion of the south curb line.

I am requesting that the original, approved plans be returned to me so that I can make the necessary revisions. I regret any inconvenience that this may cause, but feel it is important to prevent unnecessary costs during construction.

Sincerely,
PROTEC Consulting


Raymond W. Macy, P.E.
Owner

xc: Mr. Ben Spencer, Argus Development
Mr. Bernie Montoya, City Hydrology

December 18, 1996

Professional Technologies and
Design Development Services

Mr. Bernie J. Montoya
Engineering Associate
City of Albuquerque
Public Works Department
Hydrology Division
P.O. Box 1293
Albuquerque, NM 87103

**Re: SECOND REVISION - Rosewood Subdivision Drainage Report & Grading and Drainage Plan
Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant
Dated November 29, 1996**

Dear Mr. Montoya:

Please find enclosed for your review and approval, one copy of the SECOND REVISION to the above referenced drainage report and grading and drainage plan. The following statements identify changes made to the First Revision of June 20, 1996:

- There have been minor revisions to retaining wall locations and top of wall elevations.
- There have been revisions to top of curb elevations as a result of the use of mountable curb on the cul-de-sacs and on Baybrook Road.
- There have been minor revisions to pad grades and spot elevations as a result of top of curb elevation refinements.
- The drainage easement between Lots 16 and 17 in Block B has been increased to a width of 22'.
- The 27-inch storm drain in Blossom Wood Place has been revised to a 24-inch.
- There have been minor refinements to the emergency spillway details.
- The text in the Drainage Report has been revised to correctly reference the 22-foot wide drainage easement and the 24-inch storm drain in Blossom Wood Place (pages 5 and 7).

All of the above revisions are in agreement with the latest, approved infrastructure list

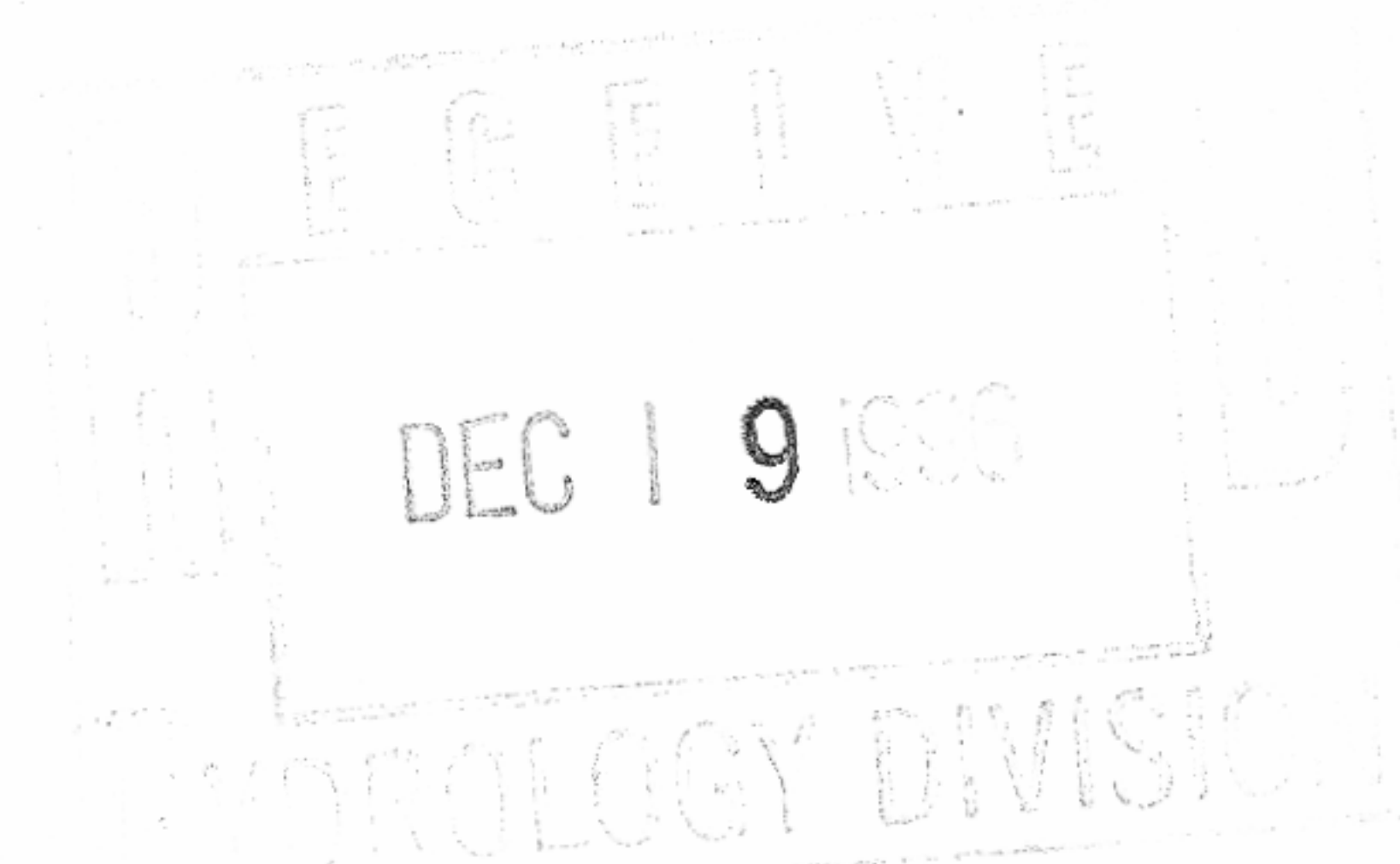
We respectfully request your expedient review and approval of the enclosed documents. If you have any questions regarding the information provided here, please do not hesitate to contact me at (505) 833-0177.

Sincerely,
PROTEC Consulting


Raymond W. Macy, P.E.
Owner

Enclosure

xc: Mr. Adil Rizvi



DRAINAGE REPORT

FOR

ROSEWOOD SUBDIVISION

A 56 LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION

PREPARED FOR:

**ADIL RIZVI
7049 LUELLA ANNE DRIVE, NE
ALBUQUERQUE, NM 87112**

PREPARED BY:

**PROTEC CONSULTING
PO BOX 27007
ALBUQUERQUE, NM 87125
(505) 833-0177**

NOVEMBER 29, 1996
(2nd Revision of 4/30/96 Submittal)



R. W. Macy
11/29/96

RECEIVED

DEC 19 1996

ENGINEERING DIVISION

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I. GENERAL

I.1 Legal Description

A certain tract of land, being and comprising lots 234-A, 234-B and 234-C, plat of division of Tract 234, Airport Unit, Tracts allotted from Town of Atrisco Grant, as the same are shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on March 9, 1981 in Vol. B18, Folio 146; together with a portion of Tract 233, Town of Atrisco Grant, as the same is shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on December 5, 1944 in Vol. D, Folio 118, less and excepting that portion of said Tract taken for the right-of-way of the access ramp from I-40 to Unser Boulevard, NW as the same is shown on the New Mexico State Highway Commission Right-of-way Map I-040-3(28)148.

I.2 Engineer

PROTEC Consulting
PO Box 27007
Albuquerque, NM 87125
(505) 833-0177

I.3 Surveyor

Southwest Surveying Co., Inc.
333 Lomas Boulevard, NE
Albuquerque, NM 87102
(505) 247-4444

I.4 Benchmark

ACS "I-J9" located on the Unser Blvd overpass on I-040 approximately 222 feet north of centerline of I-040. Elevation 5199.19

I.5 TBM

SAS MH rim at Hanover Road and 80th Street, NW. Elevation 5153.61

I.6 Zoning

RD (15 Du/Acre max.)

I.7 Proposed

56 Single Family Residential Lots

I.8 Area

9.6161 Acres more or less (418,877.32 square feet, more or less)

I.9 Flood Hazard

The proposed site (Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant) is located within Flood Hazard Zone C (areas of minimal flooding) as designated on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) Community-Panel No. 350002 0027 C (October 14, 1983).

I.10 Location and Description

The proposed 9.6161 acre site is undeveloped and mostly undisturbed at the writing of this Drainage Report. The extreme west edge of the site has been disturbed along the length of the west boundary line as a result of block retaining wall construction for the recently developed Chamisa Encantada Subdivision. Existing ground cover across the site is comprised of sage brush and various native grasses. The proposed site is bounded on the north by Hanover Road, NW, on the south by the Unser Boulevard northbound off ramp from the Unser/I-40 Interchange, on the west by the Chamisa Encantada Subdivision, and on the east by Tract 232 Airport Unit, Town of Atrisco Grant, which is presently undeveloped. Hanover Road is developed and is characterized by a 40' wide paved roadway with standard curb and gutters on either side, a sanitary sewer collection system, water line, and overhead power and telephone lines. There are presently no sidewalks on Hanover Road adjacent to the proposed site. The proposed West Bluff Outfall Channel (West Bluff Storm Interceptor, Phase II) is planned to be located at the south edge of the proposed site inside of existing Unser/I-40 Interchange right-of-way. Plans for the outfall channel improvements are currently in the preliminary design phase, and construction is expected to begin sometime in 1997.

II HYDROLOGIC ANALYSIS**II.1 Existing Conditions**

Hanover Road, NW intercepts offsite flows originating from north of the proposed Rosewood Subdivision and diverts them eastward to the Laurelwood Park Drainage Management Area at the northwest corner of Hanover Road, NW and 72nd Street, NW.

The recently developed Chamisa Encantada Subdivision is immediately west of the proposed site. This subdivision has been designed to carry all storm runoff originating from within it to the south for containment in a temporary earthen drainage basin. This basin will eventually be removed and replaced with the development of residential lots when the West Bluff Outfall Channel is constructed along the north edge of the northbound Unser/I-40 off ramp. At that time, runoff from the Chamisa Encantada Subdivision will drain directly into the West Bluff Outfall Channel.

Runoff originating along the north edge of the Unser/I-40 northbound off ramp is collected within the I-40 right-of-way at the north edge of the roadway. It is conveyed in a roadside ditch to the east for several hundred feet where it is drained into a 30-inch diameter CMP culvert and directed southward to the south side of I-40.

Off-site flows are prevented from entering the proposed Rosewood Subdivision by drainage improvements associated with Hanover Road, NW, the Chamisa Encantada Subdivision and the Unser/ I-40 off ramp.

Presently, runoff originating on the proposed Rosewood Subdivision drains eastward primarily as sheet flow with a gradient of approximately 2%. Based on a review of actual field conditions and recent topography, it appears the northern most 1.25 acres of the 9.6161 acre site will drain either directly onto Hanover Road, NW, or will exit the east edge of the property in a natural swale that subsequently turns north and drains onto Hanover Road, NW within Tract 232. The remaining 8.27 acres drains east to southeast and enters the north edge of the I-40 right of way, where the runoff is collected into a 30-inch CMP culvert and directed southward to the south side of I-40.

II.2 Site Hydrology (Existing Conditions)

The site hydrology as determined herein is based on the methods and criteria presented in the City of Albuquerque Development Process Manual (DPM) - Volume 2, Section 22.2 Hydrology, dated January 1993. The proposed site is in Precipitation Zone 1 (west of the Rio Grande). The P360 (100-year, 6-hour storm event) has a depth of 2.20 inches as shown in Table A-2. Since the proposed site is primarily undeveloped and undisturbed land, then Land Treatment A is applicable. See Table A-2. Excess Precipitation E for this storm is 0.44 inches as shown in Table A-8. The Peak Discharge, Q_p , from the same storm is 1.29 cfs/acre. See Table A-9. The runoff volumes and peak discharge rates from the undeveloped site are determined as follows:

1.25 Acres at the South Edge of Hanover Road, NW

$$\text{Volume(360)} = 0.44 \text{ in} \times 1.25 \text{ ac} \times 1 \text{ ft}/12 \text{ in}$$

$$\text{Volume(360)} = .04583 \text{ ac-ft}$$

$$\text{Volume(360)} = 1,996.5 \text{ cf}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.29 \text{ cfs/acre} \times 1.25 \text{ ac}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.6 \text{ cfs}$$

Remaining 8.37 Acres

$$\text{Volume(360)} = 13,368.6 \text{ ac-ft}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 10.8 \text{ cfs}$$

II.3 Proposed Improvements (Interim)

Initially, it will be necessary to construct a temporary retention basin at the south end of the subdivision to receive on-site runoff. This basin will require the area of two residential lots (Lots 16 and 17 in Block B) plus a portion of the drainage area designated as DA-3b, which will be dedicated for the future West Bluff Outfall Channel.

Lot 1 and a portion of Lot 2 in Block B will drain northward onto Hanover Road, NW. This is a result of developing a water block in Blossom Wood Road, NW at Hanover Road, NW to prevent runoff in Hanover from entering the site. The area draining onto Hanover (DA-1) is approximately 0.365 acres.

Kane Court, NW will be constructed without a street crown, and runoff will be allowed to drain from the north side of the street to the south curb line while being conveyed eastward. This is to diminish the flow of water entering Blossom Wood Road from Kane Court at the extreme northwest quadrant of the intersection, where there would be a possible opportunity for some of the runoff to rise above the water block and drain northward into Hanover Road. The vertical geometry of Blossom Wood Road is such that it must rise high enough near Hanover Road so as to produce a sufficient gradient southward to the knuckle. Furthermore, this must be done without resulting in an undesirably low elevation at the knuckle, which would impair drainage into the future West Bluff Outfall Channel. The need to raise Blossom Wood Road to provide a sufficient gradient along the roadway toward the south, while simultaneously directing runoff from Kane Court southward on Blossom Wood Road away from Hanover, results in tight vertical curve geometry on Blossom Wood Road between Kane Court and Hanover Road, and also prompts the elimination of the street crown in Kane Court.

Baybrook Road, NW will connect Blossom Wood Road with the existing Tarrington Drive, NW in the Chamisa Encantada Subdivision. A water block will be formed in Baybrook Road just east of Tarrington Drive to prevent flows from leaving Tarrington Drive and entering Baybrook Road. The geometry of the water block is such that a small area (approximately 0.0317 acres) of the Chamisa Encantada Subdivision will drain into the Rosewood Subdivision.

Single and Double "C" inlets will be placed along Blossom Wood Road as shown on the Grading and Drainage Plan to prevent street flow for the 100-year, 6-hour event from overtopping the curbs. The curb inlets and storm drain piping are sized to accommodate the runoff from this storm event.

The temporary retention pond will be sized to contain runoff from the 100-year, 6-hour storm event originating from within the Rosewood Subdivision. Only drainage areas DA-1 and DA-3a will not contribute runoff into the pond. DA-1 is comprised of Lot 1 and part of Lot 2 in Block B. As discussed above, this area will drain north into Hanover Road, NW. DA-3a is a portion of the land dedicated as future right-of-way for the West Bluff Outfall Channel. The 0.0386 acres of DA-3a will continue to drain into the Unser/I-40 Interchange right-of-way as it does presently. The retention pond will be of earthen construction with 3:1 interior slopes and a 4:1 exterior slope where necessary. It will have dumped riprap where the 30-inch storm drain line enters the pond,

and it will be enclosed with a five foot high chain link fence. Total pond depth will be 8.4 feet. It will be equipped with an emergency spillway capable of discharging a flow rate equal to the 10-year, 6-hour runoff from the Rosewood Subdivision. Discharge from the spillway will be into the Unser/I-40 Interchange right-of-way.

II.4 Proposed Improvements (Final Conditions)

In the final conditions, after the West Bluff Outfall Channel is constructed, the temporary retention pond will be removed. Lots 16 and 17 in Block B will be completely developed and a 22-foot wide drainage easement will be located between the lots. The drainage easement will serve three functions. First, it will provide for placement of the 30-inch RCP storm drain that will connect Blossom Wood Road with the future West Bluff Outfall Channel. Second, it will serve as an emergency storm water (surface) outlet from the subdivision in the event the storm drain becomes clogged or a storm with a lower return frequency than the 100-year, 6-hour event is encountered. Finally, it will serve as a pedestrian access to the future trail system planned for construction along the north edge of the future West Bluff Outfall Channel.

All other aspects of the drainage improvements will remain as described in II.3 above.

II.5 General Site Hydrology for Developed Conditions

The total runoff volume and peak discharge from the developed site into the retention pond (DA-3, DA-4 and DA-5) are determined as follows:

<u>LAND TREATMENT CLASSIFICATION</u>	<u>LAND AREA (Acres)</u>	<u>EXCESS PRECIP (Inches)</u>	<u>PEAK DISCHARGE (cfs)</u>
A	0.00	0.44	1.29
B	3.03	0.67	2.03
C	1.16	0.99	2.87
D	5.09	1.97	4.37

Runoff Volume into the Retention Pond

$$\text{Weighted E} = ((3.03 \times 0.67) + (1.16 \times 0.99) + (5.09 \times 1.97))/9.28$$

$$\text{Weighted E} = 1.423 \text{ inches}$$

$$\text{Volume}(360) = 1.42 \text{ in} \times 9.28 \text{ acres} \times 1 \text{ ft}/12 \text{ in} = 1.0981 \text{ acre-ft}$$

$$\text{Volume}(360) = 1.0981 \text{ acre-ft} \times 43,560 \text{ sf/acre} = 47,833 \text{ cf}$$

Peak Discharge

Total Peak Discharge from combined drainage areas DA-3, DA-4 and DA-5 into the retention pond is determined as follows:

$$\text{Peak Discharge (100-yr, 6-hr)} = (3.03 \times 2.03) + (1.16 \times 2.87) + (5.09 \times 4.37)$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 31.72 \text{ cfs}$$

II.6 Site Hydrology Street Capacity

Except for the short one block segment of Blossom Wood Road, NW between Kane Court and Hanover Road, all of the roads within the Rosewood Subdivision are 28 feet from face-of-curb to face-of-curb. This one block segment has a street width of 32 feet.

The City of Albuquerque DPM Plate 22.3 D-1 provides a determination of street flow capacity for a 32 foot wide street of varying street slopes and flow depths. It is understood that the capacity within a 28 foot wide street will be less than a 32 foot wide street for depths which exceed the crown height (approximately 0.28 feet). Of particular interest here is the street capacity when the flow is just below the top of curb. It is desirable to place inlets and storm drains into the street system so that the street flow does not exceed the curb tops. This will minimize damage to the planter areas between the back of curb and sidewalk. Since the difference in flow capacity between the 28 foot wide street and 32 foot wide street is primarily due to the difference in flow areas, the results obtained from Plate 22.3 D-1 will be scaled down by a factor equal to the ratio of the area of a 28 foot wide street divided by the area of a 32 foot wide street at a flow depth of 0.6 feet. This factor is approximately equal to $12.88/14.08$, or 0.91.

Between Baybrook Road and Kane Court, Blossom Wood Road has a gradient of 0.50 %. At this slope a 28 foot wide road has a half street capacity of 15.5 cfs when the flow depth is 0.6 feet. Flow is subcritical with a velocity of approximately 3 fps. This street segment is the most limiting in terms of capacity, and also carries most of the flow from within the subdivision.

II.7 Site Hydrology Curb Inlets

At the west side of Blossom Wood Road just north of Baybrook Road, the flow in the west half of the street would reach approximately 11.5 cfs during the 100-year, 6-hour event, since an area of approximately 3.37 acres would contribute runoff to that point. This is determined by proportioning the total peak flow of 31.72 cfs from the 9.28 acres. From Plate 22.3 D-6 of the DPM, a Double "C" inlet would be able to remove approximately 6 cfs assuming a flow depth of 0.5 feet. The remaining 5.5 cfs would continue southward past Baybrook Road.

At a point on the west side of Blossom Wood Road just north of the knuckle, the 5.5 cfs from above would be joined by another 5.8 cfs contributed from runoff leaving Baybrook Road. A Single "C" inlet placed just north of the knuckle return would be capable of collecting about 6 cfs assuming a street slope near the vertical curve of approximately 0.2% and a flow depth of about 0.6 feet. The remaining 5.3 cfs would continue to the next inlet at the center of the knuckle on the west side of Blossom Wood Road. Another 2.7 cfs would contribute to that inlet from the area on the north side of Blossom Wood Court west of the knuckle. The total flow arriving at the depressed inlet would equal approximately 8.0 cfs. Since the runoff collects over the top of the inlet and does not flow past it, it is probable that a Single "C" inlet would collect the 8.0 cfs without exceeding the level of the top of curb.

On the east side of Blossom Wood Road, the flow would reach 4.4 cfs from a contributing area of approximately 1.29 acres at a point opposite the proposed Double "C" inlet discussed above. A Single "C" inlet at this point on the east side of the roadway would have the capacity to remove most of this flow assuming a flow depth of approximately 0.45 feet.

The 7.3 cfs from the remainder of Blossom Wood Road would collect over the depressed inlet on the south side of the street at the center of the knuckle. Again, it is likely a Single "C" inlet would collect this runoff without exceeding the top of curb since the flow does not move past the inlet.

One advantage of the proposed design is that if the inlets or storm drains are partially clogged and operating inefficiently, the 22-foot wide drainage easement is available to collect surface runoff at the knuckle which might exceed the level of the curb tops.

Much of the storm drain along the east side of Blossom Wood Road will be 24-inch RCP. The storm drain crossing Blossom Wood Road north of Baybrook Road will also be a 24-inch RCP. All of the storm drain within the area of the knuckle will be 30-inch RCP, as will the storm drain line that connects to the interim retention pond. In the final condition after construction of the West Bluff Outfall Channel, the 30-inch RCP storm drain line will be extended from the defunct retention pond to the new channel within the 22-foot drainage easement.

II.8 Site Hydrology - Emergency Spillway

The retention pond emergency spillway will be capable of passing the 10-year, 6-hour peak discharge flow rate arriving in the pond from the Rosewood Subdivision. Discharge will be into the Unser/I-40 Interchange right-of-way. The determination of the peak flow rate and spillway geometry are determined in the following:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	PEAK DISCHARGE (cfs)
A	0.00	0.24
B	3.03	0.76
C	1.16	1.49
D	5.09	2.89

Peak Discharge

$$\text{Peak Discharge (10-yr, 6-hr)} = (3.03 \times 0.76) + (1.16 \times 1.49) + (5.09 \times 2.89)$$

$$\text{Peak Discharge (10-yr, 6-hr)} = 18.74 \text{ cfs}$$

Trapezoidal (Broad Crested) Weir

$$Q = 3.367 L H^{3/2}$$

where: Q = weir flow rate, 18.74 cfs

L = length of the weir crest, ft

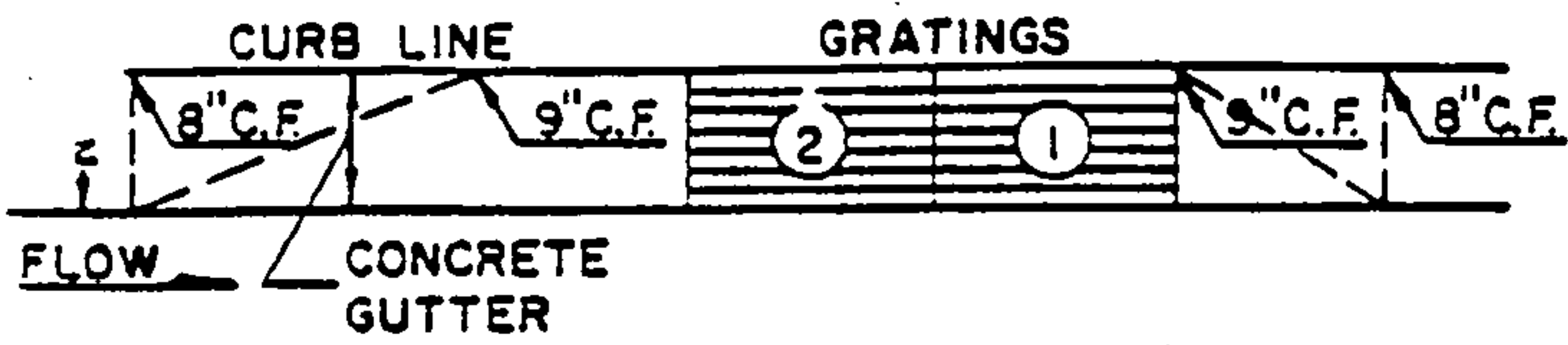
H = head on the weir, 0.5 ft (assumed)

solving L:

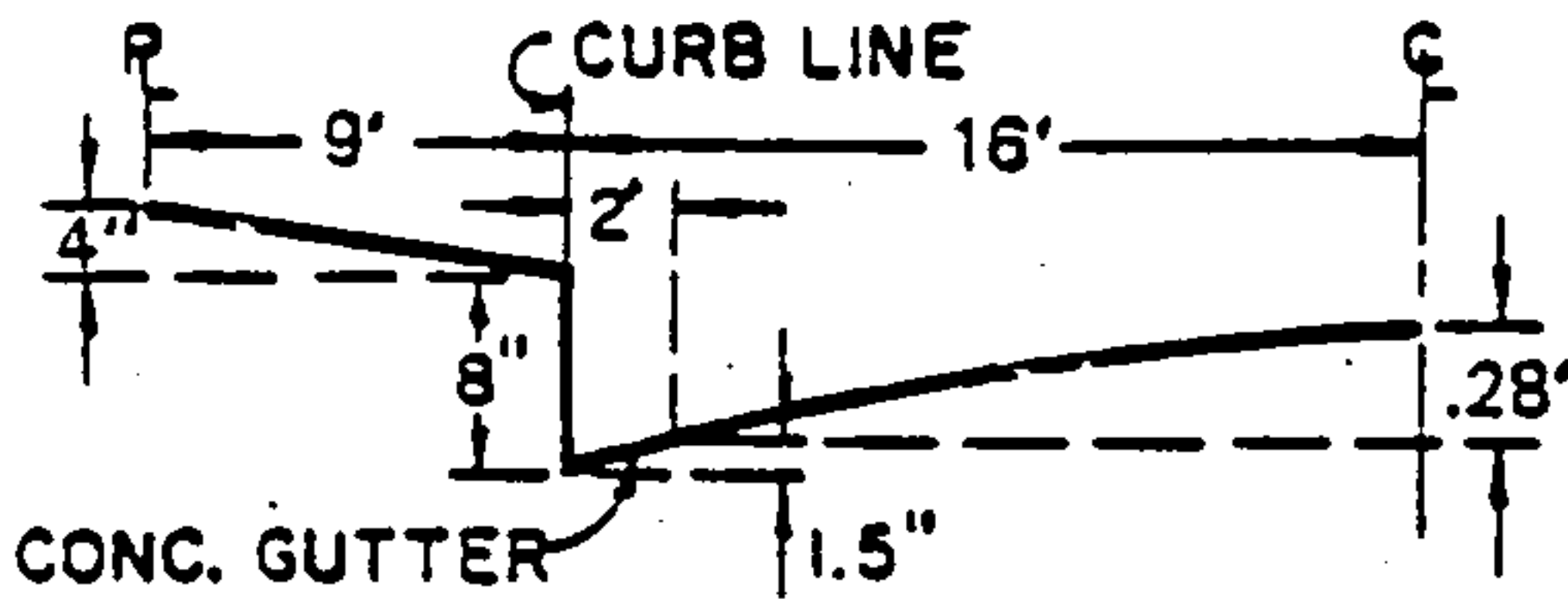
$$L = Q / (3.367 H^{3/2})$$

$$L = 15.74 \text{ ft} \quad \text{use 20 ft (minimum)}$$

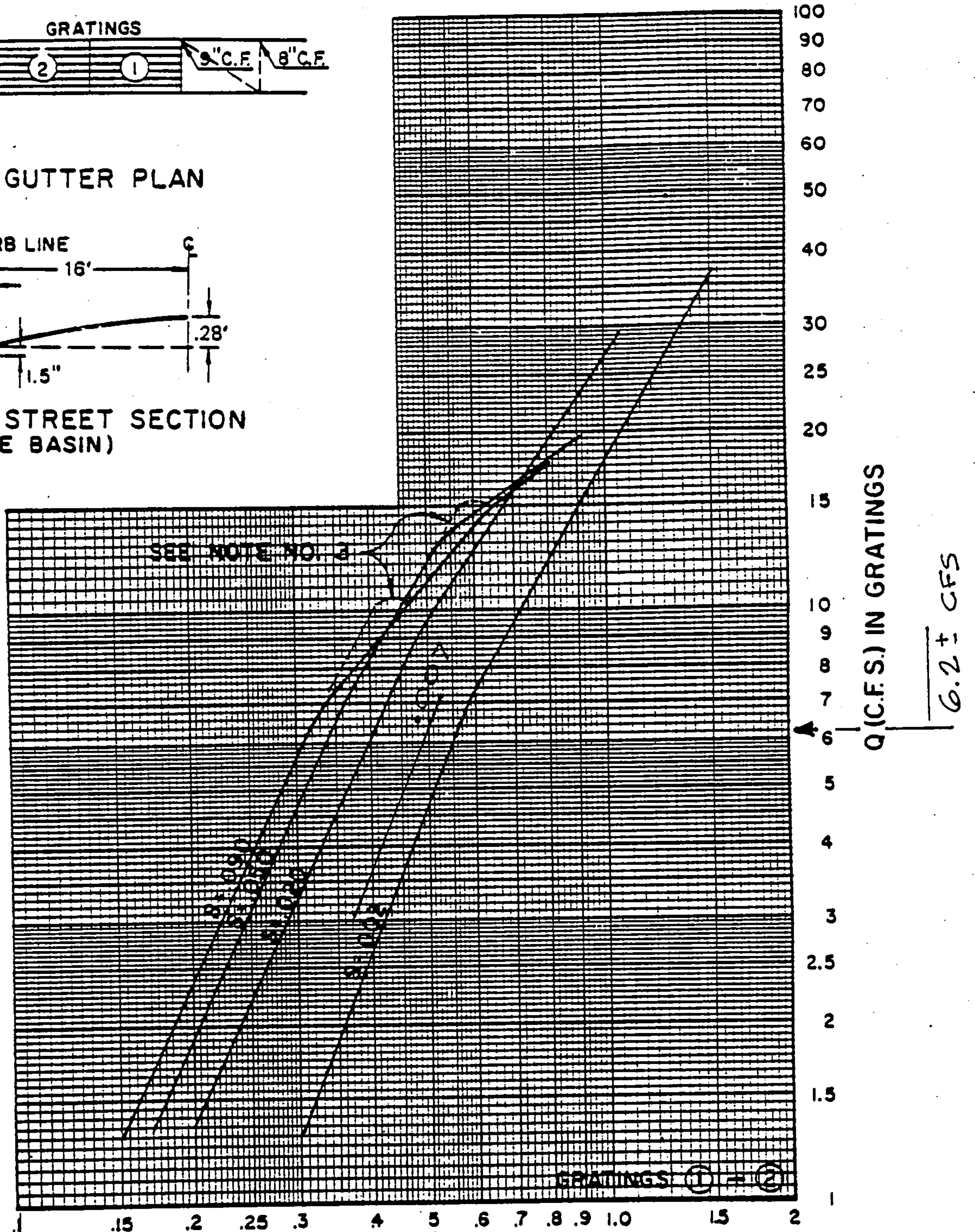
GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION (ABOVE BASIN)



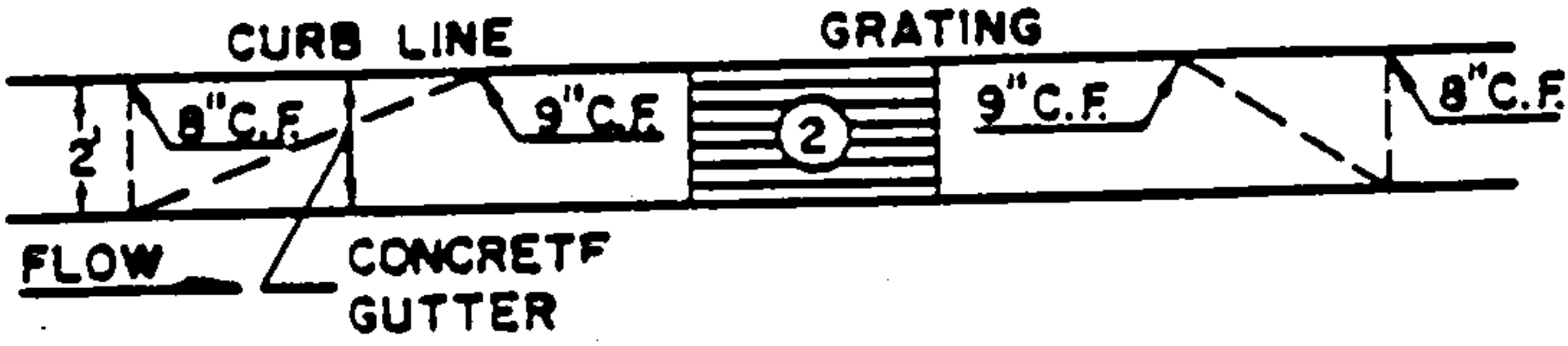
D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

ROSEWOOD SUB'N

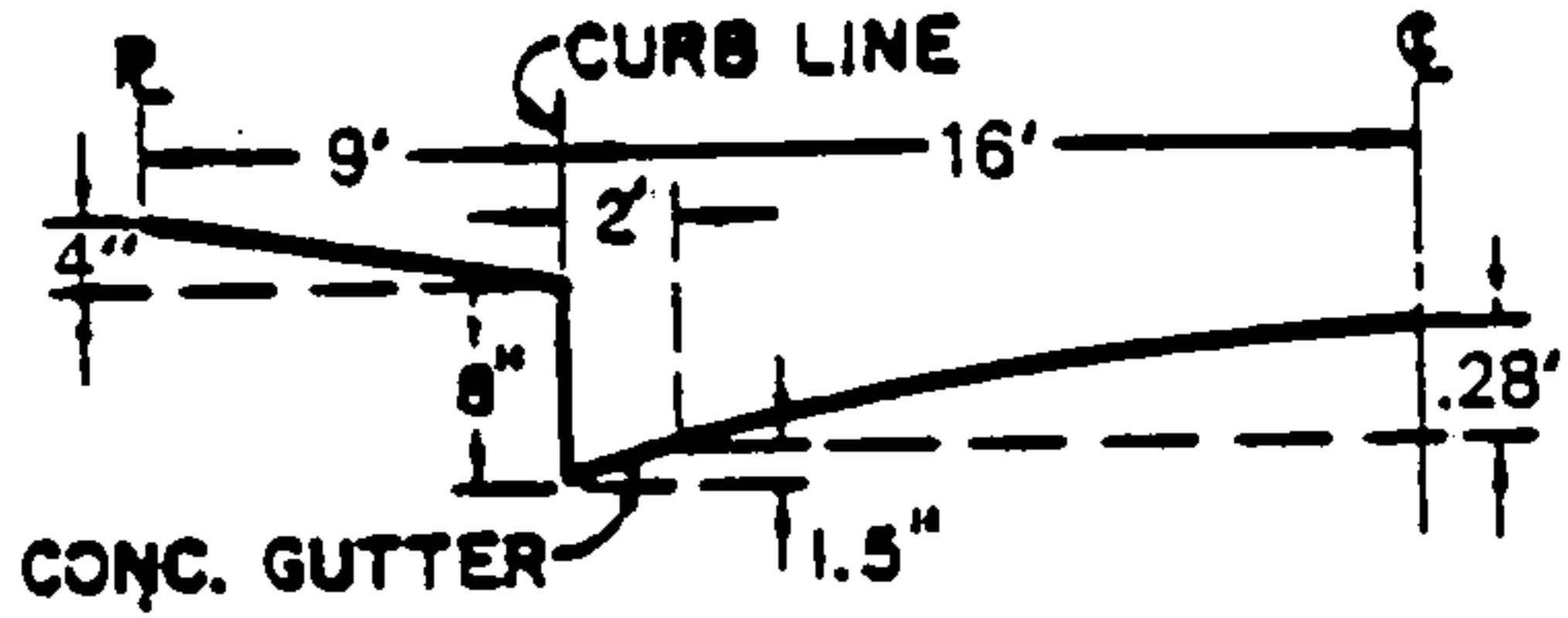
BLOSSOM WOOD RD

0.5' DEPTH @ S = 0.007 FT/FT

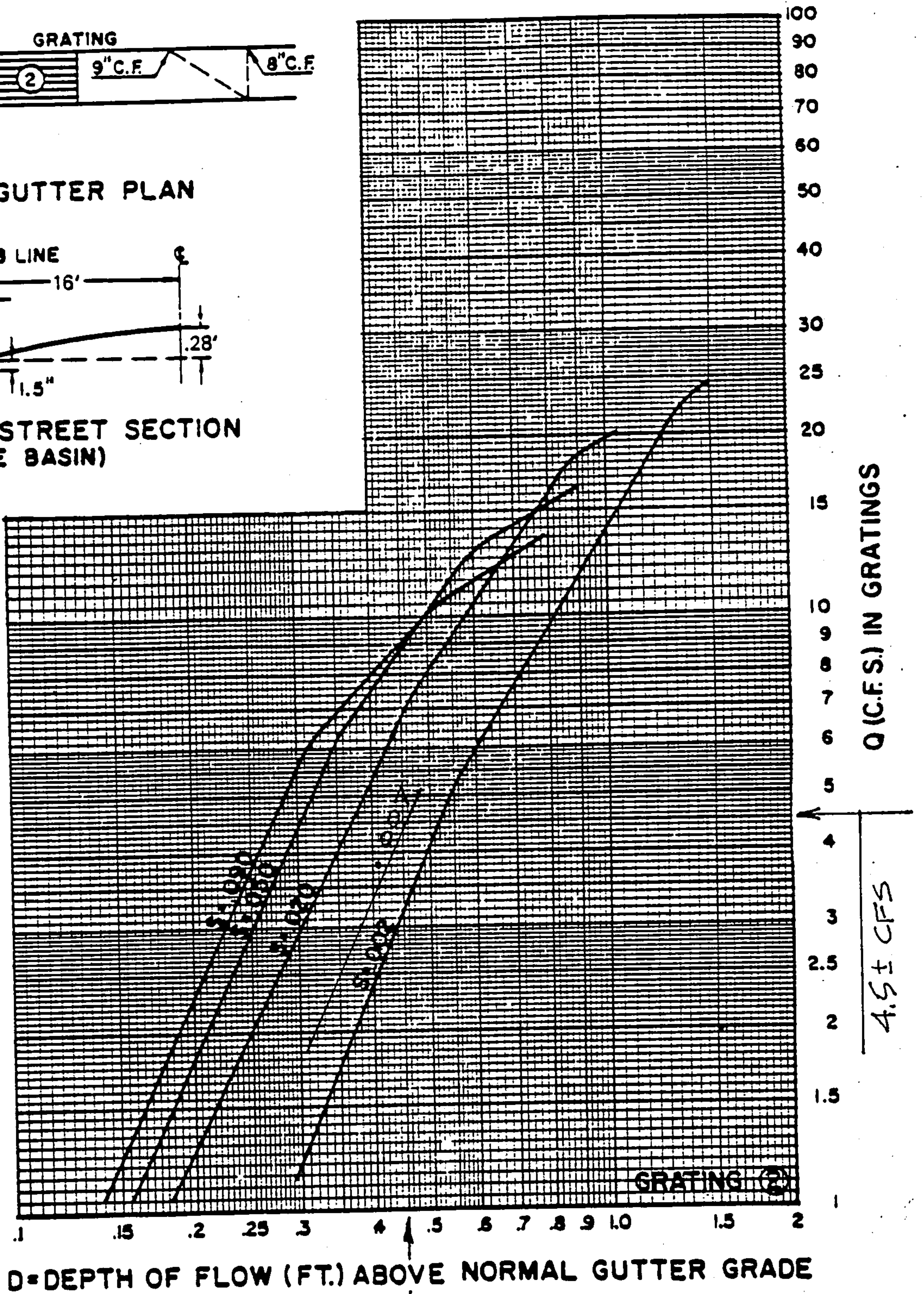
GRATING CAPACITIES FOR TYPE "A", "C" and "D"



GRATING & GUTTER PLAN

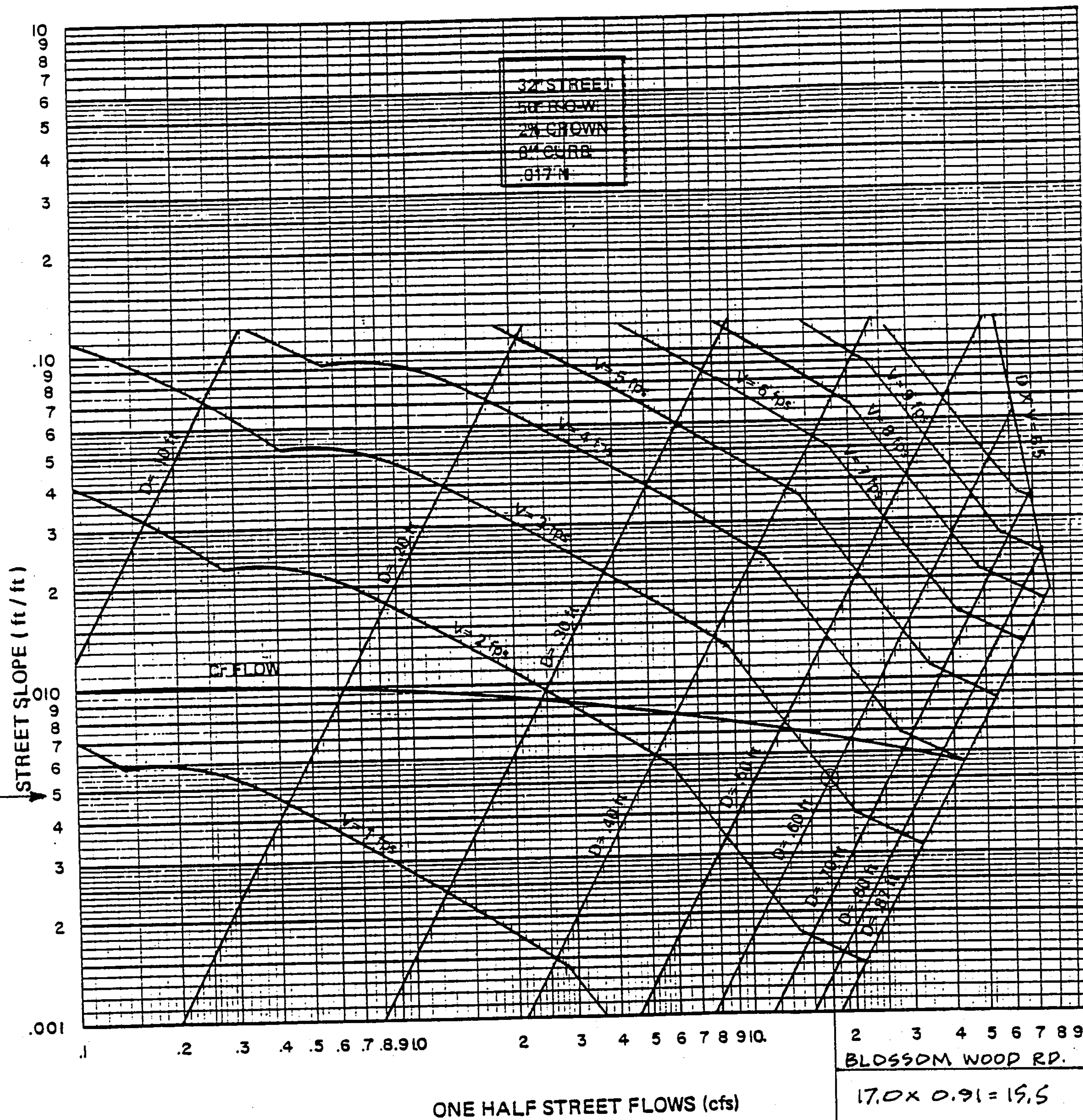


TYPICAL HALF STREET SECTION (ABOVE BASIN)



BLOSSOM WOOD RD.
0.45' DEPTH @ S=0.007 FT/FT

STREET CAPACITY



DRAINAGE INFORMATION SHEET

PROJECT TITLE: Rosewood Sub'n ZONE ATLAS/DRNG. FILE #: J-10 / ~~1116~~ D19
 DRB #: 96-49 EPC #: _____ WORK ORDER #: _____
 LEGAL DESCRIPTION: TRACTS 233, 234-A, 234-B, & 234-C, AIRPORT UNIT,
 CITY ADDRESS: TOWN OF ATRISCO GRANT
 ENGINEERING FIRM: PROTEC Consulting CONTACT: Ray Macy
 ADDRESS: P.O. Box 27007, Albuq., 87125 PHONE: (505) 833-0177
 OWNER: Adil Rizvi CONTACT: Adil Rizvi
 ADDRESS: 7049 Luella Anne, Albuq. PHONE: (505) 857-0467
 ARCHITECT: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____
 SURVEYOR: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____
 CONTRACTOR: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____

(Revision to
 TYPE OF SUBMITTAL: Previous Submittal) CHECK TYPE OF APPROVAL SOUGHT:
☒ DRAINAGE REPORT _____ SKETCH PLAT APPROVAL
☒ DRAINAGE PLAN _____ PRELIMINARY PLAT APPROVAL
 _____ CONCEPTUAL GRADING & DRAINAGE PLAN _____ S. DEV. PLAN FOR SUB'D. APPROVAL
☒ GRADING PLAN _____ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
 _____ EROSION CONTROL PLAN _____ SECTOR PLAN APPROVAL
 _____ ENGINEER'S CERTIFICATION _____ FINAL PLAT APPROVAL
 _____ OTHER _____ FOUNDATION PERMIT APPROVAL
 _____ BUILDING PERMIT APPROVAL
 _____ CERTIFICATE OF OCCUPANCY APPROVAL
 _____ GRADING PERMIT APPROVAL
 _____ PAVING PERMIT APPROVAL
 _____ S.A.D. DRAINAGE REPORT
 _____ DRAINAGE REQUIREMENTS
 _____ SUBDIVISION CERTIFICATION
☒ OTHER DRC W.D. (SPECIFY)
Final Design

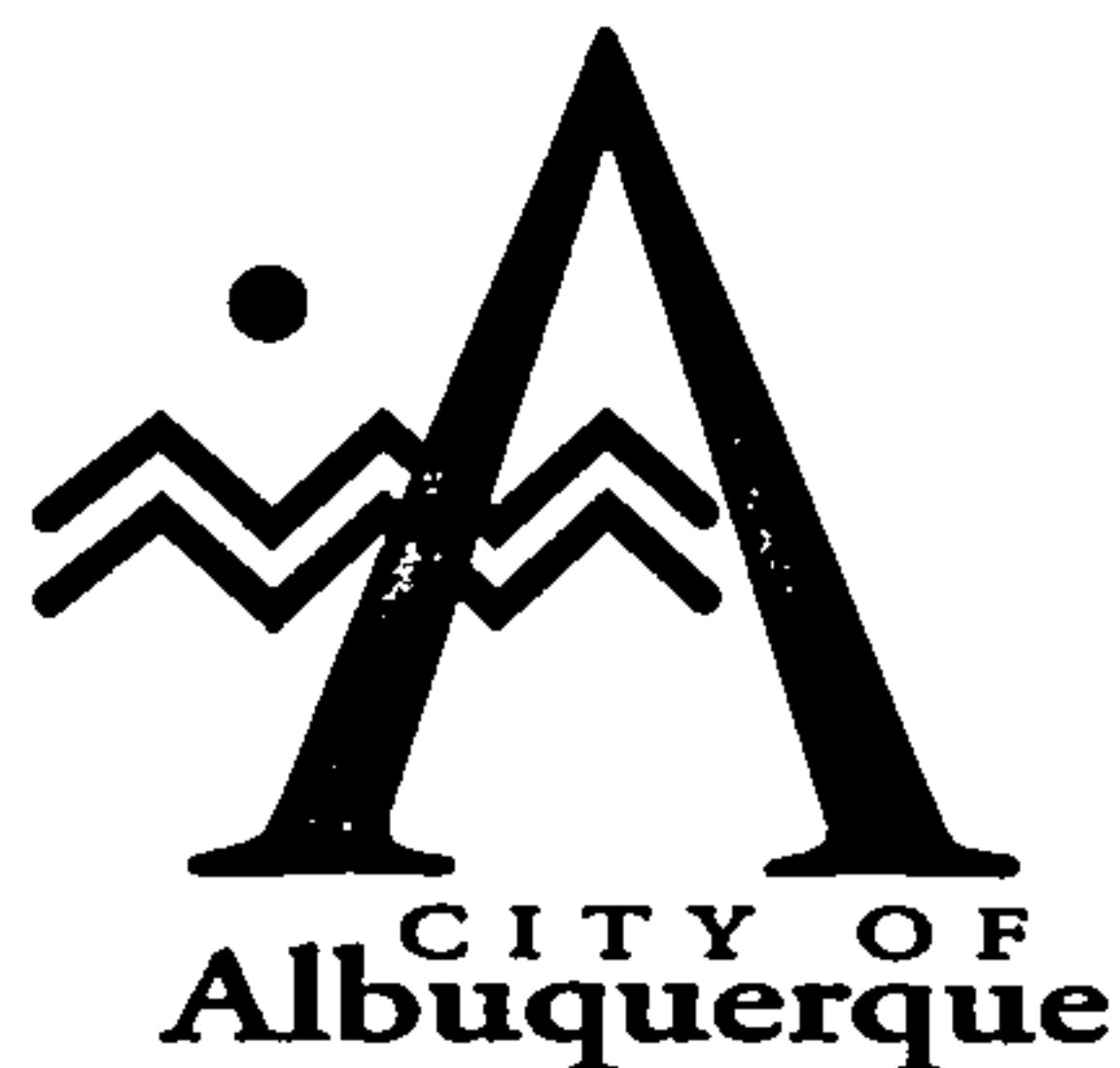
PRE-DESIGN MEETING:

_____ YES
 _____ NO
 _____ COPY PROVIDED

DATE SUBMITTED: December 18, 1996
 BY: R.W. Macy

DEC 19

HYDROLOGY DIVISION



June 24, 1996

Martin J. Chávez, Mayor

Raymond W. Macy
PROTEC Consulting
P.O. Box 27007
Albuquerque, NM 87125

RE: REVISED DRAINAGE PLAN/REPORT FOR ROSEWOOD SUBDIVISION
(J10-D19) REVISION DATED 6/20/96.

Dear Mr. Macy:

Based on the information provided on your June 21, 1996 resubmittal, the above referenced site is approved for Preliminary Plat, Final Plat, Work Order & Building Permit.

Please be advised that no building permits will be issued until the copy of the filed Executed Agreement & Covenant for the maintenance of the ponding area is submitted.

Also, Engineer Certification per the D.P.M. checklist will be required prior to Financial Guarantee release.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

BJM/dl

c: Andrew Garcia
Adil Rizvi

File

Good for You, Albuquerque!



JUN 21 1996

Rosewood Subdivision
 DBR Case No. 96-49
 DRC Project No.:
 Date Submitted: 06-20-96
 Prelim. Plat Approved:
 Prelim Plat Expires:

FIGURE 12
 EXHIBIT "A"
TO SUBDIVISION IMPROVEMENT AGREEMENT
 DEVELOPMENT REVIEW BOARD
 REQUIRED INFRASTRUCTURE LISTING
 DRB 96-49

TRACTS 233, 234-A, 234-B, AND 234-C, TOWN OF ATRISCO GRANT, AIRPORT UNIT
 BEING REPLATED AS

ROSEWOOD SUBDIVISION

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are Subdivider responsibility. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided by the City.

SIZE	IMPROVEMENT	LOCATION	FROM	TO
4'	*PCC Sidewalk (Both Sides)	Hanover Rd.	East Property Line	West Property Line
32' F-F	Res. Paving	Blossom Wood Place	Hanover Rd.	Kane Crt
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
10"	Sanitary Sewer	"	"	"
28' F-F	Res. Paving	Blossom Wood Place	Kane Crt	Blossom Wood Place
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
10"	Sanitary Sewer	"	"	"

SIZE	IMPROVEMENT	LOCATION	FROM	TO
28' F-F	Res. Paving	Kane Court	Blossom Wood Place	Cul-de-sac
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
6"	Waterline	"	"	"
8"	Sanitary Sewer	"	"	"
28' F-F	Res. Paving	Amy Marie Court	Blossom Wood Place	Cul-de-sac
STD	Curb & Gutter (Both Sides.)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Sanitary Sewer	"	"	"
6"	Waterline	"	"	"
28' F-F	Res. Paving	Baybrook Rd.	Blossom Wood Place	Tarrington Drive
STD	Curb & Gutter (Both Sides.)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
8"	Sanitary Sewer	Baybrook Rd	Blossom Wood Place	East Side Lot 24 Block "C"
28' F-F	Residential Paving	Blossom Wood Place	Blossom Wood Place	Cul-de-sac
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
8"	Sanitary Sewer	"	"	"
18" 24" 27" & 30"	Storm drain including all appurtenances, inlets, manholes, etc.	Blossom Wood Place	Just No. Of Baybrook Rd.	15' Wide Drainage Easement Between Lots 16 & 17 - Block B

MISCELLANEOUS

Street lighting per DPM.

Grading & Drainage: Certification per DPM (prior to release of financial guarantees). To include private perimeter and retaining walls as required on the approved Grading Plan.

*Sidewalks to be deferred.

**Concrete lined drainage easement between Lots 16 & 17 Block B per DPM Standards.

All water to include fire hydrants, valves, and appurtenances per DPM.

Temporary storm water retention pond on Lots 16 & 17 Block B, the 15' wide drainage easement between Lots 16 & 17, Block B, and the 0.1320 acres to be dedicated for future construction of the West Bluff Division Channel.

Wheelchair ramps per DPM.

Prepared by: Ray Macy, P.E.

Date: 6/21/96

* * * * *

Development Review Board Member Approval

Transportation Development

Date

Utility Development

Date

Parks & General Services

Date

City Engineer/AMAFCA

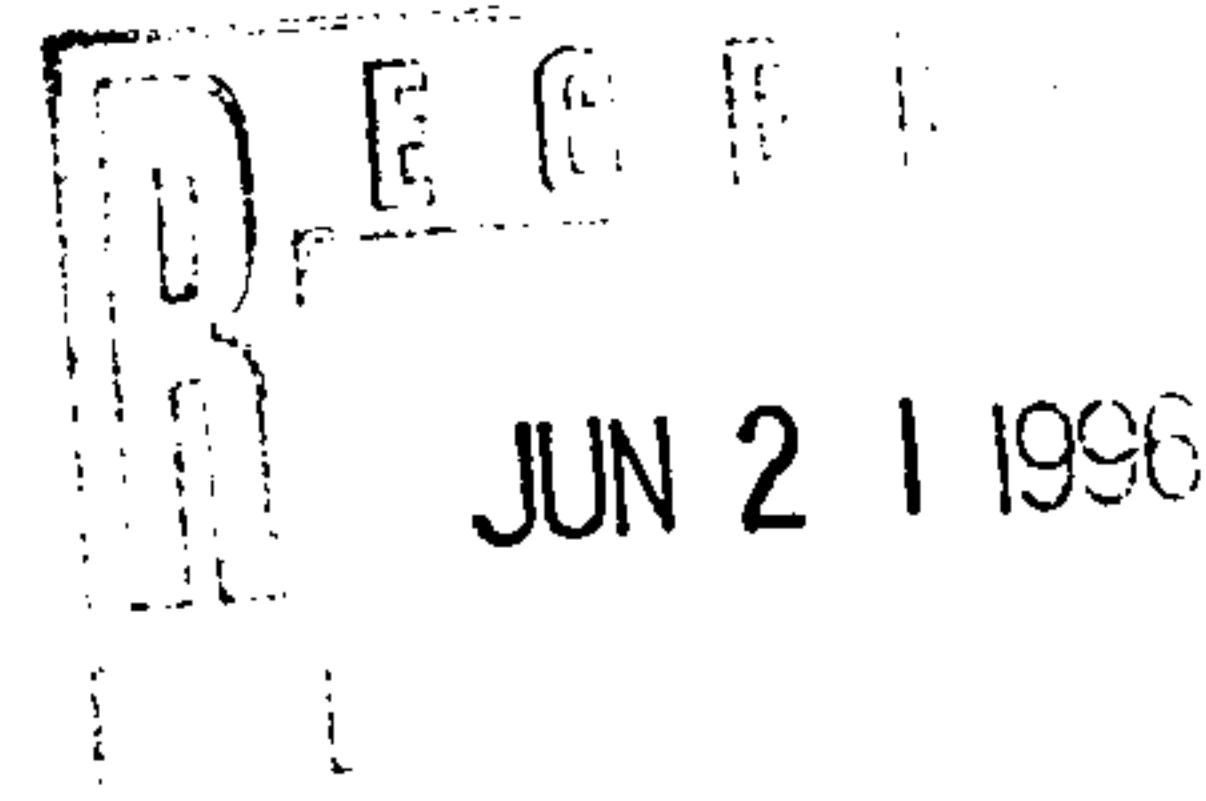
Date

DRB Chairman

Date

June 21, 1996

Mr. Bernie J. Montoya
Engineering Associate
City of Albuquerque
Public Works Department
Hydrology Division
P.O. Box 1293
Albuquerque, NM 87103



Re: FIRST REVISION - Rosewood Subdivision Infrastructure List
Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant

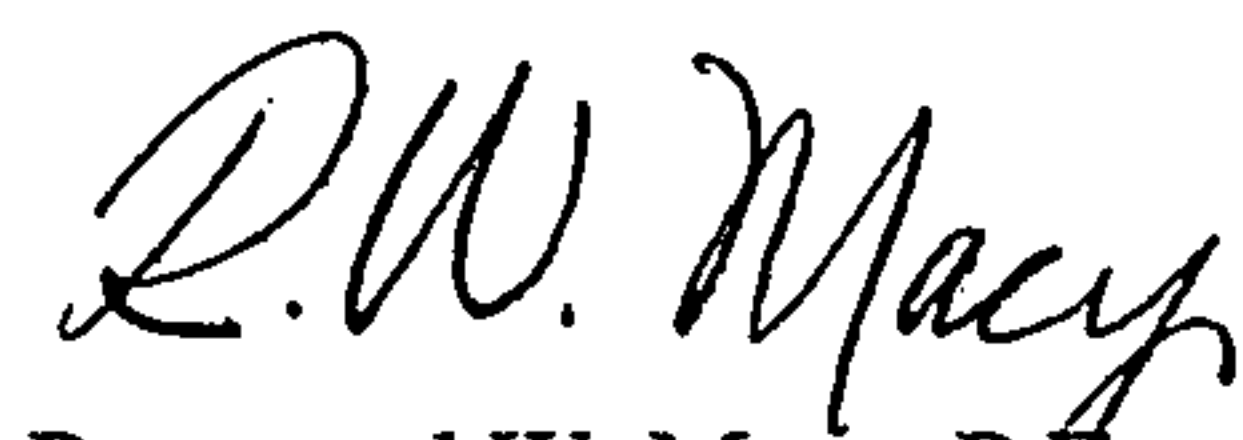
Dear Mr. Montoya:

Please find enclosed two copies of the FIRST REVISION to the above referenced infrastructure list. The following statements identify changes made to the original submittal dated May 17, 1996:

- The extension of Amy Marie Place eastward from Blossom Wood Place to Tract 232 has been eliminated per the approval of City Transportation. One additional lot has been created in place of the deleted street segment. Adjustments have been made in the identification of lots and blocks as a result of the street segment deletion.
- The sanitary sewer in Blossom Wood Place has been corrected, identifying it as 10-inch diameter.
- Sidewalk has been included on the south side of Hanover Road.
- 10-inch diameter sanitary sewer has been included in Hanover Road.

If you have any questions regarding the information provided herein, please do not hesitate to contact me at (505) 833-0177.

Sincerely,
PROTEC Consulting


Raymond W. Macy, P.E.
Owner

Enclosure

xc: Mr. Adil Rizvi

DRAINAGE INFORMATION SHEET

PROJECT TITLE: ROSEWOOD SUBDIVISION ZONE ATLAS/DRNG. FILE #: J-10/ 1119

DRB #: 96-049

EPC #:

WORK ORDER #:

LEGAL DESCRIPTION: TRACTS 233, 234-A, 234-B, & 234-C Airport Unit,
TOWN OF ATRISCO GRANT

CITY ADDRESS: HANDOVER ROAD, NW

ENGINEERING FIRM: PROTEC Consulting

CONTACT: Ray Macy

ADDRESS: P.O. Box 27007
Albuquerque, NM 87125

PHONE: 833-0177 or 833-0414

OWNER: Adil Rizvi

CONTACT: Adil Rizvi

ADDRESS: 7045 Luella Anne Dr., NE
Albuquerque, NM 87112

PHONE: 857-0467

ARCHITECT:

CONTACT:

ADDRESS:

PHONE:

SURVEYOR: SOUTHWEST SURVEYING CO., INC.

CONTACT:

ADDRESS: 333 Lomas Blvd., NE
Albuquerque, NM 87102

PHONE:

CONTRACTOR:

CONTACT:

ADDRESS:

PHONE:

TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
- ☒ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☒ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION
- ☐ OTHER _____

PRE-DESIGN MEETING:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SKETCH PLAT APPROVAL
- ☒ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ S.A.D. DRAINAGE REPORT
- ☐ DRAINAGE REQUIREMENTS
- ☐ SUBDIVISION CERTIFICATION
- ☐ OTHER _____ (SPECIFY)

MAY 1 1996

DROLOGY DIVISION

DATE SUBMITTED: April 30, 1996

BY:

R.W. Macy

PROTEC

Consulting

Professional Technologies and
Design Development Services

April 30, 1996

Mr. Bernie J. Montoya
Engineering Associate
City of Albuquerque
Public Works Department
Hydrology Division
P.O. Box 1293
Albuquerque, NM 87103

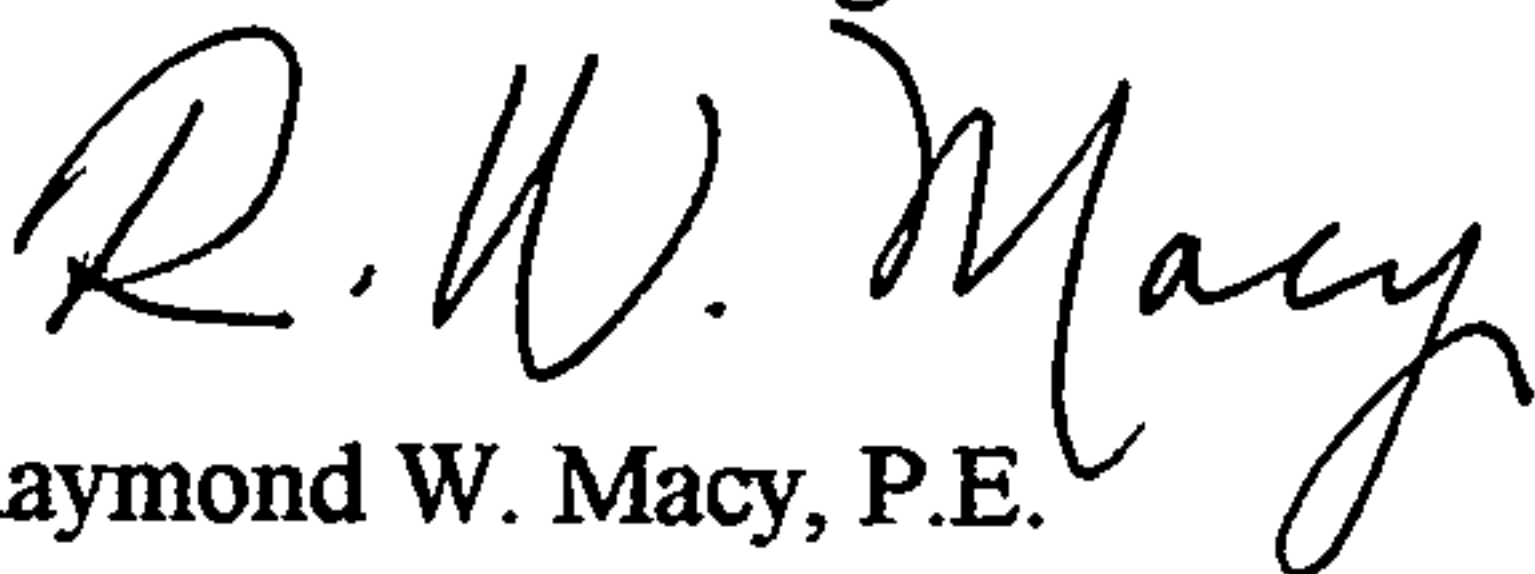
**Re: Rosewood Subdivision Drainage Report & Grading and Drainage Plan
 Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant
 Albuquerque, NM**

Dear Mr. Montoya:

Please find enclosed for your review and comment, three copies of the above referenced drainage report and grading and drainage plan. We respectfully request your expedient review and approval of theses documents.

If you have any questions regarding the information provided here, please do not hesitate to contact me at either (505) 833-0177 or (505) 833-0414.

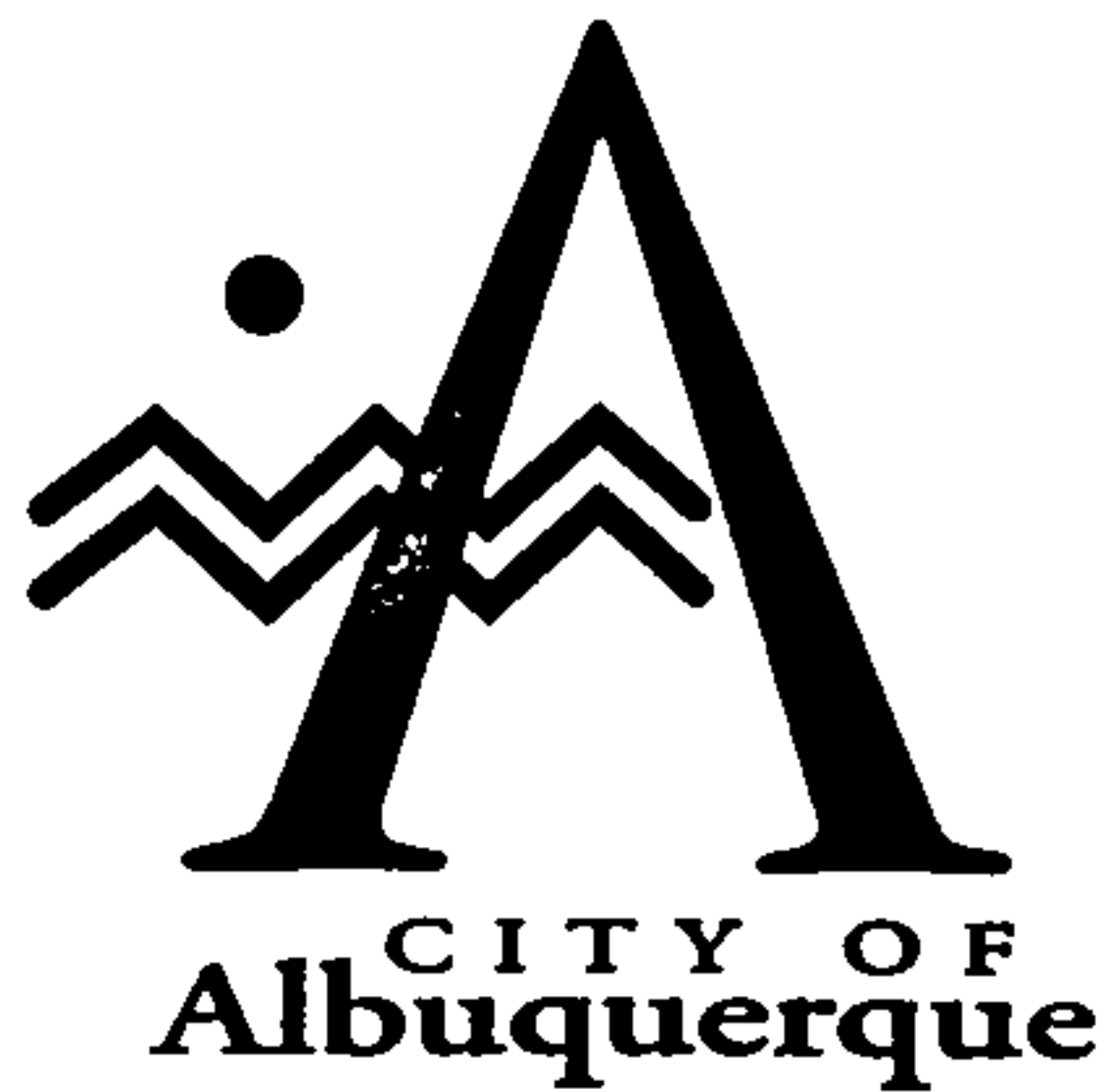
Sincerely,
PROTEC Consulting


Raymond W. Macy, P.E.
Owner

Enclosure

xc: Mr. Adil Rizvi

1996



May 13, 1996

Martin J. Chávez, Mayor

Raymond W. Macy
PROTEC Consulting
P.O. Box 27007
Albuquerque, NM 87125

RE: DRAINAGE PLAN/REPORT FOR ROSEWOOD SUBDIVISION
(J10-D19) ENGINEER'S STAMP DATED 4/30/96.

Dear Mr. Macy:

Based on the information provided on your May 1, 1996 submittal, listed are some concerns that will need to be addressed prior to final approval:

1. As-built information on Chamisa Encantada Subdivision indicated that your site is about 2.5'+ lower than the adjacent site. If you can not meet the 3 to 1 slope requirement, then you must construct your own retaining wall so as not to undermine the wall on Chamisa Encantada.
2. A 1.0' water block on Hanover & Blossom Wood Rd. NW will be required. You indicate a water block, but it is not shown to be 1.0'.
3. Please identify the future storm drain connection to the West Bluff Diversion Channel on your plan drawing.
4. Top of curb and flow line elevations along Hanover Rd. NW.
5. Copy of executed Agreement and Covenant for maintenance of the pond.
6. Copy of the infrastructure list.

If I can be of further assistance, please feel free to contact me at 768-2667.

Sincerely,

Bernie J. Montoya, CE
Engineering Associate

c: Andrew Garcia
Adil Rizvi
File

Good for You, Albuquerque!



DRAINAGE INFORMATION SHEET

PROJECT TITLE: ROSEWOOD SUB'n ZONE ATLAS/DRNG. FILE #: J-10 / 1119
 DRB #: _____ EPC #: _____ WORK ORDER #: _____
 LEGAL DESCRIPTION: LOTS 233, 234-A, 234-B, & 234-C TOWN OF ATRISCO GRANT,
 CITY ADDRESS: HANOVER RD., NW AIRPORT UNIT

ENGINEERING FIRM: PROTEC Consulting CONTACT: Ray Macy
 ADDRESS: P.O. Box 27007, Albuq, NM PHONE: 833-0177

OWNER: ADIL RIZVI CONTACT: ADIL RIZVI
 ADDRESS: 7049 Luella Ann NE, Albuq. PHONE: 857-0467

ARCHITECT: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____

SURVEYOR: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____

CONTRACTOR: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____

TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
- ☒ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☒ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION
- ☐ OTHER _____

PRE-DESIGN MEETING:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SKETCH PLAT APPROVAL
- ☒ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ S.A.D. DRAINAGE REPORT
- ☐ DRAINAGE REQUIREMENTS
- ☐ SUBDIVISION CERTIFICATION
- ☐ OTHER _____ (SPECIFY)

494
125/5
615

RECEIVED

DATE SUBMITTED: June 21, 1996
 BY: R.W. Macy

JUN 21 1996

June 20, 1996

Mr. Bernie J. Montoya
Engineering Associate
City of Albuquerque
Public Works Department
Hydrology Division
P.O. Box 1293
Albuquerque, NM 87103

**Re: FIRST REVISION - Rosewood Subdivision Drainage Report & Grading and Drainage Plan
Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant**

Dear Mr. Montoya:

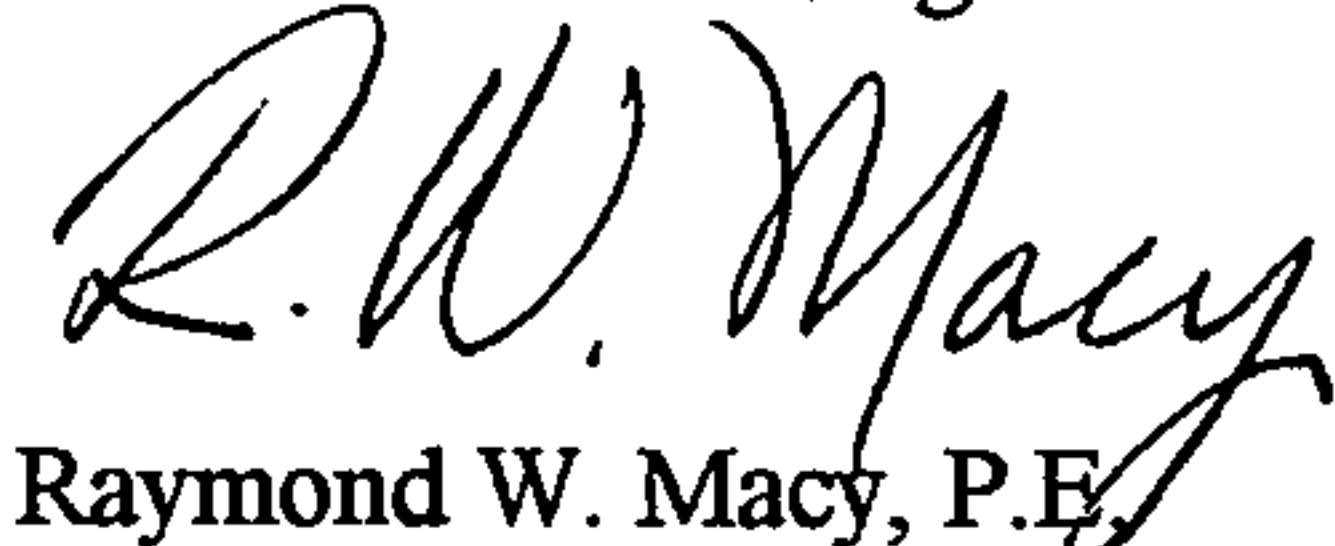
Please find enclosed for your review and comment, three copies of the FIRST REVISION to the above referenced drainage report and grading and drainage plan. The following statements identify changes made to the original submittal of April 30, 1996:

- The extension of Amy Marie Place eastward from Blossom Wood Place to Tract 232 has been eliminated per the approval of City Transportation. One additional lot has been created in place of the deleted street segment. Corresponding runoff volumes and peak rates of flow from the subdivision have been revised in the report.
- The 27-inch and 30-inch storm drain in Blossom Wood Place has been shifted to the east side of the road. This was necessary to prevent a vertical placement conflict between the sanitary main and the storm drain. The number, types and placement of curb inlets has not been changed.
- Retaining walls have been added at the west edge of lots 5, 6 and 15 in Block A due to the potential of exposing the footing on the existing retaining wall along the Chamisa Encantada east property line.
- A water block on Blossom Wood Place just south of Hanover Road is identified. A note on the drawing indicates that it exceeds the required 1.0'
- The future storm drain connection to the West Bluff Diversion Channel is identified on the drawing.
- Top of curb and flow line elevations are provided along Hanover Road.

A revised copy of the infrastructure list and a copy of the executed Agreement and Covenant for maintenance of the temporary pond are being submitted under separate cover.

We respectfully request your expedient review and approval of the enclosed documents. If you have any questions regarding the information provided here, please do not hesitate to contact me at (505) 833-0177.

Sincerely,
PROTEC Consulting



Raymond W. Macy, P.E.
Owner

Enclosure

xc: Mr. Adil Rizvi

JUN 21 1996

DRAINAGE REPORT
FOR
ROSEWOOD SUBDIVISION
A 55 LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION

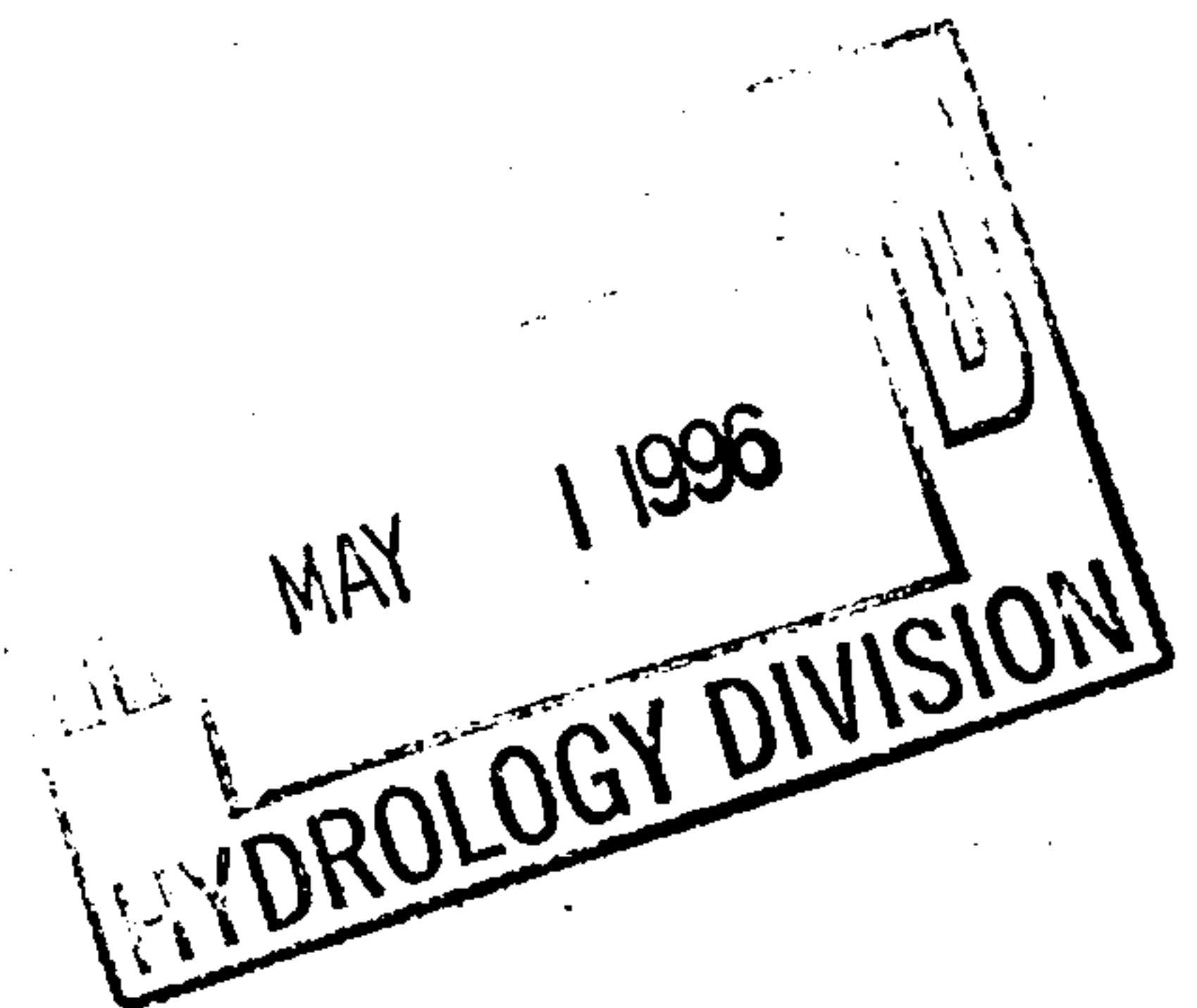
PREPARED FOR:

ADIL RIZVI
7049 LUELLA ANNE DRIVE, NE
ALBUQUERQUE, NM 87112

PREPARED BY:

PROTEC CONSULTING
PO BOX 27007
ALBUQUERQUE, NM 87125
(505) 833-0177

APRIL 30, 1996



R.W. Macy
4/30/96

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I. GENERAL

I.1 Legal Description

A certain tract of land, being and comprising lots 234-A, 234-B and 234-C, plat of division of Tract 234, Airport Unit, Tracts allotted from Town of Atrisco Grant, as the same are shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on March 9, 1981 in Vol. B18, Folio 146; together with a portion of Tract 233, Town of Atrisco Grant, as the same is shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on December 5, 1944 in Vol. D, Folio 118, less and excepting that portion of said Tract taken for the right-of-way of the access ramp from I-40 to Unser Boulevard, NW as the same is shown on the New Mexico State Highway Commission Right-of-way Map I-040-3(28)148.

I.2 Engineer

PROTEC Consulting
PO Box 27007
Albuquerque, NM 87125
(505) 833-0177

I.3 Surveyor

Southwest Surveying Co., Inc.
333 Lomas Boulevard, NE
Albuquerque, NM 87102
(505) 247-4444

I.4 Benchmark

ACS "I-J9" located on the Unser Blvd overpass on I-040 approximately 222 feet north of centerline of I-040. Elevation 5199.19

I.5 TBM

SAS MH rim at Hanover Road and 80th Street, NW. Elevation 5153.61

I.6 Zoning

RD (15 Du/Acre max.)

I.7 Proposed

55 Single Family Residential Lots

I.8 Area

9.6161 Acres more or less (418,877.32 square feet, more or less)

I.9 Flood Hazard

The proposed site (Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant) is located within Flood Hazard Zone C (areas of minimal flooding) as designated on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) Community-Panel No. 350002 0027 C (October 14, 1983).

I.10 Location and Description

The proposed 9.6161 acre site is undeveloped and mostly undisturbed at the writing of this Drainage Report. The extreme west edge of the site has been disturbed along the length of the west boundary line as a result of block retaining wall construction for the recently developed Chamisa Encantada Subdivision. Existing ground cover across the site is comprised of sage brush and various native grasses. The proposed site is bounded on the north by Hanover Road, NW, on the south by the Unser Boulevard northbound off ramp from the Unser/I-40 Interchange, on the west by the Chamisa Encantada Subdivision, and on the east by Tract 232 Airport Unit, Town of Atrisco Grant, which is presently undeveloped. Hanover Road is developed and is characterized by a 40' wide paved roadway with standard curb and gutters on either side, a sanitary sewer collection system, water line, and overhead power and telephone lines. There are presently no sidewalks on Hanover Road adjacent to the proposed site. The proposed West Bluff Outfall Channel (West Bluff Storm Interceptor, Phase II) is planned to be located at the south edge of the proposed site inside of existing Unser/I-40 Interchange right-of-way. Plans for the outfall channel improvements are currently in the preliminary design phase, and construction is expected to begin sometime in 1997.

II HYDROLOGIC ANALYSIS**II.1 Existing Conditions**

Hanover Road, NW intercepts offsite flows originating from north of the proposed Rosewood Subdivision and diverts them eastward to the Laurelwood Park Drainage Management Area at the northwest corner of Hanover Road, NW and 72nd Street, NW.

The recently developed Chamisa Encantada Subdivision is immediately west of the proposed site. This subdivision has been designed to carry all storm runoff originating from within it to the south for containment in a temporary earthen drainage basin. This basin will eventually be removed and replaced with the development of residential lots when the West Bluff Outfall Channel is constructed along the north edge of the northbound Unser/I-40 off ramp. At that time, runoff from the Chamisa Encantada Subdivision will drain directly into the West Bluff Outfall Channel.

Runoff originating along the north edge of the Unser/I-40 northbound off ramp is collected within the I-40 right-of-way at the north edge of the roadway. It is conveyed in a roadside ditch to the east for several hundred feet where it is drained into a 30-inch diameter CMP culvert and directed southward to the south side of I-40.

Off-site flows are prevented from entering the proposed Rosewood Subdivision by drainage improvements associated with Hanover Road, NW, the Chamisa Encantada Subdivision and the Unser/ I-40 off ramp.

Presently, runoff originating on the proposed Rosewood Subdivision drains eastward primarily as sheet flow with a gradient of approximately 2%. Based on a review of actual field conditions and recent topography, it appears the northern most 1.25 acres of the 9.6161 acre site will drain either directly onto Hanover Road, NW, or will exit the east edge of the property in a natural swale that subsequently turns north and drains onto Hanover Road, NW within Tract 232. The remaining 8.27 acres drains east to southeast and enters the north edge of the I-40 right of way, where the runoff is collected into a 30-inch CMP culvert and directed southward to the south side of I-40.

II.2 Site Hydrology (Existing Conditions)

The site hydrology as determined herein is based on the methods and criteria presented in the City of Albuquerque Development Process Manual (DPM) - Volume 2, Section 22.2 Hydrology, dated January 1993. The proposed site is in Precipitation Zone 1 (west of the Rio Grande). The P360 (100-year, 6-hour storm event) has a depth of 2.20 inches as shown in Table A-2. Since the proposed site is primarily undeveloped and undisturbed land, then Land Treatment A is applicable. See Table A-2. Excess Precipitation E for this storm is 0.44 inches as shown in Table A-8. The Peak Discharge, Q_p , from the same storm is 1.29 cfs/acre. See Table A-9. The runoff volumes and peak discharge rates from the undeveloped site are determined as follows:

1.25 Acres at the South Edge of Hanover Road, NW

$$\text{Volume(360)} = 0.44 \text{ in} \times 1.25 \text{ ac} \times 1 \text{ ft}/12 \text{ in}$$

$$\text{Volume(360)} = .04583 \text{ ac-ft}$$

$$\text{Volume(360)} = 1,996.5 \text{ cf}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.29 \text{ cfs/acre} \times 1.25 \text{ ac}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.6 \text{ cfs}$$

Remaining 8.37 Acres

$$\text{Volume(360)} = 13,368.6 \text{ ac-ft}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 10.8 \text{ cfs}$$

II.3 Proposed Improvements (Interim)

Initially, it will be necessary to construct a temporary retention basin at the south end of the subdivision to receive on-site runoff. This basin will require the area of two residential lots (Lots 9 and 10 in Block C) plus a portion of the drainage area designated as DA-3b, which will be dedicated for the future West Bluff Outfall Channel.

Lot 1 and a portion of Lot 2 in Block B will drain northward onto Hanover Road, NW. This is a result of developing a water block in Blossom Wood Road, NW at Hanover Road, NW to prevent runoff in Hanover from entering the site. The area draining onto Hanover (DA-1) is approximately 0.365 acres.

Kane Court, NW will be constructed without a street crown, and runoff will be allowed to drain from the north side of the street to the south curb line while being conveyed eastward. This is to diminish the flow of water entering Blossom Wood Road from Kane Court at the extreme northwest quadrant of the intersection, where there would be a possible opportunity for some of the runoff to rise above the water block and drain northward into Hanover Road. The vertical geometry of Blossom Wood Road is such that it must rise high enough near Hanover Road so as to produce a sufficient gradient southward to the knuckle. Furthermore, this must be done without resulting in an undesirably low elevation at the knuckle, which would impair drainage into the future West Bluff Outfall Channel. The need to raise Blossom Wood Road to provide a sufficient gradient along the roadway toward the south, while simultaneously directing runoff from Kane Court southward on Blossom Wood Road away from Hanover, results in tight vertical curve geometry on Blossom Wood Road between Kane Court and Hanover Road, and also prompts the elimination of the street crown in Kane Court.

There is a small area of approximately 0.0634 acres at the extreme east end of Amy Marie Road, NW that will drain directly onto Tract 232 to the east. A water block will be created in this area of Amy Marie Road to prevent runoff in Blossom Wood Road from turning east at Amy Marie Road and draining onto Tract 232.

Baybrook Road, NW will connect Blossom Wood Road with the existing Tarrington Drive, NW in the Chamisa Encantada Subdivision. A water block will be formed in Baybrook Road just east of Tarrington Drive to prevent flows from leaving Tarrington Drive and entering Baybrook Road. The geometry of the water block is such that a small area (approximately 0.0317 acres) of the Chamisa Encantada Subdivision will drain into the Rosewood Subdivision.

Single and Double "C" inlets will be placed along Blossom Wood Road as shown on the Grading and Drainage Plan to prevent street flow for the 100-year, 6-hour event from overtopping the curbs. The curb inlets and storm drain piping are sized to accommodate the runoff from this storm event.

The temporary retention pond will be sized to contain runoff from the 100-year, 6-hour storm event originating from within the Rosewood Subdivision. Only drainage areas DA-1, DA-2, and DA-3a will not contribute runoff into the pond. DA-1 is comprised of Lot 1 and part of Lot 2 in

Block B. As discussed above, this area will drain north into Hanover Road, NW. DA-2 is the extreme east end of Amy Marie Road which will drain into Tract 232. DA-3a is a portion of the land dedicated as future right-of-way for the West Bluff Outfall Channel. The 0.0386 acres of DA-3a will continue to drain into the Unser/I-40 Interchange right-of-way as it does presently. The retention pond will be of earthen construction with 3:1 interior slopes and a 4:1 exterior slope where necessary. It will have dumped riprap where the 30-inch storm drain line enters the pond, and it will be enclosed with a five foot high chain link fence. Total pond depth will be eight feet. It will be equipped with an emergency spillway capable of discharging a flow rate equal to the 10-year, 6-hour runoff from the Rosewood Subdivision. Discharge from the spillway will be into the Unser/I-40 Interchange right-of-way.

II.4 Proposed Improvements (Final Conditions)

In the final conditions, after the West Bluff Outfall Channel is constructed, the temporary retention pond will be removed. Lots 9 and 10 in Block C will be completely developed and a 15-foot wide drainage easement will be located between the lots. The drainage easement will serve three functions. First, it will provide for placement of the 30-inch RCP storm drain that will connect Blossom Wood Road with the future West Bluff Outfall Channel. Second, it will serve as an emergency storm water (surface) outlet from the subdivision in the event the storm drain becomes clogged or a storm with a lower return frequency than the 100-year, 6-hour event is encountered. Finally, it will serve as a pedestrian access to the future trail system planned for construction along the north edge of the future West Bluff Outfall Channel.

All other aspects of the drainage improvements will remain as described in II.3 above.

II.5 General Site Hydrology for Developed Conditions

The total runoff volume and peak discharge from the developed site into the retention pond (DA-4 and DA-5) are determined as follows:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	EXCESS PRECIP (Inches)	PEAK DISCHARGE (cfs)
A	0.00	0.44	1.29
B	2.99	0.67	2.03
C	1.15	0.99	2.87
D	5.05	1.97	4.37

Runoff Volume into the Retention Pond

$$\text{Weighted E} = ((2.99 \times 0.67) + (1.15 \times 0.99) + (5.05 \times 1.97))/9.19$$

$$\text{Weighted E} = 1.425 \text{ inches}$$

$$\text{Volume(360)} = 1.42 \text{ in} \times 9.19 \text{ acres} \times 1 \text{ ft}/12 \text{ in} = 1.0914 \text{ acre-ft}$$

$$\text{Volume(360)} = 1.0914 \text{ acre-ft} \times 43,560 \text{ sf/acre} = 47,543 \text{ cf}$$

Peak Discharge

Total Peak Discharge from combined drainage areas DA-4 and DA-5 into the retention pond is determined as follows:

$$\text{Peak Discharge (100-yr, 6-hr)} = (2.99 \times 2.03) + (1.15 \times 2.87) + (5.05 \times 4.37)$$

$$\text{Peak Discharge(100-yr, 6-hr)} = 31.46 \text{ cfs}$$

II.6 Site Hydrology Street Capacity

Except for the short one block segment of Blossom Wood Road, NW between Kane Court and Hanover Road, all of the roads within the Rosewood Subdivision are 28 feet from face-of-curb to face-of-curb. This one block segment has a street width of 32 feet.

The City of Albuquerque DPM Plate 22.3 D-1 provides a determination of street flow capacity for a 32 foot wide street of varying street slopes and flow depths. It is understood that the capacity within a 28 foot wide street will be less than a 32 foot wide street for depths which exceed the crown height (approximately 0.28 feet). Of particular interest here is the street capacity when the flow is just below the top of curb. It is desirable to place inlets and storm drains into the street system so that the street flow does not exceed the curb tops. This will minimize damage to the planter areas between the back of curb and sidewalk. Since the difference in flow capacity between the 28 foot wide street and 32 foot wide street is primarily due to the difference in flow areas, the results obtained from Plate 22.3 D-1 will be scaled down by a factor equal to the ratio of the area of a 28 foot wide street divided by the area of a 32 foot wide street at a flow depth of 0.6 feet. This factor is approximately equal to $12.88/14.08$, or 0.91.

Between Baybrook Road and Kane Court, Blossom Wood Road has a gradient of 0.50 %. At this slope a 28 foot wide road has a half street capacity of 15.5 cfs when the flow depth is 0.6 feet. Flow is subcritical with a velocity of approximately 3 fps. This street segment is the most limiting in terms of capacity, and also carries most of the flow from within the subdivision.

II.7 Site Hydrology Curb Inlets

At the west side of Blossom Wood Road just north of Baybrook Road, the flow in the west half of the street would reach approximately 11.5 cfs during the 100-year, 6-hour event, since an area of approximately 3.37 acres would contribute runoff to that point. This is determined by proportioning the total peak flow of 31.46 cfs from the 9.19 acres. From Plate 22.3 D-6 of the DPM, a Double "C" inlet would be able to remove approximately 6 cfs assuming a flow depth of 0.5 feet. The remaining 5.5 cfs would continue southward past Baybrook Road.

At a point on the west side of Blossom Wood Road just north of the knuckle, the 5.5 cfs from above would be joined by another 5.8 cfs contributed from runoff leaving Baybrook Road. A Single "C" inlet placed just north of the knuckle return would be capable of collecting about 6 cfs assuming a street slope near the vertical curve of approximately 0.2% and a flow depth of about 0.6 feet. The remaining 5.3 cfs would continue to the next inlet at the center of the knuckle on the

west side of Blossom Wood Road. Another 2.7 cfs would contribute to that inlet from the area on the north side of Blossom Wood Court west of the knuckle. The total flow arriving at the depressed inlet would equal approximately 8.0 cfs. Since the runoff collects over the top of the inlet and does not flow past it, it is probable that a Single "C" inlet would collect the 8.0 cfs without exceeding the level of the top of curb.

On the east side of Blossom Wood Road, the flow would reach 4.2 cfs from a contributing area of approximately 1.23 acres at a point opposite the proposed Double "C" inlet discussed above. A Single "C" inlet at this point on the east side of the roadway would have the capacity to remove most of this flow assuming a flow depth of approximately 0.45 feet.

The 7.3 cfs from the remainder of Blossom Wood Road would collect over the depressed inlet on the south side of the street at the center of the knuckle. Again, it is likely a Single "C" inlet would collect this runoff without exceeding the top of curb since the flow does not move past the inlet.

One advantage of the proposed design is that if the inlets or storm drains are partially clogged and operating inefficiently, the 15-foot wide drainage easement is available to collect surface runoff at the knuckle which might exceed the level of the curb tops.

Much of the storm drain along the west side of Blossom Wood Road will be 27-inch RCP. The storm drain crossing Blossom Wood Road north of Baybrook Road will be an 18-inch RCP. All of the storm drain within the area of the knuckle will be 30-inch RCP, as will the storm drain line that connects to the interim retention pond. In the final condition after construction of the West Bluff Outfall Channel, the 30-inch RCP storm drain line will be extended from the defunct retention pond to the new channel within the 15-foot drainage easement.

II.8 Site Hydrology - Emergency Spillway

The retention pond emergency spillway will be capable of passing the 10-year, 6-hour peak discharge flow rate arriving in the pond from the Rosewood Subdivision. Discharge will be into the Unser/I-40 Interchange right-of-way. The determination of the peak flow rate and spillway geometry are determined in the following:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	PEAK DISCHARGE (cfs)
A	0.00	0.24
B	2.99	0.76
C	1.15	1.49
D	5.05	2.89

Peak Discharge

Peak Discharge (10-yr, 6-hr) = $(2.99 \times 0.76) + (1.15 \times 1.49) + (5.05 \times 2.89)$

Peak Discharge (10-yr, 6-hr) = 18.58 cfs

Trapezoidal (Broad Crested) Weir

$$Q = 3.367 L H^{3/2}$$

where: Q = weir flow rate, 18.58 cfs

L = length of the weir crest, ft

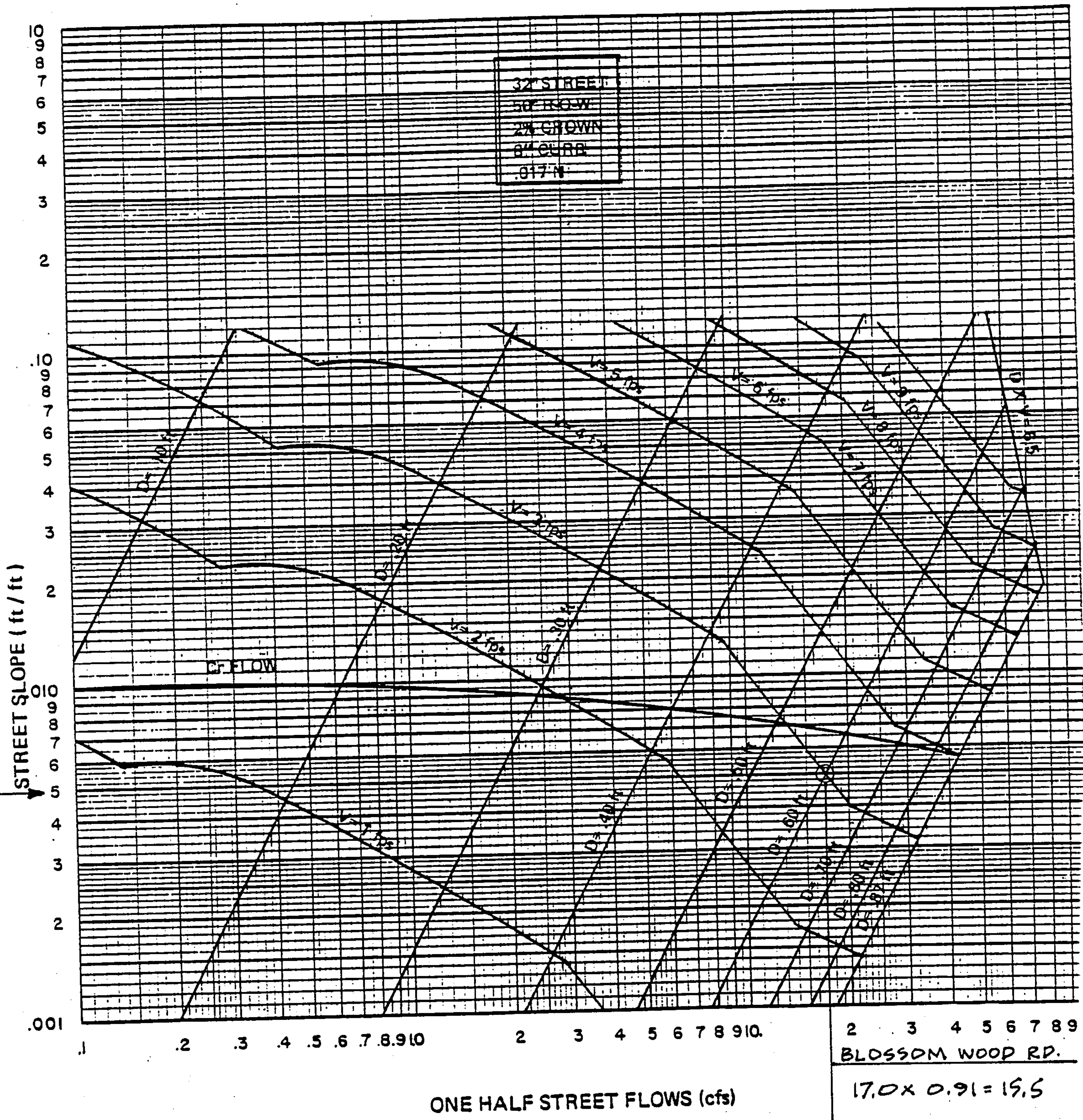
H = head on the weir, 0.5 ft (assumed)

solving L:

$$L = Q / (3.367 H^{3/2})$$

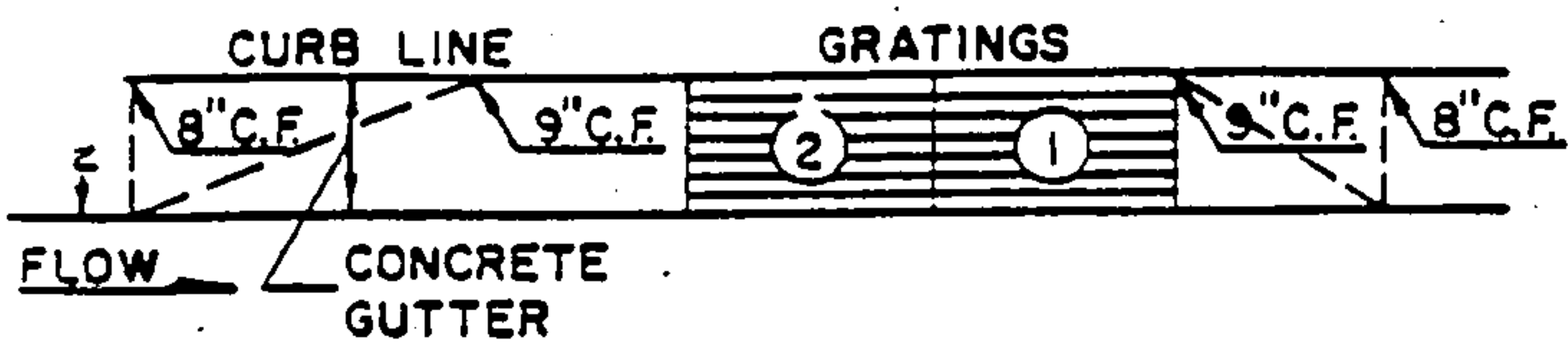
$$L = 15.61 \text{ ft} \quad \text{use 20 ft (minimum)}$$

STREET CAPACITY

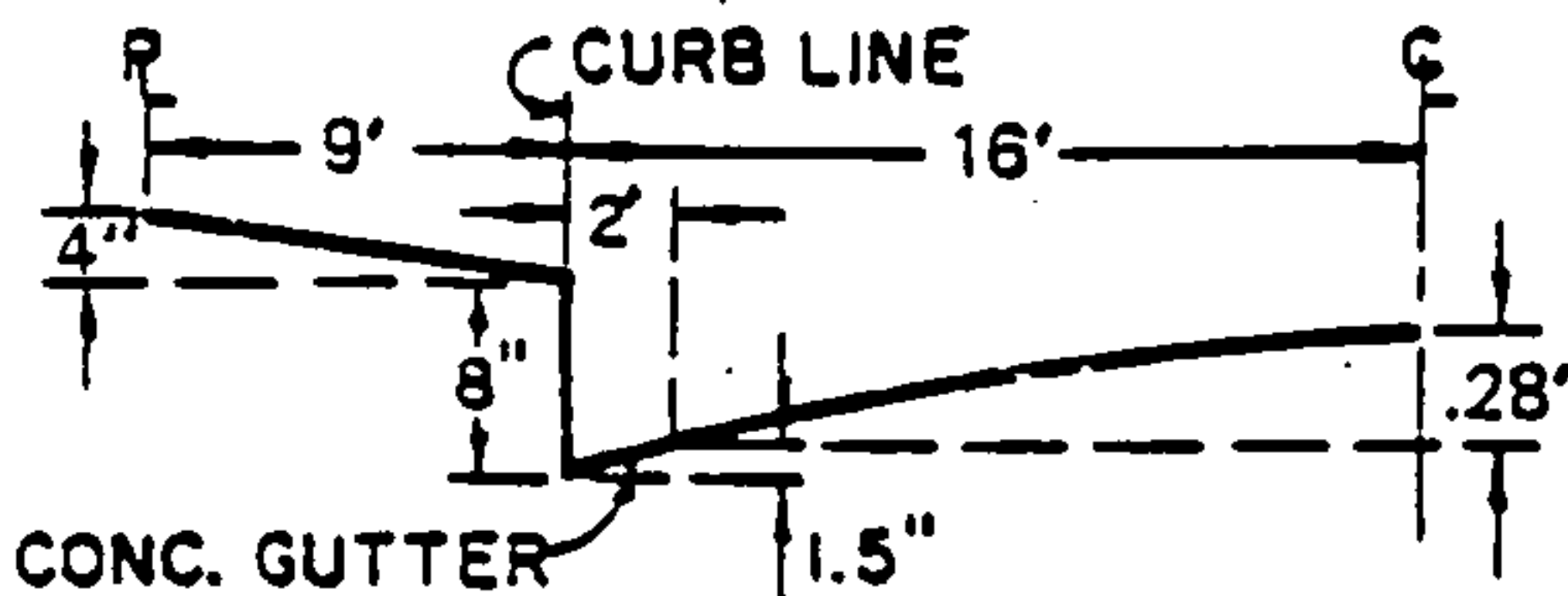
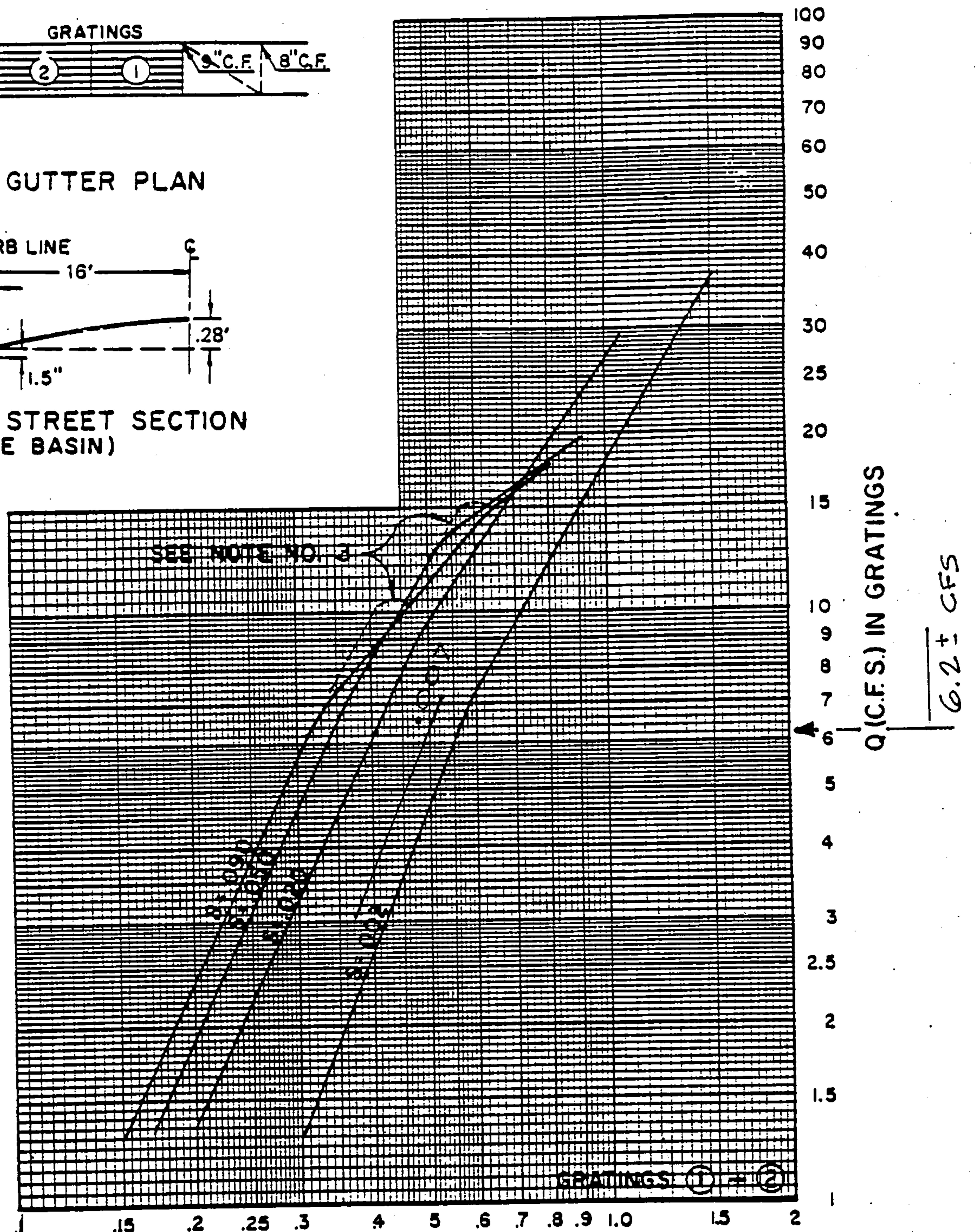


GRATING CAPACITIES FOR TYPE DOUBLE

"C," AND "D"



GRATING & GUTTER PLAN

TYPICAL HALF STREET SECTION
(ABOVE BASIN)

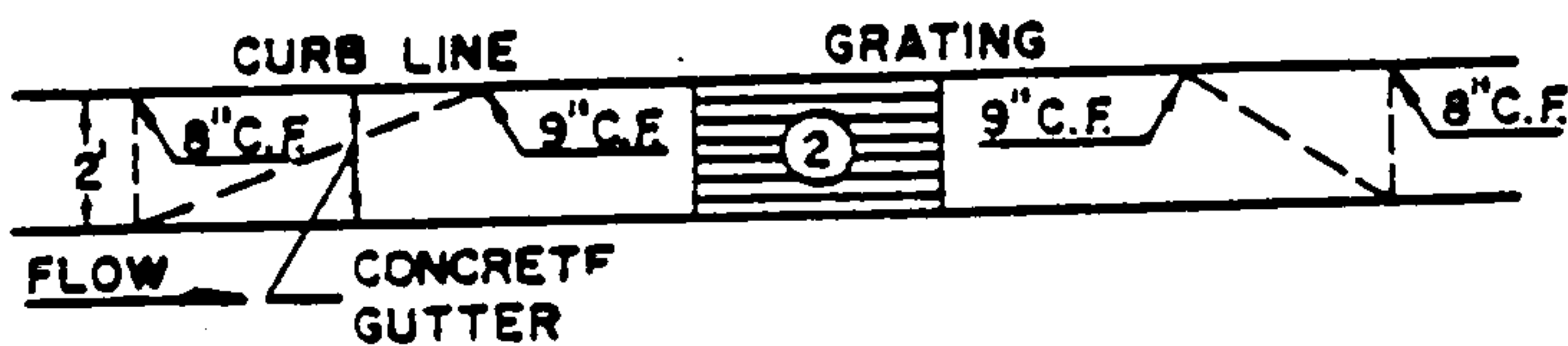
D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

ROSEWOOD SUB'N

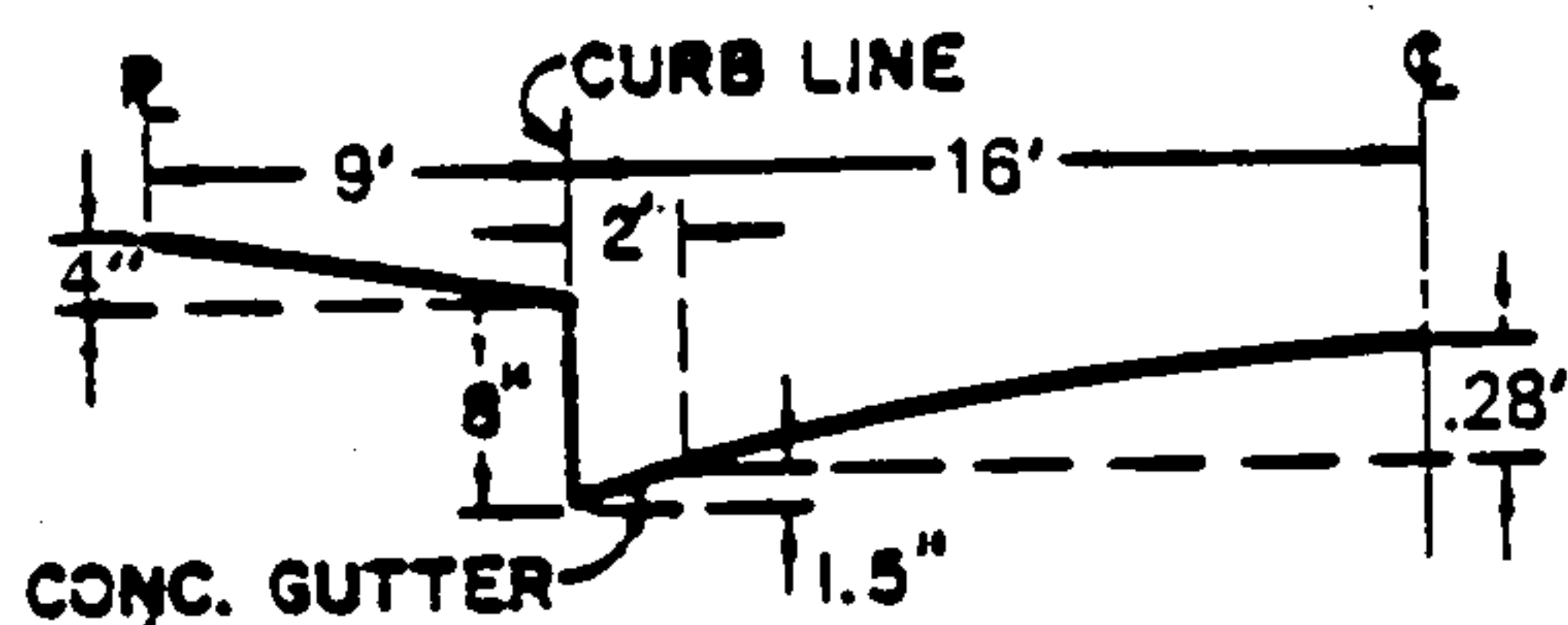
BLOSSOM WOOD RD

0.5' DEPTH @ $S = 0.007$ FT/FT

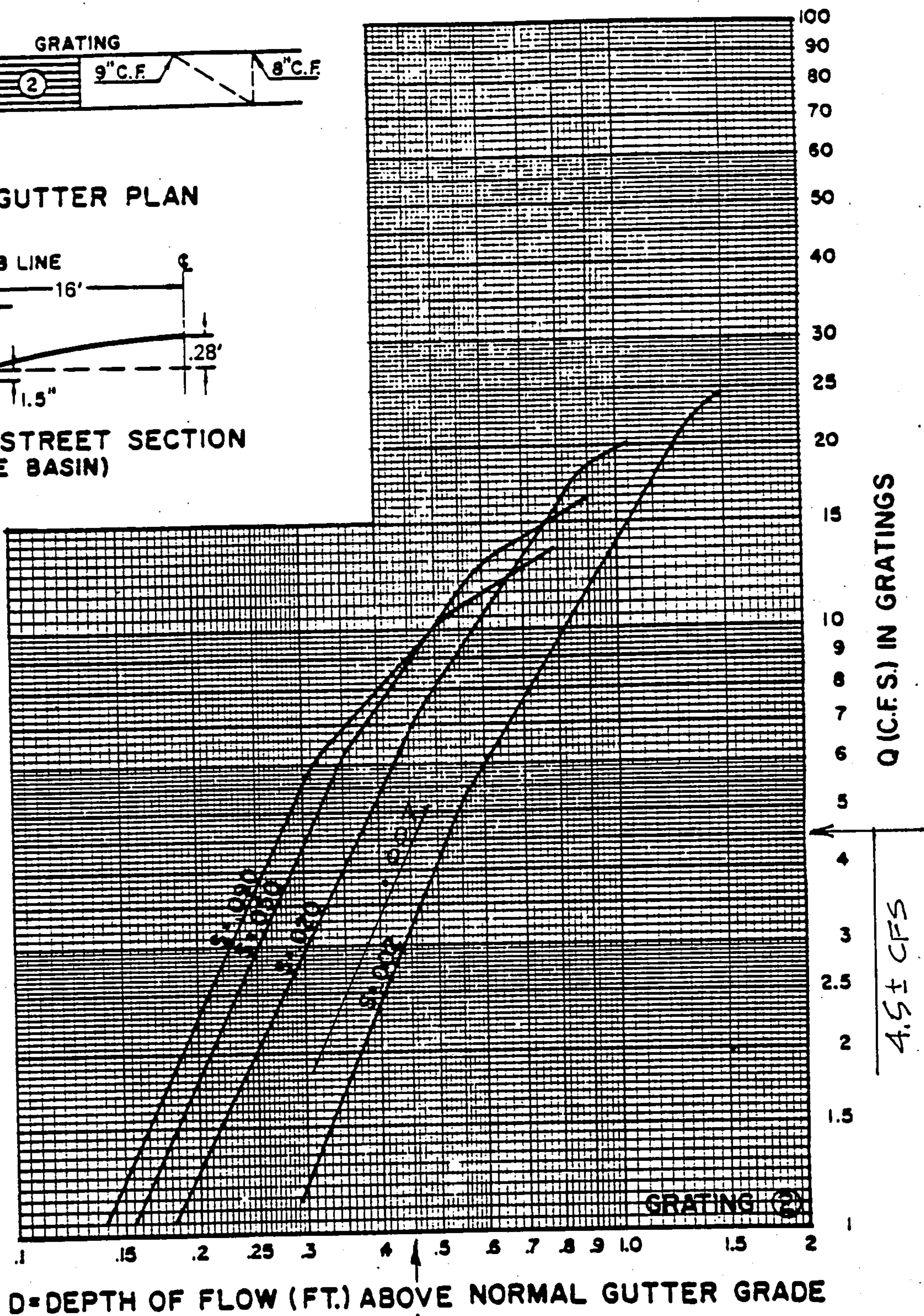
GRATING CAPACITIES FOR TYPE "A" , "C" and "D"



GRATING & GUTTER PLAN



**TYPICAL HALF STREET SECTION
(ABOVE BASIN)**



BLOSSOM WOOD RD.
0.45' DEPTH @ $S = 0.007$ FT/FT

DRAINAGE REPORT

FOR

ROSEWOOD SUBDIVISION

A 55 LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION

PREPARED FOR:

**ADIL RIZVI
7049 LUELLA ANNE DRIVE, NE
ALBUQUERQUE, NM 87112**

PREPARED BY:

**PROTEC CONSULTING
PO BOX 27007
ALBUQUERQUE, NM 87125
(505) 833-0177**



APRIL 30, 1996

R.W. Macy
4/30/96

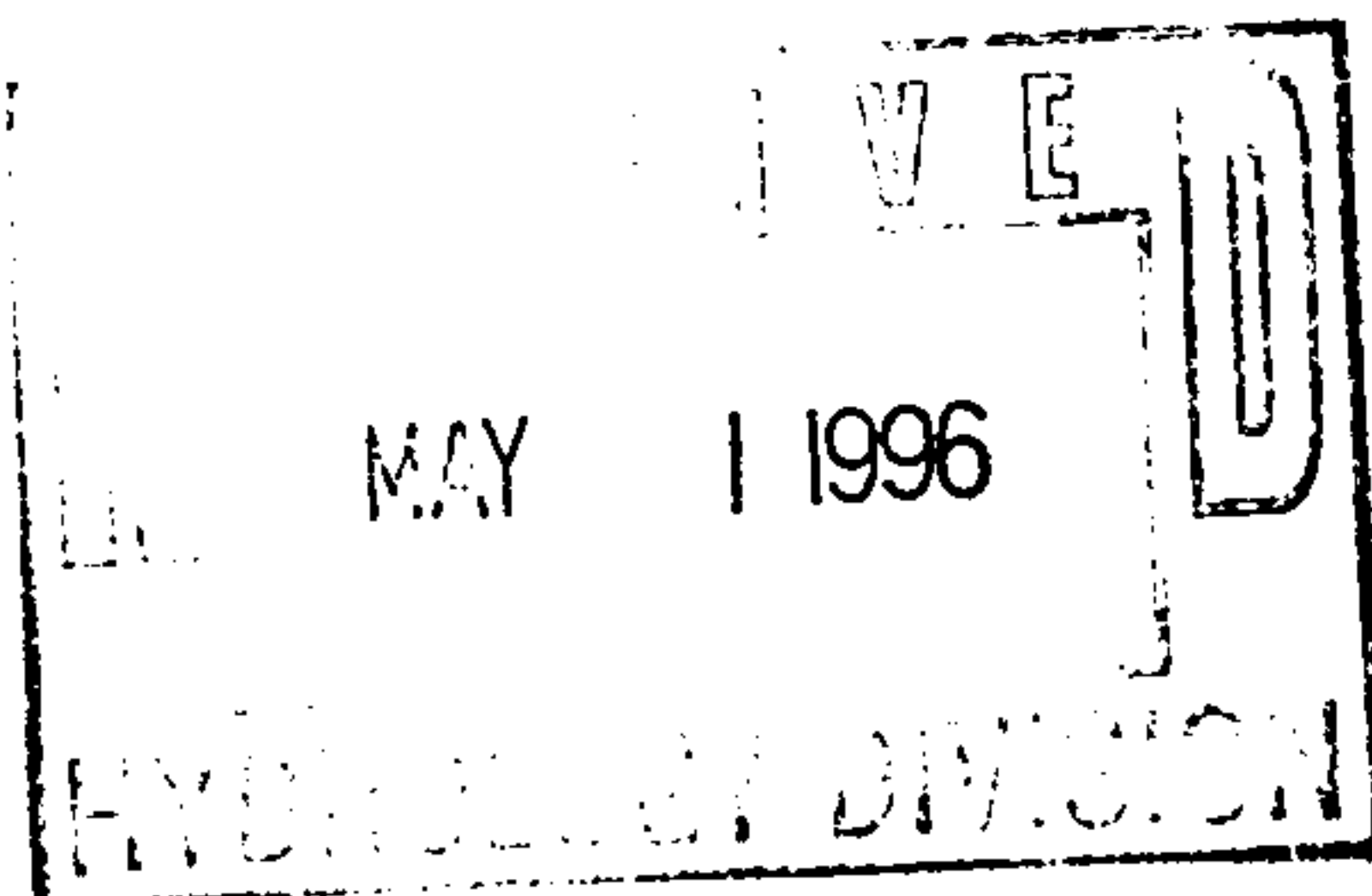


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Albuquerque, NM 87125
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The proposed site (Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant) is located within Flood Hazard Zone C (areas of minimal flooding) as designated on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) Community-Panel No. 350002 0027 C (October 14, 1983).

I.10 Location and Description

The proposed 9.6161 acre site is undeveloped and mostly undisturbed at the writing of this Drainage Report. The extreme west edge of the site has been disturbed along the length of the west boundary line as a result of block retaining wall construction for the recently developed Chamisa Encantada Subdivision. Existing ground cover across the site is comprised of sage brush and various native grasses. The proposed site is bounded on the north by Hanover Road, NW, on the south by the Unser Boulevard northbound off ramp from the Unser/I-40 Interchange, on the west by the Chamisa Encantada Subdivision, and on the east by Tract 232 Airport Unit, Town of Atrisco Grant, which is presently undeveloped. Hanover Road is developed and is characterized by a 40' wide paved roadway with standard curb and gutters on either side, a sanitary sewer collection system, water line, and overhead power and telephone lines. There are presently no sidewalks on Hanover Road adjacent to the proposed site. The proposed West Bluff Outfall Channel (West Bluff Storm Interceptor, Phase II) is planned to be located at the south edge of the proposed site inside of existing Unser/I-40 Interchange right-of-way. Plans for the outfall channel improvements are currently in the preliminary design phase, and construction is expected to begin sometime in 1997.

II HYDROLOGIC ANALYSIS**II.1 Existing Conditions**

Hanover Road, NW intercepts offsite flows originating from north of the proposed Rosewood Subdivision and diverts them eastward to the Laurelwood Park Drainage Management Area at the northwest corner of Hanover Road, NW and 72nd Street, NW.

The recently developed Chamisa Encantada Subdivision is immediately west of the proposed site. This subdivision has been designed to carry all storm runoff originating from within it to the south for containment in a temporary earthen drainage basin. This basin will eventually be removed and replaced with the development of residential lots when the West Bluff Outfall Channel is constructed along the north edge of the northbound Unser/I-40 off ramp. At that time, runoff from the Chamisa Encantada Subdivision will drain directly into the West Bluff Outfall Channel.

Runoff originating along the north edge of the Unser/I-40 northbound off ramp is collected within the I-40 right-of-way at the north edge of the roadway. It is conveyed in a roadside ditch to the east for several hundred feet where it is drained into a 30-inch diameter CMP culvert and directed southward to the south side of I-40.

Off-site flows are prevented from entering the proposed Rosewood Subdivision by drainage improvements associated with Hanover Road, NW, the Chamisa Encantada Subdivision and the Unser/ I-40 off ramp.

Presently, runoff originating on the proposed Rosewood Subdivision drains eastward primarily as sheet flow with a gradient of approximately 2%. Based on a review of actual field conditions and recent topography, it appears the northern most 1.25 acres of the 9.6161 acre site will drain either directly onto Hanover Road, NW, or will exit the east edge of the property in a natural swale that subsequently turns north and drains onto Hanover Road, NW within Tract 232. The remaining 8.27 acres drains east to southeast and enters the north edge of the I-40 right of way, where the runoff is collected into a 30-inch CMP culvert and directed southward to the south side of I-40.

II.2 Site Hydrology (Existing Conditions)

The site hydrology as determined herein is based on the methods and criteria presented in the City of Albuquerque Development Process Manual (DPM) - Volume 2, Section 22.2 Hydrology, dated January 1993. The proposed site is in Precipitation Zone 1 (west of the Rio Grande). The P360 (100-year, 6-hour storm event) has a depth of 2.20 inches as shown in Table A-2. Since the proposed site is primarily undeveloped and undisturbed land, then Land Treatment A is applicable. See Table A-2. Excess Precipitation E for this storm is 0.44 inches as shown in Table A-8. The Peak Discharge, Q_p , from the same storm is 1.29 cfs/acre. See Table A-9. The runoff volumes and peak discharge rates from the undeveloped site are determined as follows:

1.25 Acres at the South Edge of Hanover Road, NW

$$\text{Volume(360)} = 0.44 \text{ in} \times 1.25 \text{ ac} \times 1 \text{ ft}/12 \text{ in}$$

$$\text{Volume(360)} = .04583 \text{ ac-ft}$$

$$\text{Volume(360)} = 1,996.5 \text{ cf}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.29 \text{ cfs/acre} \times 1.25 \text{ ac}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.6 \text{ cfs}$$

Remaining 8.37 Acres

$$\text{Volume(360)} = 13,368.6 \text{ ac-ft}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 10.8 \text{ cfs}$$

II.3 Proposed Improvements (Interim)

Initially, it will be necessary to construct a temporary retention basin at the south end of the subdivision to receive on-site runoff. This basin will require the area of two residential lots (Lots 9 and 10 in Block C) plus a portion of the drainage area designated as DA-3b, which will be dedicated for the future West Bluff Outfall Channel.

Lot 1 and a portion of Lot 2 in Block B will drain northward onto Hanover Road, NW. This is a result of developing a water block in Blossom Wood Road, NW at Hanover Road, NW to prevent runoff in Hanover from entering the site. The area draining onto Hanover (DA-1) is approximately 0.365 acres.

Kane Court, NW will be constructed without a street crown, and runoff will be allowed to drain from the north side of the street to the south curb line while being conveyed eastward. This is to diminish the flow of water entering Blossom Wood Road from Kane Court at the extreme northwest quadrant of the intersection, where there would be a possible opportunity for some of the runoff to rise above the water block and drain northward into Hanover Road. The vertical geometry of Blossom Wood Road is such that it must rise high enough near Hanover Road so as to produce a sufficient gradient southward to the knuckle. Furthermore, this must be done without resulting in an undesirably low elevation at the knuckle, which would impair drainage into the future West Bluff Outfall Channel. The need to raise Blossom Wood Road to provide a sufficient gradient along the roadway toward the south, while simultaneously directing runoff from Kane Court southward on Blossom Wood Road away from Hanover, results in tight vertical curve geometry on Blossom Wood Road between Kane Court and Hanover Road, and also prompts the elimination of the street crown in Kane Court.

There is a small area of approximately 0.0634 acres at the extreme east end of Amy Marie Road, NW that will drain directly onto Tract 232 to the east. A water block will be created in this area of Amy Marie Road to prevent runoff in Blossom Wood Road from turning east at Amy Marie Road and draining onto Tract 232.

Baybrook Road, NW will connect Blossom Wood Road with the existing Tarrington Drive, NW in the Chamisa Encantada Subdivision. A water block will be formed in Baybrook Road just east of Tarrington Drive to prevent flows from leaving Tarrington Drive and entering Baybrook Road. The geometry of the water block is such that a small area (approximately 0.0317 acres) of the Chamisa Encantada Subdivision will drain into the Rosewood Subdivision.

Single and Double "C" inlets will be placed along Blossom Wood Road as shown on the Grading and Drainage Plan to prevent street flow for the 100-year, 6-hour event from overtopping the curbs. The curb inlets and storm drain piping are sized to accommodate the runoff from this storm event.

The temporary retention pond will be sized to contain runoff from the 100-year, 6-hour storm event originating from within the Rosewood Subdivision. Only drainage areas DA-1, DA-2, and DA-3a will not contribute runoff into the pond. DA-1 is comprised of Lot 1 and part of Lot 2 in

Block B. As discussed above, this area will drain north into Hanover Road, NW. DA-2 is the extreme east end of Amy Marie Road which will drain into Tract 232. DA-3a is a portion of the land dedicated as future right-of-way for the West Bluff Outfall Channel. The 0.0386 acres of DA-3a will continue to drain into the Unser/I-40 Interchange right-of-way as it does presently. The retention pond will be of earthen construction with 3:1 interior slopes and a 4:1 exterior slope where necessary. It will have dumped riprap where the 30-inch storm drain line enters the pond, and it will be enclosed with a five foot high chain link fence. Total pond depth will be eight feet. It will be equipped with an emergency spillway capable of discharging a flow rate equal to the 10-year, 6-hour runoff from the Rosewood Subdivision. Discharge from the spillway will be into the Unser/I-40 Interchange right-of-way.

II.4 Proposed Improvements (Final Conditions)

In the final conditions, after the West Bluff Outfall Channel is constructed, the temporary retention pond will be removed. Lots 9 and 10 in Block C will be completely developed and a 15-foot wide drainage easement will be located between the lots. The drainage easement will serve three functions. First, it will provide for placement of the 30-inch RCP storm drain that will connect Blossom Wood Road with the future West Bluff Outfall Channel. Second, it will serve as an emergency storm water (surface) outlet from the subdivision in the event the storm drain becomes clogged or a storm with a lower return frequency than the 100-year, 6-hour event is encountered. Finally, it will serve as a pedestrian access to the future trail system planned for construction along the north edge of the future West Bluff Outfall Channel.

All other aspects of the drainage improvements will remain as described in II.3 above.

II.5 General Site Hydrology for Developed Conditions

The total runoff volume and peak discharge from the developed site into the retention pond (DA-4 and DA-5) are determined as follows:

<u>LAND TREATMENT CLASSIFICATION</u>	<u>LAND AREA (Acres)</u>	<u>EXCESS PRECIP (Inches)</u>	<u>PEAK DISCHARGE (cfs)</u>
A	0.00	0.44	1.29
B	2.99	0.67	2.03
C	1.15	0.99	2.87
D	5.05	1.97	4.37

Runoff Volume into the Retention Pond

$$\text{Weighted E} = ((2.99 \times 0.67) + (1.15 \times 0.99) + (5.05 \times 1.97))/9.19$$

$$\text{Weighted E} = 1.425 \text{ inches}$$

$$\text{Volume(360)} = 1.42 \text{ in} \times 9.19 \text{ acres} \times 1 \text{ ft}/12 \text{ in} = 1.0914 \text{ acre-ft}$$

$$\text{Volume(360)} = 1.0914 \text{ acre-ft} \times 43,560 \text{ sf/acre} = 47,543 \text{ cf}$$

Peak Discharge

Total Peak Discharge from combined drainage areas DA-4 and DA-5 into the retention pond is determined as follows:

$$\text{Peak Discharge (100-yr, 6-hr)} = (2.99 \times 2.03) + (1.15 \times 2.87) + (5.05 \times 4.37)$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 31.46 \text{ cfs}$$

II.6 Site Hydrology Street Capacity

Except for the short one block segment of Blossom Wood Road, NW between Kane Court and Hanover Road, all of the roads within the Rosewood Subdivision are 28 feet from face-of-curb to face-of-curb. This one block segment has a street width of 32 feet.

The City of Albuquerque DPM Plate 22.3 D-1 provides a determination of street flow capacity for a 32 foot wide street of varying street slopes and flow depths. It is understood that the capacity within a 28 foot wide street will be less than a 32 foot wide street for depths which exceed the crown height (approximately 0.28 feet). Of particular interest here is the street capacity when the flow is just below the top of curb. It is desirable to place inlets and storm drains into the street system so that the street flow does not exceed the curb tops. This will minimize damage to the planter areas between the back of curb and sidewalk. Since the difference in flow capacity between the 28 foot wide street and 32 foot wide street is primarily due to the difference in flow areas, the results obtained from Plate 22.3 D-1 will be scaled down by a factor equal to the ratio of the area of a 28 foot wide street divided by the area of a 32 foot wide street at a flow depth of 0.6 feet. This factor is approximately equal to 12.88/14.08, or 0.91.

Between Baybrook Road and Kane Court, Blossom Wood Road has a gradient of 0.50 %. At this slope a 28 foot wide road has a half street capacity of 15.5 cfs when the flow depth is 0.6 feet. Flow is subcritical with a velocity of approximately 3 fps. This street segment is the most limiting in terms of capacity, and also carries most of the flow from within the subdivision.

II.7 Site Hydrology Curb Inlets

At the west side of Blossom Wood Road just north of Baybrook Road, the flow in the west half of the street would reach approximately 11.5 cfs during the 100-year, 6-hour event, since an area of approximately 3.37 acres would contribute runoff to that point. This is determined by proportioning the total peak flow of 31.46 cfs from the 9.19 acres. From Plate 22.3 D-6 of the DPM, a Double "C" inlet would be able to remove approximately 6 cfs assuming a flow depth of 0.5 feet. The remaining 5.5 cfs would continue southward past Baybrook Road.

At a point on the west side of Blossom Wood Road just north of the knuckle, the 5.5 cfs from above would be joined by another 5.8 cfs contributed from runoff leaving Baybrook Road. A Single "C" inlet placed just north of the knuckle return would be capable of collecting about 6 cfs assuming a street slope near the vertical curve of approximately 0.2% and a flow depth of about 0.6 feet. The remaining 5.3 cfs would continue to the next inlet at the center of the knuckle on the

west side of Blossom Wood Road. Another 2.7 cfs would contribute to that inlet from the area on the north side of Blossom Wood Court west of the knuckle. The total flow arriving at the depressed inlet would equal approximately 8.0 cfs. Since the runoff collects over the top of the inlet and does not flow past it, it is probable that a Single "C" inlet would collect the 8.0 cfs without exceeding the level of the top of curb.

On the east side of Blossom Wood Road, the flow would reach 4.2 cfs from a contributing area of approximately 1.23 acres at a point opposite the proposed Double "C" inlet discussed above. A Single "C" inlet at this point on the east side of the roadway would have the capacity to remove most of this flow assuming a flow depth of approximately 0.45 feet.

The 7.3 cfs from the remainder of Blossom Wood Road would collect over the depressed inlet on the south side of the street at the center of the knuckle. Again, it is likely a Single "C" inlet would collect this runoff without exceeding the top of curb since the flow does not move past the inlet.

One advantage of the proposed design is that if the inlets or storm drains are partially clogged and operating inefficiently, the 15-foot wide drainage easement is available to collect surface runoff at the knuckle which might exceed the level of the curb tops.

Much of the storm drain along the west side of Blossom Wood Road will be 27-inch RCP. The storm drain crossing Blossom Wood Road north of Baybrook Road will be an 18-inch RCP. All of the storm drain within the area of the knuckle will be 30-inch RCP, as will the storm drain line that connects to the interim retention pond. In the final condition after construction of the West Bluff Outfall Channel, the 30-inch RCP storm drain line will be extended from the defunct retention pond to the new channel within the 15-foot drainage easement.

II.8 Site Hydrology - Emergency Spillway

The retention pond emergency spillway will be capable of passing the 10-year, 6-hour peak discharge flow rate arriving in the pond from the Rosewood Subdivision. Discharge will be into the Unser/I-40 Interchange right-of-way. The determination of the peak flow rate and spillway geometry are determined in the following:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	PEAK DISCHARGE (cfs)
A	0.00	0.24
B	2.99	0.76
C	1.15	1.49
D	5.05	2.89

Peak Discharge

$$\text{Peak Discharge (10-yr, 6-hr)} = (2.99 \times 0.76) + (1.15 \times 1.49) + (5.05 \times 2.89)$$

$$\text{Peak Discharge (10-yr, 6-hr)} = 18.58 \text{ cfs}$$

Trapezoidal (Broad Crested) Weir

$$Q = 3.367 L H^{3/2}$$

where: Q = weir flow rate, 18.58 cfs

L = length of the weir crest, ft

H = head on the weir, 0.5 ft (assumed)

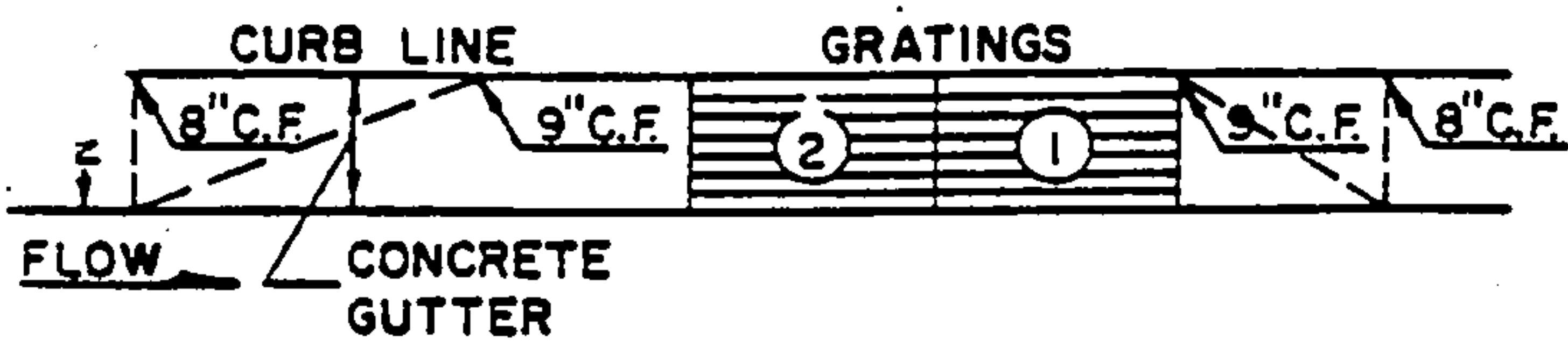
solving L:

$$L = Q / (3.367 H^{3/2})$$

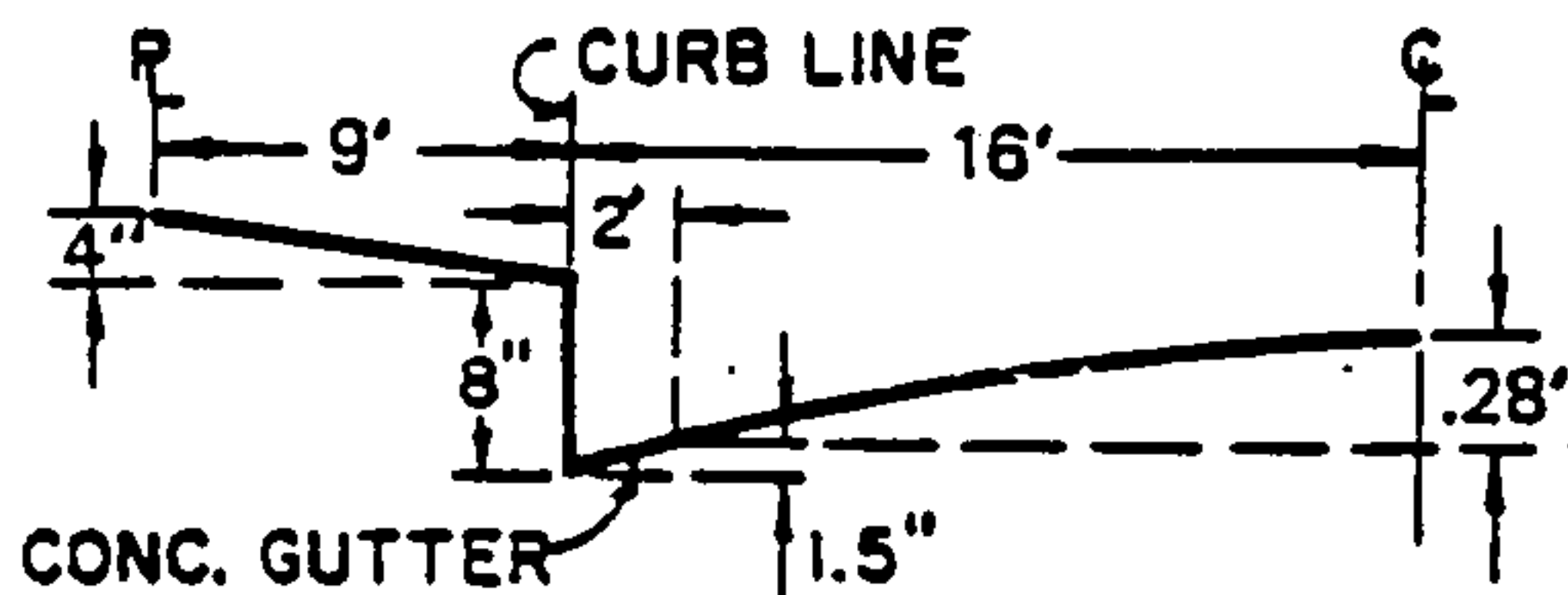
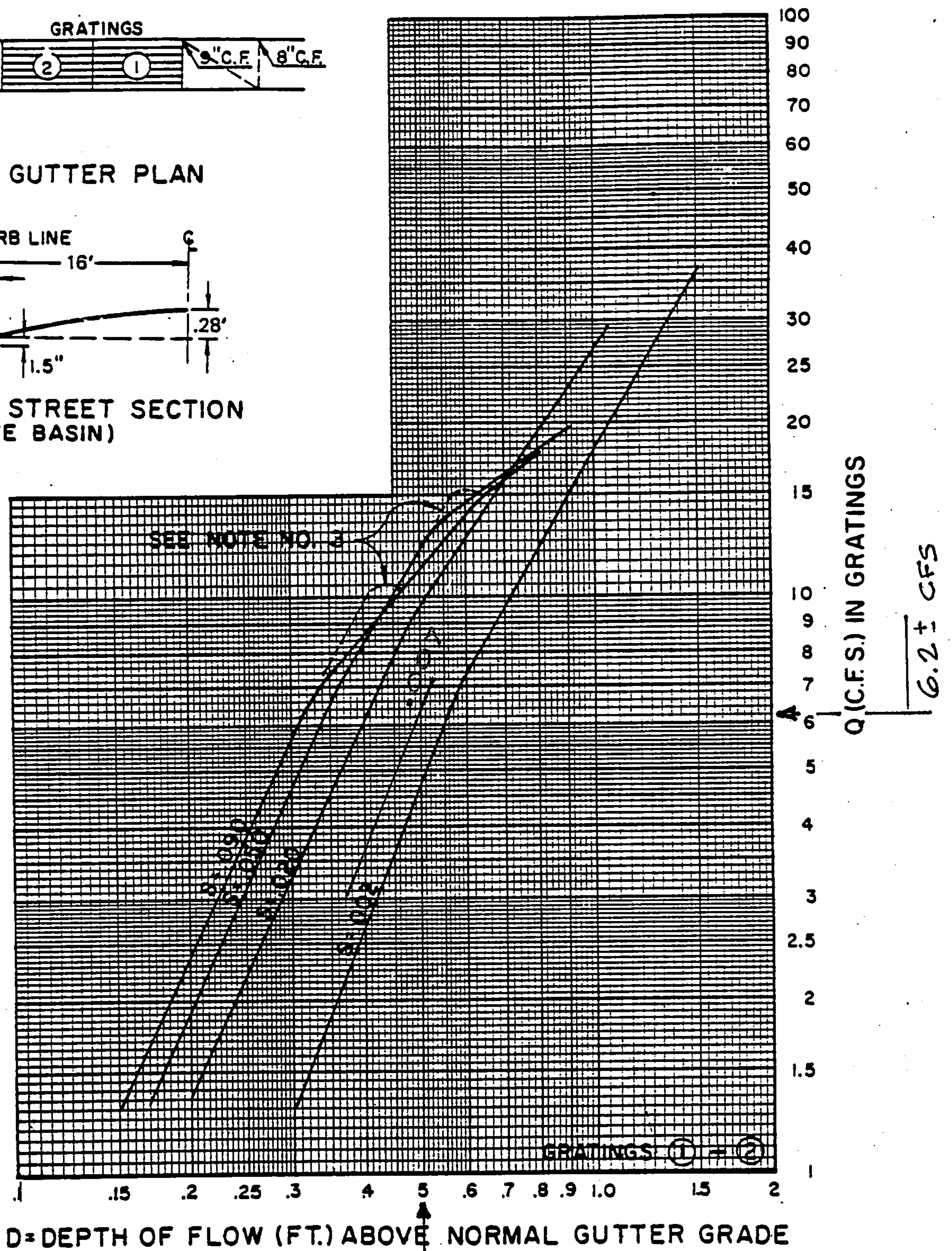
$$L = 15.61 \text{ ft} \quad \text{use 20 ft (minimum)}$$

GRATING CAPACITIES FOR TYPE DOUBLE

"C," AND "D"



GRATING & GUTTER PLAN

TYPICAL HALF STREET SECTION
(ABOVE BASIN)

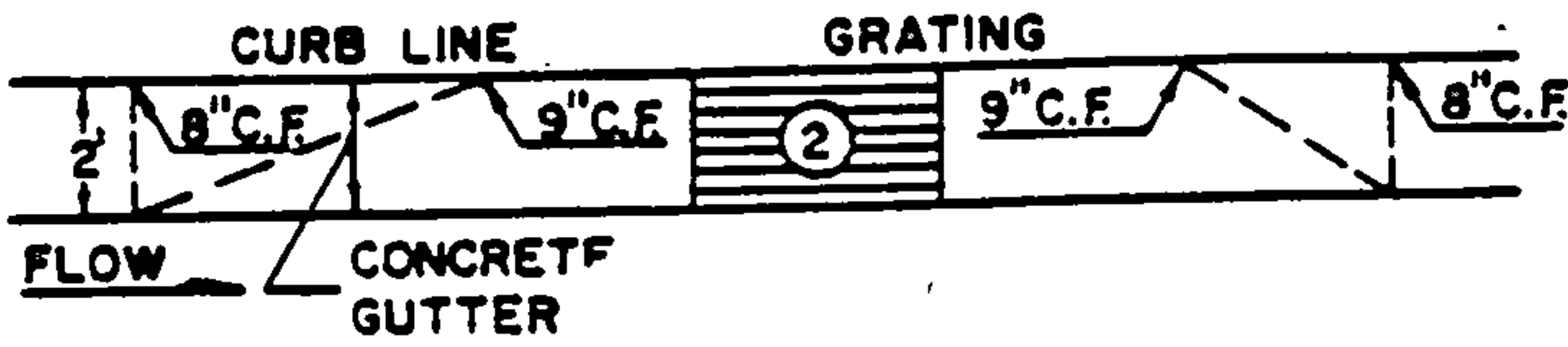
D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

ROSEWOOD SUB'N

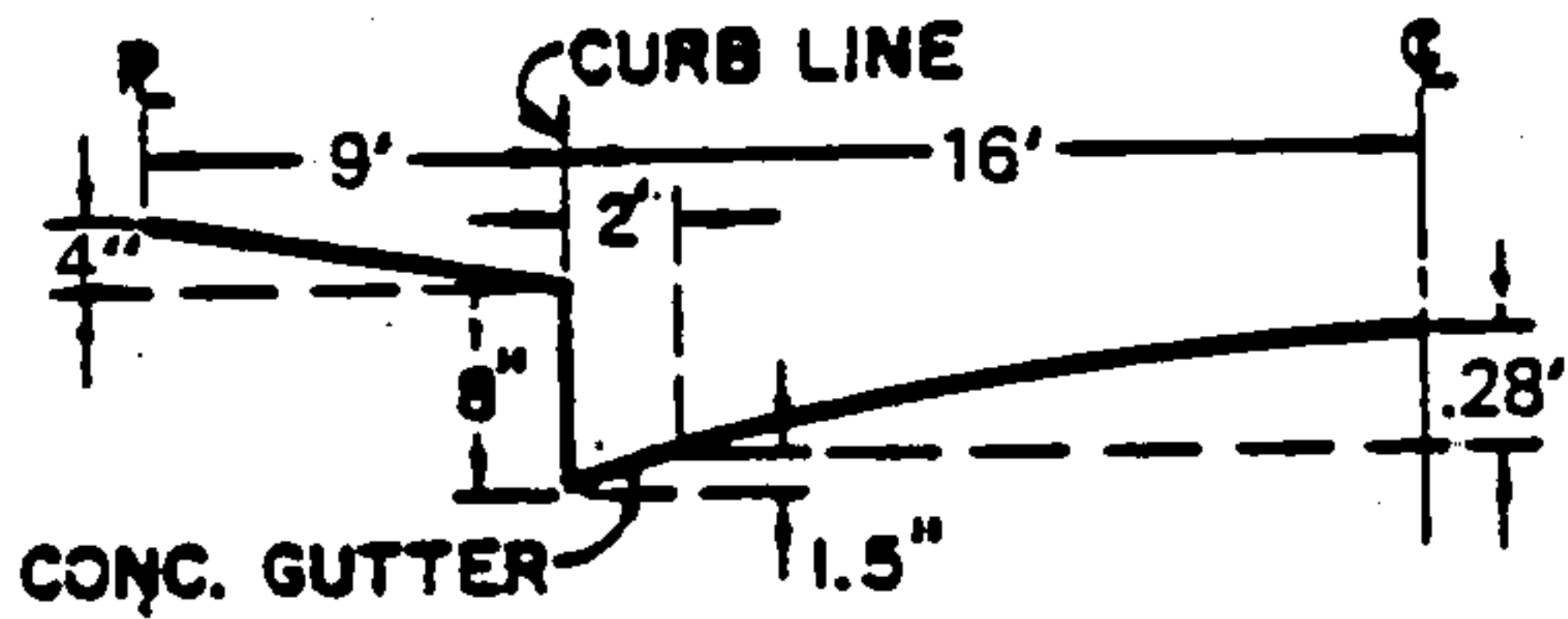
BLOSSOM WOOD RD

0.5' DEPTH @ S = 0.007 FT/FT

GRATING CAPACITIES FOR TYPE "A", "C" and "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION (ABOVE BASIN)

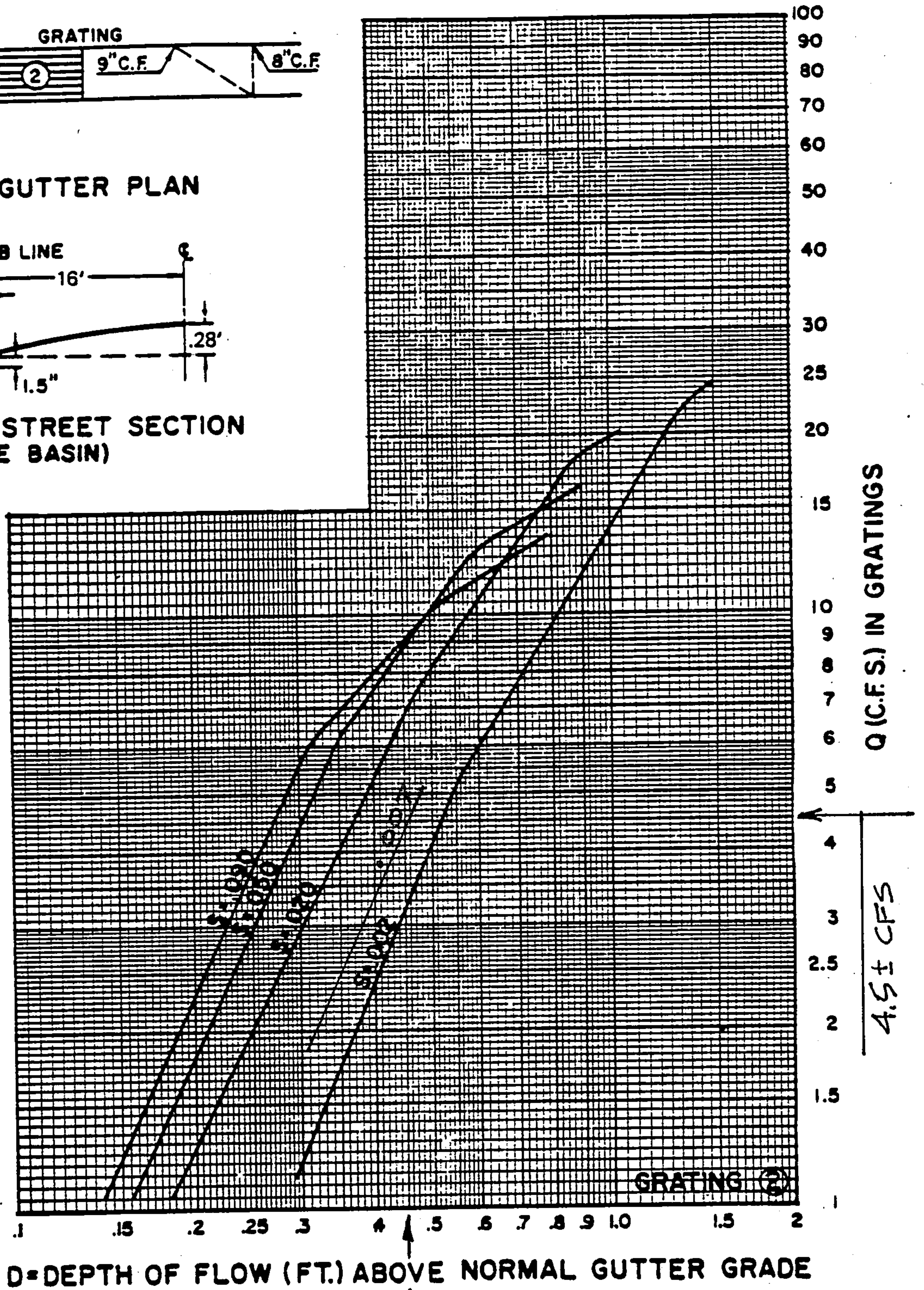


FIGURE 12
 EXHIBIT "A"
TO SUBDIVISION IMPROVEMENT AGREEMENT
 DEVELOPMENT REVIEW BOARD
 REQUIRED INFRASTRUCTURE LISTING
 DRB 96-49

TRACTS 233, 234-A, 234-B, AND 234-C, TOWN OF ATRISCO GRANT, AIRPORT UNIT
 BEING REPLATED AS

ROSEWOOD SUBDIVISION

Following is a summary of Public/Private Infrastructure required to be constructed or financially guaranteed to be constructed for the above development. This summary is not necessarily a complete listing. During the design process, if the City determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are Subdivider responsibility. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided by the City.

SIZE	IMPROVEMENT	LOCATION	FROM	TO
4'	*PCC Sidewalk (So. Both Sides)	Hanover Rd.	East Property Line	West Property Line
32' F-F	Res. Paving	Blossom Wood Place	Hanover Rd.	Kane Crt
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
10"	Sanitary Sewer	"	"	"
28' F-F	Res. Paving	Blossom Wood Place	Kane Crt	Blossom Wood Place
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
10"	Sanitary Sewer	"	"	"

SIZE	IMPROVEMENT	LOCATION	FROM	TO
28' F-F	Res. Paving	Kane Court	Blossom Wood Place	Cul-de-sac
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
6"	Waterline	"	"	"
8"	Sanitary Sewer	"	"	"
28' F-F	Res. Paving	Amy Marie Court	Blossom Wood Place	Cul-de-sac
STD	Curb & Gutter (Both Sides.)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Sanitary Sewer	"	"	"
6"	Waterline	"	"	"
28' F-F	Res. Paving	Baybrook Rd.	Blossom Wood Place	Tarrington Drive
STD	Curb & Gutter (Both Sides.)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
8"	Sanitary Sewer	Baybrook Rd	Blossom Wood Place	East Side Lot 24 Block "C"
28' F-F	Residential Paving	Blossom Wood Place	Blossom Wood Place	Cul-de-sac
STD	Curb & Gutter (Both Sides)	"	"	"
4'	*PCC Sidewalk (Both Sides)	"	"	"
8"	Waterline	"	"	"
8"	Sanitary Sewer	"	"	"
18" 24" 27" & 30"	Storm drain including all appurtenances, inlets, manholes, etc.	Blossom Wood Place	Just No. Of Baybrook Rd.	15' Wide Drainage Easement Between Lots 16 & 17 - Block B

MISCELLANEOUS

Street lighting per DPM.

Grading & Drainage: Certification per DPM (prior to release of financial guarantees). To include private perimeter and retaining walls as required on the approved Grading Plan.

*Sidewalks to be deferred.

**Concrete lined drainage easement between Lots 16 & 17 Block B per DPM Standards.

All water to include fire hydrants, valves, and appurtenances per DPM.

Temporary storm water retention pond on Lots 16 & 17 Block B, the 15' wide drainage easement between Lots 16 & 17, Block B, and the 0.1320 acres to be dedicated for future construction of the West Bluff Division Channel.

Wheelchair ramps per DPM.

Prepared by: Ray Macy, P.E.
Ray Macy, P.E.

Date: 6/21/96

* * * * *

Development Review Board Member Approval

Michael D. [Signature]
Transportation Development

6-25-96
Date

Robert W. Kane
Utility Development

6-25-96
Date

Edward A. [Signature]
Parks & General Services

6-25-96
Date

Paul [Signature] 6/25/96
City Engineer/AMAFCA

Date

Kenn [Signature]
DRB Chairman

6-25-96
Date

220
140
380
45
105

105
15
5

DRAINAGE REPORT

FOR

ROSEWOOD SUBDIVISION

A 56 LOT SINGLE FAMILY RESIDENTIAL SUBDIVISION

PREPARED FOR:

ADIL RIZVI
7049 LUELLA ANNE DRIVE, NE
ALBUQUERQUE, NM 87112

PREPARED BY:

PROTEC CONSULTING
PO BOX 27007
ALBUQUERQUE, NM 87125
(505) 833-0177



JUNE 20, 1996
(1st Revision of 4/30/96 Submittal)

R.W. Macy
6/20/96

JUN 21 1996

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I. GENERAL

I.1 Legal Description

A certain tract of land, being and comprising lots 234-A, 234-B and 234-C, plat of division of Tract 234, Airport Unit, Tracts allotted from Town of Atrisco Grant, as the same are shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on March 9, 1981 in Vol. B18, Folio 146; together with a portion of Tract 233, Town of Atrisco Grant, as the same is shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on December 5, 1944 in Vol. D, Folio 118, less and excepting that portion of said Tract taken for the right-of-way of the access ramp from I-40 to Unser Boulevard, NW as the same is shown on the New Mexico State Highway Commission Right-of-way Map I-040-3(28)148.

I.2 Engineer

PROTEC Consulting
PO Box 27007
Albuquerque, NM 87125
(505) 833-0177

I.3 Surveyor

Southwest Surveying Co., Inc.
333 Lomas Boulevard, NE
Albuquerque, NM 87102
(505) 247-4444

I.4 Benchmark

ACS "I-J9" located on the Unser Blvd overpass on I-040 approximately 222 feet north of centerline of I-040. Elevation 5199.19

I.5 TBM

SAS MH rim at Hanover Road and 80th Street, NW. Elevation 5153.61

I.6 Zoning

RD (15 Du/Acre max.)

I.7 Proposed

56 Single Family Residential Lots

I.8 Area

9.6161 Acres more or less (418,877.32 square feet, more or less)

I.9 Flood Hazard

The proposed site (Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant) is located within Flood Hazard Zone C (areas of minimal flooding) as designated on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) Community-Panel No. 350002 0027 C (October 14, 1983).

I.10 Location and Description

The proposed 9.6161 acre site is undeveloped and mostly undisturbed at the writing of this Drainage Report. The extreme west edge of the site has been disturbed along the length of the west boundary line as a result of block retaining wall construction for the recently developed Chamisa Encantada Subdivision. Existing ground cover across the site is comprised of sage brush and various native grasses. The proposed site is bounded on the north by Hanover Road, NW, on the south by the Unser Boulevard northbound off ramp from the Unser/I-40 Interchange, on the west by the Chamisa Encantada Subdivision, and on the east by Tract 232 Airport Unit, Town of Atrisco Grant, which is presently undeveloped. Hanover Road is developed and is characterized by a 40' wide paved roadway with standard curb and gutters on either side, a sanitary sewer collection system, water line, and overhead power and telephone lines. There are presently no sidewalks on Hanover Road adjacent to the proposed site. The proposed West Bluff Outfall Channel (West Bluff Storm Interceptor, Phase II) is planned to be located at the south edge of the proposed site inside of existing Unser/I-40 Interchange right-of-way. Plans for the outfall channel improvements are currently in the preliminary design phase, and construction is expected to begin sometime in 1997.

II HYDROLOGIC ANALYSIS

II.1 Existing Conditions

Hanover Road, NW intercepts offsite flows originating from north of the proposed Rosewood Subdivision and diverts them eastward to the Laurelwood Park Drainage Management Area at the northwest corner of Hanover Road, NW and 72nd Street, NW.

The recently developed Chamisa Encantada Subdivision is immediately west of the proposed site. This subdivision has been designed to carry all storm runoff originating from within it to the south for containment in a temporary earthen drainage basin. This basin will eventually be removed and replaced with the development of residential lots when the West Bluff Outfall Channel is constructed along the north edge of the northbound Unser/I-40 off ramp. At that time, runoff from the Chamisa Encantada Subdivision will drain directly into the West Bluff Outfall Channel.

Runoff originating along the north edge of the Unser/I-40 northbound off ramp is collected within the I-40 right-of-way at the north edge of the roadway. It is conveyed in a roadside ditch to the east for several hundred feet where it is drained into a 30-inch diameter CMP culvert and directed southward to the south side of I-40.

Off-site flows are prevented from entering the proposed Rosewood Subdivision by drainage improvements associated with Hanover Road, NW, the Chamisa Encantada Subdivision and the Unser/ I-40 off ramp.

Presently, runoff originating on the proposed Rosewood Subdivision drains eastward primarily as sheet flow with a gradient of approximately 2%. Based on a review of actual field conditions and recent topography, it appears the northern most 1.25 acres of the 9.6161 acre site will drain either directly onto Hanover Road, NW, or will exit the east edge of the property in a natural swale that subsequently turns north and drains onto Hanover Road, NW within Tract 232. The remaining 8.27 acres drains east to southeast and enters the north edge of the I-40 right of way, where the runoff is collected into a 30-inch CMP culvert and directed southward to the south side of I-40.

II.2 Site Hydrology (Existing Conditions)

The site hydrology as determined herein is based on the methods and criteria presented in the City of Albuquerque Development Process Manual (DPM) - Volume 2, Section 22.2 Hydrology, dated January 1993. The proposed site is in Precipitation Zone 1 (west of the Rio Grande). The P360 (100-year, 6-hour storm event) has a depth of 2.20 inches as shown in Table A-2. Since the proposed site is primarily undeveloped and undisturbed land, then Land Treatment A is applicable. See Table A-2. Excess Precipitation E for this storm is 0.44 inches as shown in Table A-8. The Peak Discharge, Q_p , from the same storm is 1.29 cfs/acre. See Table A-9. The runoff volumes and peak discharge rates from the undeveloped site are determined as follows:

1.25 Acres at the South Edge of Hanover Road, NW

$$\text{Volume(360)} = 0.44 \text{ in} \times 1.25 \text{ ac} \times 1 \text{ ft}/12 \text{ in}$$

$$\text{Volume(360)} = .04583 \text{ ac-ft}$$

$$\text{Volume(360)} = 1,996.5 \text{ cf}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.29 \text{ cfs/acre} \times 1.25 \text{ ac}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 1.6 \text{ cfs}$$

Remaining 8.37 Acres

$$\text{Volume(360)} = 13,368.6 \text{ ac-ft}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 10.8 \text{ cfs}$$

II.3 Proposed Improvements (Interim)

Initially, it will be necessary to construct a temporary retention basin at the south end of the subdivision to receive on-site runoff. This basin will require the area of two residential lots (Lots 16 and 17 in Block B) plus a portion of the drainage area designated as DA-3b, which will be dedicated for the future West Bluff Outfall Channel.

Lot 1 and a portion of Lot 2 in Block B will drain northward onto Hanover Road, NW. This is a result of developing a water block in Blossom Wood Road, NW at Hanover Road, NW to prevent runoff in Hanover from entering the site. The area draining onto Hanover (DA-1) is approximately 0.365 acres.

Kane Court, NW will be constructed without a street crown, and runoff will be allowed to drain from the north side of the street to the south curb line while being conveyed eastward. This is to diminish the flow of water entering Blossom Wood Road from Kane Court at the extreme northwest quadrant of the intersection, where there would be a possible opportunity for some of the runoff to rise above the water block and drain northward into Hanover Road. The vertical geometry of Blossom Wood Road is such that it must rise high enough near Hanover Road so as to produce a sufficient gradient southward to the knuckle. Furthermore, this must be done without resulting in an undesirably low elevation at the knuckle, which would impair drainage into the future West Bluff Outfall Channel. The need to raise Blossom Wood Road to provide a sufficient gradient along the roadway toward the south, while simultaneously directing runoff from Kane Court southward on Blossom Wood Road away from Hanover, results in tight vertical curve geometry on Blossom Wood Road between Kane Court and Hanover Road, and also prompts the elimination of the street crown in Kane Court.

Baybrook Road, NW will connect Blossom Wood Road with the existing Tarrington Drive, NW in the Chamisa Encantada Subdivision. A water block will be formed in Baybrook Road just east of Tarrington Drive to prevent flows from leaving Tarrington Drive and entering Baybrook Road. The geometry of the water block is such that a small area (approximately 0.0317 acres) of the Chamisa Encantada Subdivision will drain into the Rosewood Subdivision.

Single and Double "C" inlets will be placed along Blossom Wood Road as shown on the Grading and Drainage Plan to prevent street flow for the 100-year, 6-hour event from overtopping the curbs. The curb inlets and storm drain piping are sized to accommodate the runoff from this storm event.

The temporary retention pond will be sized to contain runoff from the 100-year, 6-hour storm event originating from within the Rosewood Subdivision. Only drainage areas DA-1 and DA-3a will not contribute runoff into the pond. DA-1 is comprised of Lot 1 and part of Lot 2 in Block B. As discussed above, this area will drain north into Hanover Road, NW. DA-3a is a portion of the land dedicated as future right-of-way for the West Bluff Outfall Channel. The 0.0386 acres of DA-3a will continue to drain into the Unser/I-40 Interchange right-of-way as it does presently. The retention pond will be of earthen construction with 3:1 interior slopes and a 4:1 exterior slope where necessary. It will have dumped riprap where the 30-inch storm drain line enters the pond,

and it will be enclosed with a five foot high chain link fence. Total pond depth will be eight feet. It will be equipped with an emergency spillway capable of discharging a flow rate equal to the 10-year, 6-hour runoff from the Rosewood Subdivision. Discharge from the spillway will be into the Unser/I-40 Interchange right-of-way.

II.4 Proposed Improvements (Final Conditions)

In the final conditions, after the West Bluff Outfall Channel is constructed, the temporary retention pond will be removed. Lots 16 and 17 in Block B will be completely developed and a 15-foot wide drainage easement will be located between the lots. The drainage easement will serve three functions. First, it will provide for placement of the 30-inch RCP storm drain that will connect Blossom Wood Road with the future West Bluff Outfall Channel. Second, it will serve as an emergency storm water (surface) outlet from the subdivision in the event the storm drain becomes clogged or a storm with a lower return frequency than the 100-year, 6-hour event is encountered. Finally, it will serve as a pedestrian access to the future trail system planned for construction along the north edge of the future West Bluff Outfall Channel.

All other aspects of the drainage improvements will remain as described in II.3 above.

II.5 General Site Hydrology for Developed Conditions

The total runoff volume and peak discharge from the developed site into the retention pond (DA-3, DA-4 and DA-5) are determined as follows:

<u>LAND TREATMENT CLASSIFICATION</u>	<u>LAND AREA (Acres)</u>	<u>EXCESS PRECIP (Inches)</u>	<u>PEAK DISCHARGE (cfs)</u>
A	0.00	0.44	1.29
B	3.03	0.67	2.03
C	1.16	0.99	2.87
D	5.09	1.97	4.37

Runoff Volume into the Retention Pond

$$\text{Weighted E} = ((3.03 \times 0.67) + (1.16 \times 0.99) + (5.09 \times 1.97))/9.28$$

$$\text{Weighted E} = 1.423 \text{ inches}$$

$$\text{Volume}(360) = 1.42 \text{ in} \times 9.28 \text{ acres} \times 1 \text{ ft}/12 \text{ in} = 1.0981 \text{ acre-ft}$$

$$\text{Volume}(360) = 1.0981 \text{ acre-ft} \times 43,560 \text{ sf/acre} = 47,833 \text{ cf}$$

Peak Discharge

Total Peak Discharge from combined drainage areas DA-3, DA-4 and DA-5 into the retention pond is determined as follows:

Peak Discharge (100-yr, 6-hr) = $(3.03 \times 2.03) + (1.16 \times 2.87) + (5.09 \times 4.37)$

Peak Discharge(100-yr, 6-hr) = 31.72 cfs

II.6 Site Hydrology Street Capacity

Except for the short one block segment of Blossom Wood Road, NW between Kane Court and Hanover Road, all of the roads within the Rosewood Subdivision are 28 feet from face-of-curb to face-of-curb. This one block segment has a street width of 32 feet.

The City of Albuquerque DPM Plate 22.3 D-1 provides a determination of street flow capacity for a 32 foot wide street of varying street slopes and flow depths. It is understood that the capacity within a 28 foot wide street will be less than a 32 foot wide street for depths which exceed the crown height (approximately 0.28 feet). Of particular interest here is the street capacity when the flow is just below the top of curb. It is desirable to place inlets and storm drains into the street system so that the street flow does not exceed the curb tops. This will minimize damage to the planter areas between the back of curb and sidewalk. Since the difference in flow capacity between the 28 foot wide street and 32 foot wide street is primarily due to the difference in flow areas, the results obtained from Plate 22.3 D-1 will be scaled down by a factor equal to the ratio of the area of a 28 foot wide street divided by the area of a 32 foot wide street at a flow depth of 0.6 feet. This factor is approximately equal to $12.88/14.08$, or 0.91.

Between Baybrook Road and Kane Court, Blossom Wood Road has a gradient of 0.50 %. At this slope a 28 foot wide road has a half street capacity of 15.5 cfs when the flow depth is 0.6 feet. Flow is subcritical with a velocity of approximately 3 fps. This street segment is the most limiting in terms of capacity, and also carries most of the flow from within the subdivision.

II.7 Site Hydrology Curb Inlets

At the west side of Blossom Wood Road just north of Baybrook Road, the flow in the west half of the street would reach approximately 11.5 cfs during the 100-year, 6-hour event, since an area of approximately 3.37 acres would contribute runoff to that point. This is determined by proportioning the total peak flow of 31.72 cfs from the 9.28 acres. From Plate 22.3 D-6 of the DPM, a Double "C" inlet would be able to remove approximately 6 cfs assuming a flow depth of 0.5 feet. The remaining 5.5 cfs would continue southward past Baybrook Road.

At a point on the west side of Blossom Wood Road just north of the knuckle, the 5.5 cfs from above would be joined by another 5.8 cfs contributed from runoff leaving Baybrook Road. A Single "C" inlet placed just north of the knuckle return would be capable of collecting about 6 cfs assuming a street slope near the vertical curve of approximately 0.2% and a flow depth of about 0.6 feet. The remaining 5.3 cfs would continue to the next inlet at the center of the knuckle on the west side of Blossom Wood Road. Another 2.7 cfs would contribute to that inlet from the area on the north side of Blossom Wood Court west of the knuckle. The total flow arriving at the depressed inlet would equal approximately 8.0 cfs. Since the runoff collects over the top of the inlet and does not flow past it, it is probable that a Single "C" inlet would collect the 8.0 cfs without exceeding the level of the top of curb.

On the east side of Blossom Wood Road, the flow would reach 4.4 cfs from a contributing area of approximately 1.29 acres at a point opposite the proposed Double "C" inlet discussed above. A Single "C" inlet at this point on the east side of the roadway would have the capacity to remove most of this flow assuming a flow depth of approximately 0.45 feet.

The 7.3 cfs from the remainder of Blossom Wood Road would collect over the depressed inlet on the south side of the street at the center of the knuckle. Again, it is likely a Single "C" inlet would collect this runoff without exceeding the top of curb since the flow does not move past the inlet.

One advantage of the proposed design is that if the inlets or storm drains are partially clogged and operating inefficiently, the 15-foot wide drainage easement is available to collect surface runoff at the knuckle which might exceed the level of the curb tops.

Much of the storm drain along the east side of Blossom Wood Road will be 27-inch RCP. The storm drain crossing Blossom Wood Road north of Baybrook Road will be a 24-inch RCP. All of the storm drain within the area of the knuckle will be 30-inch RCP, as will the storm drain line that connects to the interim retention pond. In the final condition after construction of the West Bluff Outfall Channel, the 30-inch RCP storm drain line will be extended from the defunct retention pond to the new channel within the 15-foot drainage easement.

II.8 Site Hydrology - Emergency Spillway

The retention pond emergency spillway will be capable of passing the 10-year, 6-hour peak discharge flow rate arriving in the pond from the Rosewood Subdivision. Discharge will be into the Unser/I-40 Interchange right-of-way. The determination of the peak flow rate and spillway geometry are determined in the following:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	PEAK DISCHARGE (cfs)
A	0.00	0.24
B	3.03	0.76
C	1.16	1.49
D	5.09	2.89

Peak Discharge

$$\text{Peak Discharge (10-yr, 6-hr)} = (3.03 \times 0.76) + (1.16 \times 1.49) + (5.09 \times 2.89)$$

$$\text{Peak Discharge (10-yr, 6-hr)} = 18.74 \text{ cfs}$$

Trapezoidal (Broad Crested) Weir

$$Q = 3.367 L H^{3/2}$$

where: Q = weir flow rate, 18.74 cfs

L = length of the weir crest, ft

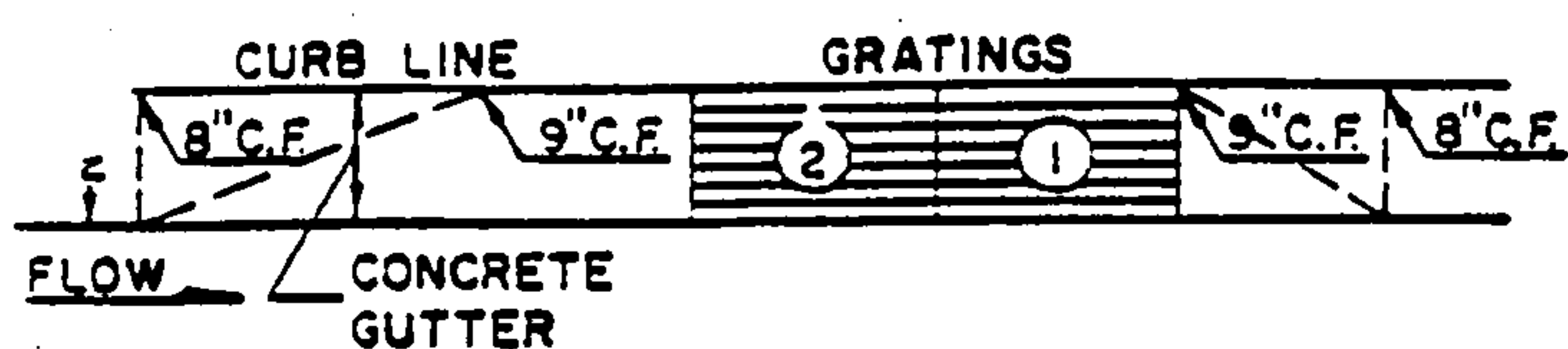
H = head on the weir, 0.5 ft (assumed)

solving L:

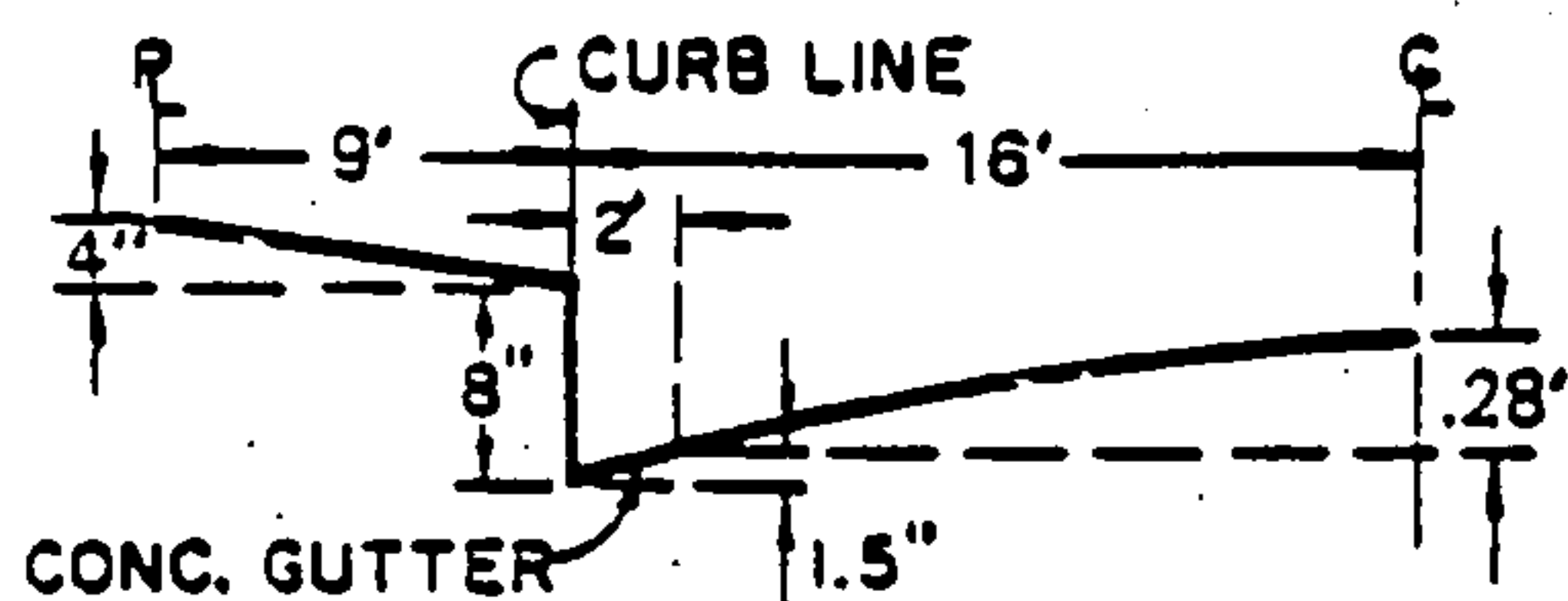
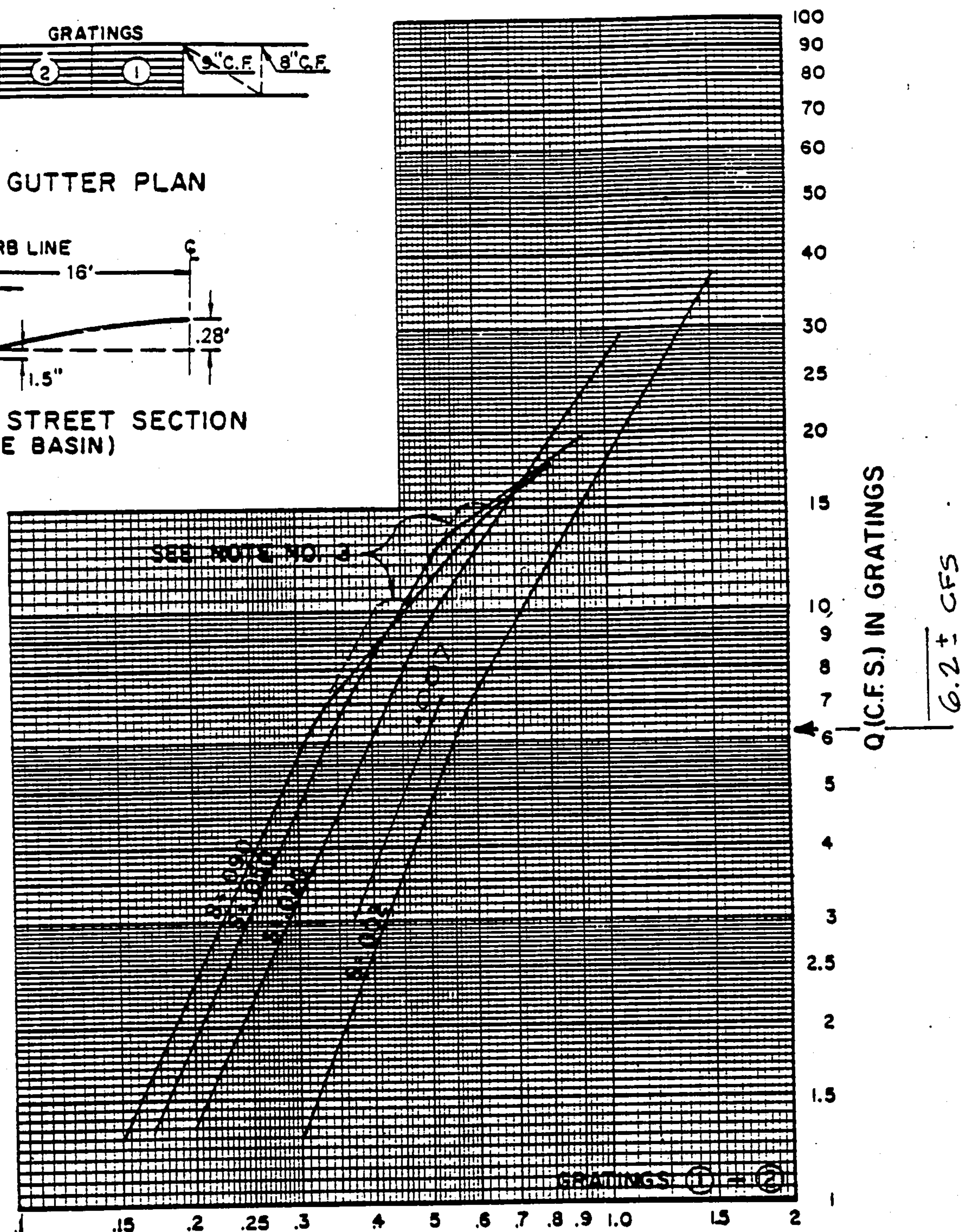
$$L = Q / (3.367 H^{3/2})$$

$$L = 15.74 \text{ ft} \quad \text{use 20 ft (minimum)}$$

GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN

TYPICAL HALF STREET SECTION
(ABOVE BASIN)

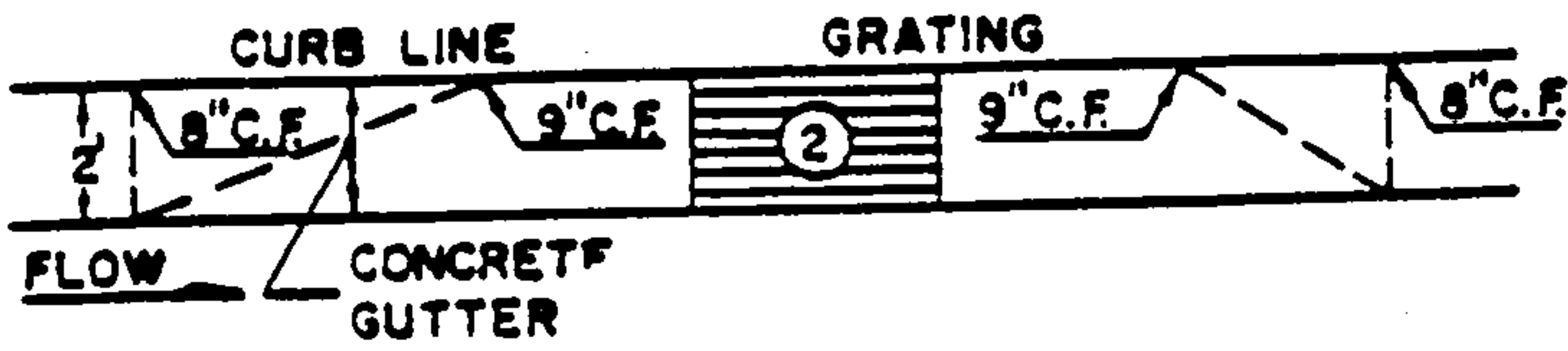
D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

ROSEWOOD SUB'N

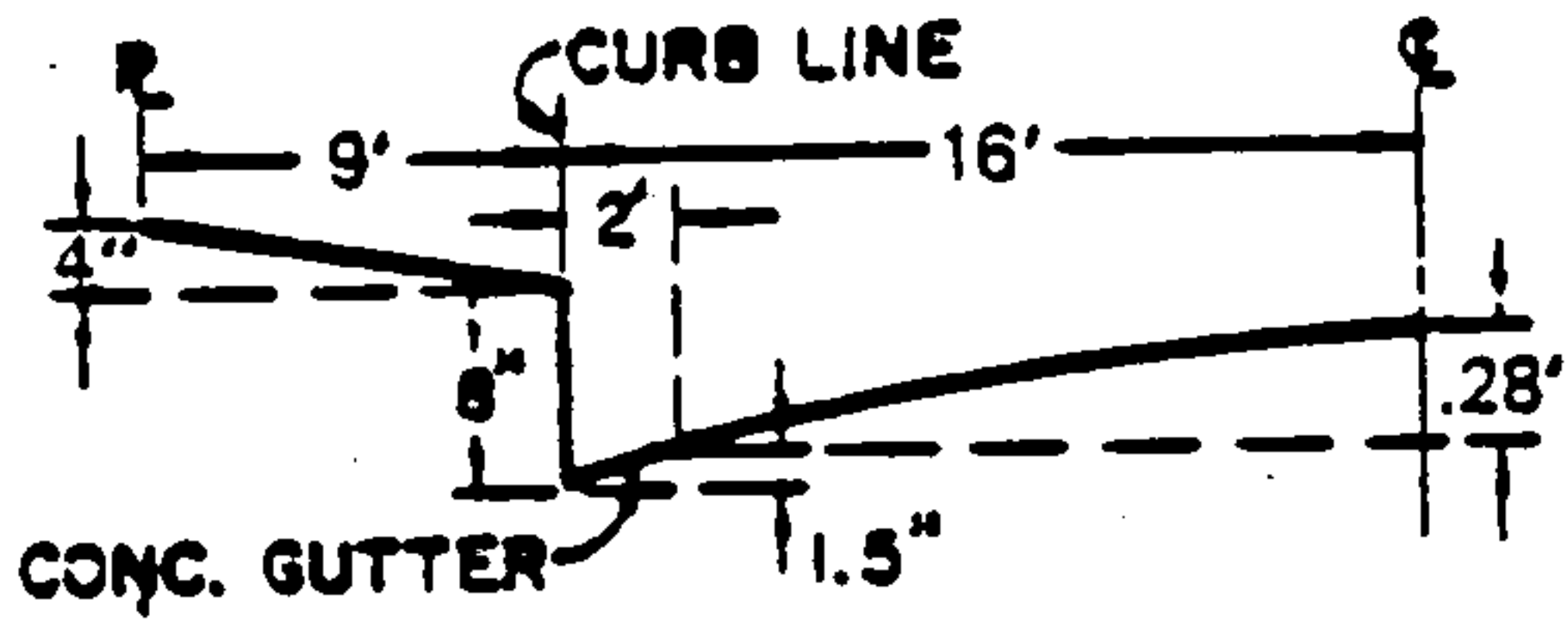
BLOSSOM WOOD RD

0.5' DEPTH @ S = 0.007 FT/FT

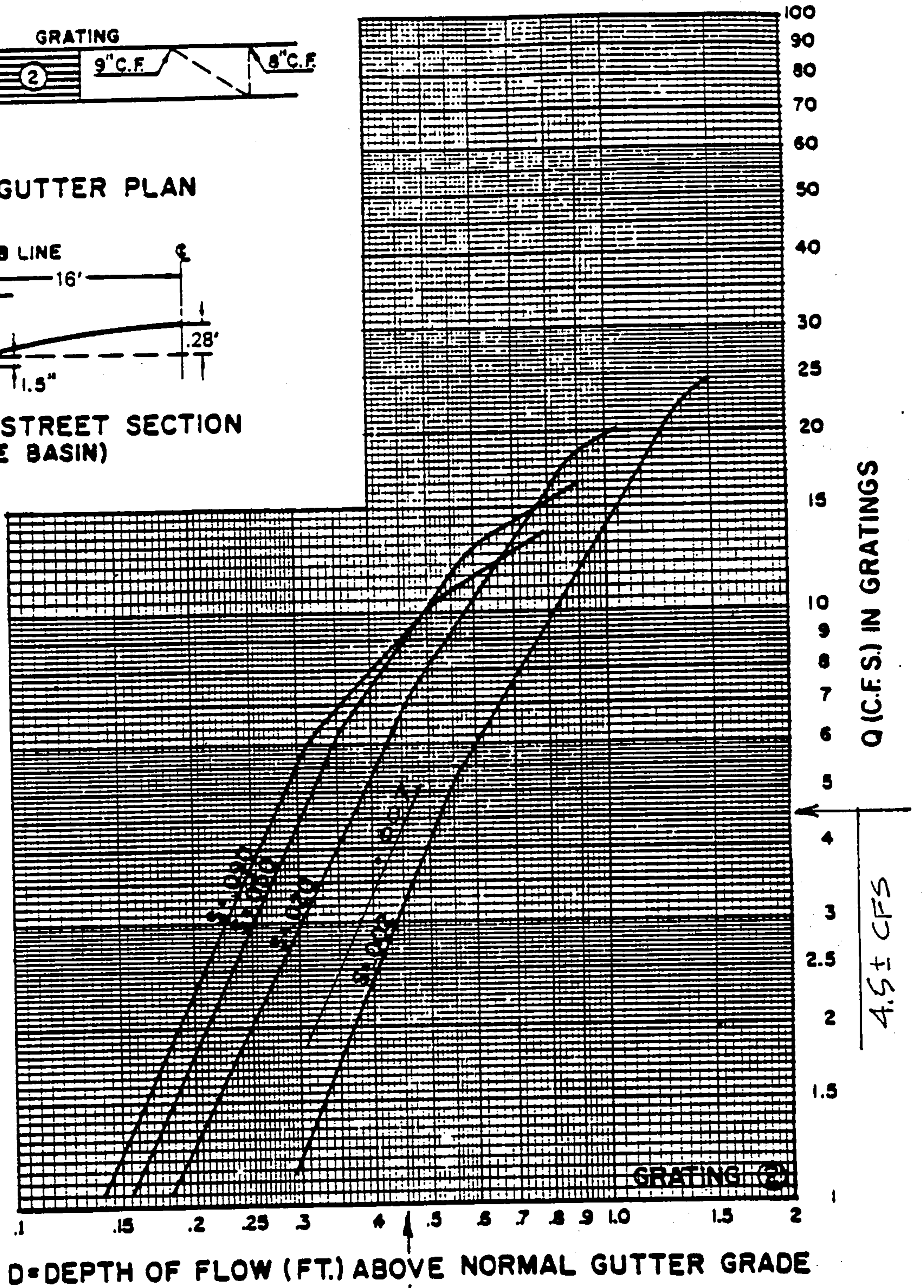
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN

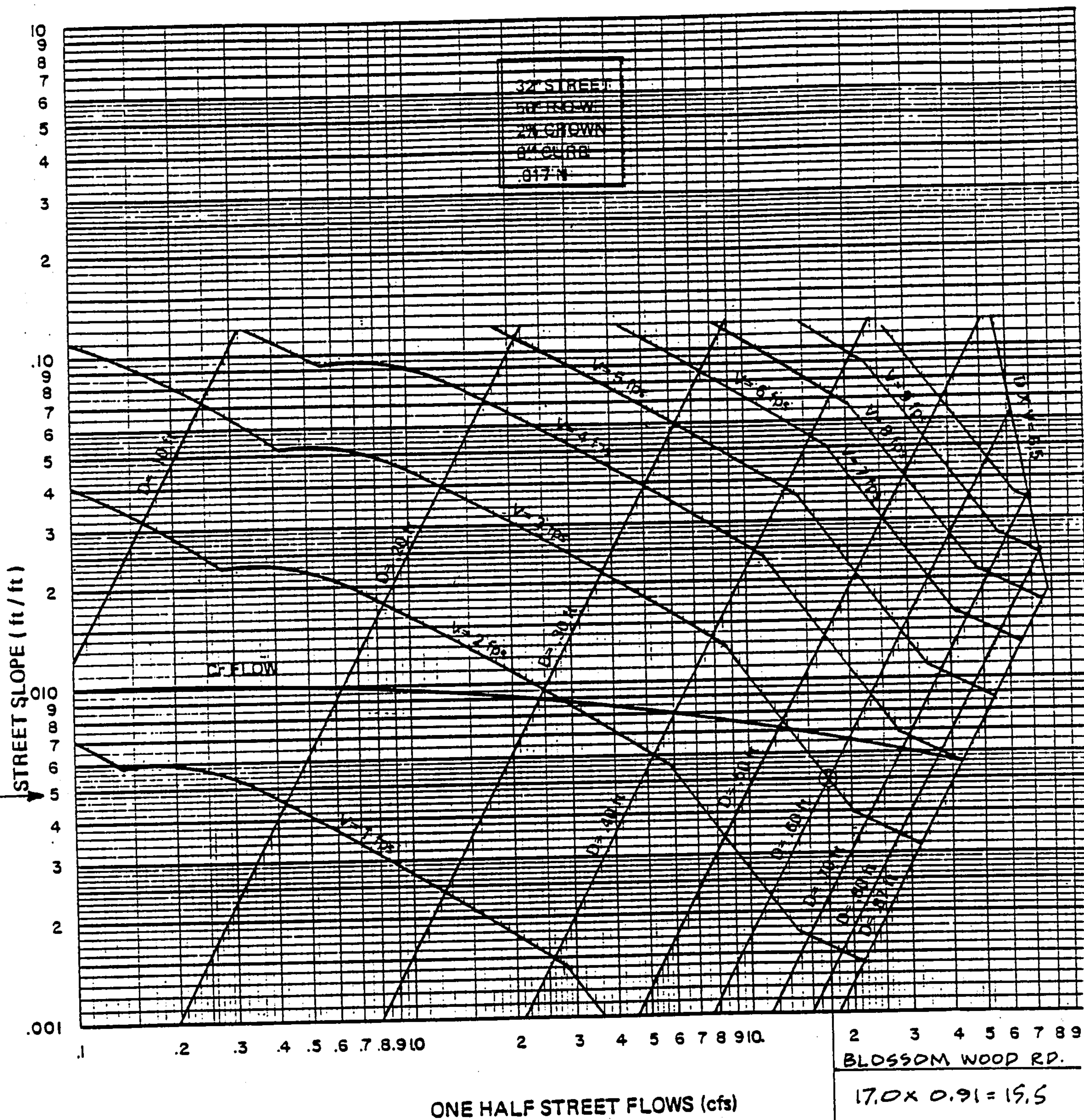


TYPICAL HALF STREET SECTION
(ABOVE BASIN)



BLOSSOM WOOD RD.
D. 45' DEPTH @ S = 0.007 FT/FT

STREET CAPACITY



DRAINAGE REPORT

FOR

ROSEWOOD SUBDIVISION

**A 56 LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION**

PREPARED FOR:

**ADIL RIZVI
7049 LUELLA ANNE DRIVE, NE
ALBUQUERQUE, NM 87112**

PREPARED BY:

**PROTEC CONSULTING
PO BOX 27007
ALBUQUERQUE, NM 87125
(505) 833-0177**

JUNE 20, 1996
(1st Revision of 4/30/96 Submittal)



R.W. Macy
6/20/96

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I. GENERAL

I.1 Legal Description

A certain tract of land, being and comprising lots 234-A, 234-B and 234-C, plat of division of Tract 234, Airport Unit, Tracts allotted from Town of Atrisco Grant, as the same are shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on March 9, 1981 in Vol. B18, Folio 146; together with a portion of Tract 233, Town of Atrisco Grant, as the same is shown and designated on the plat thereof, filed in the Office of the County Clerk of Bernalillo County, New Mexico on December 5, 1944 in Vol. D, Folio 118, less and excepting that portion of said Tract taken for the right-of-way of the access ramp from I-40 to Unser Boulevard, NW as the same is shown on the New Mexico State Highway Commission Right-of-way Map I-040-3(28)148.

I.2 Engineer

PROTEC Consulting
PO Box 27007
Albuquerque, NM 87125
(505) 833-0177

I.3 Surveyor

Southwest Surveying Co., Inc.
333 Lomas Boulevard, NE
Albuquerque, NM 87102
(505) 247-4444

I.4 Benchmark

ACS "I-J9" located on the Unser Blvd overpass on I-040 approximately 222 feet north of centerline of I-040. Elevation 5199.19

I.5 TBM

SAS MH rim at Hanover Road and 80th Street, NW. Elevation 5153.61

I.6 Zoning

RD (15 Du/Acre max.)

I.7 Proposed

56 Single Family Residential Lots

I.8 Area

9.6161 Acres more or less (418,877.32 square feet, more or less)

I.9 Flood Hazard

The proposed site (Tracts 233, 234-A, 234-B, and 234-C Airport Unit, Town of Atrisco Grant) is located within Flood Hazard Zone C (areas of minimal flooding) as designated on the Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM) Community-Panel No. 350002 0027 C (October 14, 1983).

I.10 Location and Description

The proposed 9.6161 acre site is undeveloped and mostly undisturbed at the writing of this Drainage Report. The extreme west edge of the site has been disturbed along the length of the west boundary line as a result of block retaining wall construction for the recently developed Chamisa Encantada Subdivision. Existing ground cover across the site is comprised of sage brush and various native grasses. The proposed site is bounded on the north by Hanover Road, NW, on the south by the Unser Boulevard northbound off ramp from the Unser/I-40 Interchange, on the west by the Chamisa Encantada Subdivision, and on the east by Tract 232 Airport Unit, Town of Atrisco Grant, which is presently undeveloped. Hanover Road is developed and is characterized by a 40' wide paved roadway with standard curb and gutters on either side, a sanitary sewer collection system, water line, and overhead power and telephone lines. There are presently no sidewalks on Hanover Road adjacent to the proposed site. The proposed West Bluff Outfall Channel (West Bluff Storm Interceptor, Phase II) is planned to be located at the south edge of the proposed site inside of existing Unser/I-40 Interchange right-of-way. Plans for the outfall channel improvements are currently in the preliminary design phase, and construction is expected to begin sometime in 1997.

II HYDROLOGIC ANALYSIS

II.1 Existing Conditions

Hanover Road, NW intercepts offsite flows originating from north of the proposed Rosewood Subdivision and diverts them eastward to the Laurelwood Park Drainage Management Area at the northwest corner of Hanover Road, NW and 72nd Street, NW.

The recently developed Chamisa Encantada Subdivision is immediately west of the proposed site. This subdivision has been designed to carry all storm runoff originating from within it to the south for containment in a temporary earthen drainage basin. This basin will eventually be removed and replaced with the development of residential lots when the West Bluff Outfall Channel is constructed along the north edge of the northbound Unser/I-40 off ramp. At that time, runoff from the Chamisa Encantada Subdivision will drain directly into the West Bluff Outfall Channel.

Runoff originating along the north edge of the Unser/I-40 northbound off ramp is collected within the I-40 right-of-way at the north edge of the roadway. It is conveyed in a roadside ditch to the east for several hundred feet where it is drained into a 30-inch diameter CMP culvert and directed southward to the south side of I-40.

Off-site flows are prevented from entering the proposed Rosewood Subdivision by drainage improvements associated with Hanover Road, NW, the Chamisa Encantada Subdivision and the Unser/ I-40 off ramp.

Presently, runoff originating on the proposed Rosewood Subdivision drains eastward primarily as sheet flow with a gradient of approximately 2%. Based on a review of actual field conditions and recent topography, it appears the northern most 1.25 acres of the 9.6161 acre site will drain either directly onto Hanover Road, NW, or will exit the east edge of the property in a natural swale that subsequently turns north and drains onto Hanover Road, NW within Tract 232. The remaining 8.27 acres drains east to southeast and enters the north edge of the I-40 right of way, where the runoff is collected into a 30-inch CMP culvert and directed southward to the south side of I-40.

II.2 Site Hydrology (Existing Conditions)

The site hydrology as determined herein is based on the methods and criteria presented in the City of Albuquerque Development Process Manual (DPM) - Volume 2, Section 22.2 Hydrology, dated January 1993. The proposed site is in Precipitation Zone 1 (west of the Rio Grande). The P360 (100-year, 6-hour storm event) has a depth of 2.20 inches as shown in Table A-2. Since the proposed site is primarily undeveloped and undisturbed land, then Land Treatment A is applicable. See Table A-2. Excess Precipitation E for this storm is 0.44 inches as shown in Table A-8. The Peak Discharge, Q_p , from the same storm is 1.29 cfs/acre. See Table A-9. The runoff volumes and peak discharge rates from the undeveloped site are determined as follows:

1.25 Acres at the South Edge of Hanover Road, NW

$$\text{Volume(360)} = 0.44 \text{ in} \times 1.25 \text{ ac} \times 1 \text{ ft}/12 \text{ in}$$

$$\text{Volume(360)} = .04583 \text{ ac-ft}$$

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$$\text{Peak Discharge (100-yr, 6-hr)} = 1.6 \text{ cfs}$$

Remaining 8.37 Acres

$$\text{Volume(360)} = 13,368.6 \text{ ac-ft}$$

$$\text{Peak Discharge (100-yr, 6-hr)} = 10.8 \text{ cfs}$$

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Initially, it will be necessary to construct a temporary retention basin at the south end of the subdivision to receive on-site runoff. This basin will require the area of two residential lots (Lots 16 and 17 in Block B) plus a portion of the drainage area designated as DA-3b, which will be dedicated for the future West Bluff Outfall Channel.

Lot 1 and a portion of Lot 2 in Block B will drain northward onto Hanover Road, NW. This is a result of developing a water block in Blossom Wood Road, NW at Hanover Road, NW to prevent runoff in Hanover from entering the site. The area draining onto Hanover (DA-1) is approximately 0.365 acres.

Kane Court, NW will be constructed without a street crown, and runoff will be allowed to drain from the north side of the street to the south curb line while being conveyed eastward. This is to diminish the flow of water entering Blossom Wood Road from Kane Court at the extreme northwest quadrant of the intersection, where there would be a possible opportunity for some of the runoff to rise above the water block and drain northward into Hanover Road. The vertical geometry of Blossom Wood Road is such that it must rise high enough near Hanover Road so as to produce a sufficient gradient southward to the knuckle. Furthermore, this must be done without resulting in an undesirably low elevation at the knuckle, which would impair drainage into the future West Bluff Outfall Channel. The need to raise Blossom Wood Road to provide a sufficient gradient along the roadway toward the south, while simultaneously directing runoff from Kane Court southward on Blossom Wood Road away from Hanover, results in tight vertical curve geometry on Blossom Wood Road between Kane Court and Hanover Road, and also prompts the elimination of the street crown in Kane Court.

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Single and Double "C" inlets will be placed along Blossom Wood Road as shown on the Grading and Drainage Plan to prevent street flow for the 100-year, 6-hour event from overtopping the curbs. The curb inlets and storm drain piping are sized to accommodate the runoff from this storm event.

The temporary retention pond will be sized to contain runoff from the 100-year, 6-hour storm event originating from within the Rosewood Subdivision. Only drainage areas DA-1 and DA-3a will not contribute runoff into the pond. DA-1 is comprised of Lot 1 and part of Lot 2 in Block B. As discussed above, this area will drain north into Hanover Road, NW. DA-3a is a portion of the land dedicated as future right-of-way for the West Bluff Outfall Channel. The 0.0386 acres of DA-3a will continue to drain into the Unser/I-40 Interchange right-of-way as it does presently. The retention pond will be of earthen construction with 3:1 interior slopes and a 4:1 exterior slope where necessary. It will have dumped riprap where the 30-inch storm drain line enters the pond,

and it will be enclosed with a five foot high chain link fence. Total pond depth will be eight feet. It will be equipped with an emergency spillway capable of discharging a flow rate equal to the 10-year, 6-hour runoff from the Rosewood Subdivision. Discharge from the spillway will be into the Unser/I-40 Interchange right-of-way.

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In the final conditions, after the West Bluff Outfall Channel is constructed, the temporary retention pond will be removed. Lots 16 and 17 in Block B will be completely developed and a 15-foot wide drainage easement will be located between the lots. The drainage easement will serve three functions. First, it will provide for placement of the 30-inch RCP storm drain that will connect Blossom Wood Road with the future West Bluff Outfall Channel. Second, it will serve as an emergency storm water (surface) outlet from the subdivision in the event the storm drain becomes clogged or a storm with a lower return frequency than the 100-year, 6-hour event is encountered. Finally, it will serve as a pedestrian access to the future trail system planned for construction along the north edge of the future West Bluff Outfall Channel.

All other aspects of the drainage improvements will remain as described in II.3 above.

II.5 General Site Hydrology for Developed Conditions

The total runoff volume and peak discharge from the developed site into the retention pond (DA-3, DA-4 and DA-5) are determined as follows:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	EXCESS PRECIP (Inches)	PEAK DISCHARGE (cfs)
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C	1.16	0.99	2.87
D	5.09	1.97	4.37

Runoff Volume into the Retention Pond

$$\text{Weighted E} = ((3.03 \times 0.67) + (1.16 \times 0.99) + (5.09 \times 1.97))/9.28$$

$$\text{Weighted E} = 1.423 \text{ inches}$$

$$\text{Volume(360)} = 1.42 \text{ in} \times 9.28 \text{ acres} \times 1 \text{ ft}/12 \text{ in} = 1.0981 \text{ acre-ft}$$

$$\text{Volume(360)} = 1.0981 \text{ acre-ft} \times 43,560 \text{ sf/acre} = 47,833 \text{ cf}$$

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Peak Discharge (100-yr, 6-hr) = $(3.03 \times 2.03) + (1.16 \times 2.87) + (5.09 \times 4.37)$

Peak Discharge(100-yr, 6-hr) = 31.72 cfs

II.6 Site Hydrology Street Capacity

Except for the short one block segment of Blossom Wood Road, NW between Kane Court and Hanover Road, all of the roads within the Rosewood Subdivision are 28 feet from face-of-curb to face-of-curb. This one block segment has a street width of 32 feet.

The City of Albuquerque DPM Plate 22.3 D-1 provides a determination of street flow capacity for a 32 foot wide street of varying street slopes and flow depths. It is understood that the capacity within a 28 foot wide street will be less than a 32 foot wide street for depths which exceed the crown height (approximately 0.28 feet). Of particular interest here is the street capacity when the flow is just below the top of curb. It is desirable to place inlets and storm drains into the street system so that the street flow does not exceed the curb tops. This will minimize damage to the planter areas between the back of curb and sidewalk. Since the difference in flow capacity between the 28 foot wide street and 32 foot wide street is primarily due to the difference in flow areas, the results obtained from Plate 22.3 D-1 will be scaled down by a factor equal to the ratio of the area of a 28 foot wide street divided by the area of a 32 foot wide street at a flow depth of 0.6 feet. This factor is approximately equal to $12.88/14.08$, or 0.91.

Between Baybrook Road and Kane Court, Blossom Wood Road has a gradient of 0.50 %. At this slope a 28 foot wide road has a half street capacity of 15.5 cfs when the flow depth is 0.6 feet. Flow is subcritical with a velocity of approximately 3 fps. This street segment is the most limiting in terms of capacity, and also carries most of the flow from within the subdivision.

II.7 Site Hydrology Curb Inlets

At the west side of Blossom Wood Road just north of Baybrook Road, the flow in the west half of the street would reach approximately 11.5 cfs during the 100-year, 6-hour event, since an area of approximately 3.37 acres would contribute runoff to that point. This is determined by proportioning the total peak flow of 31.72 cfs from the 9.28 acres. From Plate 22.3 D-6 of the DPM, a Double "C" inlet would be able to remove approximately 6 cfs assuming a flow depth of 0.5 feet. The remaining 5.5 cfs would continue southward past Baybrook Road.

At a point on the west side of Blossom Wood Road just north of the knuckle, the 5.5 cfs from above would be joined by another 5.8 cfs contributed from runoff leaving Baybrook Road. A Single "C" inlet placed just north of the knuckle return would be capable of collecting about 6 cfs assuming a street slope near the vertical curve of approximately 0.2% and a flow depth of about 0.6 feet. The remaining 5.3 cfs would continue to the next inlet at the center of the knuckle on the west side of Blossom Wood Road. Another 2.7 cfs would contribute to that inlet from the area on the north side of Blossom Wood Court west of the knuckle. The total flow arriving at the depressed inlet would equal approximately 8.0 cfs. Since the runoff collects over the top of the inlet and does not flow past it, it is probable that a Single "C" inlet would collect the 8.0 cfs without exceeding the level of the top of curb.

On the east side of Blossom Wood Road, the flow would reach 4.4 cfs from a contributing area of approximately 1.29 acres at a point opposite the proposed Double "C" inlet discussed above. A Single "C" inlet at this point on the east side of the roadway would have the capacity to remove most of this flow assuming a flow depth of approximately 0.45 feet.

The 7.3 cfs from the remainder of Blossom Wood Road would collect over the depressed inlet on the south side of the street at the center of the knuckle. Again, it is likely a Single "C" inlet would collect this runoff without exceeding the top of curb since the flow does not move past the inlet.

One advantage of the proposed design is that if the inlets or storm drains are partially clogged and operating inefficiently, the 15-foot wide drainage easement is available to collect surface runoff at the knuckle which might exceed the level of the curb tops.

Much of the storm drain along the east side of Blossom Wood Road will be 27-inch RCP. The storm drain crossing Blossom Wood Road north of Baybrook Road will be a 24-inch RCP. All of the storm drain within the area of the knuckle will be 30-inch RCP, as will the storm drain line that connects to the interim retention pond. In the final condition after construction of the West Bluff Outfall Channel, the 30-inch RCP storm drain line will be extended from the defunct retention pond to the new channel within the 15-foot drainage easement.

II.8 Site Hydrology - Emergency Spillway

The retention pond emergency spillway will be capable of passing the 10-year, 6-hour peak discharge flow rate arriving in the pond from the Rosewood Subdivision. Discharge will be into the Unser/I-40 Interchange right-of-way. The determination of the peak flow rate and spillway geometry are determined in the following:

LAND TREATMENT CLASSIFICATION	LAND AREA (Acres)	PEAK DISCHARGE (cfs)
A	0.00	0.24
B	3.03	0.76
C	1.16	1.49
D	5.09	2.89

Peak Discharge

$$\text{Peak Discharge (10-yr, 6-hr)} = (3.03 \times 0.76) + (1.16 \times 1.49) + (5.09 \times 2.89)$$

$$\text{Peak Discharge (10-yr, 6-hr)} = 18.74 \text{ cfs}$$

Trapezoidal (Broad Crested) Weir

$$Q = 3.367 L H^{3/2}$$

where: Q = weir flow rate, 18.74 cfs

L = length of the weir crest, ft

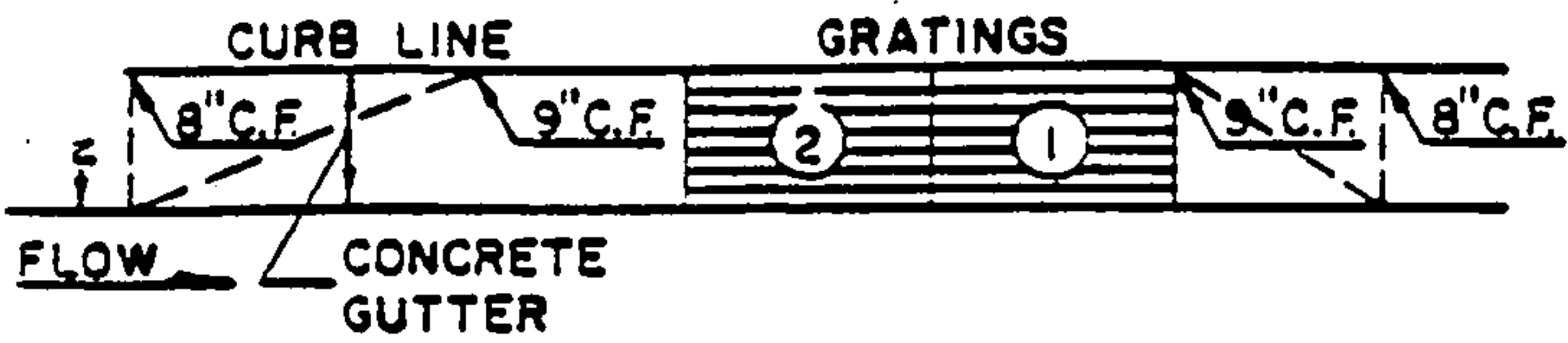
H = head on the weir, 0.5 ft (assumed)

solving L:

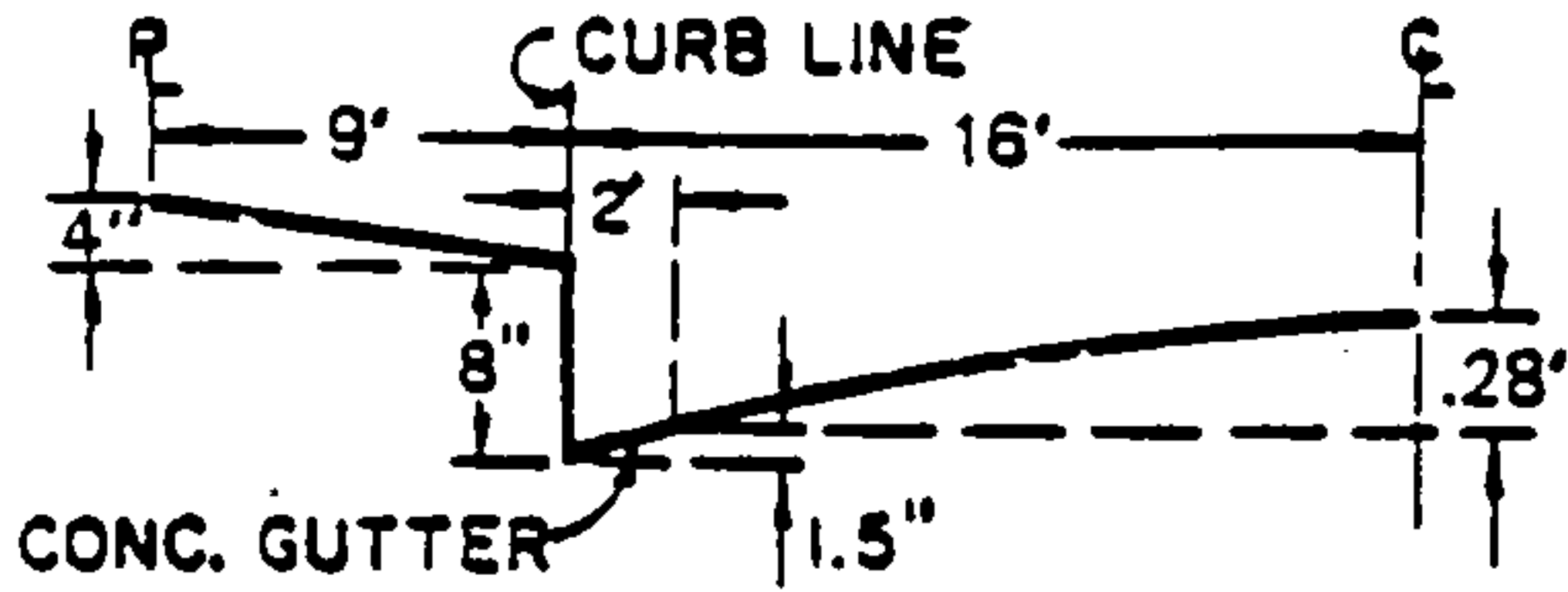
$$L = Q / (3.367 H^{3/2})$$

$$L = 15.74 \text{ ft} \quad \text{use 20 ft (minimum)}$$

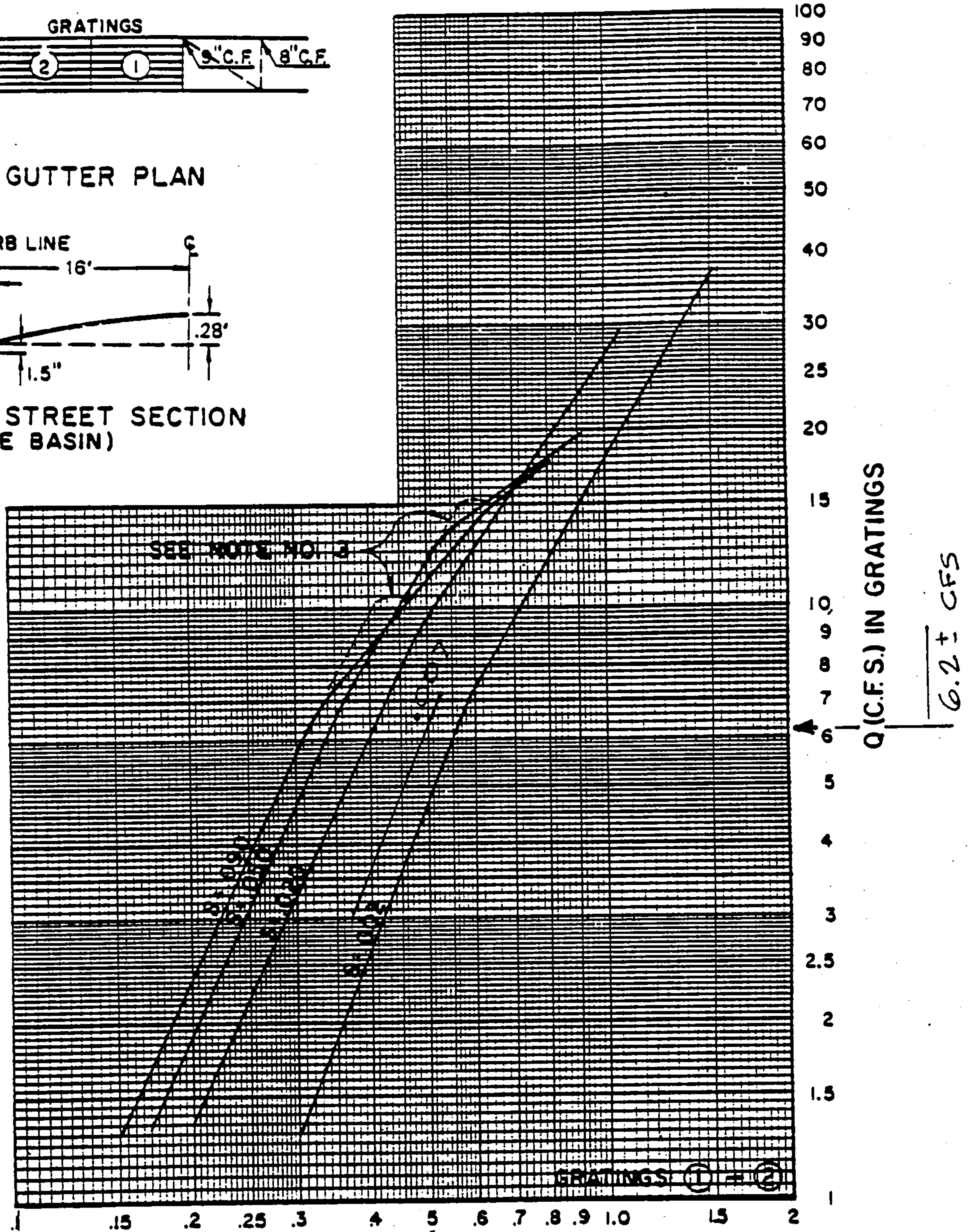
GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN

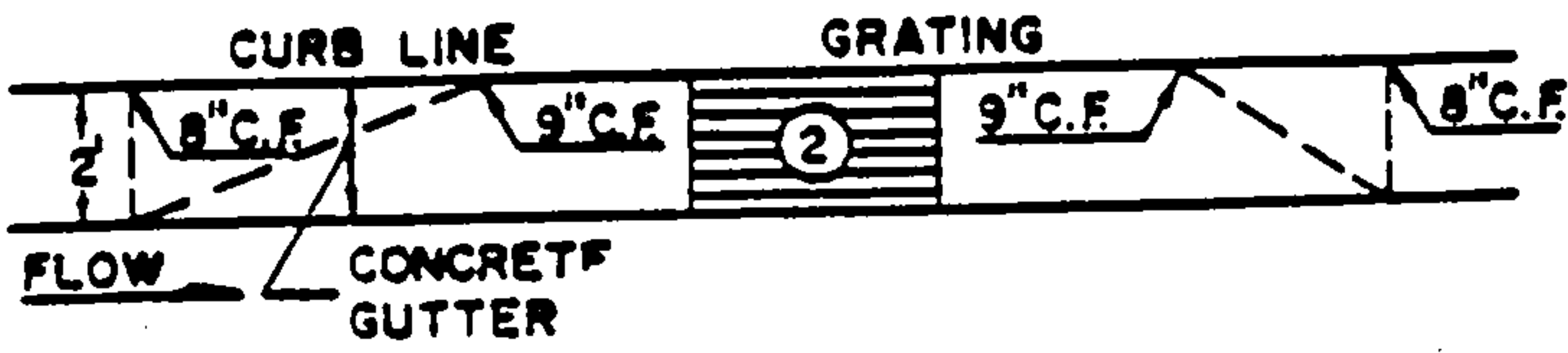


TYPICAL HALF STREET SECTION
(ABOVE BASIN)

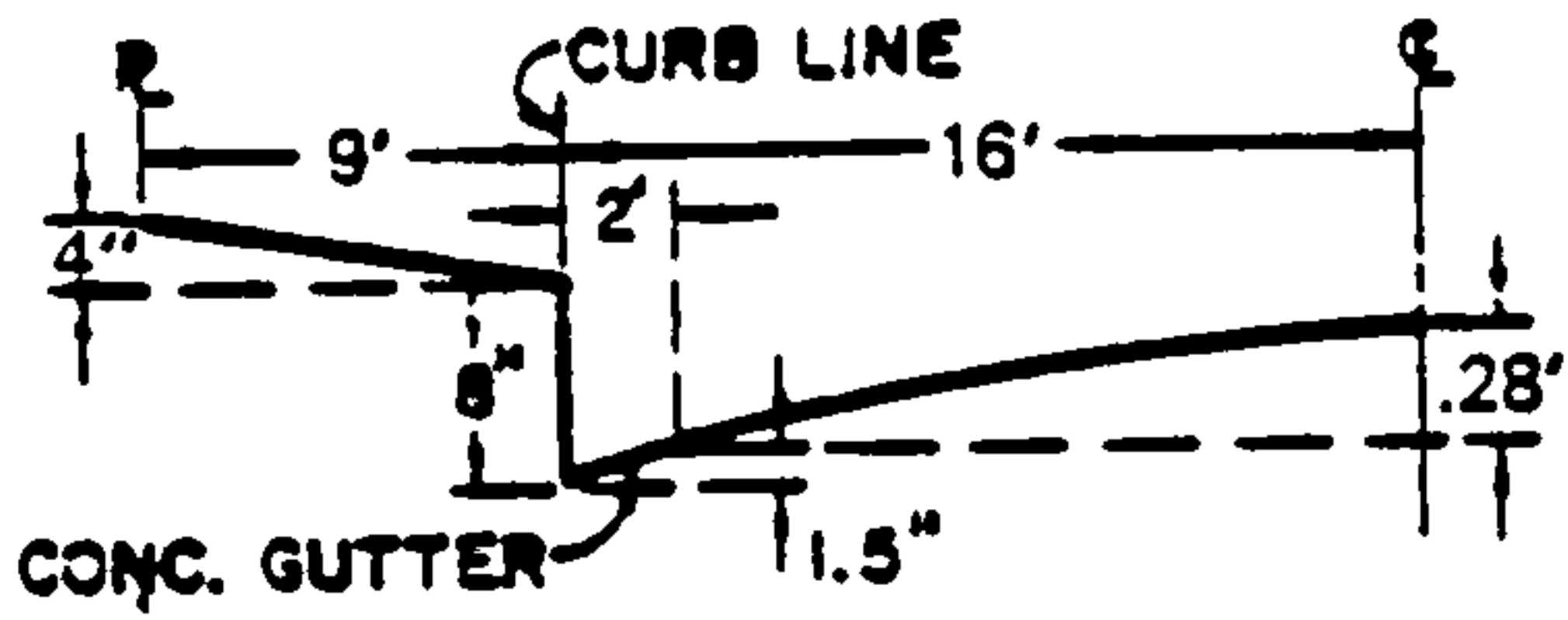


D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE
 ROSEWOOD SUB'N
 BLOSSOM WOOD RD
 0.5' DEPTH @ S = 0.007 FT/FT

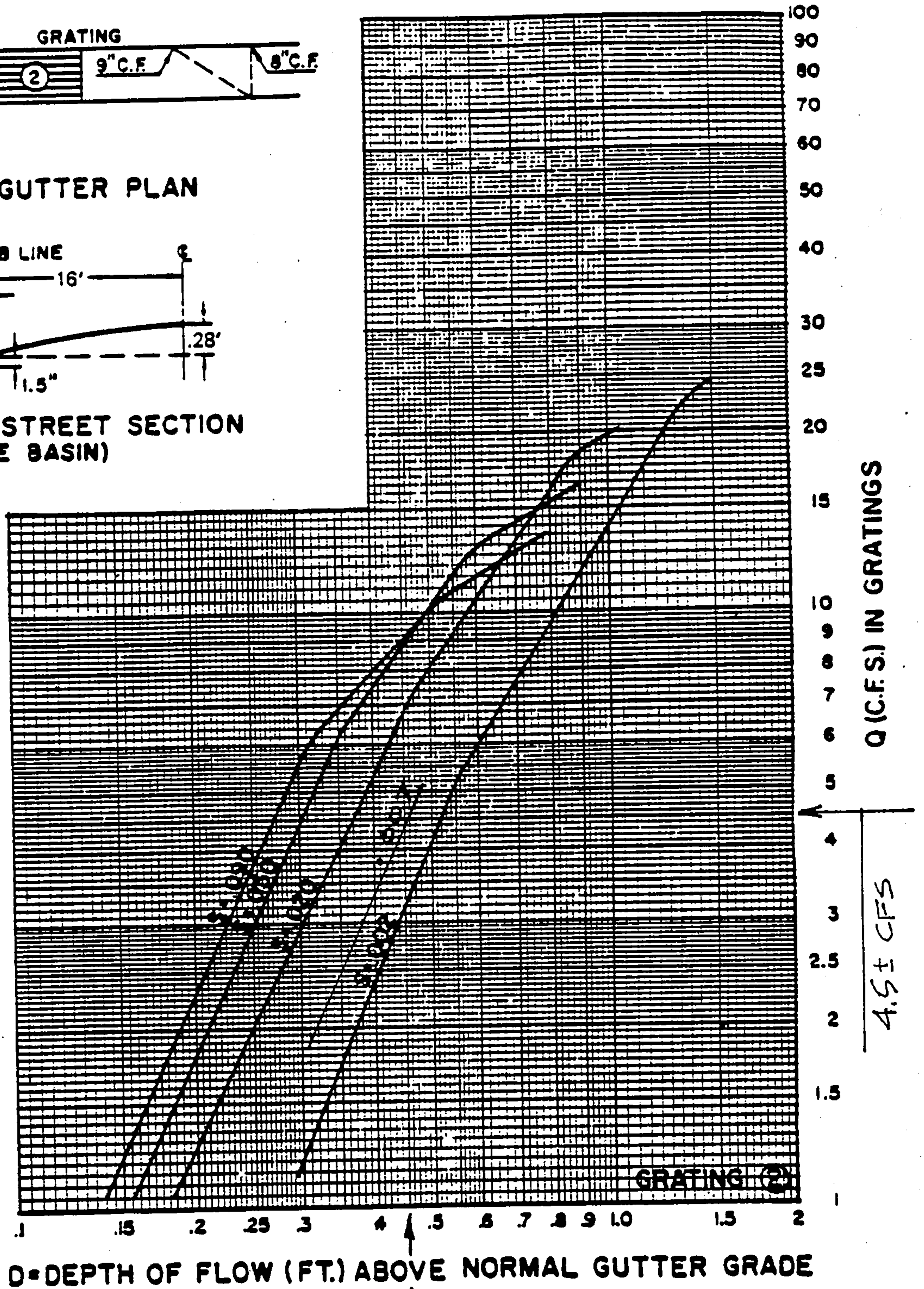
GRATING CAPACITIES FOR TYPE 'A', 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION (ABOVE BASIN)



BLOSSOM WOOD RD.
0.45' DEPTH @ S = 0.007 FT/FT

STREET CAPACITY

