



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 16, 2003

Kevin Daggett, P.E.
Daggett Engineering & Surveying
2125 Corte de Chamisa NW
Albuquerque, New Mexico 87120

RE: DESERT GARDENS SUBD (AKA: V.E. Barrett Subd) (L-10/D19)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 5/24/2001
Engineers Certification dated 12/25/2002 Rev. 1/10/2003

Dear Kevin:

Based upon the information provided in your Engineers Certification submittal dated 12/30/2002, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin
Hydrology Plan Checker
Development & Bldg. Ser. Division
DLB

c: Arlene Portillo, COA--Project # 670581
✓ File

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/11/2002)

PROJECT TITLE: DESERT GARDENS

DRB # _____ EPC# _____

ZONE MAP/DRG. FILE #:

WORK ORDER#: 670581

L-10/D19

LEGAL DESCRIPTION: DESERT GARDENS SUBDIVISION

CITY ADDRESS: BRIDGE BLVD @ UNSER BLVD.

ENGINEERING FIRM: DAGGETT ENGRG. & SURVEYING

ADDRESS: 2125 CORTI DE CHAMISA, NW

CITY, STATE: ALB, NM

CONTACT: KEVIN

PHONE: 228-7821

ZIP CODE: 87120

OWNER: SILVAGE-THOMAS HOMES, INC

ADDRESS: 7445 PAN AMERICAN

CITY, STATE: ALB, NM

CONTACT: ROBERT LUPTON

PHONE: 341-6911

ZIP CODE: _____

ARCHITECT: N/A

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

SURVEYOR: DAGGETT ENGRG. & SURVEYING

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

CONTRACTOR: HYDRO-SYSTEMS, INC

ADDRESS: 6811 B ATRISCO DR.

CITY, STATE: ALB, NM

CONTACT: LEE

PHONE: 344-3840

ZIP CODE: 87120

CHECK TYPE OF SUBMITTAL:

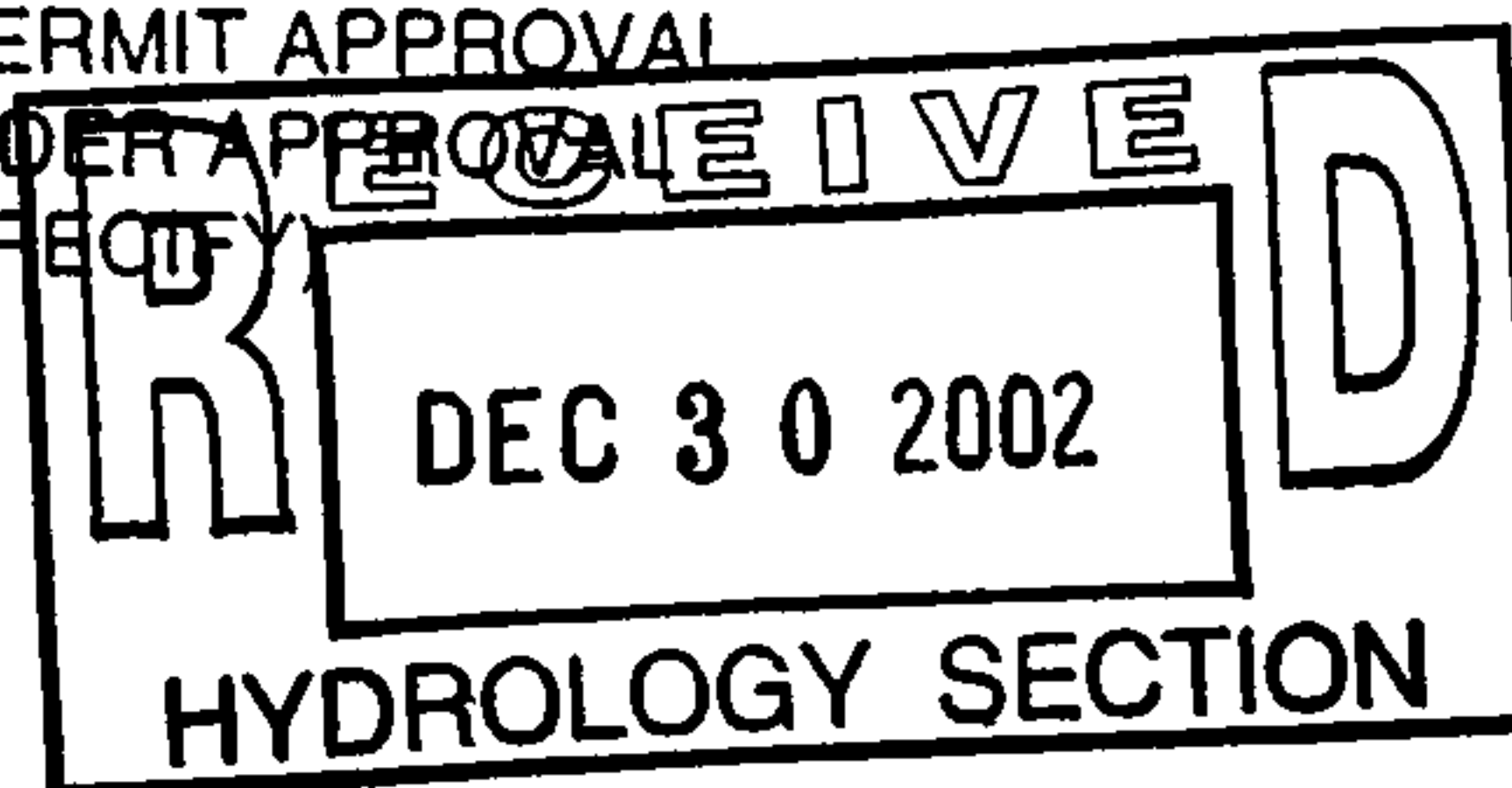
- ☐ DRAINAGE REPORT
- ☐ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☒ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☒ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ 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 (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED



DATE SUBMITTED: 12/30/02

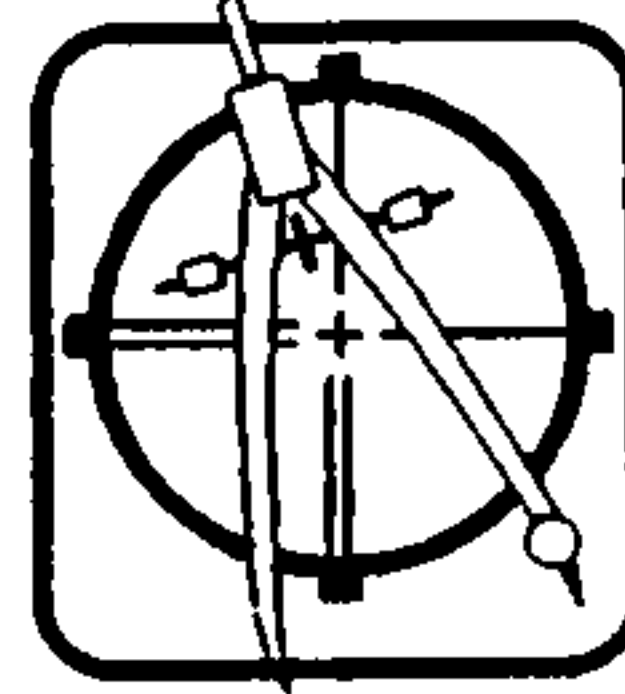
BY: Kevin Daggett

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5)
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

DAGGETT
ENGINEERING &
SURVEYING

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(505) 352-5279 (Office)
(505) 228-7821 (Cell)
(505) 833-2088 (Fax)

☐ FAX TRANSMITTAL



☒ HAND DELIVERED TRANSMITTAL

To: BRAD BINGHAM

Date: 12/30/02

Company: COA HYDROLOGY

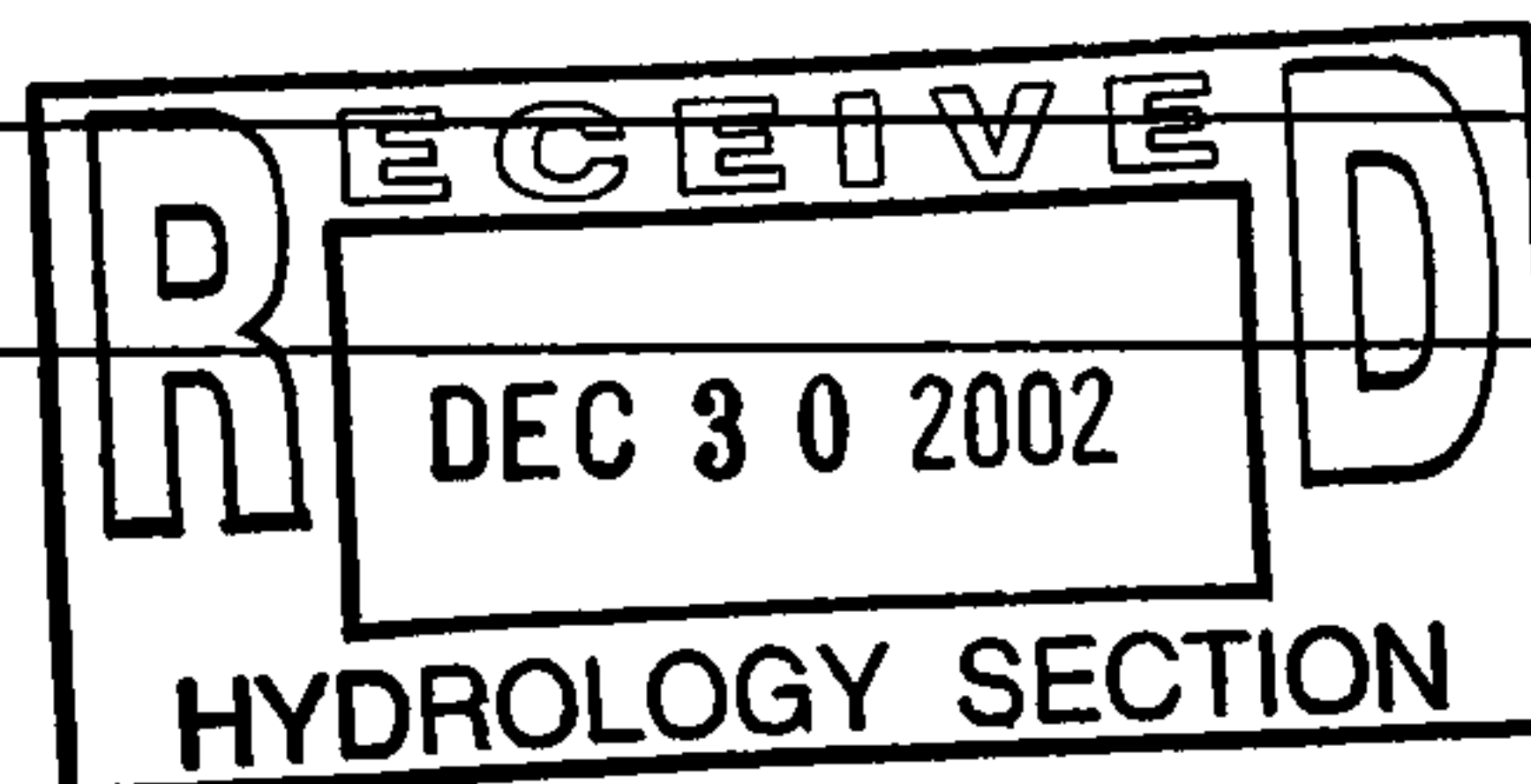
Pages: 2 (incl. cover)

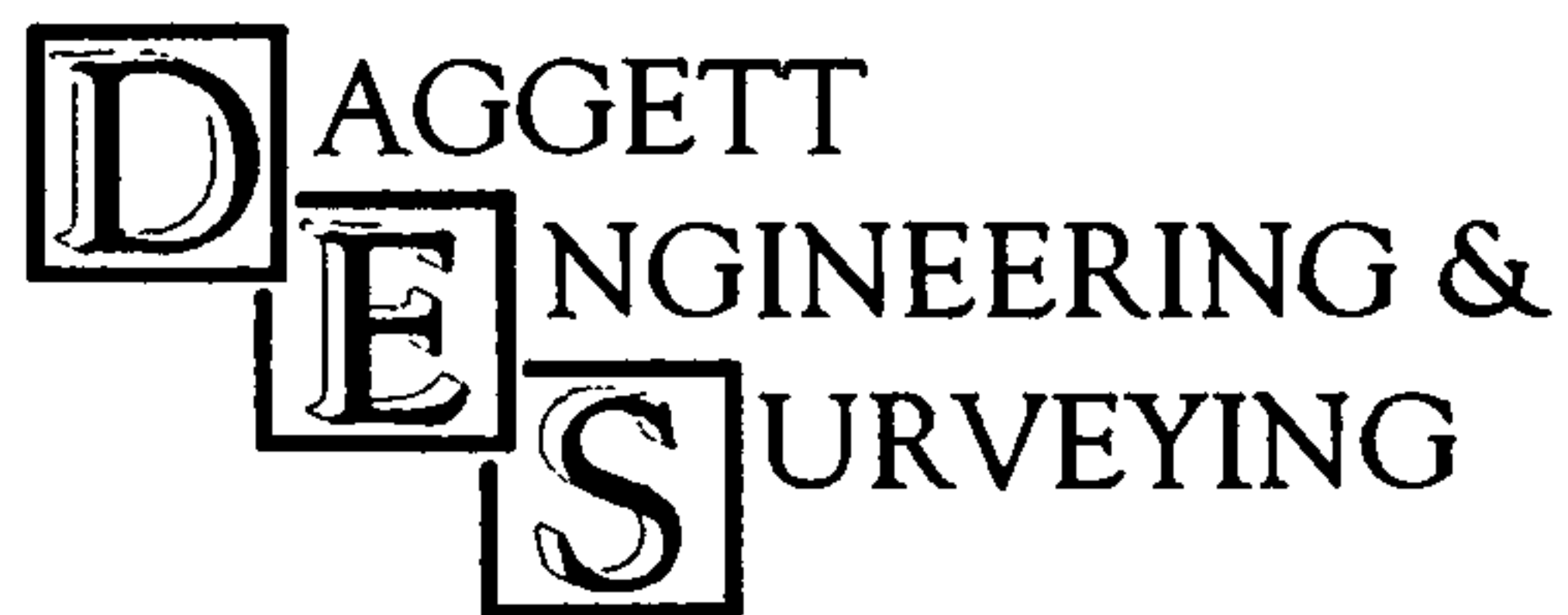
Fax #: _____

From: KEVIN DAGGETT

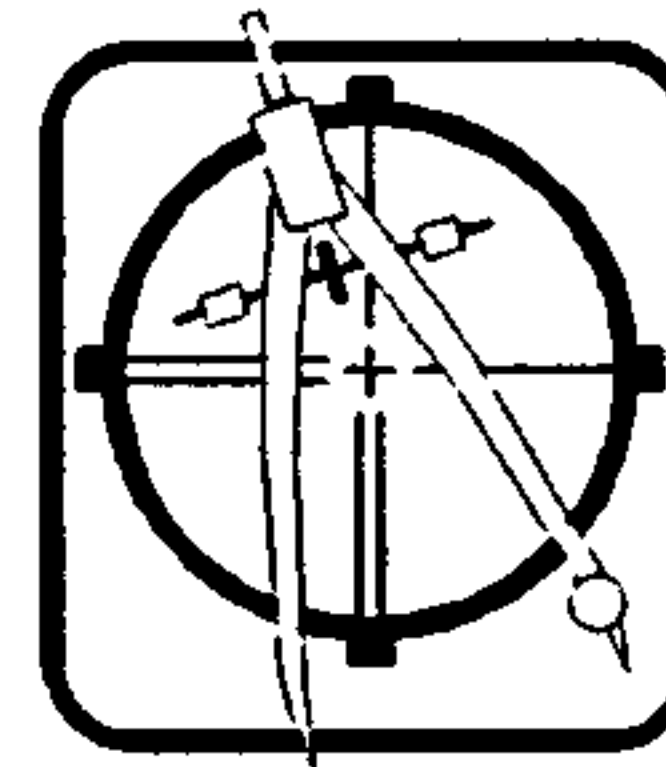
Subject: DESERT GARDENS SUBD.

Comments: ATTACHED PLEASE FIND THE GRADING
CERTIFICATION FOR THE ABOVE PROJECT.





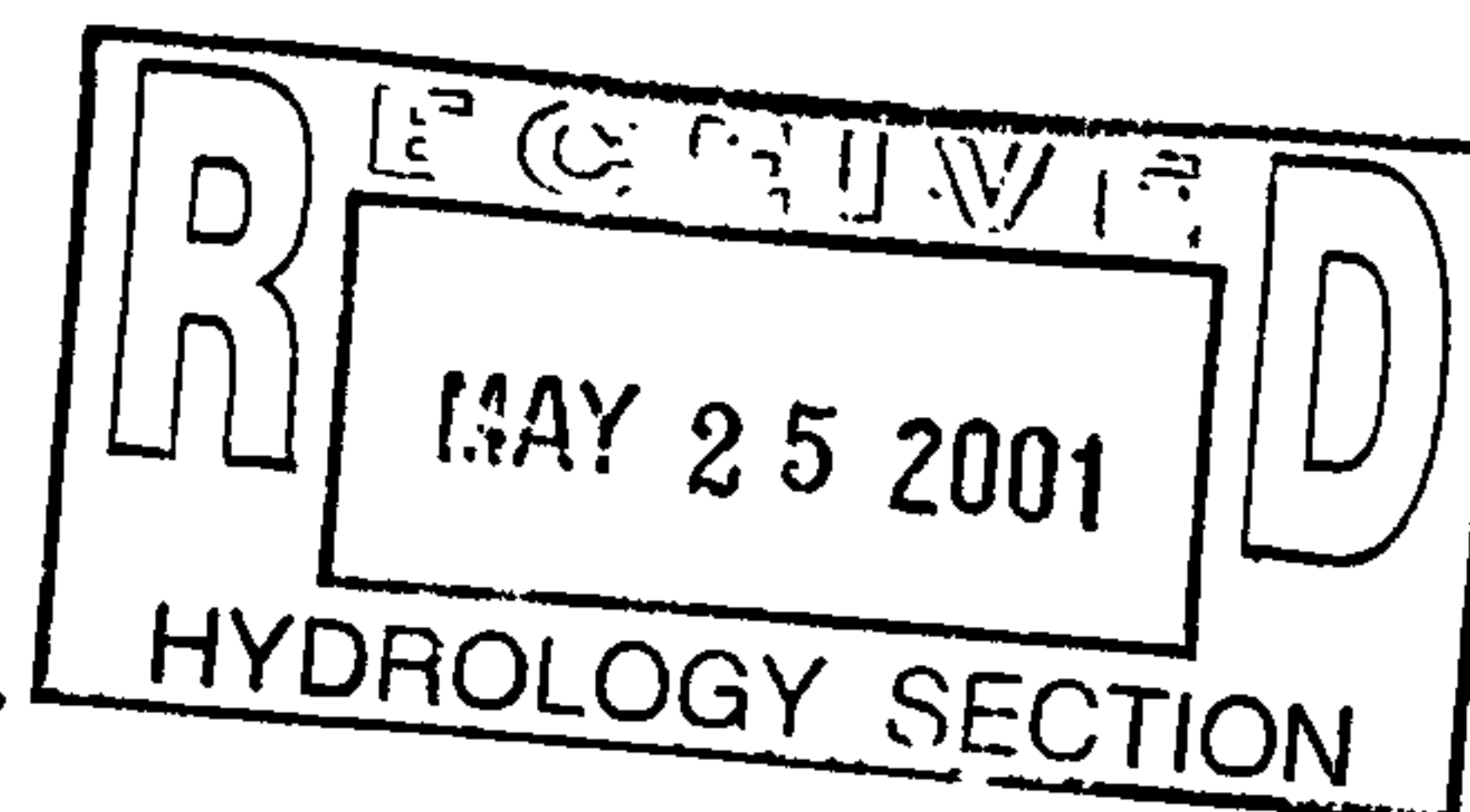
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(505) 352-1165 (Fax)

DRAINAGE REPORT
FOR
PROPOSED SINGLE FAMILY DETACHED
RESIDENTIAL DEVELOPMENT
ON
TRACTS 11 & 12
V.E. BARRETT SUBDIVISION

Prepared for
Brookside Holdings
919 Salamanca NW
Albuquerque, NM 87107



MAY 2001

DRAINAGE INFORMATION SHEET

PROJECT TITLE: TRACTS 11 & 12, VERABETT ZONE MAP/DRG. FILE #: L-10-Z
DRB #: _____ EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: ABOVE
CITY ADDRESS: _____

ENGINEERING FIRM: DAGGETT ENGINEERING & SURVEYING CONTACT: KEVIN DAGGETT
ADDRESS: 2125 CORTE DE CHAMISA, NW PHONE: 228-7821
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87120

OWNER: BROOKSIDE HOLDINGS CONTACT: NICK BELL
ADDRESS: 919 SALAMANCA, NW PHONE: 341-4324
CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87107

ARCHITECT: N/A CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: DAGGETT ENGINEERING & SURVEYING CONTACT: _____
ADDRESS: SIA ABOVE PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

CONTRACTOR: N/A CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

TYPE OF SUBMITTAL:

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

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☒ YES
- ☐ NO
- ☐ COPY PROVIDED

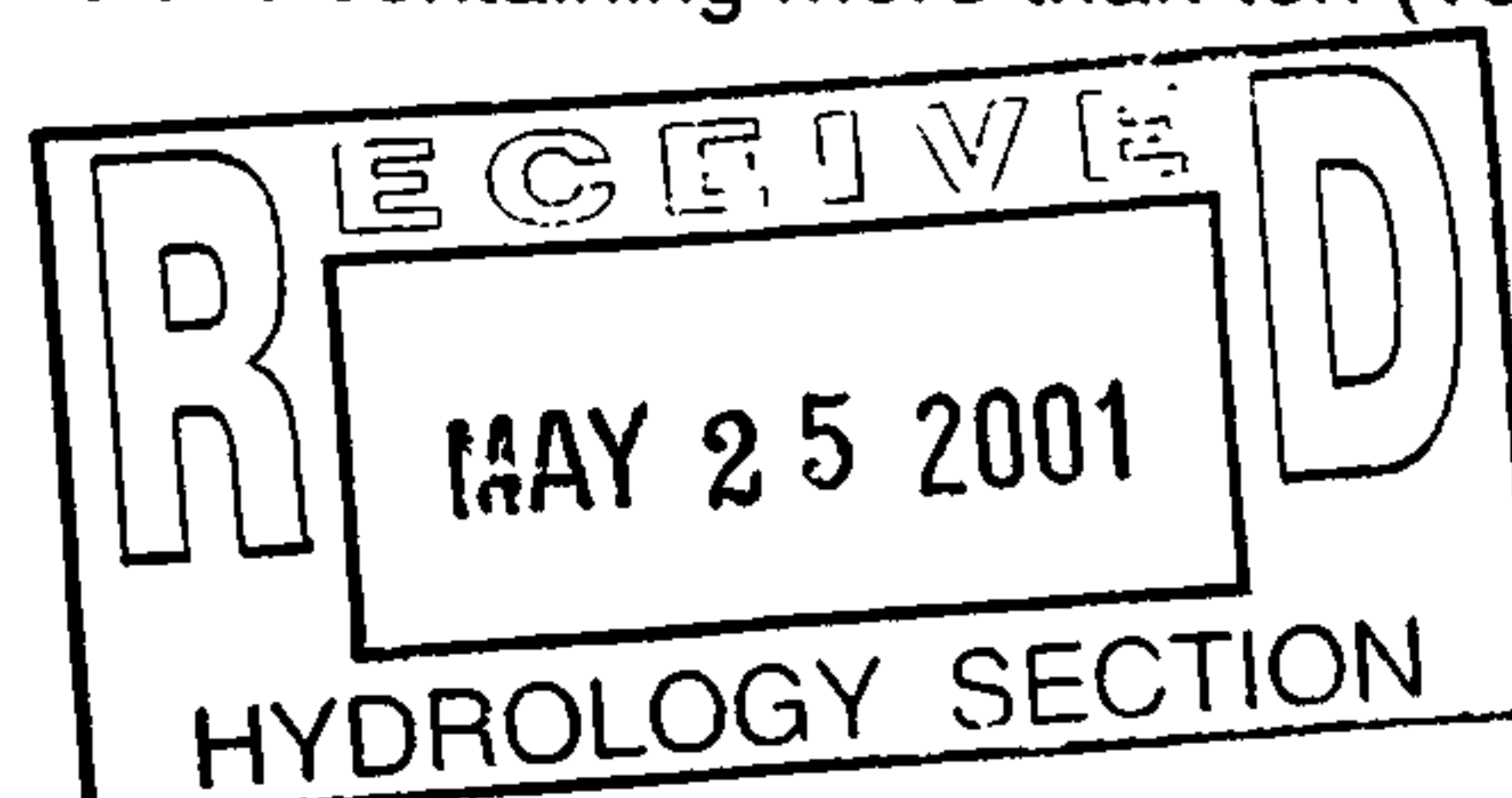
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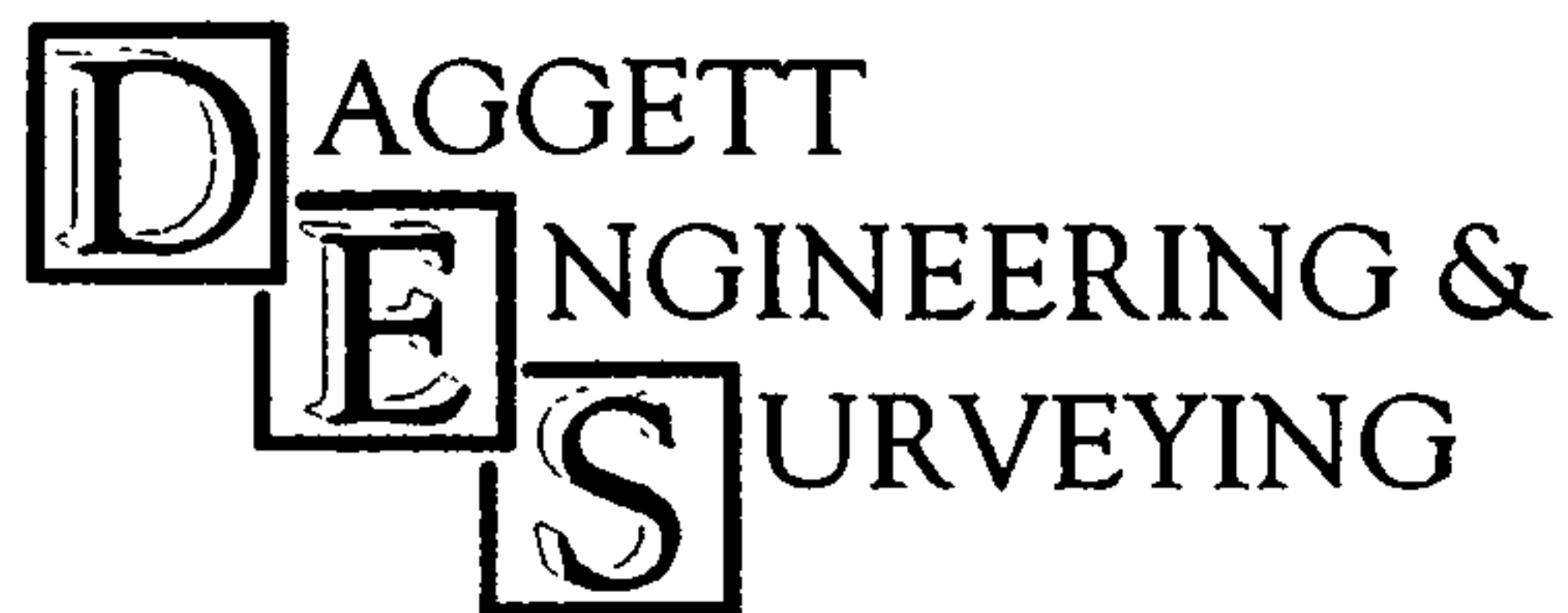
- ☐ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☒ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY)

DATE SUBMITTED: 5/24/01 BY: KEVIN DAGGETT

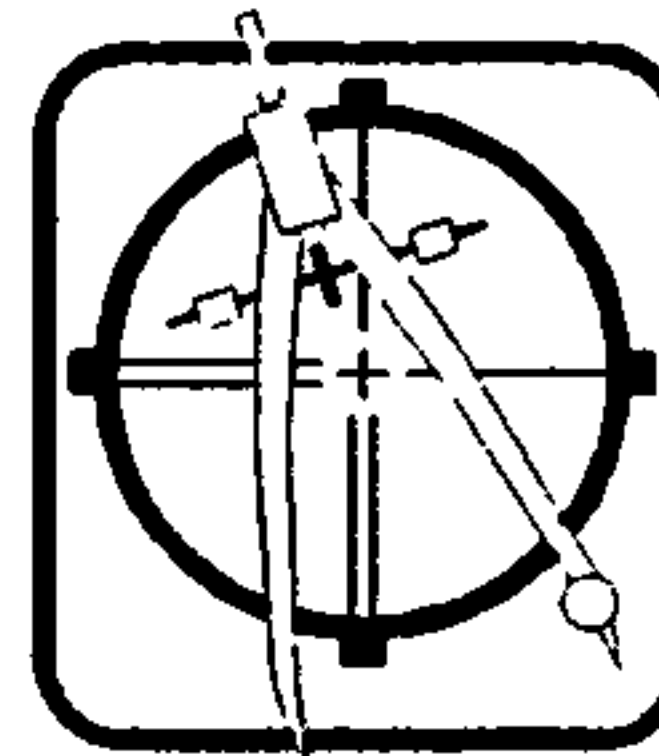
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1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.





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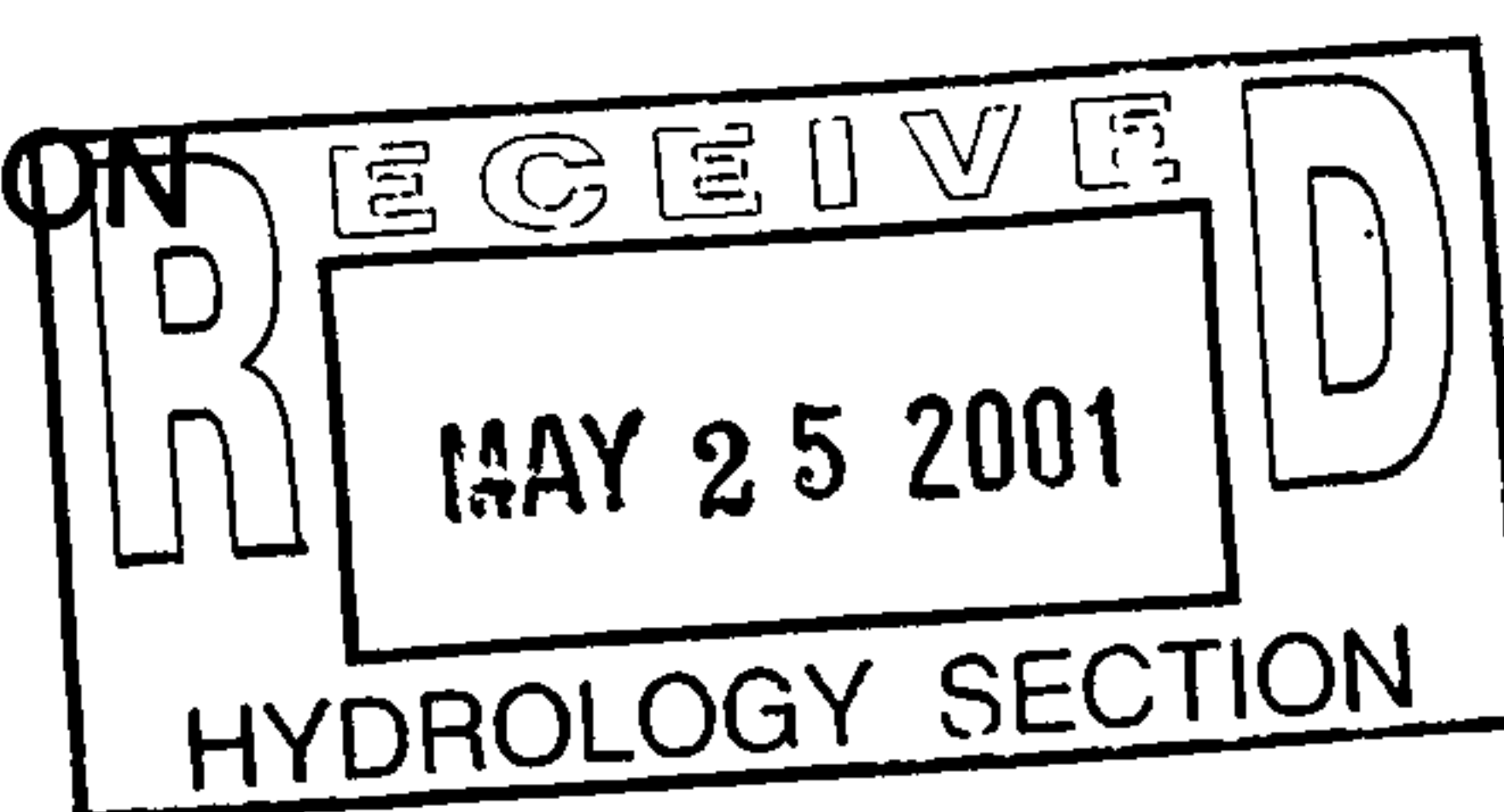
DRAINAGE REPORT

FOR

PROPOSED SINGLE FAMILY DETACHED
RESIDENTIAL DEVELOPMENT

ON

TRACTS 11 & 12
V.E. BARRETT SUBDIVISION



Prepared for

Brookside Holdings
919 Salamanca NW
Albuquerque, NM 87107

MAY 2001

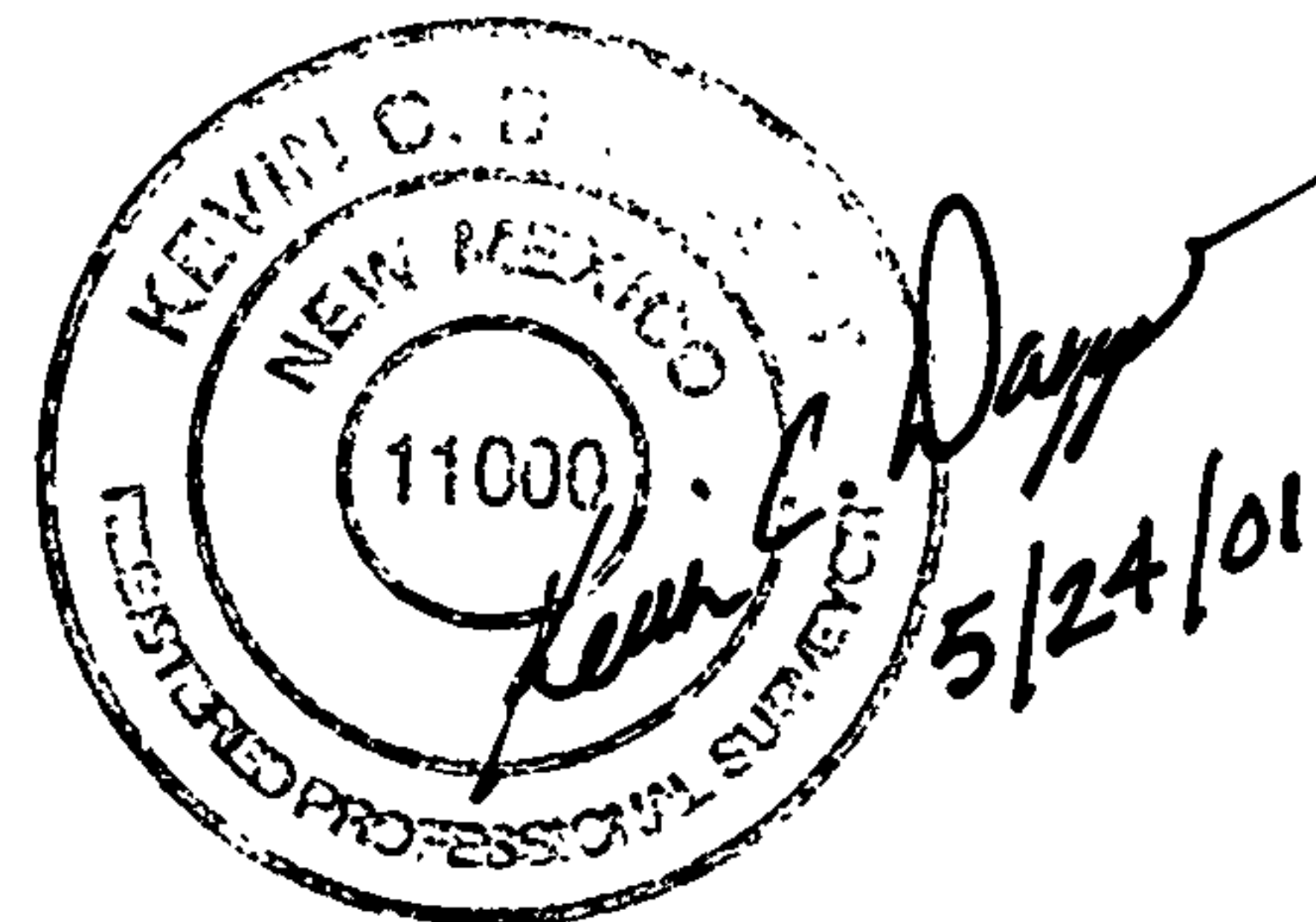


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City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 3, 2001

Mr. Kevin Daggett, P.E.
Daggett Engineering and Surveying
2125 Corte de Chamisa NW
Albuquerque, NM 87120

**Re: Grading and Drainage Plan Tracts 11 and 12, V.E. Barrett
Subdivision, (L10/D19), Engineer stamp dated 4/17/01.**

Dear Mr. Daggett,

The above referenced report has been reviewed, and the following comments will need to be addressed.

1. Please provide additional information on Bridge Blvd drainage. Show street slopes, cross-sections of developed condition, and address the off-site conditions to the west. Does any drainage from the west enter this section of Bridge Blvd, or is there sufficient inlet capacity to accept all drainage into the pipe? Bridge Blvd. drainage must address DPM standards for arterial classification.
2. Provide a drainage basin map in the report for offsite and on-site basins mentioned in the report.
3. Show proposed street flows on the grading plan for all streets.
4. Inlets on "D" street should be double grate, double throats per the information in the report.
5. The proposed overflow spillway will create a Tract for public maintenance. This needs to be discussed with staff, and may possibly be eliminated with grading plan, and adequate inlet capacities.
6. Flood zone treatment will have to be discussed with the Floodplain Administrator, Carlos Montoya.
7. The proposed 10" curb height at the sump condition is not City standard.

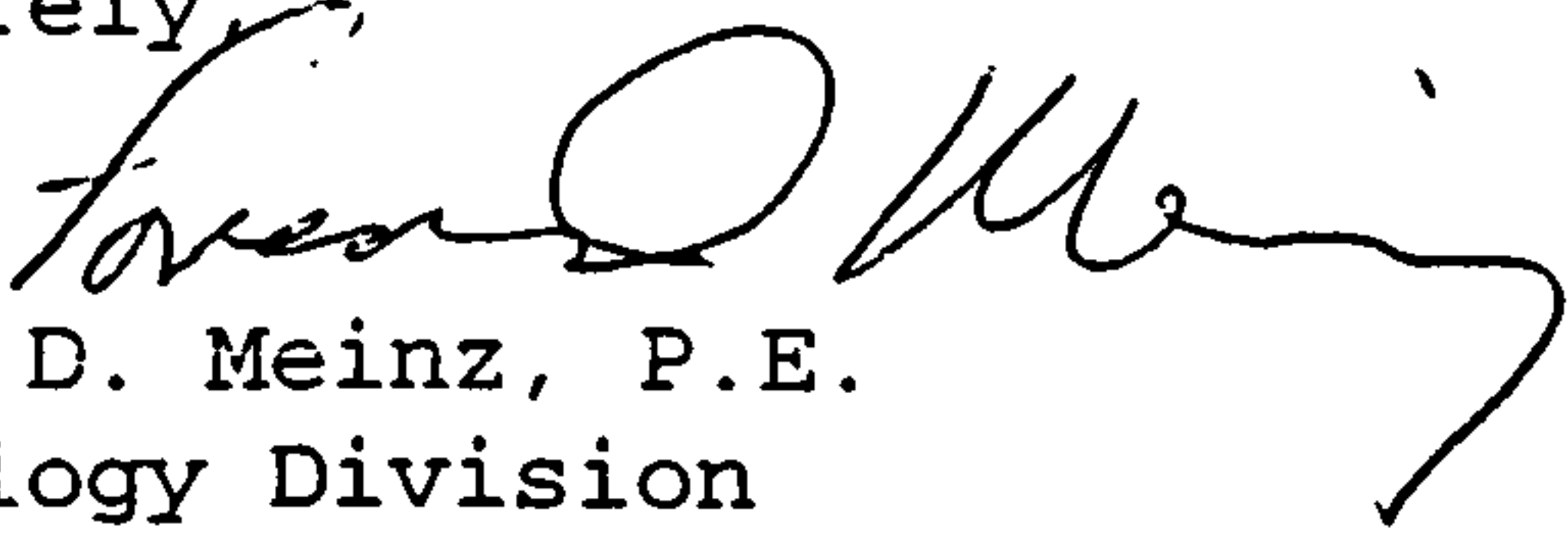
L10/D19

Page 2

I would be happy to meet with you to discuss some of the changes.

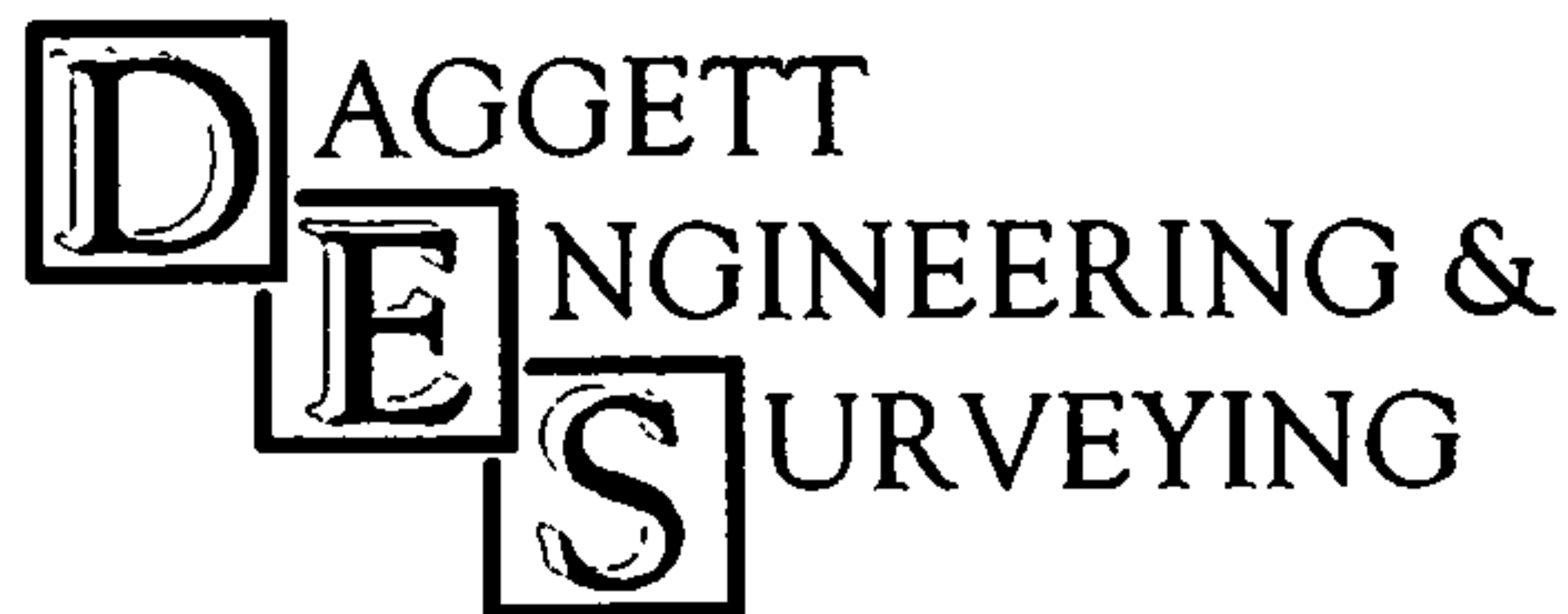
If you have any questions, please call me at 924-3980.

Sincerely,

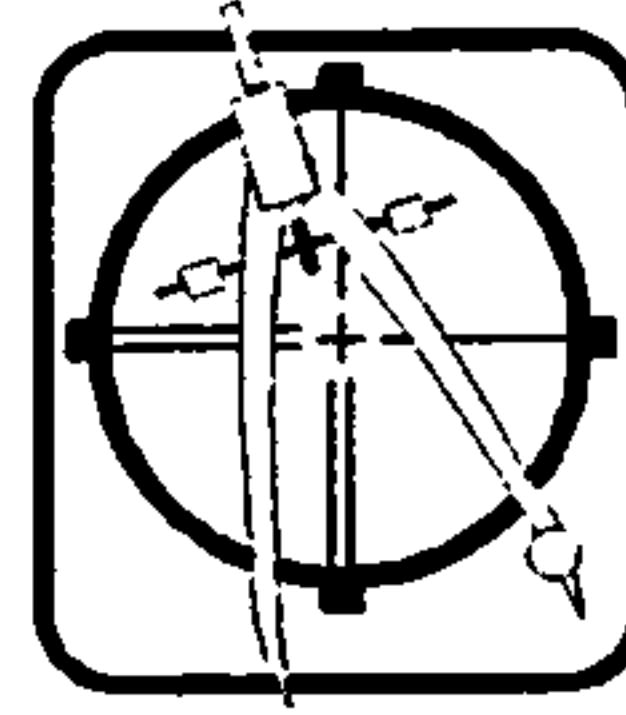

Loren D. Mainz, P.E.
Hydrology Division

c: Terri Martin
File

for 25 cfs, $d = 0.47'$
per Neenah.cak,



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Albuquerque, N.M. 87120
kcd@swcp.com (E-mail)



(505) 352-5279 (Office)
(505) 228-7821 (Mobile)
(505) 352-6779 (Fax)

May 24, 2001

Mr. Loren Meinz, P.E.
Hydrology Division
City of Albuquerque
Land Development Coordination Division
600 2nd Street NW

Re: Grading and Drainage Plan Tracts 11 and 12, V.E. Barrett Subdivision, (L10/D9)
Hydrology Comments from original submittal dated 4/17/01.

Dear Mr. Meinz:

The comments identified in your letter of May 3, 2001 have been addressed as per discussions during our meeting on Monday, May 21, 2001.

1. Please find calculations for the flow depth in Bridge Boulevard for the 10-year storm. The 100-year street flow is published as 74 c.f.s. (Sheet 4 of 11, C.O.A. Project #4076.93). Using methodology from Chapter 22 of the D.P.M., the 10-year flow is calculated as 49.36 c.f.s. The 10-year flow depth has been calculated at 0.58' for the proposed 60' f-f street cross section.
2. The divide between the two on-site basins is now shown on the revised Grading Plan.
3. Proposed street flows have been added to the Grading Plan.
4. Inlets on street "D" have been revised. The original two sump inlets (Type A, double grate) are now double throated. As per our discussion, two additional inlets have been added in the sump area (Type A, single grate, single throat). The addition of these inlets now produces a factor of safety of 1.58.
5. As per our conversation, the overflow spillway will remain as public right-of-way since it will also serve to provide pedestrian connectivity to the Unser Boulevard corridor.

6. During our discussion, it was decided that the proposed treatments for the flood zone were appropriate given the existing storm drain in Bridge Boulevard. These treatments included elevating the pads 1' above the flood profile surface and providing a water block on the street entrance to the subdivision.
7. The proposed 10" curb in the on-site sump has been eliminated by the addition of the two new inlets discussed in item 4 above.

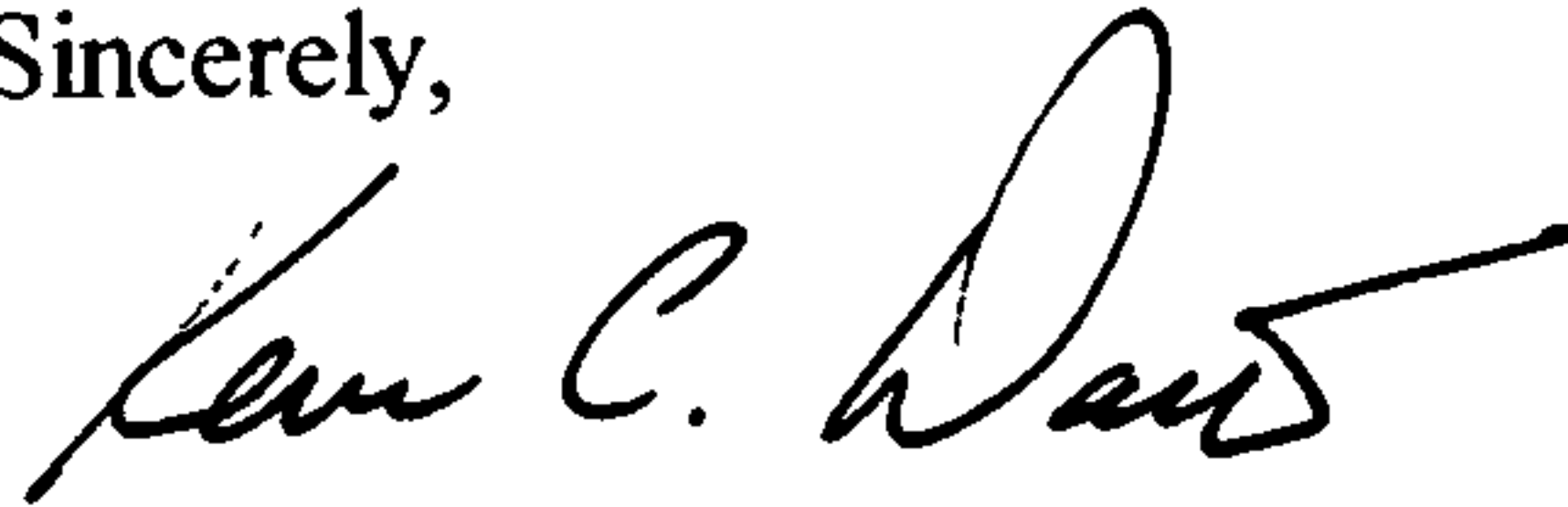
In addition, you asked that the profiles for adjoining streets be included in the report. The report now contains the paving profile sheets for 82nd Street (Project #5226.90) and Sunset Gardens Road (Project #5929.81) as well as the above referenced storm drain profile sheet (Project #4076.93).

Please note that on-site street names have been added to the Preliminary Plat and Grading Plan for this revised submittal. They are as follows:

Street A	=	Blue Spurge Street
Street B	=	Barberry Street
Street C	=	Greythorn Road
Street D	=	Whitethorn Street
Street E	=	Scottish Broom Road
Street F	=	Bristlebrush Street
Street G	=	Bluethorn Court

If you have any further questions or comments, please feel free to call me at 228-7821.

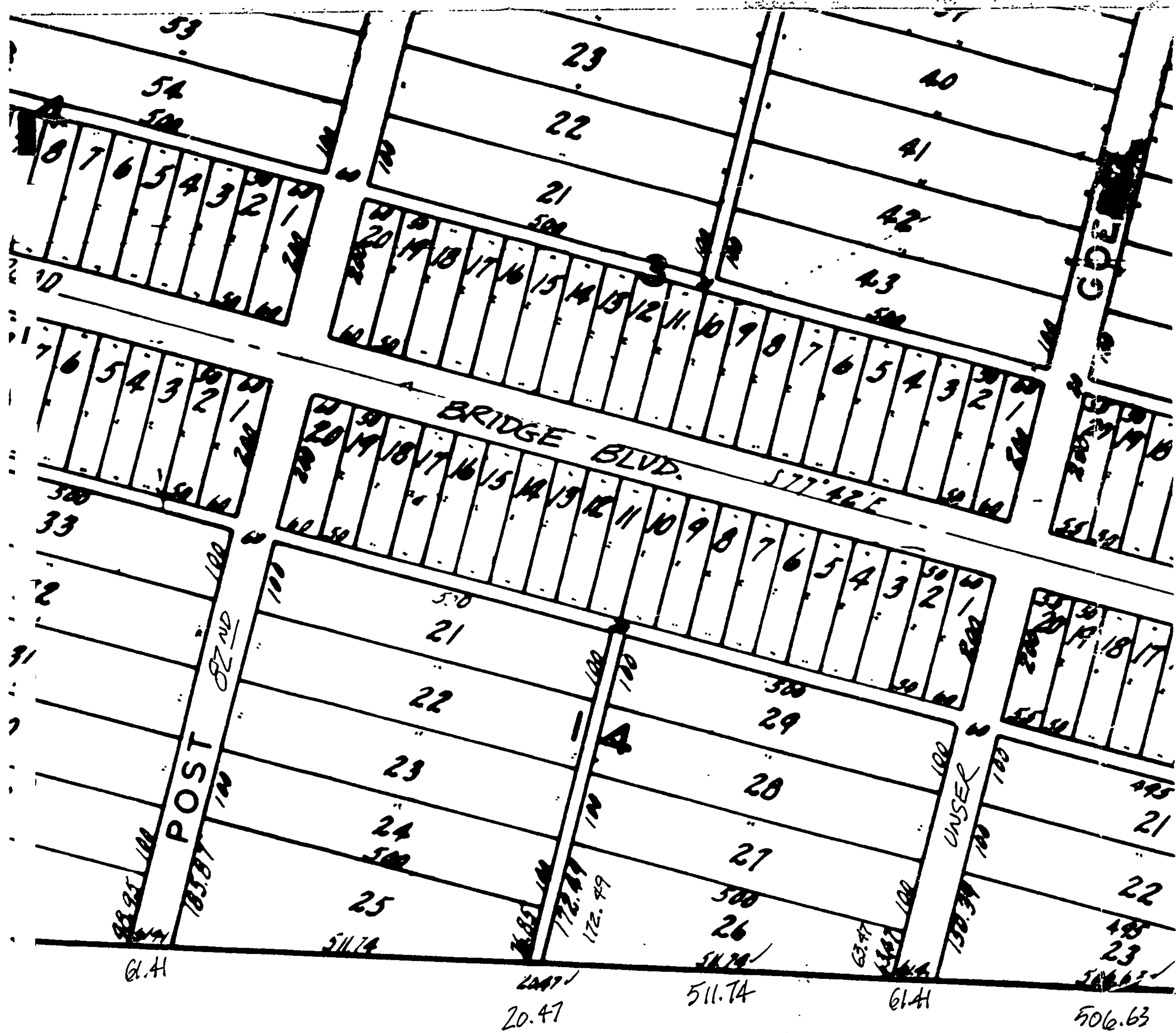
Sincerely,



Kevin C. Daggett, P.E., P.S.

Proprietor

Daggett Engineering & Surveying



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

**BERNALILLO COUNTY,
NEW MEXICO AND
INCORPORATED AREAS**

PANEL 328 OF 825

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS
COMMUNITY

NUMBER PANEL SUFFIX

ALBUQUERQUE, CITY OF
BERNALILLO COUNTY
UNINCORPORATED AREAS

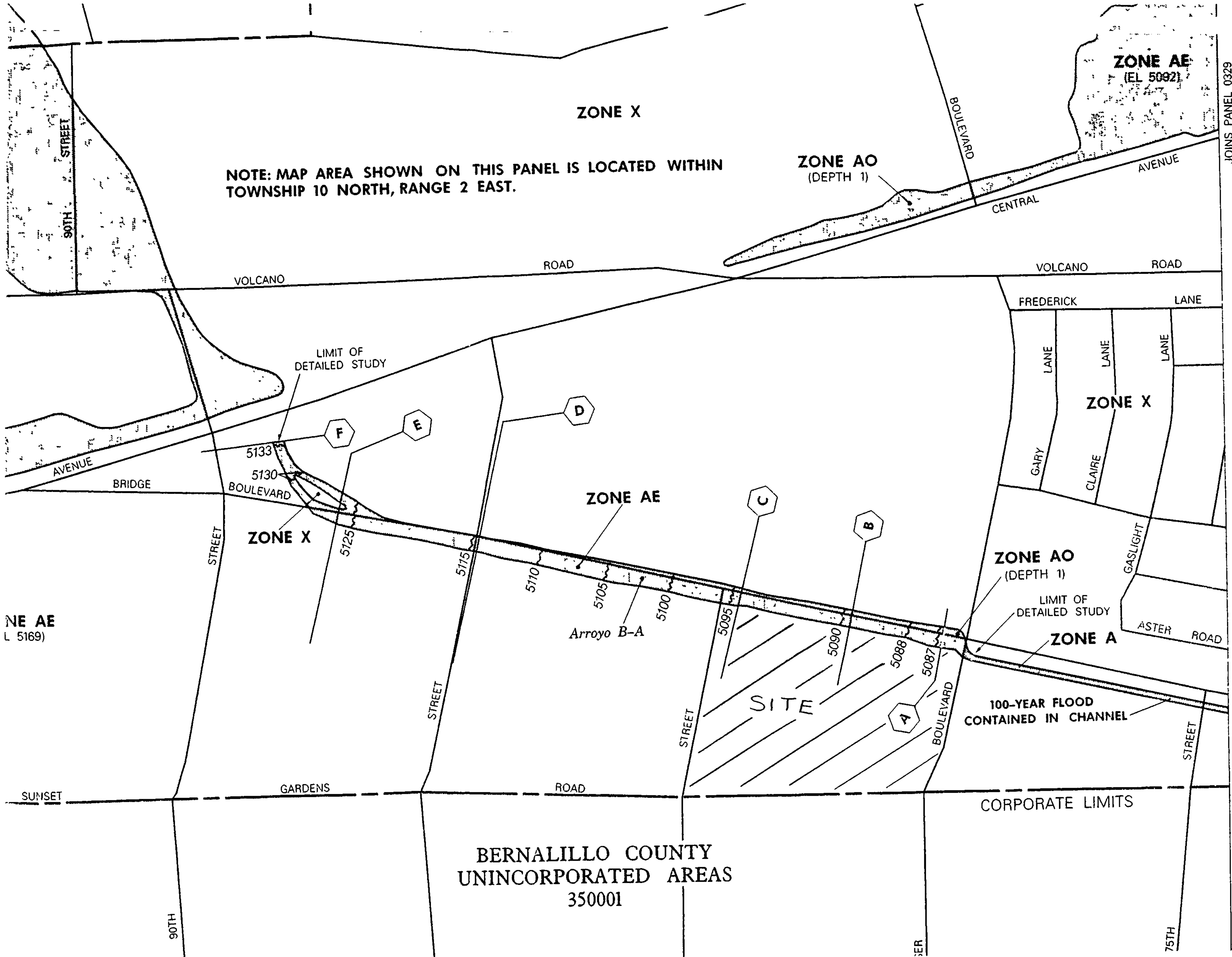
350002	0328	D
350001	0328	D

**MAP NUMBER
35001C0328 D**

**EFFECTIVE DATE:
SEPTEMBER 20, 1996**



Federal Emergency Management Agency



PURPOSE

The purpose of this report is to present the Drainage Management and Grading Plan for Final Plat and Work Order approvals for Tracts 11 & 12 of the V.E. Barrett Subdivision and portions of Bridge Boulevard, S.W. and Unser Boulevard, S.W., within the City of Albuquerque. The Zoning for Tracts 11 and 12 is currently being changed from O-1 to RT.

EXISTING CONDITIONS

- The undeveloped site is located on the southwest mesa (Zone Atlas L-10-Z) between Bridge Boulevard and Sunset Gardens Road (north to south) and Unser Boulevard and 82nd Street (east to west).
- Total area of the site is 15.6997 acres. After proposed street dedication (Unser) and vacation (Bridge) the area will be 15.6078 acres. A landscape buffer of 6' is being provided along the Unser and Bridge frontages (principal arterial and collector respectively) as required by the West Route 66 Sector Development Plan. This buffer will not drain internally to the subdivision, therefore the on-site hydrologic basin for the development has an area of 15.6230 acres.
- The site is surrounded on three sides by recently constructed residential developments: Encanto Village, Unit 1 on the east, Bridgepoint Apartments on the west and Whispering Pointe, Unit 1 on the south. The latter two developments have built paving and utility improvements in Sunset Gardens Road and 82nd Street. Unser Boulevard street improvements have not yet been constructed by Encanto Village, Unit 1.
- A 100-year floodplain is mapped in Bridge Boulevard along the north side of the site. The AE Zone is depicted on Bernalillo County FIRM Panel 328 of 825, Map Number 35001C0328 D. An existing earthen berm along the north property line of the site contains the flood zone within the existing right-of-way of Bridge Boulevard. For this development, proposed pad elevations along Bridge Boulevard have been set at one (1) foot above the 100 year water surface elevations as published on the FIRM.
- The floodplain "water" has been physically removed by recently constructed drainage improvements associated with the "Amole Del Norte Storm Diversion Facilities Project". These include of a 96" storm drain and inlets in Bridge Boulevard and detention ponds upstream near 98th Street and Central Avenue (Amole Del Norte, Phase IIID, COA Project #4076.93 & Phase IIIC, COA Project #4076.92).
- A 72" storm drain exists along the south and east sides of the project. This storm drain is part of the Amole Del Norte Storm Diversion Facilities and is termed the Sunset Gardens/Unser Boulevard Storm Drain (COA Project #5226.92).
- Off-site flows do not impact this site. Runoff from the north-northwest is currently mitigated by a combination of temporary and permanent drainage improvements in the Bridge Boulevard right-of-way. These include the above referenced 96" storm drain and berm, the asphalt-paved swale on the north side of the berm (built by the Bridgepoint Apartments Development, COA Project #5226.90) and the five large inlet structures located between 82nd Street and Unser Boulevard (COA Project #4076.93). Runoff from the west-southwest is currently mitigated by the above referenced 72" storm drain.

PROPOSED MANAGEMENT PLAN

Tracts 11 and 12 of the V.E. Barrett Subdivision will ultimately be developed into 105 single-family detached residential lots (6.73 DU/Ac.). On-site storm runoff will be conveyed by surface flow in streets to inlets located on the eastern and northeastern side of the project. Flow collected by these inlets will discharge to both the Bridge and Sunset Gardens/Unser ("SG/Unser") storm drains.

Per the "Final Design Report, Amole Del Norte Storm Diversion Facilities, Tierra Bayita Drainage Facilities, Phase III, COA Project #4076.93, Dated March 1998, by URS Greiner, Inc., the north 200' of tract 11 drains to the Bridge Storm Drain ("Basin 21-D" in the report) while the remainder of Tracts 11 and 12 drain to the SG/Unser Storm Drain ("Basin Y" in the report). This assumption in the model may go back to the "Original Townsite of Westland" plat on which both sides of Bridge are platted with 50' by 200' commercial lots (see attached copy of plat). In the report, "Basin 21-D" produces a peak discharge of 24.83 c.f.s. from 6.46 acres which includes 82nd north of the water block and the south half of Bridge between 82nd and Unser. "Basin Y" produces a peak discharge of 52.58 c.f.s. from 12.51 acres which includes all of Unser between Sunset Gardens and Bridge. Land treatments for the two basins are identical: D=70%, C=5% and B=25%. The high percentage of impervious area is appropriate given the O-1 (office) zoning and the mix with adjoining streets.

Under this plan, the site will conform to the Greiner report producing peak discharges under those referenced above. The peak discharge to the Bridge Storm Drain from this project will be 18.51 c.f.s. which is less than the 24.83 c.f.s. allowable (8.51 c.f.s. from offsite Basin S-B-1 and 10.0 c.f.s. intercepted by onsite inlets). The peak discharge to the SG/Unser Storm Drain from this project will be 51.76 c.f.s. which is less than the 52.58 c.f.s. allowable (44.07 c.f.s. from onsite inlets and 7.70 c.f.s. from offsite Unser basins E-U-2 and W-U-2. Refer to Ahymo files in Appendix A.

Hydraulic grade line analysis was performed using "Storm Plus, County of Los Angeles" and verified using standard COA DPM methodology in spreadsheet form. Refer to Appendix B for the results of the HGL analysis.

Inlets for this project are planned in the following locations:

1. 2 - Type A, double grated, double throated inlets at the onsite sump in Whitethorn Street.
2. 2 - Type A, single grated, single throated inlets at the onsite sump in Whitethorn Street.
3. 1 - Type A, double grated, double throated inlet at the offsite sump in Unser Boulevard.
4. 1 - Type C, double grated inlet as a replacement for the existing inlet adjacent to the site on the south side of Bridge Boulevard just west of Unser Boulevard.
5. 1 - Type A, double grated, single throated inlet in Bridge Boulevard.
6. 2 - Type A, double grated, single throated inlets in Scottish Broom Road.

Calculations are as follows:

Easterling & Associates, Inc.

• CONSULTING ENGINEERS •

Project Name TRACTS 11 & 12
Project No. _____ Date 4/3/01
Subject HYDROLOGY CALCULATIONS
By KEVIN DASSETT Sheet 1 of _____

LAND TREATMENTS:

ON-SITE AREA = 15.6997 AC.

- SUBTRACT 6' BUFFER ALONG UNDER & BRIDGE

$$15.6997 - 0.0767 = \underline{15.6230 \text{ AC. TOTAL AREA}}$$

- CALC. IMPERVIOUS AREA FOR LOTS

$$\# \text{ PADS} \times (\text{DRIVEWAY AREA} + \text{PAD AREA}) =$$

$$105 (17 \times 20' + 35 \times 65') / 43560 = 6.3034 \text{ AC.}$$

- CALC. IMPERVIOUS AREA FOR STREETS (46' R/W)

$$\text{AREA OF STREETS (FROM AVTODAD)} = 3.5247 \text{ AC.}$$

$$\% \text{ D IN X-SECTION} = [28 + 2(.625) + 2(1)] / 46' = 80.98\%$$

- CALC. TOTAL IMPERVIOUS AREA

$$6.3034 + .81(3.5247) = 9.1584 \text{ AC}$$

- CALC. % IMPERVIOUS ON-SITE

$$9.1584 / 15.6230 = 58.62\% \approx \underline{59\%}$$

- ASSUME ON-SITE LAND TREATMENTS AS FOLLOWS:

$$A = 0$$

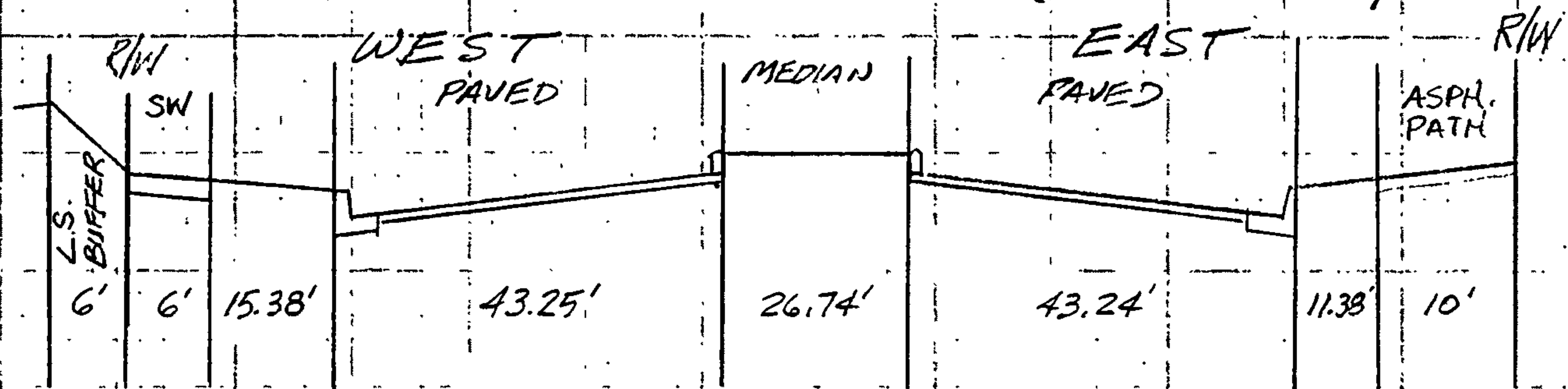
$$B = 41$$

$$C = 0$$

$$D = 59$$

LAND TREATMENTS (CONTINUED)

- CALC. LAND TREATMENT FOR UNDER (EASINS W-U-2 & E-U-2)



WEST HALF (W-U-2)

$$\text{FIND \% B: } (6 + 15.38 + \frac{26.74}{2}) / (78 + 6) = 0.41 \Rightarrow 41\%$$

$$\text{FIND \% D: } (6 + 43.25) / (78 + 6) = 0.59 \Rightarrow 59\%$$

EAST HALF (E-U-2)

$$\text{FIND \% B: } (11.38 + \frac{26.74}{2}) / 78 \approx 0.32 \Rightarrow 32\%$$

$$\text{FIND \% D: } (43.24 + 10) / 78 \approx 0.63 \Rightarrow 63\%$$

- CALC. AREAS AREA OF UNDER EASIN = 2.148 AC. (AUTOCAD)

$$\text{WEST HALF } A = (78 + 6) / (15.38 + 6) \times 2.148 = 1.1138 \text{ AC.}$$

$$\text{EAST HALF } A = 78 / (15.38 + 6) \times 2.148 = 1.0342 \text{ AC.}$$

- CALC LAND TREATMENTS FOR BRIDGE & 82ND (EASIN S-B-1)

$$\text{82ND: } \%D = \frac{40' + .625 \times 2 + 4' \times 2}{60'} = 0.82$$

$$\text{BRIDGE: } \%D = \frac{60' + .625 \times 2 + 6' \times 2}{80 + 6 + 6} = 0.80$$

LS
BUFFER

$$\text{COMBINED } \%D = \frac{0.82(0.7989 \text{ AC}) + 0.80(1.3333 \text{ AC})}{2.1327 \text{ AC}} = 0.81$$

$$D = 81\% \quad B = 19\%$$

CALCULATE MOUNTABLE TO STANDARD CURB TRANSITION LOCATIONS ON A Q_p/LOT BASIS:

$$\left. \begin{array}{l} Q_{p100} = 54.07 \text{ CFS} \\ \# \text{ LOTS} = 105 \end{array} \right\} 54.07/105 = 0.52 \text{ CFS/LOT}$$

- DETERMINE THE # OF LOTS BEFORE TRANSITION FOR STREET E

$$\text{SLOPE ST. E} = 1.01\%$$

* CAPACITY FROM LOOK UP TABLE ON FOLLOW PAGE = 12.45 CFS @ 1.01%

$$\therefore 12.45/0.52 = 23.94 \approx 24 \text{ LOTS} \quad \text{Barbervy}$$

ANS. { COUNTING LOTS FROM DIVIDE IN STREET & THE
 TRANSITION SHOULD OCCUR AT THE INTERSECTION
 WITH STREET A.

- DETERMINE THE # OF LOTS TO TRANSITION FOR STREET C

$$\text{SLOPE ST. C} = 0.71\%$$

* FROM LOOK UP TABLE $Q_{cap} = 10.41 \text{ CFS @ } 0.71\%$

$$\therefore 10.41/0.52 = 20 \text{ LOTS}$$

ANS. { COUNTING FROM DIVIDE TRANSITION OCCURS AT
 THE WEST P.C. OF STREET C.

CHECK STREET CAPACITY WITH STANDARD CURB ON BOTH SIDES OF THE ON-SITE SUMP.

$$\text{NORTH SIDE: } 38 \text{ LOTS} \times 0.52 = 19.57 \text{ CFS @ } 1.01\% \text{ SLOPE}$$

$$19.57 \text{ CFS} - 10.0 = 9.57 \text{ CFS}$$

* FROM STD. CURB LOOK UP TABLE $Q_{cap} = 43.54 \text{ CFS} \checkmark \text{ OK}$

$$\text{SOUTH SIDE: } 67 \text{ LOT} \times 0.52 = 34.50 \text{ CFS @ } 0.71\% \text{ SLOPE}$$

* FROM LOOK UP TABLE $Q_{cap} = 45.22 \text{ CFS} \checkmark \text{ OK}$

* LOOK UP TABLES FOR MOUNTABLE & STANDARD CURB CAPACITIES AT VARIOUS SLOPES USE AUTOCAD DERIVED CROSS SECTIONAL GEOMETRIC DATA.

HYDRAULIC STREET CAPACITIES AT VARIOUS SLOPES
28' F-F IN 46' R.O.W.

MOUNTABLE CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017
g = 32.2
EGLmax = 0.50 COA ALLOWABLE

S	EGL	Q	V	F	Vhead	HGL	A	WP	TW	R	D
[ft. / ft.]	[ft.]	[CFS]	[FPS]		[ft.]	[ft.]	[SF]	[ft.]	[ft.]	[ft.]	[ft.]
0.005	0.39	8.80	1.84	0.80	0.05	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.006	0.40	9.64	2.02	0.88	0.06	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.007	0.41	10.41	2.18	0.95	0.07	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.008	0.42	11.13	2.33	1.02	0.08	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.009	0.43	11.81	2.47	1.08	0.09	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.010	0.44	12.45	2.61	1.14	0.11	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.011	0.45	13.05	2.73	1.19	0.12	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.012	0.46	13.63	2.85	1.24	0.13	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.013	0.47	14.19	2.97	1.30	0.14	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.014	0.48	14.73	3.08	1.34	0.15	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.015	0.49	15.24	3.19	1.39	0.16	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.016	0.50	15.74	3.30	1.44	0.17	0.3333	4.7766	29.3507	29.2500	0.1627	0.1633
0.017	0.49	14.75	3.29	1.47	0.17	0.3233	4.4867	28.9498	28.8498	0.1550	0.1555
0.018	0.50	15.18	3.38	1.51	0.18	0.3233	4.4867	28.9498	28.8498	0.1550	0.1555
0.019	0.49	14.02	3.34	1.54	0.17	0.3133	4.1991	28.7838	28.6850	0.1459	0.1464
0.020	0.50	14.39	3.43	1.58	0.18	0.3133	4.1991	28.7838	28.6850	0.1459	0.1464
0.021	0.48	13.14	3.36	1.61	0.18	0.3033	3.9129	28.6563	28.9591	0.1365	0.1351
0.022	0.49	13.45	3.44	1.65	0.18	0.3033	3.9129	28.6563	28.9591	0.1365	0.1351
0.023	0.50	13.75	3.52	1.69	0.19	0.3033	3.9129	28.6563	28.9591	0.1365	0.1351
0.024	0.50	14.05	3.59	1.72	0.20	0.3033	3.9129	28.6563	28.9591	0.1365	0.1351
0.025	0.49	12.98	3.57	1.73	0.20	0.2933	3.6320	27.6304	27.5352	0.1314	0.1319
0.026	0.50	13.23	3.64	1.77	0.21	0.2933	3.6320	27.6304	27.5352	0.1314	0.1319
0.027	0.49	12.18	3.62	1.79	0.20	0.2833	3.3622	26.5352	26.4424	0.1267	0.1272
0.028	0.49	12.41	3.69	1.82	0.21	0.2833	3.3622	26.5352	26.4424	0.1267	0.1272
0.029	0.50	12.63	3.76	1.86	0.22	0.2833	3.3622	26.5352	26.4424	0.1267	0.1272
0.030	0.49	11.55	3.72	1.88	0.22	0.2733	3.1032	25.4492	25.3590	0.1219	0.1224

HYDRAULIC STREET CAPACITIES AT VARIOUS SLOPES

28' F-F IN 46' R.O.W.

STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

n = 0.017
g = 32.2
EGLmax = 0.85 COA ALLOWABLE

S	EGL	Q	V	F	Vhead	HGL	A	WP	TW	R	D
[ft / ft.]	[ft.]	[CFS]	[FPS]		[ft.]	[ft.]	[SF]	[ft.]	[ft.]	[ft.]	[ft.]
0.005	0.85	44.54	3.52	0.93	0.19	0.6604	12.6442	29.3860	28.4309	0.4303	0.4447
0.006	0.86	45.31	3.75	1.01	0.22	0.6404	12.0769	29.2831	28.3393	0.4124	0.4262
0.007	0.86	45.22	3.93	1.09	0.24	0.6204	11.5104	29.2357	28.3143	0.3937	0.4065
0.008	0.86	44.49	4.06	1.15	0.26	0.6004	10.9442	29.1942	28.3033	0.3749	0.3867
0.009	0.85	43.23	4.17	1.21	0.27	0.5804	10.3782	29.1530	28.2933	0.3560	0.3668
0.010	0.86	43.54	4.31	1.27	0.29	0.5704	10.0953	29.1324	28.2883	0.3465	0.3569
0.011	0.85	41.52	4.36	1.32	0.29	0.5504	9.5296	29.0911	28.2783	0.3276	0.3370
0.012	0.85	41.26	4.46	1.37	0.31	0.5404	9.2469	29.0705	28.2733	0.3181	0.3271
0.013	0.85	40.80	4.55	1.42	0.32	0.5304	8.9642	29.0499	28.2683	0.3086	0.3171
0.014	0.85	40.15	4.63	1.47	0.33	0.5204	8.6815	29.0293	28.2633	0.2991	0.3072
0.015	0.85	39.35	4.69	1.51	0.34	0.5104	8.3989	29.0087	28.2583	0.2895	0.2972
0.016	0.85	38.41	4.73	1.56	0.35	0.5004	8.1163	28.9880	28.2533	0.2800	0.2873
0.017	0.84	37.34	4.77	1.59	0.35	0.4904	7.8338	28.9674	28.2483	0.2704	0.2773
0.018	0.86	38.42	4.90	1.64	0.37	0.4904	7.8338	28.9674	28.2483	0.2704	0.2773
0.019	0.86	37.15	4.92	1.68	0.38	0.4804	7.5514	28.9468	28.2433	0.2609	0.2674
0.020	0.85	35.78	4.92	1.71	0.38	0.4704	7.2690	28.9262	28.2383	0.2513	0.2574
0.021	0.84	34.34	4.92	1.74	0.38	0.4604	6.9866	28.9056	28.2333	0.2417	0.2475
0.022	0.85	35.15	5.03	1.78	0.39	0.4604	6.9866	28.9056	28.2333	0.2417	0.2475
0.023	0.84	33.57	5.01	1.81	0.39	0.4504	6.7043	28.8850	28.2283	0.2321	0.2375
0.024	0.86	34.29	5.11	1.85	0.41	0.4504	6.7043	28.8850	28.2283	0.2321	0.2375
0.025	0.84	32.59	5.07	1.87	0.40	0.4404	6.4220	28.8643	28.2233	0.2225	0.2275
0.026	0.86	33.24	5.18	1.91	0.42	0.4404	6.4220	28.8643	28.2233	0.2225	0.2275
0.027	0.84	31.44	5.12	1.93	0.41	0.4304	6.1398	28.8437	28.2183	0.2129	0.2176
0.028	0.85	32.02	5.21	1.97	0.42	0.4304	6.1398	28.8437	28.2183	0.2129	0.2176
0.029	0.87	32.58	5.31	2.00	0.44	0.4304	6.1398	28.8437	28.2183	0.2129	0.2176
0.030	0.85	30.66	5.23	2.02	0.43	0.4204	5.8577	28.8231	28.2133	0.2032	0.2076

POOL DEPTH AT STREET INTERSECTIONS
 28' F-F IN 46' R.O.W.
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017
 g = 32.2
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: **STREET C & F**

OF LOTS= 35.00
 Q/LOT= 0.51
 Q = 18.02

S [ft. / ft.]	EGL [ft.]	Q [CFS]	V [FPS]	F	Vhead [ft.]	HGL [ft.]	A [SF]	WP [ft.]	TW [ft.]	R [ft.]	D [ft.]
0.005	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.006	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.007	0.57	18.52	2.76	1.00	0.12	0.4504	6.7043	28.8850	28.2283	0.2321	0.2375
0.008	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.009	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!

0.57' < 0.85' OK

POOL DEPTH AT STREET INTERSECTIONS
 28' F-F IN 46' R.O.W.
MOUNTABLE CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017
 g = 32.2
 EGLmax = 0.50 COA ALLOWABLE

INTERSECTION: STREET E & F

OF LOTS= 18.00
 Q/LOT= 0.51
 Q = 9.27

S [ft. / ft.]	EGL [ft.]	Q [CFS]	V [FPS]	F	Vhead [ft.]	HGL [ft.]	A [SF]	WP [ft.]	TW [ft.]	R [ft.]	D [ft.]
0.005	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.006	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.007	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.008	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.009	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.010	0.40	10.17	2.42	1.12	0.09	0.3133	4.1991	28.7838	28.6850	0.1459	0.1464
0.011	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.012	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!

0.40' < 0.50' OK


POOL DEPTH AT STREET INTERSECTIONS
 28' F-F IN 46' R.O.W.
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017
 g = 32.2
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: STREET C & G

OF LOTS= 49.00
 CFS/LOT= 0.51
 Q = 25.23

S [ft. / ft.]	EGL [ft.]	Q [CFS]	V [FPS]	F	Vhead [ft.]	HGL [ft.]	A [SF]	WP [ft.]	TW [ft.]	R [ft.]	D [ft.]
0.005	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.006	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.007	0.65	25.40	3.13	1.03	0.15	0.5004	8.1163	28.9880	28.2533	0.2800	0.2873
0.008	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.009	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!

0.65' < 0.85' OK

POOL DEPTH AT STREET INTERSECTIONS
 28' F-F IN 46' R.O.W.
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017
 g = 32.2
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: STREET C & SE STUB

OF LOTS= 58.00
 CFS/LOT= 0.51
 Q = 29.87

S [ft. / ft.]	EGL [ft.]	Q [CFS]	V [FPS]	F	Vhead [ft.]	HGL [ft.]	A [SF]	WP [ft.]	TW [ft.]	R [ft.]	D [ft.]
0.005	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.006	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.007	0.70	29.94	3.34	1.05	0.17	0.5304	8.9642	29.0499	28.2683	0.3086	0.3171
0.008	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.009	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!

0.70' < 0.85' OK
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POOL DEPTH AT STREET SUMP  
 28' F-F IN 46' R.O.W.  
 STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: SUMP APPROACH FROM SOUTH

# OF LOTS= 84.00  
 CFS/LOT= 0.51  
 Q = 43.26

| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | 0.86         | 45.22      | 3.93       | 1.09    | 0.24           | 0.6204       | 11.5104   | 29.2357     | 28.3143     | 0.3937     | 0.4065     |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

45.22 CFS - 43.26 CFS  $\frac{2.96}{2}$

DEPTH AT STREET INLETS FOR CAPACITY  
 28' F-F IN 46' R.O.W.  
 STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: STREET E INLETS ON GRADE

# OF LOTS= 32.00  
 CFS/LOT= 0.51  
 Q = 16.48

| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.010            | 0.54         | 16.31      | 2.93       | 1.16    | 0.13           | 0.4104       | 5.5756    | 28.8025     | 28.2083     | 0.1936     | 0.1977     |
| 0.011            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.012            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

0.41' OF DEPTH

FROM PLATE 22.3 D-6, CHAP. 22, DPM

INLET CAPACITY = 5.0 CFS/INLET

TOTAL REMOVED FROM STREET = 10 CFS

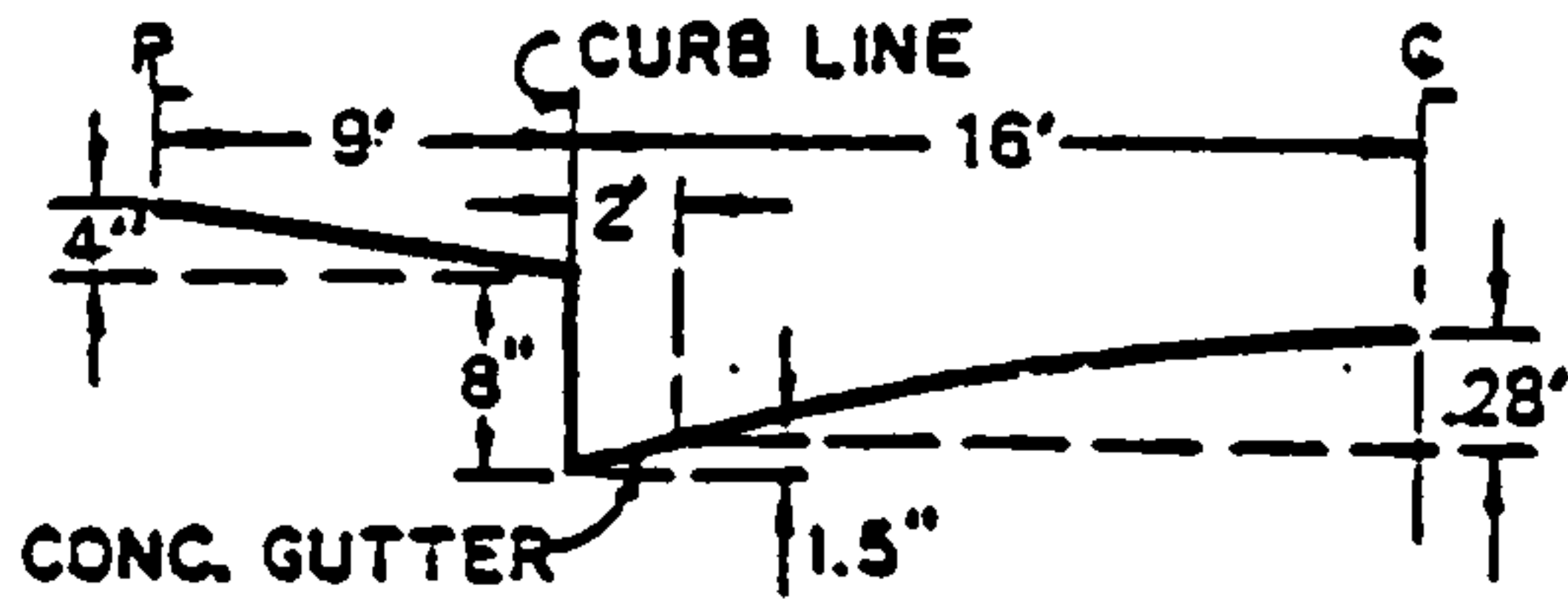
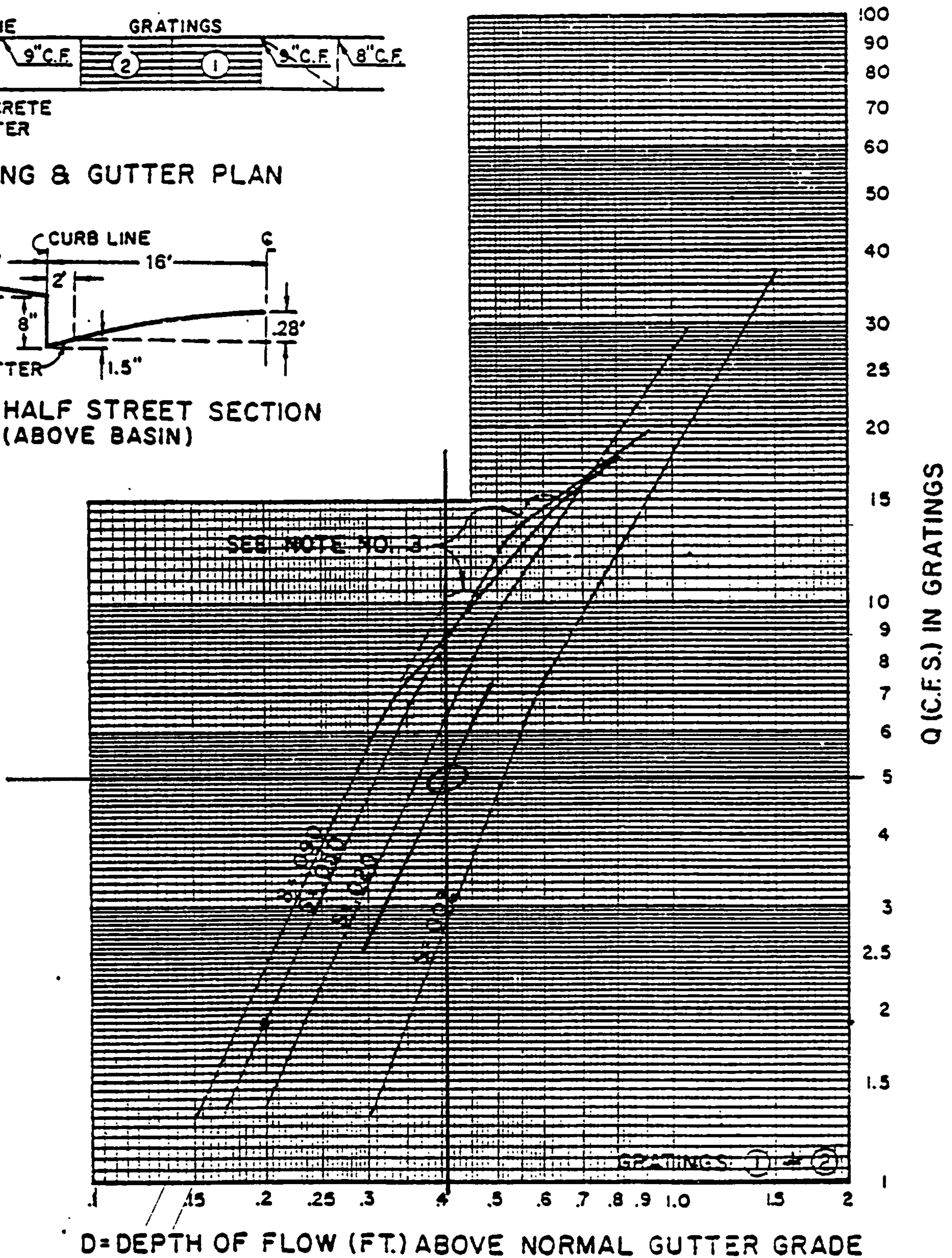
16.48 - 10.0 = 6.48 BYPASS

## GRATING CAPACITIES FOR TYPE DOUBLE

"C," AND "D"



GRATING &amp; GUTTER PLAN

TYPICAL HALF STREET SECTION  
(ABOVE BASIN)

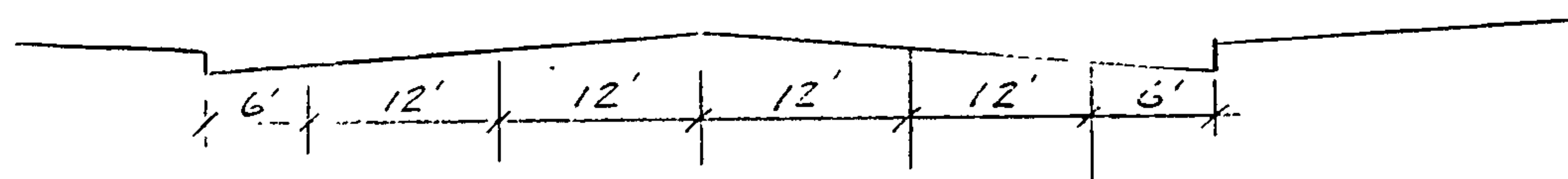
HYDRAULIC STREET CAPACITIES AT VARIOUS SLOPES  
60' F-F IN 86' R.O.W.  
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
g = 32.2  
EGLmax = 0.85 COA ALLOWABLE

Collector Street

BRIDGE BLVD.



| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.010            | 0.86         | 29.96      | 3.73       | 1.24    | 0.22           | 0.6404       | 8.0215    | 28.7261     | 28.2514     | 0.2792     | 0.2839     |
| 0.011            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.012            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

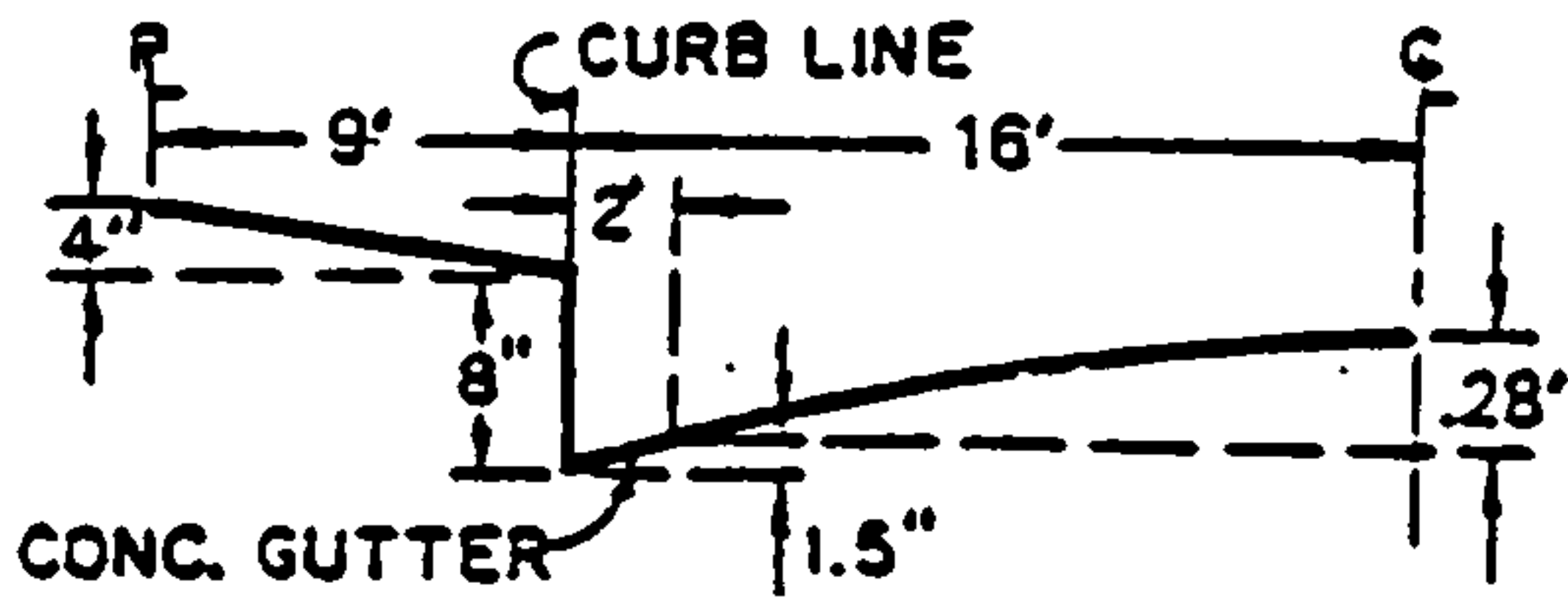
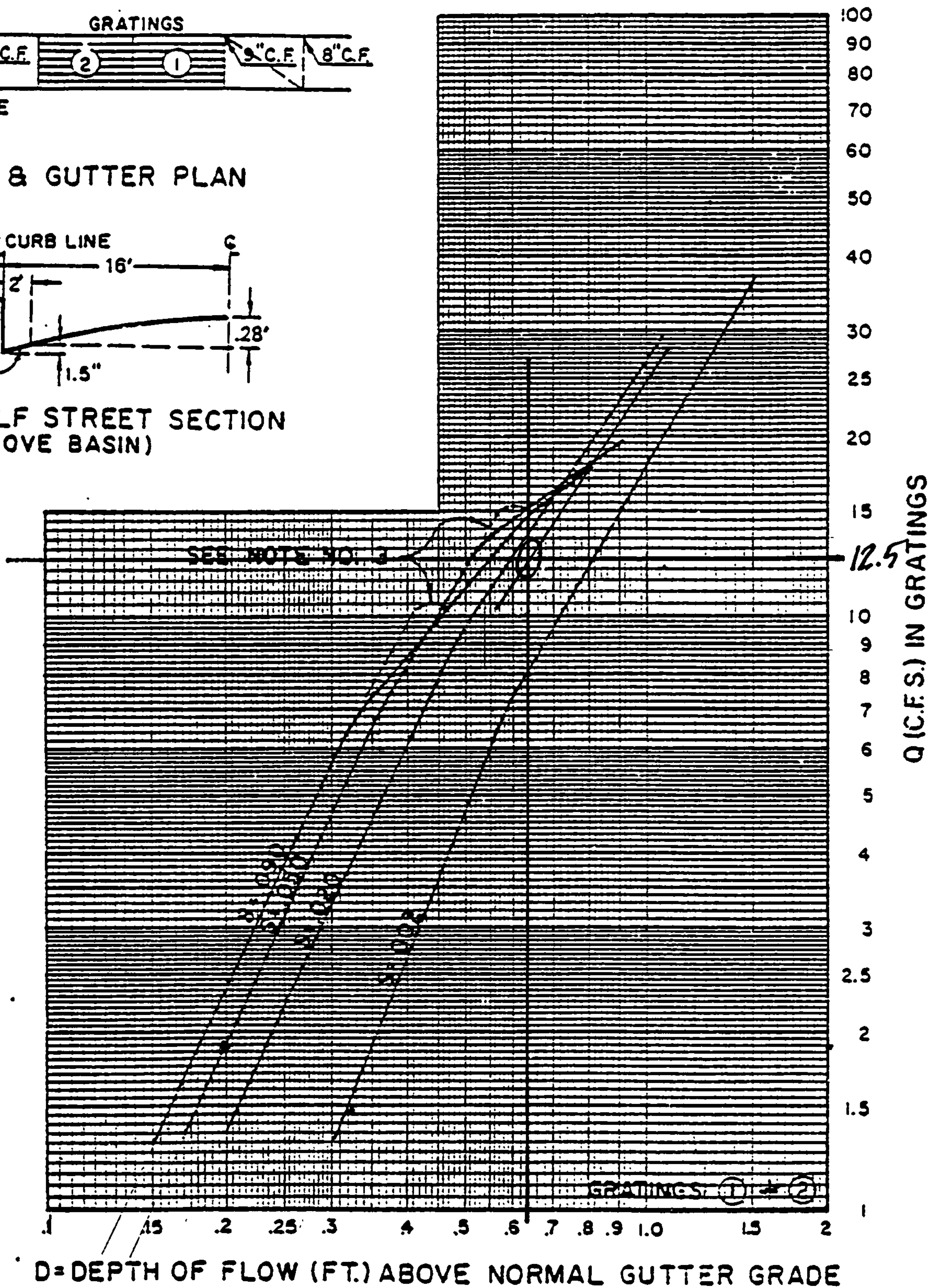
FIRST INLET - ASSUME STREET @ CAPACITY,  $Q = 30.0$  CFS/HALF ST.  
 $d = 0.64'$

## GRATING CAPACITIES FOR TYPE DOUBLE

"C." AND "D."



GRATING &amp; GUTTER PLAN

TYPICAL HALF STREET SECTION  
(ABOVE BASIN)

BRIDGE BLVD. 1 - TYPE A, DG, ST 1.01% GRADE

ASSUME STREET AT CAPACITY

75  $d = 0.64'$

REV 3-83

PLATE 22.3 D-6

30 CFS - 12.5 CFS = 17.5 CFS BY PASS

HYDRAULIC STREET CAPACITIES AT VARIOUS SLOPES  
 60' F-F IN 86' R.O.W.  
 STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.85 COA ALLOWABLE

| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.010            | 0.71         | 17.91      | 3.29       | 1.20    | 0.17           | 0.5404       | 5.4483    | 23.6191     | 23.2187     | 0.2307     | 0.2347     |
| 0.011            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.012            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.013            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

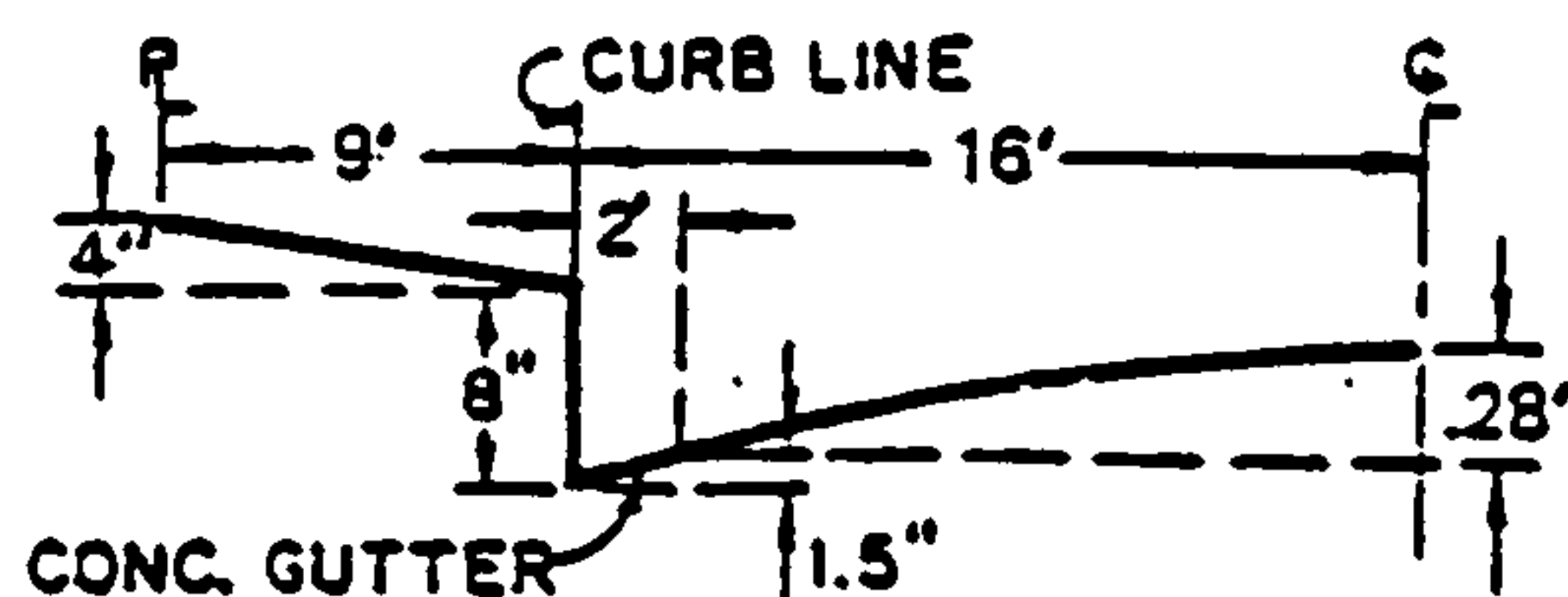
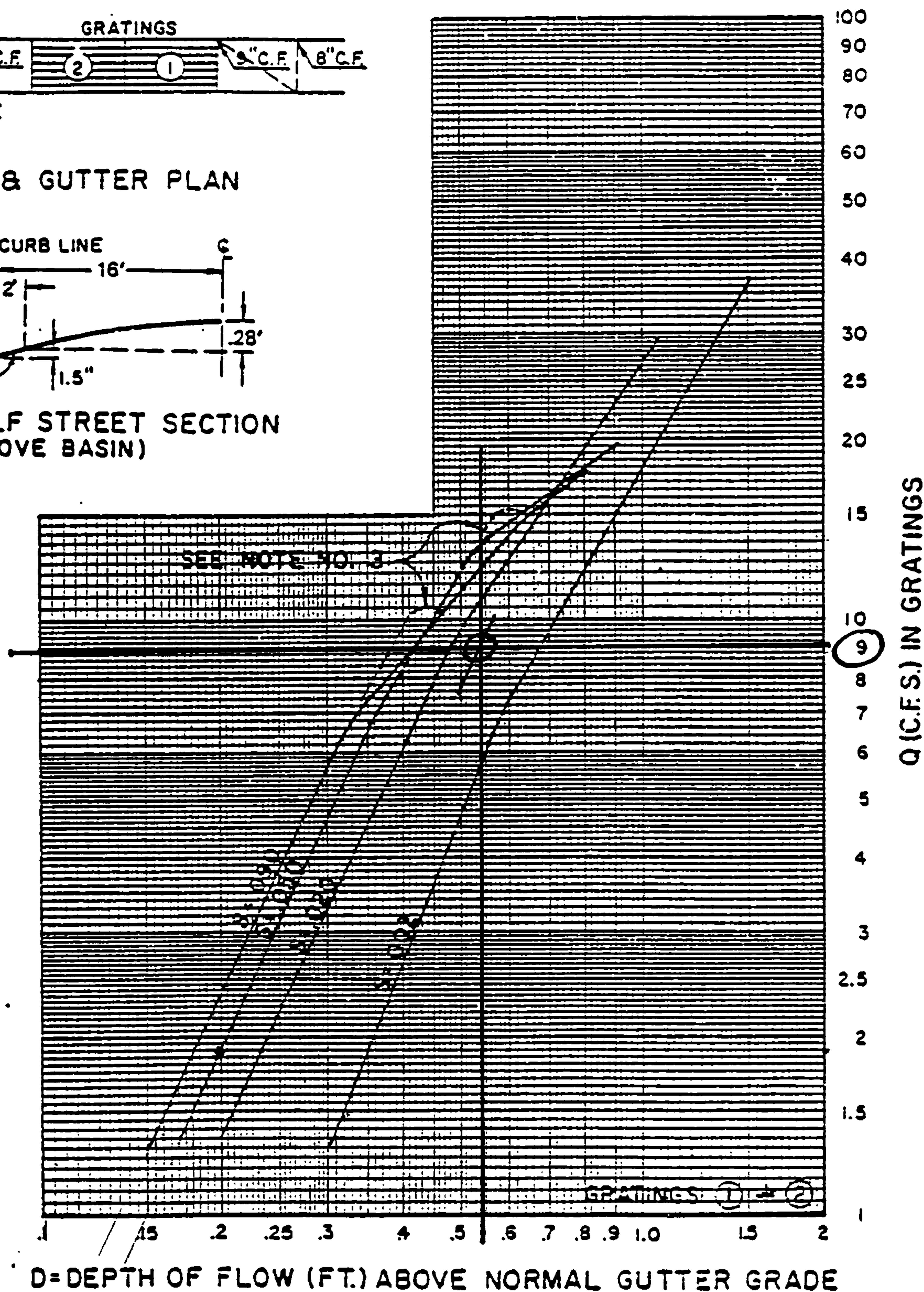
*BYPASS  $Q = 17.5 \text{ CFS} \approx 17.91 \text{ CFS} \therefore d \approx 0.54'$*

## GRATING CAPACITIES FOR TYPE DOUBLE

"C," AND "D"



GRATING &amp; GUTTER PLAN

TYPICAL HALF STREET SECTION  
(ABOVE BASIN)BRIDGE BLVD.

1 - TYPE C, DG

BYPASS OF INLET #1 = 17.5 CFS  $\Rightarrow d = 0.54$

KCD 5/24/01

CALCULATE DEPTH OF FLOW IN BRIDGE BOULEVARD  
FOR 10 YEAR STORM USING  $Q_{100}$  FROM COA PROJECT  
# 4076.93 ANOLE DEL NORTE, STORM DIVERSION FACILITIES  
TIERRA BAYITA DRAINAGE FACILITIES, BY URS GREINER.

$$Q_{100} = 74 \text{ CFS (PER SHEET 4 OF 11, } Q_T = 946 \text{ CFS, } Q_{\text{PIPE}} = 872 \text{ CFS)}$$

$$Q_{10} = (74 \text{ CFS}) 0.667 = 49.36 \text{ CFS (TABLE A-3, CHAP. 22, DAM)}$$

$$Q_{10} (\frac{1}{2} \text{ STREET}) = 24.68 \text{ CFS}$$

FROM LOOKUP TABLE ON NEXT PG. @  $S = 0.011$

$$\text{FLOW DEPTH} = 0.58' \text{ (HGL)}$$

HYDRAULIC STREET CAPACITIES AT VARIOUS SLOPES  
60' F-F IN 86' R.O.W.  
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
g = 32.2  
EGLmax = 0.85 COA ALLOWABLE

BRIDGE BLVD.

10 YEAR FLOW DEPTH

$Q_{10} = 24.63 \text{ CFS (PER PREV. PG.)}$

$d \approx 0.58'$

| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.010            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.011            | 0.79         | 24.28      | 3.64       | 1.27    | 0.21           | 0.5804       | 6.6696    | 26.6608     | 26.2285     | 0.2502     | 0.2543     |
| 0.012            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.013            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

NEENAH calculator, x-slope = 2%, road grade = 1.10%,  
for  $Q = 25 \text{ cfs}$ ,  $d = 0.47'$   
OK.

Project Name TRACTS 11 & 12  
 Project No. \_\_\_\_\_ Date 4/4/01  
 Subject INLET CAPACITIES IN SUMP

By KCD Sheet \_\_\_\_\_ of \_\_\_\_\_

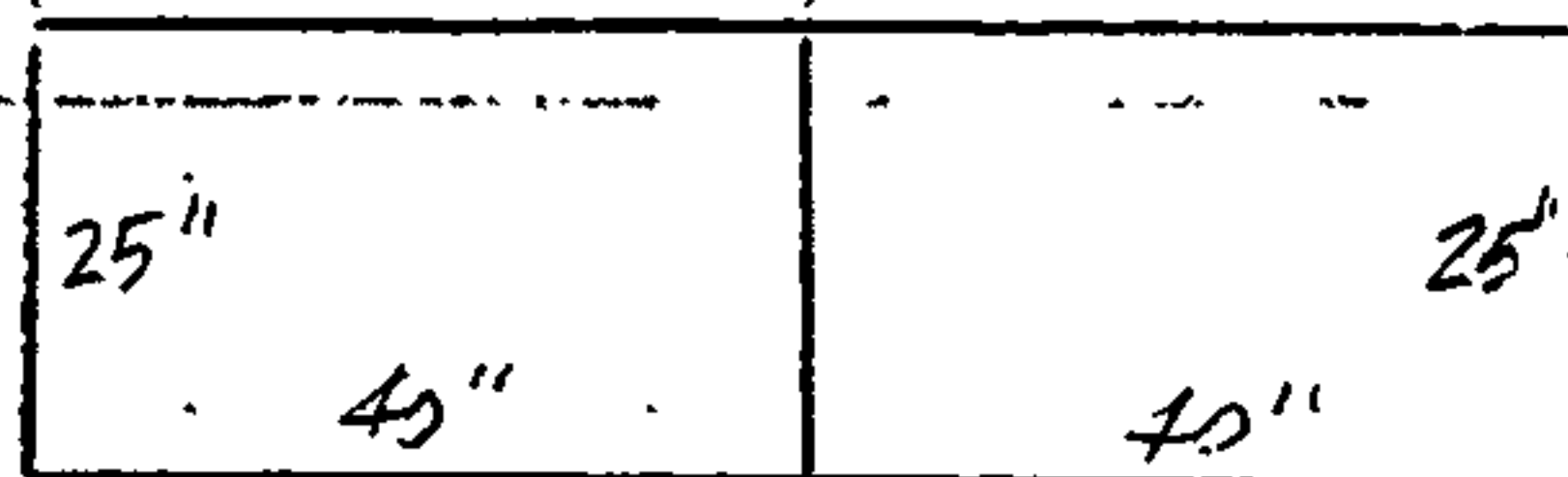
REVISED 5/24/01 KCD ✓

## SUMP INLET CAPACITIES

\* USE WEIR EQ. FOR FRONT & SIDES OF GRATE

INLET IS TYPE A, DG, DT

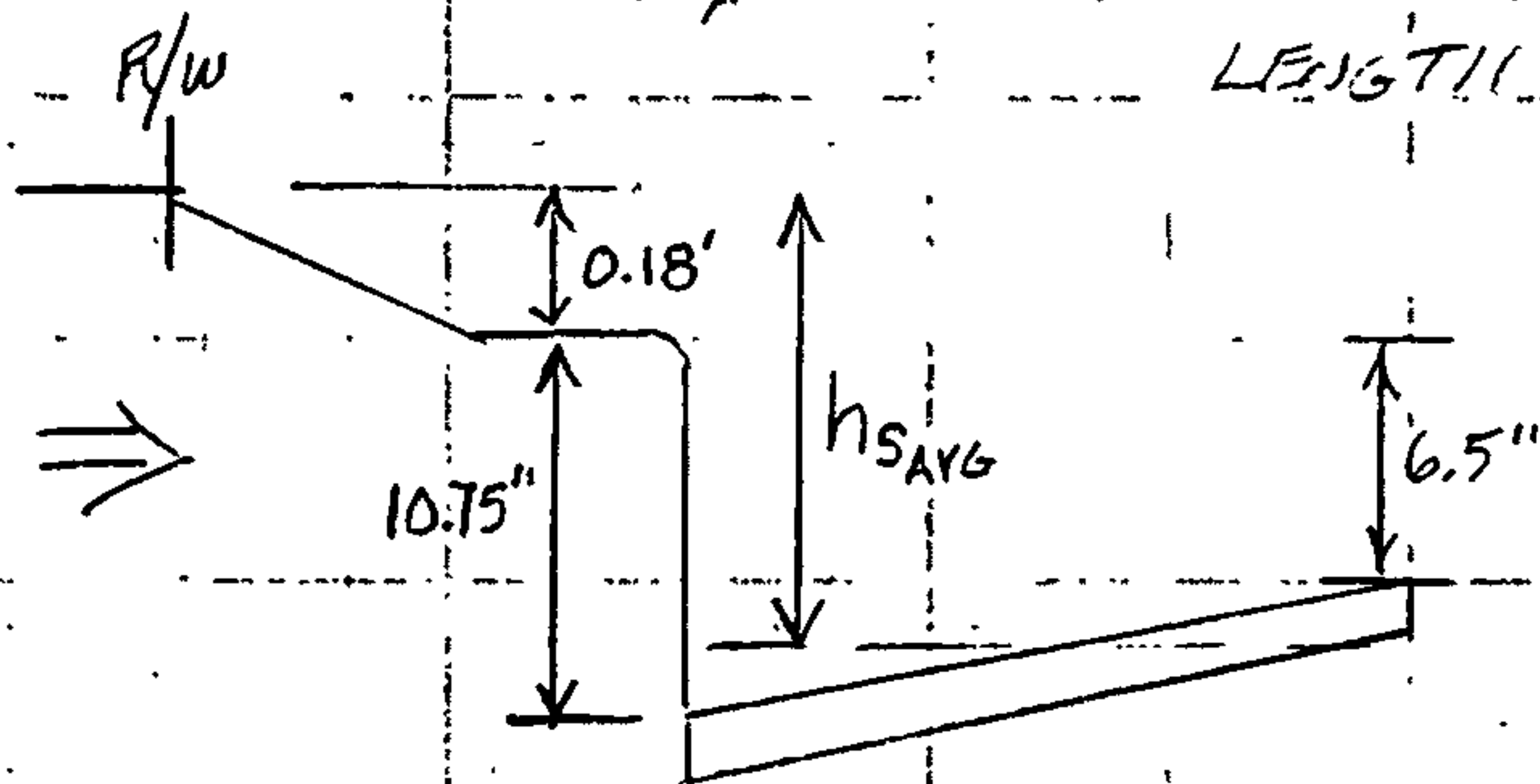
LENGTH ⇒



$L_s = 2.08' \Rightarrow$  USE 2.00' AS EFFECTIVE LENGTH

$L_f = 6.67' \Rightarrow$  USE 6.55' AS EFFECTIVE LENGTH

HEIGHT ⇒



$$h_{s_{avg}} = \left( \frac{10.75 + 6.5}{2.12} \right) + .13 = 0.90'$$

$$h_f = \frac{6.5}{12} + .13 = 0.72'$$

TO OBTAIN REQUIRED CAPACITY (44.07 CFS) PLUS AN ADEQUATE FACTOR OF SAFETY FOR CLOSING

USE 2 - TYPE A, DOUBLE GRATE, DOUBLE THROAT "PLUS"  
 2 - TYPE A, SINGLE GRATE, SINGLE THROAT

① CALCULATE 2 - TYPE A, DOUBLE GRATE, DOUBLE THROAT

(FRONT)  $Q_f = 3.0 \times 6.5 \times 0.72^{3/2} = 11.91 \text{ CFS}$

(SIDES)  $Q_s = 3.0 \times (2 \times 2) \times 0.90^{3/2} = 10.25 \text{ CFS}$

$+ 10.25 \text{ CFS}$   
 $22.16 \text{ CFS/INLET}$

$FS = \frac{\text{PROPOSED}}{\text{REQUIRED}} = \frac{(30.11 \times 2)}{44.07} = 1.36$

② CALCULATE Z- TYPE A, SINGLE GRATE, SINGLE THROAT

$$\text{LENGTH} \Rightarrow L_F = \frac{1}{2} L_F \text{ PREV. PG.} = 6.50' / 2 = 3.25'$$

$$L_S = L_S \text{ PREV. PG. (NO CHANGE)} = 2.00'$$

NOTE: THESE INLET ARE 0.07' & 0.19' HIGHER THAN  
INLETS ON PREV. PAGE.

CALC. WEST INLET (0.19 HIGHER)

$$(\text{FRONT}) Q_F = 3.0 \times 3.25' \times (0.72 - 0.19)^{3/2} = 3.76 \text{ CFS}$$

$$(\text{SIDES}) Q_S = 3.0 \times (2 \times 2') \times (0.90 - 0.19)^{3/2} = 7.13 \text{ CFS}$$
$$+ \\ = 10.94 \text{ CFS}$$

CALC. EAST INLET (0.07 HIGHER)

$$(\text{FRONT}) Q_F = 3.0 \times 3.25' \times (0.72 - 0.07)^{3/2} = 5.11 \text{ CFS}$$

$$Q_S = 3.0 \times (2 \times 2') \times (0.90 - 0.07)^{3/2} = 9.07 \text{ CFS}$$
$$+ \\ = 14.18 \text{ CFS}$$

③ CALC. TOTAL Q:

$$Q_T = (22.16 \text{ CFS})_2 + 10.94 \text{ CFS} + 14.18 \text{ CFS} = 69.44 \text{ CFS}$$

④ CALC. FACTOR OF SAFETY:

$$FS = \frac{Q_{\text{CAPACITY PROVIDED}}}{Q_{\text{REQUIRED}}}$$

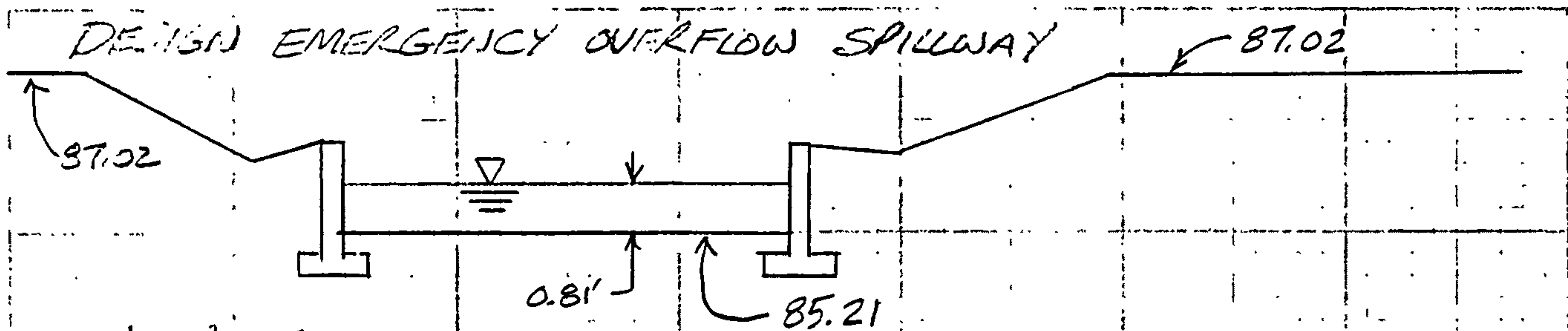
$$FS = \frac{69.44 \text{ CFS}}{44.07 \text{ CFS}} = \boxed{1.58} \checkmark \text{ OK}$$

Project Name \_\_\_\_\_

Project No. \_\_\_\_\_ Date \_\_\_\_\_

Subject \_\_\_\_\_

By \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_



WEIR EQ:

$$Q = CLH^{3/2}$$

$$44.07 = (3 \times 20) H^{3/2} \quad H = 0.81'$$

ELEV. OF TOP OF CURB @ JUMP + H + 1.0' = MIN PAD ELEV.

$$85.21 + 0.81 + 1 = \underline{87.02}$$

MANNINGS EQ:

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

$$S = \frac{85.21 - 84.58}{106.49'} = .0059$$

$$44.07 = \frac{1.49}{.022} (20Y) \left( \frac{20Y}{2Y+20} \right)^{2/3} (.0059)^{1/2}$$

$$Y = 0.61'$$

$$0.61 < 0.81 \text{ OK}$$

APPENDIX A

• ↓  
• ↓  
• ↓  
• ↓

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994  
INPUT FILE = TR11-12B.DAT

RUN DATE (MON/DAY/YR) = 04/17/2001  
USER NO. = DAGGETTK.S94

| COMMAND          | HYDROGRAPH IDENTIFICATION                                        | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | PAGE = 1<br>NOTATION |
|------------------|------------------------------------------------------------------|-------------|-----------|--------------|----------------------|-----------------------|-----------------|----------------------|--------------|----------------------|
| *S               | O-1 45x100 LOT SUBDIVISION DEVELOPED CONDITIONS                  |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | BY: KCD DATE: 4-17-2001                                          |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | ACTUAL AREAS FOR TRTMNTS MEASURED WITH AUTOCAD                   |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | 100 YEAR - 6 HOUR STORM                                          |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| START            |                                                                  |             |           |              |                      |                       |                 |                      |              | TIME= .00            |
| RAINFALL TYPE= 1 |                                                                  |             |           |              |                      |                       |                 |                      |              | RAIN6= 2.210         |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | CALC ONSITE FLOW                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD   | ONSITE -                                                         | 1           |           | .02441       | 54.07                | 1.883                 | 1.44632         | 1.499                | 3.461        | PER IMP= 59.00       |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | SEPARATE 10 CFS FOR BRIDGE STORM DRAIN                           |             |           |              |                      |                       |                 |                      |              |                      |
| DIVIDE HYD       | S-B-1                                                            | 1           | 5         | .01175       | 10.00                | .906                  | 1.44630         | 1.332                | 1.330        |                      |
|                  | ONSITE-10 AND                                                    | 2           |           | .01266       | 44.07                | .977                  | 1.44630         | 1.499                | 5.439        |                      |
| *S               | CALC FLOW IN WEST HALF UNSER                                     |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | (SUNSET GARDENS TO BRIDGE BLVD. NOTE: INCLUDES 6' LS BUFFER)     |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | FLOW TO WEST SUMP INLET IN UNSER FROM THIS BASIN                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD   | W-U-2 -                                                          | 1           |           | .00174       | 3.87                 | .134                  | 1.44631         | 1.499                | 3.474        | PER IMP= 59.00       |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | ADD FLOW FROM ONSITE BASIN TO FLOW FROM WEST HALF OF UNSER       |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| ADD HYD          | W-U-2+ONSITE                                                     | 1& 2        | 3         | .01440       | 47.94                | 1.111                 | 1.44628         | 1.499                | 5.201        |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | CALC FLOW IN EAST HALF UNSER (SG TO BRIDGE)                      |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD   | E-U-2 -                                                          | 1           |           | .00162       | 3.83                 | .135                  | 1.56262         | 1.499                | 3.689        | PER IMP= 68.00       |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | ADD FLOWS FROM ONSITE BASIN, WEST HALF UNSER & EAST HALF UNSER   |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| ADD HYD          | UNSER+ONSITE                                                     | 1& 3        | 2         | .01602       | 51.76                | 1.246                 | 1.45803         | 1.499                | 5.048        |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | CALC FLOW FROM SOUTH HALF OF BRIDGE BLVD. AND ALL OF 82ND STREET |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | (82ND STREET TO UNSER BLVD. NOTE: INCLUDES 6' LS BUFFER)         |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD   | S-B-1 -                                                          | 1           |           | .00333       | 8.51                 | .307                  | 1.73062         | 1.499                | 3.992        | PER IMP= 81.00       |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | ADD 10 CFS FROM ONSITE BASIN TO BRIDGE BLVD.                     |             |           |              |                      |                       |                 |                      |              |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| ADD HYD          | BRDG+ONSITE                                                      | 1& 5        | 3         | .01508       | 18.51                | 1.214                 | 1.50907         | 1.499                | 1.918        |                      |
| *S               | *****                                                            |             |           |              |                      |                       |                 |                      |              |                      |
| FINISH           |                                                                  |             |           |              |                      |                       |                 |                      |              |                      |

PER GREINER REPORT: "BASIN Y" = 52.53 CFS  
"BASIN 21-D" = 24.33 CFS

51.76 < 52.58 OK  
18.51 < 24.83 OK

```

*S          O-1 45x100 LOT SUBDIVISION DEVELOPED CONDITIONS
*S          BY: KCD      DATE: 4-17-2001
*S          ACTUAL AREAS FOR TRTMNTS MEASURED WITH AUTOCAD
*S          *****
*S          100 YEAR - 6 HOUR STORM
*S          *****
START          TIME=0.0 HR PUNCH CODE=0
RAINFALL      TYPE=1 RAIN QUARTER=0.0
              RAIN ONE=1.90 IN RAIN SIX=2.21 IN
              RAIN DAY=2.70 IN DT=0.0333 HRS
              *****
*S          *****
*S CALC ONSITE FLOW
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=ONSITE DA=0.02441 SQ MI
                   PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S SEPARATE 10 CFS FOR BRIDGE STORM DRAIN
DIVIDE HYD          ID=1 Q=10.0 ID I=5  HYD NO=S-B-1
                   ID II=2 HYD NO=ONSITE-10
*S CALC FLOW IN WEST HALF UNSER
*S (SUNSET GARDENS TO BRIDGE BLVD. NOTE: INCLUDES 6' LS BUFFER)
*S FLOW TO WEST SUMP INLET IN UNSER FROM THIS BASIN
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=W-U-2 DA=0.00174 SQ MI
                   PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S ADD FLOW FROM ONSITE BASIN TO FLOW FROM WEST HALF OF UNSER
*S          *****
ADD HYD              ID=3 HYD NO=W-U-2+ONSITE ID I=1 ID II=2
PRINT HYD            ID=3 CODE=1
*S          *****
*S CALC FLOW IN EAST HALF UNSER (SG TO BRIDGE)
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=E-U-2 DA=0.00162 SQ MI
                   PER A=00.0 PER B=32.0 PER C=0.0 PER D=68.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S ADD FLOWS FROM ONSITE BASIN, WEST HALF UNSER & EAST HALF UNSER
*S          *****
ADD HYD              ID=2 HYD NO=UNSER+ONSITE ID I=1 ID II=3
PRINT HYD            ID=2 CODE=1
*S          *****
*S CALC FLOW FROM SOUTH HALF OF BRIDGE BLVD. AND ALL OF 82ND STREET
*S (82ND STREET TO UNSER BLVD. NOTE: INCLUDES 6' LS BUFFER)
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=S-B-1 DA=0.00333 SQ MI
                   PER A=00.0 PER B=19.0 PER C=0.0 PER D=81.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S ADD 10 CFS FROM ONSITE BASIN TO BRIDGE BLVD.
*S          *****
ADD HYD              ID=3 HYD NO=BRDG+ONSITE ID I=1 ID II=5
PRINT HYD            ID=3 CODE=1
*S          *****
END

```

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994  
 RUN DATE (MON/DAY/YR) = 04/17/2001  
 START TIME (HR:MIN:SEC) = 05:28:32 USER NO.= DAGGETTK.S94  
 INPUT FILE = TR11-12B.DAT

\*S O-1 45x100 LOT SUBDIVISION DEVELOPED CONDITIONS  
 \*S BY: KCD DATE: 4-17-2001  
 \*S ACTUAL AREAS FOR TRTMNTS MEASURED WITH AUTOCAD  
 \*S \*\*\*\*\*  
 \*S 100 YEAR - 6 HOUR STORM  
 \*S \*\*\*\*\*  
 START TIME=0.0 HR PUNCH CODE=0  
 RAINFALL TYPE=1 RAIN QUARTER=0.0  
 RAIN ONE=1.90 IN RAIN SIX=2.21 IN  
 RAIN DAY=2.70 IN DT=0.0333 HRS

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

| DT = .033300 HOURS |        |        | END TIME = 5.994000 HOURS |        |        |        |
|--------------------|--------|--------|---------------------------|--------|--------|--------|
| .0000              | .0014  | .0029  | .0043                     | .0059  | .0074  | .0090  |
| .0106              | .0122  | .0139  | .0157                     | .0175  | .0193  | .0212  |
| .0231              | .0251  | .0272  | .0293                     | .0315  | .0338  | .0362  |
| .0386              | .0412  | .0438  | .0466                     | .0494  | .0524  | .0556  |
| .0589              | .0624  | .0662  | .0714                     | .0769  | .0829  | .0953  |
| .1237              | .1675  | .2304  | .3165                     | .4297  | .5741  | .7541  |
| .9738              | 1.1848 | 1.2714 | 1.3442                    | 1.4089 | 1.4677 | 1.5219 |
| 1.5721             | 1.6191 | 1.6631 | 1.7045                    | 1.7435 | 1.7804 | 1.8154 |
| 1.8485             | 1.8798 | 1.9096 | 1.9379                    | 1.9647 | 1.9719 | 1.9775 |
| 1.9829             | 1.9880 | 1.9929 | 1.9975                    | 2.0020 | 2.0063 | 2.0104 |
| 2.0144             | 2.0183 | 2.0220 | 2.0256                    | 2.0291 | 2.0325 | 2.0359 |
| 2.0391             | 2.0422 | 2.0453 | 2.0483                    | 2.0512 | 2.0541 | 2.0569 |
| 2.0596             | 2.0623 | 2.0650 | 2.0675                    | 2.0701 | 2.0726 | 2.0750 |
| 2.0774             | 2.0797 | 2.0821 | 2.0843                    | 2.0866 | 2.0888 | 2.0910 |
| 2.0931             | 2.0952 | 2.0973 | 2.0993                    | 2.1013 | 2.1033 | 2.1053 |
| 2.1072             | 2.1091 | 2.1110 | 2.1129                    | 2.1147 | 2.1165 | 2.1183 |
| 2.1201             | 2.1219 | 2.1236 | 2.1253                    | 2.1270 | 2.1287 | 2.1304 |
| 2.1320             | 2.1336 | 2.1352 | 2.1368                    | 2.1384 | 2.1399 | 2.1415 |
| 2.1430             | 2.1445 | 2.1460 | 2.1475                    | 2.1490 | 2.1505 | 2.1519 |
| 2.1533             | 2.1548 | 2.1562 | 2.1576                    | 2.1589 | 2.1603 | 2.1617 |
| 2.1630             | 2.1644 | 2.1657 | 2.1670                    | 2.1683 | 2.1696 | 2.1709 |
| 2.1722             | 2.1735 | 2.1747 | 2.1760                    | 2.1772 | 2.1784 | 2.1797 |
| 2.1809             | 2.1821 | 2.1833 | 2.1845                    | 2.1857 | 2.1868 | 2.1880 |
| 2.1892             | 2.1903 | 2.1914 | 2.1926                    | 2.1937 | 2.1948 | 2.1959 |
| 2.1970             | 2.1981 | 2.1992 | 2.2003                    | 2.2014 | 2.2025 | 2.2035 |
| 2.2046             | 2.2057 | 2.2067 | 2.2077                    | 2.2088 | 2.2098 |        |

\*S \*\*\*\*\*  
 \*S CALC ONSITE FLOW  
 \*S \*\*\*\*\*  
 COMPUTE NM HYD ID=1 HYD NO=ONSITE DA=0.02441 SQ MI  
 PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0  
 TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 56.859 CFS UNIT VOLUME = .9991 B = 526.28 P60 = 1.9000  
 AREA = .014402 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
 UNIT PEAK = 24.592 CFS UNIT VOLUME = .9998 B = 327.55 P60 = 1.9000  
 AREA = .010008 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA ONSITE

RUNOFF VOLUME = 1.44632 INCHES = 1.8829 ACRE-FEET  
 PEAK DISCHARGE RATE = 54.07 CFS AT 1.499 HOURS BASIN AREA = .0244 SQ. MI.

\*S \*\*\*\*\*  
 \*S SEPARATE 10 CFS FOR BRIDGE STORM DRAIN  
 DIVIDE HYD ID=1 Q=10.0 ID I=5 HYD NO=S-B-1  
 ID II=2 HYD NO=ONSITE-10  
 \*S CALC FLOW IN WEST HALF UNSER

\*S (SUNSET GARDENS TO BRIDGE BLVD. NOTE: INCLUDES 6' LS BUFFER)

\*S FLOW TO WEST SUMP INLET IN UNSER FROM THIS BASIN

\*S \*\*\*\*\*

COMPUTE NM HYD ID=1 HYD NO=W-U-2 DA=0.00174 SQ MI  
PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0  
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 4.0531 CFS UNIT VOLUME = .9965 B = 526.28 P60 = 1.9000  
AREA = .001027 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
UNIT PEAK = 1.7530 CFS UNIT VOLUME = .9926 B = 327.55 P60 = 1.9000  
AREA = .000713 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

#### HYDROGRAPH FROM AREA W-U-2

RUNOFF VOLUME = 1.44631 INCHES = .1342 ACRE-FEET  
PEAK DISCHARGE RATE = 3.87 CFS AT 1.499 HOURS BASIN AREA = .0017 SQ. MI.

\*S \*\*\*\*\*

\*S ADD FLOW FROM ONSITE BASIN TO FLOW FROM WEST HALF OF UNSER

\*S \*\*\*\*\*

ADD HYD ID=3 HYD NO=W-U-2+ONSITE ID I=1 ID II=2  
PRINT HYD ID=3 CODE=1

#### HYDROGRAPH FROM AREA W-U-2+ONSITE

RUNOFF VOLUME = 1.44628 INCHES = 1.1108 ACRE-FEET  
PEAK DISCHARGE RATE = 47.94 CFS AT 1.499 HOURS BASIN AREA = .0144 SQ. MI.

\*S \*\*\*\*\*

\*S CALC FLOW IN EAST HALF UNSER (SG TO BRIDGE)

\*S \*\*\*\*\*

COMPUTE NM HYD ID=1 HYD NO=E-U-2 DA=0.00162 SQ MI  
PER A=00.0 PER B=32.0 PER C=0.0 PER D=68.0  
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 4.3492 CFS UNIT VOLUME = .9969 B = 526.28 P60 = 1.9000  
AREA = .001102 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
UNIT PEAK = 1.2738 CFS UNIT VOLUME = .9894 B = 327.55 P60 = 1.9000  
AREA = .000518 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

#### HYDROGRAPH FROM AREA E-U-2

RUNOFF VOLUME = 1.56262 INCHES = .1350 ACRE-FEET  
PEAK DISCHARGE RATE = 3.83 CFS AT 1.499 HOURS BASIN AREA = .0016 SQ. MI.

\*S \*\*\*\*\*

\*S ADD FLOWS FROM ONSITE BASIN, WEST HALF UNSER & EAST HALF UNSER

\*S \*\*\*\*\*

ADD HYD ID=2 HYD NO=UNSER+ONSITE ID I=1 ID II=3  
PRINT HYD ID=2 CODE=1

#### HYDROGRAPH FROM AREA UNSER+ONSITE

RUNOFF VOLUME = 1.45803 INCHES = 1.2458 ACRE-FEET  
PEAK DISCHARGE RATE = 51.76 CFS AT 1.499 HOURS BASIN AREA = .0160 SQ. MI.

\*S \*\*\*\*\*  
\*S CALC FLOW FROM SOUTH HALF OF BRIDGE BLVD. AND ALL OF 82ND STREET  
\*S (82ND STREET TO UNSER BLVD. NOTE: INCLUDES 6' LS BUFFER)  
\*S \*\*\*\*\*  
COMPUTE NM HYD ID=1 HYD NO=S-B-1 DA=0.00333 SQ MI  
PER A=00.0 PER B=19.0 PER C=0.0 PER D=81.0  
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 10.649 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.9000  
AREA = .002697 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
UNIT PEAK = 1.5547 CFS UNIT VOLUME = .9919 B = 327.55 P60 = 1.9000  
AREA = .000633 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

#### HYDROGRAPH FROM AREA S-B-1

RUNOFF VOLUME = 1.73062 INCHES = .3074 ACRE-FEET  
PEAK DISCHARGE RATE = 8.51 CFS AT 1.499 HOURS BASIN AREA = .0033 SQ. MI.

\*S \*\*\*\*\*  
\*S ADD 10 CFS FROM ONSITE BASIN TO BRIDGE BLVD.  
\*S \*\*\*\*\*  
ADD HYD ID=3 HYD NO=UNSER+ONSITE ID I=1 ID II=5  
PRINT HYD ID=3 CODE=1

#### HYDROGRAPH FROM AREA UNSER+ONSITE

RUNOFF VOLUME = 1.50907 INCHES = 1.2136 ACRE-FEET  
PEAK DISCHARGE RATE = 18.51 CFS AT 1.499 HOURS BASIN AREA = .0151 SQ. MI.

\*S \*\*\*\*\*  
END  
COMMAND NOT IN TABLE

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 05:28:32

APPENDIX B

• 1  
• 2  
• 3  
• 4

4  
4  
4  
4

STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works  
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Version 00000  
Serial Number 00000000

Apr 16, 2001 10:38:11

Input file : SGU2.DAT  
Output file: SGU2.OUT

INPUT FILE LISTING

*EAST FAULT CONNECTION TO SUNSET GARDENS/UNSER  
STORM DRAIN (GREINER BASIN Y)*

T1 TR 11 & 12 CONNECTOR PIPE TO UNSER/SUNSET GARDENS STORM DRAIN

T2 ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

T3 SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

|    |         |       |   |   |      |       |       |  |      |      |   |  |  |  |  |  |  |  |  |
|----|---------|-------|---|---|------|-------|-------|--|------|------|---|--|--|--|--|--|--|--|--|
| SO | 0000.00 | 71.60 | 4 |   |      | 80.00 |       |  |      |      |   |  |  |  |  |  |  |  |  |
| R  | 0073.87 | 76.70 | 4 |   | .013 |       |       |  |      | 58.9 | 1 |  |  |  |  |  |  |  |  |
| JX | 0073.87 | 76.70 | 4 | 3 | .013 | 3.9   | 78.20 |  | 90.0 |      |   |  |  |  |  |  |  |  |  |
| JX | 0231.32 | 79.00 | 4 | 2 | .013 | 22.0  | 79.00 |  | 90.0 |      |   |  |  |  |  |  |  |  |  |
| TS | 0233.32 | 80.00 | 2 |   | .013 |       |       |  |      |      |   |  |  |  |  |  |  |  |  |
| R  | 0259.32 | 80.40 | 2 |   | .013 |       |       |  |      |      |   |  |  |  |  |  |  |  |  |
| SH |         |       | 2 |   |      |       |       |  |      |      |   |  |  |  |  |  |  |  |  |

SP

| WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING |      |      |       |          |          |       |    |    |      |      |      |      |      |      | PAGE | 1    |      |      |       |
|----------------------------------------------------|------|------|-------|----------|----------|-------|----|----|------|------|------|------|------|------|------|------|------|------|-------|
| 0 CARD                                             | SECT | CHN  | NO OF | AVE PIER | HEIGHT 1 | BASE  | ZL | ZR | INV  | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
| CODE                                               | NO   | TYPE | PIERS | WIDTH    | DIAMETER | WIDTH |    |    | DROP |      |      |      |      |      |      |      |      |      |       |
| CD                                                 | 1    | 4    |       |          | 2.50     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |
| CD                                                 | 2    | 4    |       |          | 2.00     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |
| CD                                                 | 3    | 4    |       |          | 1.50     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |
| CD                                                 | 4    | 4    |       |          | 3.00     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |

PAGE NO 1

1  
0  
OHEADING LINE NO 1 IS -  
0  
OHEADING LINE NO 2 IS -  
0  
OHEADING LINE NO 3 IS -  
0  
1  
0  
WATER SURFACE PROFILE - TITLE CARD LISTING  
TR 11 & 12 CONNECTOR PIPE TO UNSER/SUNSET GARDENS STORM DRAIN  
ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001  
SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

PAGE NO 2

| WATER SURFACE PROFILE - ELEMENT CARD LISTING |        |               |          |         |        |      |          |        |       |        |       |          |          |       |       |
|----------------------------------------------|--------|---------------|----------|---------|--------|------|----------|--------|-------|--------|-------|----------|----------|-------|-------|
| 0 ELEMENT NO                                 | 1 IS A | SYSTEM OUTLET | U/S DATA | STATION | INVERT | SECT | W S ELEV |        |       |        |       |          |          |       |       |
|                                              |        |               |          | .00     | 71.60  | 4    | 80.00    |        |       |        |       |          |          |       |       |
| 0 ELEMENT NO                                 | 2 IS A | REACH         | U/S DATA | STATION | INVERT | SECT | N        | RADIUS | ANGLE | ANG PT | MAN H |          |          |       |       |
|                                              |        |               |          | 73.87   | 76.70  | 4    | .013     | .00    | .00   | 58.90  | 1     |          |          |       |       |
| 0 ELEMENT NO                                 | 3 IS A | JUNCTION      | U/S DATA | STATION | INVERT | SECT | LAT-1    | LAT-2  | N     | Q3     | Q4    | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|                                              |        |               |          | 73.87   | 76.70  | 4    | 3        | 0      | .013  | 3.9    | .0    | 78.20    | .00      | 90.00 | .00   |

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING  
THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

0 ELEMENT NO 4 IS A JUNCTION  
 U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4  
 231.32 79.00 4 2 0 .013 22.0 .0 79.00 .00 90.00 .00  
 0 ELEMENT NO 5 IS A TRANSITION  
 U/S DATA STATION INVERT SECT N  
 233.32 80.00 2 .013  
 0 ELEMENT NO 6 IS A REACH  
 U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H  
 259.32 80.40 2 .013 .00 .00 .00 0  
 0 ELEMENT NO 7 IS A SYSTEM HEADWORKS  
 U/S DATA STATION INVERT SECT W S ELEV  
 259.32 80.40 2 .00  
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

\*\* WARNING NO. 2 \*\* - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC  
 1 PAGE 1

WATER SURFACE PROFILE LISTING  
 TR 11 & 12 CONNECTOR PIPE TO UNSER/SUNSET GARDENS STORM DRAIN  
 ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001  
 SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

| 0 STATION  | INVERT<br>ELEV | DEPTH<br>OF FLOW | W.S.<br>ELEV | Q    | VEL  | VEL<br>HEAD<br>SF AVE | ENERGY<br>GRD.EL.<br>HF | SUPER<br>ELEV | CRITICAL<br>DEPTH | NORM DEPTH | HGT/<br>DIA | BASE/<br>ID NO. | ZL<br>ZR | NO<br>PIER | AVBPR |
|------------|----------------|------------------|--------------|------|------|-----------------------|-------------------------|---------------|-------------------|------------|-------------|-----------------|----------|------------|-------|
| 0 L/ELEM   | SO             |                  |              |      |      |                       |                         |               |                   |            |             |                 |          |            |       |
| 0 .00      | 71.60          | 8.40             | 80.00        | 47.9 | 6.78 | .71                   | 80.71                   | .00           | 2.25              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0 73.87    | .06904         |                  |              |      |      | .00516                | .38                     |               |                   | 1.07       |             |                 | .00      |            |       |
| 0 73.87    | 76.70          | 3.86             | 80.56        | 47.9 | 6.78 | .71                   | 81.27                   | .00           | 2.25              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0JUNCT STR | .00000         |                  |              |      |      | .00475                | .00                     |               |                   |            |             |                 | .00      |            |       |
| 0 73.87    | 76.70          | 4.08             | 80.78        | 44.0 | 6.22 | .60                   | 81.38                   | .00           | 2.16              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0JUNCT STR | .01461         |                  |              |      |      | .00272                | .43                     |               |                   |            |             |                 | .00      |            |       |
| 0 231.32   | 79.00          | 3.11             | 82.11        | 22.0 | 3.11 | .15                   | 82.26                   | .00           | 1.51              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0TRANS STR | .50000         |                  |              |      |      |                       |                         |               |                   |            |             |                 | .00      |            |       |
| 0 233.32   | 80.00          | 1.43             | 81.43        | 22.0 | 9.14 | 1.30                  | 82.73                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 4.65     | .01539         |                  |              |      |      | .01256                | .06                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 237.97   | 80.07          | 1.45             | 81.52        | 22.0 | 9.04 | 1.27                  | 82.79                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 13.34    | .01539         |                  |              |      |      | .01176                | .16                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 251.31   | 80.28          | 1.51             | 81.79        | 22.0 | 8.62 | 1.15                  | 82.94                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 6.21     | .01539         |                  |              |      |      | .01057                | .07                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 257.52   | 80.37          | 1.59             | 81.96        | 22.0 | 8.22 | 1.05                  | 83.01                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 1.80     | .01539         |                  |              |      |      | .00957                | .02                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 259.32   | 80.40          | 1.67             | 82.08        | 22.0 | 7.83 | .95                   | 83.03                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |

Hydraulic Grade Line Computations for East Branch Connection to Sunset Gardens\Unser Storm Drain (Greiner Basin Y)

|                |       |
|----------------|-------|
| MANNING'S n =  | 0.013 |
| STARTING HGL = | 80.00 |

| INPUT             |         |    |      |        |       |          |       |               |              | OUTPUT |      |        |      |        |      |         |      |      |             |            |           |      |            |           |
|-------------------|---------|----|------|--------|-------|----------|-------|---------------|--------------|--------|------|--------|------|--------|------|---------|------|------|-------------|------------|-----------|------|------------|-----------|
| STRCT.<br>STATION | TYPE    | D  | Q    | L      | Delta | JUNCTION |       | INVERT<br>out | INVERT<br>in | A      | V    | K      | Sf   | LOSSES |      |         |      |      | S<br>LOSSES | EGL<br>out | EGL<br>in | Hv   | HGL<br>out | HGL<br>in |
|                   | SIZE    |    |      |        |       | Dia.     | Theta |               |              |        |      |        |      | Hf     | Hb   | Hj      | Hmh  | Ht   |             |            |           |      |            |           |
| 0.00              | 36" WYE |    |      |        |       |          |       |               | 71.60        |        |      |        |      |        |      |         |      |      |             |            | 80.71     |      |            | 80.00     |
|                   |         | 36 | 47.9 | 73.87  |       |          |       |               |              | 7.07   | 6.78 | 666.98 | 0.52 | 0.38   |      |         |      |      | 0.38        |            |           | 0.71 |            |           |
| 73.87             | MH      |    |      |        | 58.9  | 18       | 90.0  | 76.70         | 76.70        |        |      |        |      |        | 0.12 | 0.11    | 0.00 | 0.00 | 0.23        | 81.09      | 81.32     |      | 80.38      | 80.72     |
|                   |         | 36 | 44.0 | 157.45 |       |          |       |               |              | 7.07   | 6.22 | 666.98 | 0.44 | 0.69   |      |         |      |      | 0.69        |            |           | 0.60 |            |           |
| 231.32            | DBL A   |    |      |        |       | 24       | 90.0  | 79.00         | 79.00        |        |      |        |      |        | 0.00 | 0.89    | 0.00 | 0.00 | 0.89        | 82.60      | 83.49     |      | 82.00      | 82.73     |
|                   |         | 24 | 22.0 | 28.00  |       |          |       |               |              | 3.14   | 7.00 | 226.22 | 0.95 | 0.26   |      |         |      |      | 0.26        |            |           | 0.76 |            |           |
| 259.32            | DBL A   |    |      |        |       | 24       | 90.0  | 80.40         | 80.40        |        |      |        |      |        | 0.00 | #DIV/0! | 0.00 | 0.00 | #DIV/0!     | 83.76      | #DIV/0!   |      | 82.99      | #DIV/0!   |

STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works  
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Version 00000  
Serial Number 00000000

Apr 16, 2001 12:13:41

Input file : SGU3.DAT  
Output file: SGU3.OUT

INPUT FILE LISTING

BRANCH TO UNSER SUMP INLET

T1 UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN  
T2 ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001  
T3 SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92  
SO 0073.87 78.20 1 80.78  
R 0113.35 80.50 1 .013  
SH 1

1  
0  
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING  
PAGE 1  
0 CARD SECT CHN NO OF AVE PIER HEIGHT 1 BASE ZL ZR INV Y(1) Y(2) Y(3) Y(4) Y(5) Y(6) Y(7) Y(8) Y(9) Y(10)  
CODE NO TYPE PIERS WIDTH DIAMETER WIDTH DROP  
CD 1 4 1.50  
CD 2 4 2.00  
CD 3 4 2.50  
PAGE NO 1

1  
0  
WATER SURFACE PROFILE - TITLE CARD LISTING  
0  
OHEADING LINE NO 1 IS -  
UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN  
0  
OHEADING LINE NO 2 IS -  
ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001  
0  
OHEADING LINE NO 3 IS -  
SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92  
PAGE NO 2

1  
0  
WATER SURFACE PROFILE - ELEMENT CARD LISTING  
0 ELEMENT NO 1 IS A SYSTEM OUTLET \* \* \*  
U/S DATA STATION INVERT SECT W S ELEV  
73.87 78.20 1 80.78  
0 ELEMENT NO 2 IS A REACH \* \* \*  
U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H  
113.35 80.50 1 .013 .00 .00 .00 0  
0 ELEMENT NO 3 IS A SYSTEM HEADWORKS \*  
U/S DATA STATION INVERT SECT W S ELEV  
113.35 80.50 1 .00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

\*\* WARNING NO. 2 \*\* - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC  
PAGE 1

1  
WATER SURFACE PROFILE LISTING  
UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN  
ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

| SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92 |        |         |      |       |     |        |         |       |          |            |      |        |     |      |       |
|-----------------------------------------------|--------|---------|------|-------|-----|--------|---------|-------|----------|------------|------|--------|-----|------|-------|
| STATION                                       | INVERT | DEPTH   | W.S. | Q     | VEL | VEL    | ENERGY  | SUPER | CRITICAL |            | HGT/ | BASE/  | ZL  | NO   | AVBPR |
| L/ELEM                                        | ELEV   | OF FLOW | ELEV |       |     | HEAD   | GRD.EL. | ELEV  | DEPTH    |            | DIA  | ID NO. | ZR  | PIER |       |
|                                               | SO     |         |      |       |     | SF AVE | HF      |       |          | NORM DEPTH |      |        |     |      |       |
| 0                                             | 73.87  | 78.20   | 2.58 | 80.78 | 3.9 | 2.21   | .08     | 80.86 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 18.99  | .05826  |      |       |     |        | .00136  | .03   |          | .40        |      |        | .00 |      |       |
| 0                                             | 92.86  | 79.31   | 1.50 | 80.81 | 3.9 | 2.21   | .08     | 80.88 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 2.30   | .05826  |      |       |     |        | .00128  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                             | 95.16  | 79.44   | 1.36 | 80.80 | 3.9 | 2.31   | .08     | 80.88 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 1.26   | .05826  |      |       |     |        | .00125  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                             | 96.42  | 79.51   | 1.28 | 80.79 | 3.9 | 2.43   | .09     | 80.89 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 1.02   | .05826  |      |       |     |        | .00135  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                             | 97.44  | 79.57   | 1.21 | 80.79 | 3.9 | 2.55   | .10     | 80.89 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | .29    | .05826  |      |       |     |        | .00144  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                             | 97.73  | 79.59   | 1.19 | 80.78 | 3.9 | 2.59   | .10     | 80.88 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| OHYDRAULIC JUMP                               |        |         |      |       |     |        |         |       |          |            |      |        |     |      |       |
| 0                                             | 97.73  | 79.59   | .45  | 80.04 | 3.9 | 8.63   | 1.16    | 81.20 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | .67    | .05826  |      |       |     |        | .03414  | .02   |          | .40        |      |        | .00 |      |       |
| 0                                             | 98.40  | 79.63   | .46  | 80.09 | 3.9 | 8.54   | 1.13    | 81.22 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 3.26   | .05826  |      |       |     |        | .03154  | .10   |          | .40        |      |        | .00 |      |       |
| 0                                             | 101.66 | 79.82   | .47  | 80.29 | 3.9 | 8.15   | 1.03    | 81.32 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 2.51   | .05826  |      |       |     |        | .02763  | .07   |          | .40        |      |        | .00 |      |       |
| 0                                             | 104.16 | 79.96   | .49  | 80.45 | 3.9 | 7.77   | .94     | 81.39 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 2.00   | .05826  |      |       |     |        | .02420  | .05   |          | .40        |      |        | .00 |      |       |
| 0                                             | 106.17 | 80.08   | .51  | 80.59 | 3.9 | 7.41   | .85     | 81.44 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                             | 1.60   | .05826  |      |       |     |        | .02120  | .03   |          | .40        |      |        | .00 |      |       |

PAGE 2

| WATER SURFACE PROFILE LISTING                                       |        |         |      |       |     |        |         |       |          |            |      |        |     |      |       |
|---------------------------------------------------------------------|--------|---------|------|-------|-----|--------|---------|-------|----------|------------|------|--------|-----|------|-------|
| UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN |        |         |      |       |     |        |         |       |          |            |      |        |     |      |       |
| ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001                       |        |         |      |       |     |        |         |       |          |            |      |        |     |      |       |
| SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92                       |        |         |      |       |     |        |         |       |          |            |      |        |     |      |       |
| STATION                                                             | INVERT | DEPTH   | W.S. | Q     | VEL | VEL    | ENERGY  | SUPER | CRITICAL |            | HGT/ | BASE/  | ZL  | NO   | AVBPR |
| L/ELEM                                                              | ELEV   | OF FLOW | ELEV |       |     | HEAD   | GRD.EL. | ELEV  | DEPTH    |            | DIA  | ID NO. | ZR  | PIER |       |
|                                                                     | SO     |         |      |       |     | SF AVE | HF      |       |          | NORM DEPTH |      |        |     |      |       |
| 0                                                                   | 107.77 | 80.17   | .53  | 80.70 | 3.9 | 7.06   | .77     | 81.47 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | 1.30   | .05826  |      |       |     |        | .01858  | .02   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 109.07 | 80.25   | .54  | 80.79 | 3.9 | 6.73   | .70     | 81.50 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | 1.05   | .05826  |      |       |     |        | .01630  | .02   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 110.12 | 80.31   | .56  | 80.88 | 3.9 | 6.42   | .64     | 81.52 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .87    | .05826  |      |       |     |        | .01430  | .01   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 110.99 | 80.36   | .58  | 80.95 | 3.9 | 6.12   | .58     | 81.53 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .70    | .05826  |      |       |     |        | .01254  | .01   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 111.68 | 80.40   | .61  | 81.01 | 3.9 | 5.84   | .53     | 81.54 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .55    | .05826  |      |       |     |        | .01101  | .01   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 112.24 | 80.44   | .63  | 81.06 | 3.9 | 5.56   | .48     | 81.54 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .43    | .05826  |      |       |     |        | .00967  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 112.66 | 80.46   | .65  | 81.11 | 3.9 | 5.30   | .44     | 81.55 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .32    | .05826  |      |       |     |        | .00849  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 112.98 | 80.48   | .67  | 81.15 | 3.9 | 5.06   | .40     | 81.55 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .20    | .05826  |      |       |     |        | .00747  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 113.18 | 80.49   | .70  | 81.19 | 3.9 | 4.82   | .36     | 81.55 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .13    | .05826  |      |       |     |        | .00657  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 113.31 | 80.50   | .73  | 81.22 | 3.9 | 4.60   | .33     | 81.55 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |
| 0                                                                   | .04    | .05826  |      |       |     |        | .00577  | .00   |          | .40        |      |        | .00 |      |       |
| 0                                                                   | 113.35 | 80.50   | .75  | 81.25 | 3.9 | 4.38   | .30     | 81.55 | .00      | .75        | 1.50 | .00    | .00 | 0    | .00   |

Hydraulic Grade Line Computations for East Branch Connection to Sunset Gardens\Unser Storm Drain (Greiner Basin Y)

|                |       |
|----------------|-------|
| MANNING'S n =  | 0.013 |
| STARTING HGL = | 80.78 |

| INPUT             |       |    |     |       |       |          |       |               |              | OUTPUT |      |        |      |        |    |      |      |      |             |            |           |       |            |           |       |       |
|-------------------|-------|----|-----|-------|-------|----------|-------|---------------|--------------|--------|------|--------|------|--------|----|------|------|------|-------------|------------|-----------|-------|------------|-----------|-------|-------|
| STRCT.<br>STATION | TYPE  | D  | Q   | L     | Delta | JUNCTION |       | INVERT<br>out | INVERT<br>in | A      | V    | K      | Sf   | LOSSES |    |      |      |      | S<br>LOSSES | EGL<br>out | EGL<br>in | Hv    | HGL<br>out | HGL<br>in |       |       |
|                   | SIZE  |    |     |       |       | Dia.     | Theta |               |              |        |      |        |      | Hf     | Hb | Hj   | Hmh  | Ht   |             |            |           |       |            |           |       |       |
| 73.87             | 6' MH |    |     |       |       |          |       |               | 78.20        |        |      |        |      |        |    |      |      |      |             |            |           |       |            |           |       |       |
|                   |       | 18 | 3.9 | 59.48 |       |          |       |               |              | 1.77   | 2.21 | 105.04 | 0.14 | 0.08   |    |      |      |      | 0.08        |            |           | 80.86 |            | 0.08      |       | 80.78 |
| 133.35            | DBL A |    |     |       |       |          |       | 80.50         | 80.50        |        |      |        |      |        |    | 0.00 | 0.00 | 0.00 | 0.00        | 0.00       | 82.08     | 84.10 |            | 82.00     | 83.50 |       |

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Input file : BG2.DAT  
Output file: BG2.OUT

NORTH BRANCH CONNECTION TO BRIDGE STORM DRAIN  
(GREINER BASIN 21-D)

|    |         |       |   |   |      |      |       |      |      |
|----|---------|-------|---|---|------|------|-------|------|------|
| SO | 0000.00 | 75.66 | 1 |   |      |      | 83.30 |      |      |
| JX | 0056.65 | 78.00 | 1 | 1 | .013 | 09.0 | 78.00 | 90.0 | 45.0 |
| JX | 0084.22 | 78.76 | 1 | 1 | .013 | 12.5 | 78.76 | 90.0 | 90.0 |
| TS | 0085.89 | 78.85 | 2 |   | .013 |      |       |      |      |
| JX | 0209.82 | 82.23 | 2 | 2 | .013 | 05.0 | 82.23 | 90.0 |      |
| TS | 0211.49 | 82.32 | 4 |   | .013 |      |       |      |      |
| R  | 0237.82 | 83.00 | 4 |   | .013 |      |       |      |      |
| SH |         |       | 4 |   |      |      |       |      |      |

[illegible]

```

1
0
OHEADING LINE NO 1 IS -
0
OHEADING LINE NO 2 IS -
0
OHEADING LINE NO 3 IS -
0

```

| 0 ELEMENT NO | 1 IS A SYSTEM OUTLET | U/S DATA | STATION | INVERT | SECT | W S ELEV |       |   |    |    |          |          |       |       |
|--------------|----------------------|----------|---------|--------|------|----------|-------|---|----|----|----------|----------|-------|-------|
| 0 ELEMENT NO | 2 IS A JUNCTION      | U/S DATA | STATION | INVERT | SECT | LAT-1    | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
| 0 ELEMENT NO | 3 IS A JUNCTION      | U/S DATA | STATION | INVERT | SECT | LAT-1    | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
| 0 ELEMENT NO | 4 IS A TRANSITION    | U/S DATA | STATION | INVERT | SECT | LAT-1    | LAT-2 | N | Q3 | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |

|              |                         |         |        |      |                           |       |      |     |    |          |          |       |       |  |
|--------------|-------------------------|---------|--------|------|---------------------------|-------|------|-----|----|----------|----------|-------|-------|--|
|              | U/S DATA                | STATION | INVERT | SECT |                           |       |      |     |    |          |          |       |       |  |
|              |                         | 85.89   | 78.85  | 2    |                           |       |      |     |    |          |          |       |       |  |
| 0 ELEMENT NO | 5 IS A JUNCTION         |         |        |      |                           |       |      |     |    |          |          |       |       |  |
|              | U/S DATA                | STATION | INVERT | SECT | LAT-1                     | LAT-2 | N    | Q3  | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |  |
|              |                         | 209.82  | 82.23  | 2    | 2                         | 0     | .013 | 5.0 | .0 | 82.23    | .00      | 90.00 | .00   |  |
| 0 ELEMENT NO | 6 IS A TRANSITION       |         |        |      |                           |       |      |     |    |          |          |       |       |  |
|              | U/S DATA                | STATION | INVERT | SECT |                           |       |      |     |    |          |          |       |       |  |
|              |                         | 211.49  | 82.32  | 4    |                           |       |      |     |    |          |          |       |       |  |
| 0 ELEMENT NO | 7 IS A REACH            |         |        |      |                           |       |      |     |    |          |          |       |       |  |
|              | U/S DATA                | STATION | INVERT | SECT |                           |       |      |     |    |          |          |       |       |  |
|              |                         | 237.82  | 83.00  | 4    |                           |       |      |     |    |          |          |       |       |  |
| 0 ELEMENT NO | 8 IS A SYSTEM HEADWORKS |         |        |      |                           |       |      |     |    |          |          |       |       |  |
|              | U/S DATA                | STATION | INVERT | SECT |                           |       |      |     |    |          |          |       |       |  |
|              |                         | 237.82  | 83.00  | 4    |                           |       |      |     |    |          |          |       |       |  |
|              |                         |         |        |      | RADIUS ANGLE ANG PT MAN H |       |      |     |    |          |          |       |       |  |
|              |                         |         |        |      | .00 .00 .00 0             |       |      |     |    |          |          |       |       |  |
|              |                         |         |        |      | W S ELEV                  |       |      |     |    |          |          |       |       |  |
|              |                         |         |        |      | .00                       |       |      |     |    |          |          |       |       |  |

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

\*\* WARNING NO. 2 \*\* - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

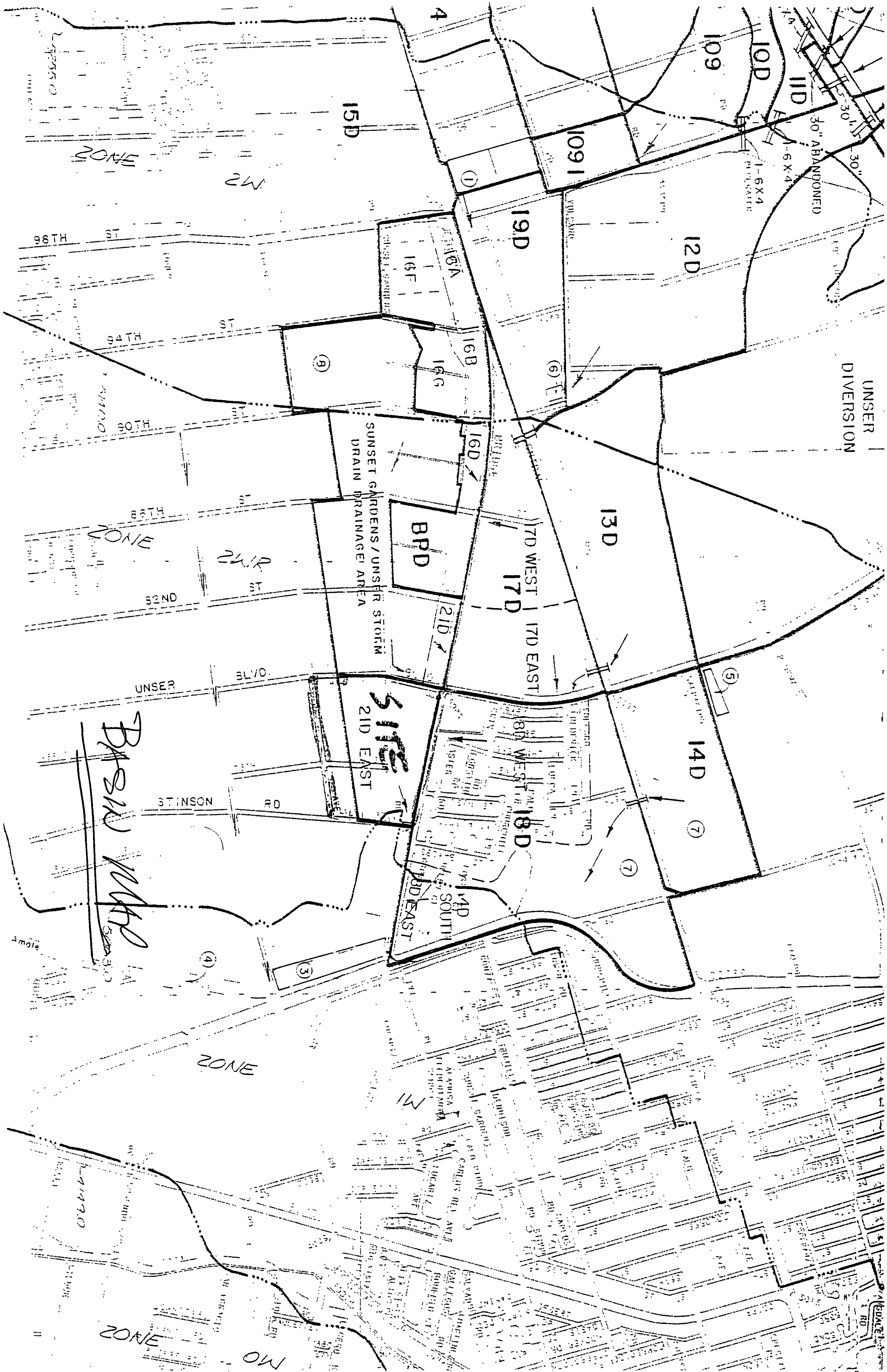
1 PAGE 1

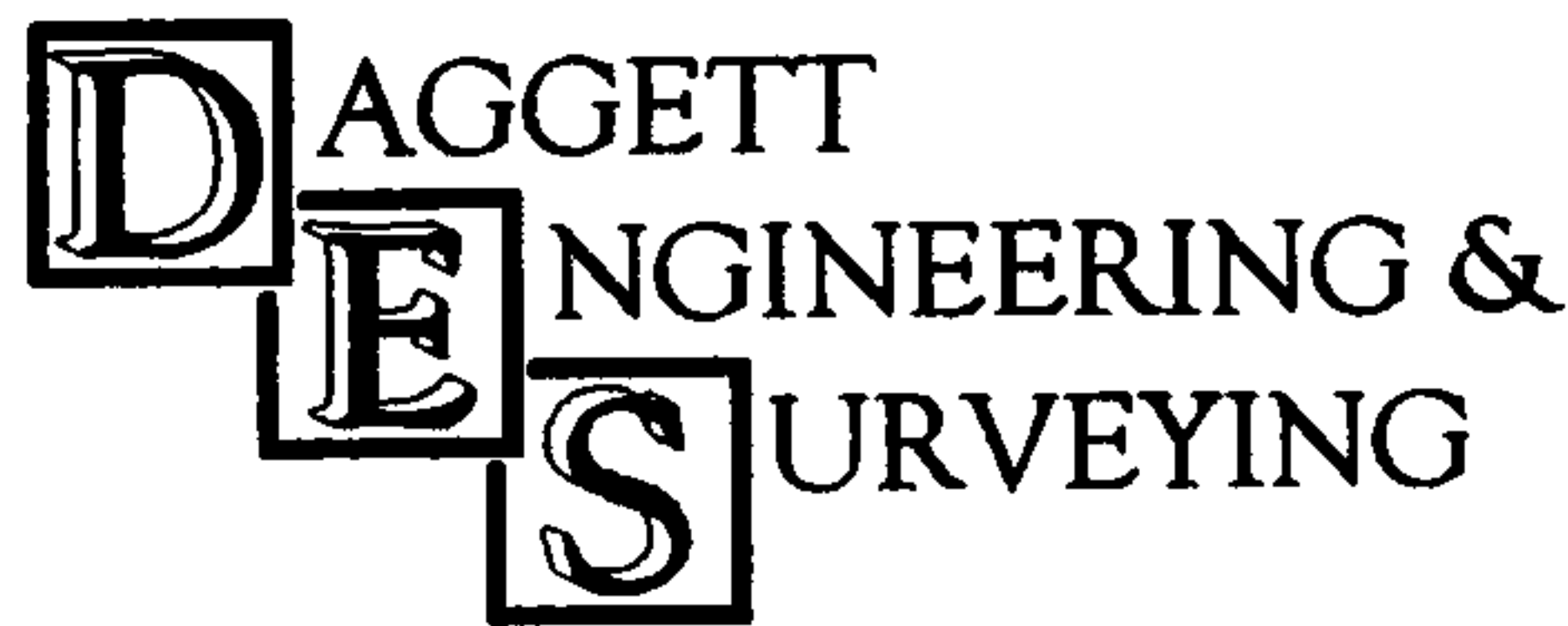
| WATER SURFACE PROFILE LISTING                      |        |         |       |      |      |        |         |       |          |     |      |        |     |      |       |
|----------------------------------------------------|--------|---------|-------|------|------|--------|---------|-------|----------|-----|------|--------|-----|------|-------|
| BRIDGE STORM DRAIN HGL CALCULATIONS FOR TR 11 & 12 |        |         |       |      |      |        |         |       |          |     |      |        |     |      |       |
| ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001      |        |         |       |      |      |        |         |       |          |     |      |        |     |      |       |
| SEE GREINER DESIGN COA PROJECT # 4076.93           |        |         |       |      |      |        |         |       |          |     |      |        |     |      |       |
| 0 STATION                                          | INVERT | DEPTH   | W.S.  | Q    | VEL  | VEL    | ENERGY  | SUPER | CRITICAL |     | HGT/ | BASE/  | ZL  | NO   | AVBPR |
| 0 L/ELEM                                           | ELEV   | OF FLOW | ELEV  |      |      | HEAD   | GRD.EL. | ELEV  | DEPTH    |     | DIA  | ID NO. | ZR  | PIER |       |
| *****                                              |        |         |       |      |      |        |         |       |          |     |      |        |     |      |       |
| 0 .00                                              | 75.66  | 7.64    | 83.30 | 31.5 | 6.42 | .64    | 83.94   | .00   | 1.91     |     | 2.50 | .00    | .00 | 0    | .00   |
| 0JUNCT STR                                         | .04131 |         |       |      |      | .00445 | .25     |       |          |     |      |        | .00 |      |       |
| 0 56.65                                            | 78.00  | 6.18    | 84.18 | 22.5 | 4.58 | .33    | 84.51   | .00   | 1.61     |     | 2.50 | .00    | .00 | 0    | .00   |
| 0JUNCT STR                                         | .02757 |         |       |      |      | .00180 | .05     |       |          |     |      |        | .00 |      |       |
| 0 84.22                                            | 78.76  | 5.99    | 84.75 | 10.0 | 2.04 | .06    | 84.82   | .00   | 1.06     |     | 2.50 | .00    | .00 | 0    | .00   |
| 0TRANS STR                                         | .05389 |         |       |      |      | .00127 | .00     |       |          |     |      |        | .00 |      |       |
| 0 85.89                                            | 78.85  | 5.83    | 84.68 | 10.0 | 3.18 | .16    | 84.84   | .00   | 1.13     |     | 2.00 | .00    | .00 | 0    | .00   |
| 0JUNCT STR                                         | .02727 |         |       |      |      | .00122 | .15     |       |          |     |      |        | .00 |      |       |
| 0 209.82                                           | 82.23  | 2.84    | 85.07 | 5.0  | 1.59 | .04    | 85.11   | .00   | .79      |     | 2.00 | .00    | .00 | 0    | .00   |
| 0TRANS STR                                         | .05389 |         |       |      |      | .00138 | .00     |       |          |     |      |        | .00 |      |       |
| 0 211.49                                           | 82.32  | 2.68    | 85.00 | 5.0  | 2.83 | .12    | 85.13   | .00   | .86      |     | 1.50 | .00    | .00 | 0    | .00   |
| 0 26.33                                            | .02583 |         |       |      |      | .00227 | .06     |       |          | .56 |      |        | .00 |      |       |
| 0 237.82                                           | 83.00  | 2.06    | 85.06 | 5.0  | 2.83 | .12    | 85.19   | .00   | .86      |     | 1.50 | .00    | .00 | 0    | .00   |

Hydraulic Grade Line Computations for North Branch Connection to Bridge Blvd. Storm Drain (Greiner Basin 21-D)

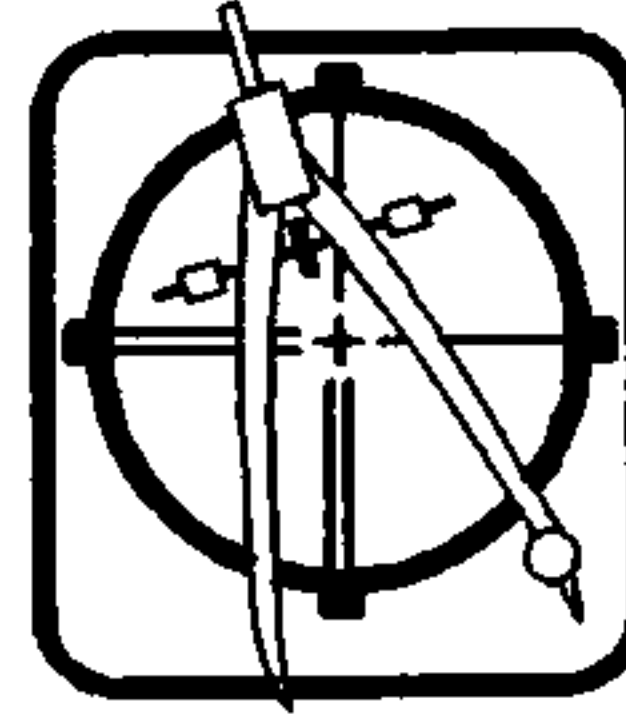
|                |       |
|----------------|-------|
| MANNING'S n =  | 0.013 |
| STARTING HGL = | 83.30 |

| INPUT          |         |    |      |        |       |          |       |            |           | OUTPUT |      |        |      |        |      |      |      |      |          |         |         |      |         |         |
|----------------|---------|----|------|--------|-------|----------|-------|------------|-----------|--------|------|--------|------|--------|------|------|------|------|----------|---------|---------|------|---------|---------|
| STRCT. STATION | TYPE    | D  | Q    | L      | Delta | JUNCTION |       | INVERT out | INVERT in | A      | V    | K      | Sf   | LOSSES |      |      |      |      | S LOSSES | EGL out | EGL in  | Hv   | HGL out | HGL in  |
|                | SIZE    |    |      |        |       | Dia.     | Theta |            |           |        |      |        |      | Hf     | Hb   | Hj   | Hmh  | Ht   |          |         |         |      |         |         |
| 0.00           | 24" WYE |    |      |        |       |          |       |            | 75.66     |        |      |        |      |        |      |      |      |      | 0.33     |         | 83.94   |      |         | 83.30   |
|                |         | 30 | 31.5 | 56.65  |       |          |       |            |           | 4.91   | 6.42 | 410.17 | 0.59 | 0.33   |      |      |      |      | 0.33     |         |         | 0.64 |         |         |
| 56.65          | DBL C   |    |      |        | 45.0  | 30       | 90.0  | 78.00      | 78.00     |        |      |        |      |        | 0.09 | 0.31 | 0.00 | 0.00 | 0.40     | 84.27   | 84.68   |      | 83.63   | 84.35   |
|                |         | 30 | 22.5 | 27.57  |       |          |       |            |           | 4.91   | 4.58 | 410.17 | 0.30 | 0.08   |      |      |      |      | 0.08     |         |         | 0.33 |         |         |
| 84.22          | DBL A   |    |      |        | 90.0  |          |       | 78.76      | 78.76     |        |      |        |      |        | 0.07 | 0.00 | 0.00 | 0.00 | 0.07     | 84.76   | 84.83   |      | 84.43   | 84.67   |
|                |         | 24 | 10.0 | 125.60 |       |          |       |            |           | 3.14   | 3.18 | 226.22 | 0.20 | 0.25   |      |      |      |      | 0.25     |         |         | 0.16 |         |         |
| 209.82         | DBL A   |    |      |        |       | 24       | 90.0  | 82.23      | 82.23     |        |      |        |      |        | 0.00 | 0.19 | 0.00 | 0.00 | 0.19     | 85.07   | 85.26   |      | 84.91   | 85.14   |
|                |         | 18 | 5.0  | 28.00  |       |          |       |            |           | 1.77   | 2.83 | 105.04 | 0.23 | 0.06   |      |      |      |      | 0.06     |         |         | 0.12 |         |         |
| 237.82         | DBL A   |    |      |        |       |          |       | 83.00      | 83.00     |        |      |        |      |        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00     | 85.32   | #DIV/0! |      | 85.20   | #DIV/0! |





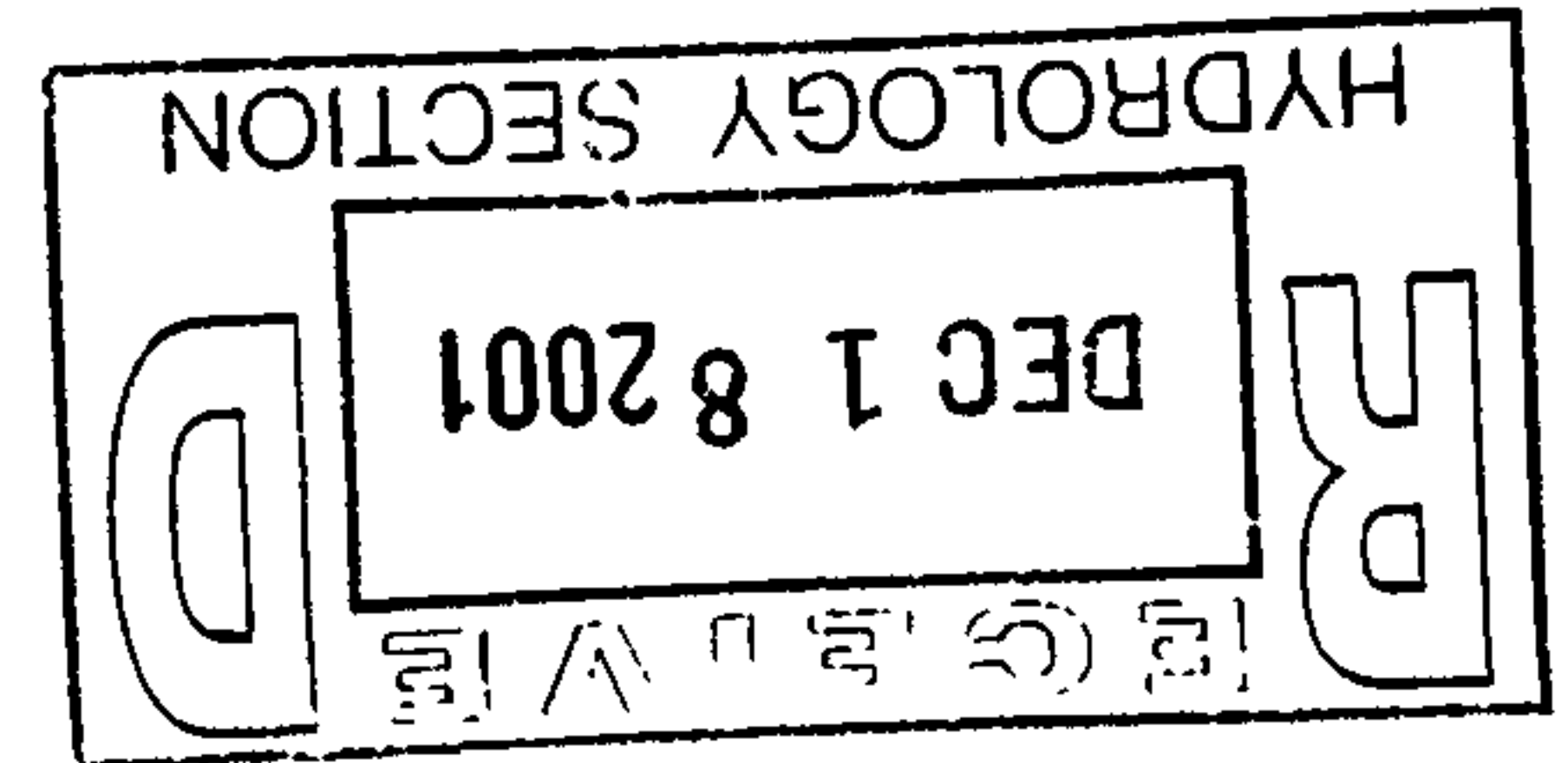
2125 Corte De Chamisa, N.W.  
Albuquerque, N.M. 87120  
kcd@swcp.com (E-mail)



(505) 352-5279 (Office)  
(505) 228-7821 (Mobile)  
(505) 352-6779 (Fax)

December 11, 2001

Mr. Brad Bingham, P.E.  
Hydrology Division  
City of Albuquerque  
Land Development Coordination Division  
600 2<sup>nd</sup> Street NW



Re: Storm Drain Design Change - Desert Gardens Subdivision  
Connection to existing 90" Storm Drain in Bridge Boulevard  
Project #6705.81

L16 / D19

Dear Mr. Bingham:

The approved construction drawings for the above referenced project call for the removal of an existing 24" lateral and wye on the Bridge Boulevard Storm Drain (Amole Del Norte, Phase III, C.O.A. Project # 4076.93). The existing lateral is to be replaced with a 30" lateral and field fabricated wye. However, after recently reviewing the hydrology and hydraulics, I have determined that the existing 24" lateral appears to be adequate and the removal is not necessary. Therefore, I am requesting City approval to utilize the existing 24" line.

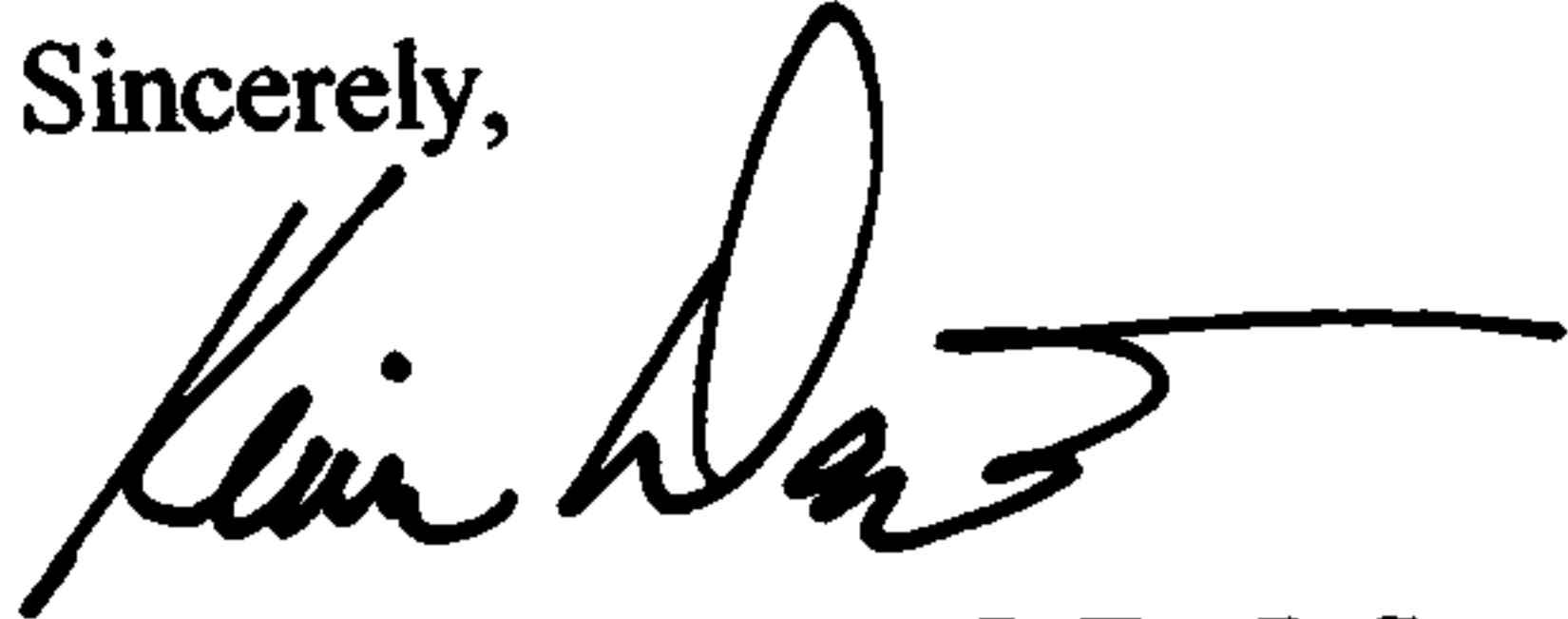
The peak flow for the Bridge Boulevard branch of the Amole Del Norte system occurs at 1.60 hours at the intersection with Unser Boulevard. The peak flow at that point is 978.4 c.f.s. per the Ahymo output for the project. The peak flow for the Desert Gardens Subdivision occurs at 1.50 hours. Referring to the two attached hydrographs (C.O.A. Projects 4076.81 & 6705.81), one can see that the Bridge Boulevard system is flowing at 750.4 c.f.s. when the peak discharge from Desert Gardens occurs. Furthermore, the record drawings for C.O.A. Project 4076.81 indicate a total peak discharge of 996 c.f.s. with 922 c.f.s. in the storm drain and 74 c.f.s. in the street.

The hydraulic grade line as published on these record drawings was the basis for the hydraulic analysis of the north branch storm drain for the Desert Gardens Subdivision. This very conservative approach indicated that the existing 24" lateral had capacity to convey the peak discharge of 31.5 c.f.s. but was not adequate with regard to the HGL which exceeded the grate elevations at the on-site inlets in Scottish Broom Road. However, the discharge in the pipe is closer to 695 c.f.s. ( $750.4/996 \times 922$ ) at 1.50 hours

and full pipe flow for a 90" R.C.P. at a slope of 1.202% is 841.9 c.f.s. (see attached copy of record drawings). The pipe is almost certainly flowing in an open-channel state, but even if the pipe were flowing full, the starting HGL for the north branch analysis would be the soffit of the 90" (approximately 3 feet lower than the published HGL used in the original analysis). Please refer to the attached HGL analysis that indicates that the existing 24" lateral does appear to be adequate under this assumption.

If you have any further questions or comments, please feel free to call me at 228-7821.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin Daggett", with a long horizontal flourish extending to the right.

Kevin C. Daggett, P.E., P.S.

Proprietor

Daggett Engineering & Surveying

FROM FINAL DESIGN REPORT, AMOLE DEL NORTE PHASE III, PROJECT # 4076.43

COMPUTE TRAVEL TIME ID=8 REACH NO=1 NOVS=1 L=1264 SLP=0.012

12/11/01

KCD

①

# TRAVEL TIME TABLE

REACH= 1.0

| WATER<br>DEPTH<br>FEET | AVERAGE<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>CFS | TRAVEL<br>TIME<br>HRS |
|------------------------|----------------------------|---------------------|-----------------------|
| .391                   | .878                       | 4.41                | .0699                 |
| .782                   | 2.443                      | 19.15               | .0448                 |
| 1.173                  | 4.412                      | 44.53               | .0348                 |
| 1.563                  | 6.673                      | 80.09               | .0293                 |
| 1.954                  | 9.155                      | 125.04              | .0257                 |
| 2.345                  | 11.804                     | 178.41              | .0232                 |
| 2.736                  | 14.577                     | 239.03              | .0214                 |
| 3.127                  | 17.436                     | 305.61              | .0200                 |
| 3.518                  | 20.347                     | 376.73              | .0190                 |
| 3.908                  | 23.276                     | 450.88              | .0181                 |
| 4.299                  | 26.193                     | 526.38              | .0175                 |
| 4.690                  | 29.065                     | 601.44              | .0170                 |
| 5.081                  | 31.857                     | 674.10              | .0166                 |
| 5.472                  | 34.533                     | 742.14              | .0163                 |
| 5.863                  | 37.050                     | 803.03              | .0162                 |
| 6.253                  | 39.357                     | 853.69              | .0162                 |
| 6.644                  | 41.389                     | 889.95              | .0163                 |
| 7.035                  | 43.043                     | 904.84              | .0167                 |
| 7.500                  | 44.179                     | 904.84              | .0171                 |

ROUTE ID=8 HYD=6.2 INFLOW ID=7 DT=0.0  
 TRAVEL TIME TABLE EXCEEDED  
 PRINT HYD ID=8 CODE=0

# OUTFLOW HYDROGRAPH REACH 6.20

| TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| .000        | .0          | 4.000       | 98.9        | 8.000       | 71.8        | 12.000      | 64.0        | 16.000      | 45.1        |
| .033        | .0          | 4.033       | 98.6        | 8.033       | 71.8        | 12.033      | 63.9        | 16.033      | 44.9        |
| .067        | .0          | 4.067       | 98.4        | 8.067       | 71.8        | 12.067      | 63.8        | 16.066      | 44.8        |
| .100        | .0          | 4.100       | 98.2        | 8.100       | 71.8        | 12.100      | 63.7        | 16.100      | 44.6        |
| .133        | .0          | 4.133       | 98.0        | 8.133       | 71.8        | 12.133      | 63.5        | 16.133      | 44.4        |
| .167        | .0          | 4.167       | 97.8        | 8.167       | 71.7        | 12.167      | 63.4        | 16.166      | 44.2        |
| .200        | .0          | 4.200       | 97.6        | 8.200       | 71.7        | 12.200      | 63.3        | 16.200      | 44.0        |
| .233        | .0          | 4.233       | 97.5        | 8.233       | 71.7        | 12.233      | 63.2        | 16.233      | 43.8        |
| .267        | .0          | 4.267       | 97.3        | 8.267       | 71.7        | 12.267      | 63.0        | 16.266      | 43.7        |
| .300        | .0          | 4.300       | 97.2        | 8.300       | 71.6        | 12.300      | 62.9        | 16.300      | 43.5        |
| .333        | .0          | 4.333       | 97.0        | 8.333       | 71.6        | 12.333      | 62.8        | 16.333      | 43.3        |
| .367        | .0          | 4.367       | 96.9        | 8.367       | 71.6        | 12.367      | 62.7        | 16.366      | 43.2        |
| .400        | .0          | 4.400       | 96.8        | 8.400       | 71.5        | 12.400      | 62.5        | 16.400      | 43.0        |
| .433        | .0          | 4.433       | 96.7        | 8.433       | 71.5        | 12.433      | 62.4        | 16.433      | 42.8        |
| .467        | .0          | 4.467       | 96.5        | 8.467       | 71.5        | 12.467      | 62.3        | 16.466      | 42.5        |
| .500        | .0          | 4.500       | 96.5        | 8.500       | 71.4        | 12.500      | 62.1        | 16.500      | 42.3        |
| .533        | .0          | 4.533       | 96.4        | 8.533       | 71.4        | 12.533      | 62.0        | 16.533      | 42.1        |
| .567        | .0          | 4.567       | 96.3        | 8.567       | 71.4        | 12.566      | 61.9        | 16.566      | 41.9        |
| .600        | .0          | 4.600       | 96.2        | 8.600       | 71.3        | 12.600      | 61.8        | 16.600      | 41.6        |
| .633        | .0          | 4.633       | 96.1        | 8.633       | 71.3        | 12.633      | 61.6        | 16.633      | 41.4        |
| .667        | .0          | 4.667       | 96.0        | 8.667       | 71.3        | 12.666      | 61.5        | 16.666      | 41.2        |
| .700        | .0          | 4.700       | 96.0        | 8.700       | 71.2        | 12.700      | 61.4        | 16.700      | 41.0        |
| .733        | .0          | 4.733       | 95.9        | 8.733       | 71.2        | 12.733      | 61.2        | 16.733      | 40.7        |
| .767        | .0          | 4.767       | 95.8        | 8.767       | 71.1        | 12.766      | 61.1        | 16.766      | 40.5        |
| .800        | .0          | 4.800       | 95.6        | 8.800       | 71.1        | 12.800      | 61.0        | 16.800      | 40.3        |
| .833        | .0          | 4.833       | 95.4        | 8.833       | 71.1        | 12.833      | 60.8        | 16.833      | 40.1        |
| .867        | .0          | 4.867       | 95.2        | 8.867       | 71.0        | 12.866      | 60.7        | 16.866      | 39.8        |

2

|       |       |       |      |        |      |        |      |        |      |
|-------|-------|-------|------|--------|------|--------|------|--------|------|
| .900  | .0    | 4.900 | 94.9 | 8.900  | 71.0 | 12.900 | 60.6 | 16.900 | 39.6 |
| .933  | .0    | 4.933 | 94.6 | 8.933  | 70.9 | 12.933 | 60.4 | 16.933 | 39.4 |
| .967  | .0    | 4.967 | 94.4 | 8.967  | 70.9 | 12.966 | 60.3 | 16.966 | 39.2 |
| 1.000 | .0    | 5.000 | 94.1 | 9.000  | 70.8 | 13.000 | 60.1 | 17.000 | 39.0 |
| 1.033 | .0    | 5.033 | 93.8 | 9.033  | 70.8 | 13.033 | 60.0 | 17.033 | 38.8 |
| 1.067 | .0    | 5.067 | 93.6 | 9.067  | 70.7 | 13.066 | 59.9 | 17.066 | 38.6 |
| 1.100 | .0    | 5.100 | 93.3 | 9.100  | 70.7 | 13.100 | 59.7 | 17.100 | 38.4 |
| 1.133 | .0    | 5.133 | 93.0 | 9.133  | 70.6 | 13.133 | 59.6 | 17.133 | 38.2 |
| 1.167 | .0    | 5.167 | 92.8 | 9.167  | 70.6 | 13.166 | 59.5 | 17.166 | 38.0 |
| 1.200 | .1    | 5.200 | 92.6 | 9.200  | 70.5 | 13.200 | 59.3 | 17.200 | 37.8 |
| 1.233 | .8    | 5.233 | 92.3 | 9.233  | 70.5 | 13.233 | 59.2 | 17.233 | 37.6 |
| 1.267 | 3.1   | 5.267 | 92.1 | 9.267  | 70.4 | 13.266 | 59.1 | 17.266 | 37.4 |
| 1.300 | 10.3  | 5.300 | 91.9 | 9.300  | 70.4 | 13.300 | 58.9 | 17.300 | 37.2 |
| 1.333 | 35.9  | 5.333 | 91.6 | 9.333  | 70.3 | 13.333 | 58.8 | 17.333 | 37.0 |
| 1.367 | 104.7 | 5.367 | 91.4 | 9.367  | 70.3 | 13.366 | 58.6 | 17.366 | 36.8 |
| 1.400 | 223.8 | 5.400 | 91.2 | 9.400  | 70.2 | 13.400 | 58.5 | 17.400 | 36.6 |
| 1.433 | 377.6 | 5.433 | 90.9 | 9.433  | 70.2 | 13.433 | 58.4 | 17.433 | 36.4 |
| 1.467 | 556.6 | 5.467 | 90.7 | 9.467  | 70.1 | 13.466 | 58.2 | 17.466 | 36.2 |
| 1.500 | 750.4 | 5.500 | 90.5 | 9.500  | 70.1 | 13.500 | 58.1 | 17.500 | 36.0 |
| 1.533 | 888.9 | 5.533 | 90.2 | 9.533  | 70.0 | 13.533 | 57.9 | 17.533 | 35.8 |
| 1.567 | 971.6 | 5.567 | 90.0 | 9.567  | 69.9 | 13.566 | 57.8 | 17.566 | 35.6 |
| 1.600 | 978.4 | 5.600 | 89.9 | 9.600  | 69.9 | 13.600 | 57.7 | 17.600 | 35.4 |
| 1.633 | 940.7 | 5.633 | 89.7 | 9.633  | 69.8 | 13.633 | 57.5 | 17.633 | 35.3 |
| 1.667 | 889.8 | 5.667 | 89.5 | 9.667  | 69.8 | 13.666 | 57.4 | 17.666 | 35.1 |
| 1.700 | 821.2 | 5.700 | 89.3 | 9.700  | 69.7 | 13.700 | 57.2 | 17.700 | 34.9 |
| 1.733 | 772.6 | 5.733 | 89.1 | 9.733  | 69.7 | 13.733 | 57.1 | 17.733 | 34.7 |
| 1.767 | 724.4 | 5.767 | 88.9 | 9.767  | 69.6 | 13.766 | 57.0 | 17.766 | 34.5 |
| 1.800 | 685.3 | 5.800 | 88.6 | 9.800  | 69.5 | 13.800 | 56.8 | 17.800 | 34.4 |
| 1.833 | 647.1 | 5.833 | 88.5 | 9.833  | 69.5 | 13.833 | 56.7 | 17.833 | 34.2 |
| 1.867 | 603.8 | 5.867 | 88.3 | 9.867  | 69.4 | 13.866 | 56.6 | 17.866 | 34.0 |
| 1.900 | 557.1 | 5.900 | 88.1 | 9.900  | 69.3 | 13.900 | 56.4 | 17.900 | 33.8 |
| 1.933 | 521.2 | 5.933 | 87.9 | 9.933  | 69.3 | 13.933 | 56.3 | 17.933 | 33.6 |
| 1.967 | 485.3 | 5.967 | 87.7 | 9.967  | 69.2 | 13.966 | 56.1 | 17.966 | 33.5 |
| 2.000 | 448.9 | 6.000 | 87.5 | 10.000 | 69.2 | 14.000 | 56.0 | 18.000 | 33.3 |
| 2.033 | 426.0 | 6.033 | 87.3 | 10.033 | 69.1 | 14.033 | 55.9 | 18.033 | 33.1 |
| 2.067 | 402.4 | 6.067 | 87.1 | 10.067 | 69.0 | 14.066 | 55.7 | 18.066 | 33.0 |
| 2.100 | 376.7 | 6.100 | 86.8 | 10.100 | 69.0 | 14.100 | 55.6 | 18.100 | 32.8 |
| 2.133 | 351.2 | 6.133 | 86.4 | 10.133 | 68.9 | 14.133 | 55.4 | 18.133 | 32.6 |
| 2.167 | 322.6 | 6.167 | 85.8 | 10.167 | 68.8 | 14.166 | 55.3 | 18.166 | 32.5 |
| 2.200 | 293.0 | 6.200 | 85.2 | 10.200 | 68.8 | 14.200 | 55.1 | 18.200 | 32.3 |
| 2.233 | 263.9 | 6.233 | 84.4 | 10.233 | 68.7 | 14.233 | 55.0 | 18.233 | 32.1 |
| 2.267 | 237.9 | 6.267 | 83.7 | 10.267 | 68.6 | 14.266 | 54.8 | 18.266 | 32.0 |
| 2.300 | 215.2 | 6.300 | 83.0 | 10.300 | 68.5 | 14.300 | 54.6 | 18.300 | 31.8 |
| 2.333 | 196.7 | 6.333 | 82.4 | 10.333 | 68.5 | 14.333 | 54.4 | 18.333 | 31.6 |
| 2.367 | 182.1 | 6.367 | 81.8 | 10.367 | 68.4 | 14.366 | 54.2 | 18.366 | 31.5 |
| 2.400 | 169.9 | 6.400 | 81.3 | 10.400 | 68.3 | 14.400 | 54.0 | 18.400 | 31.3 |
| 2.433 | 159.9 | 6.433 | 80.8 | 10.433 | 68.3 | 14.433 | 53.8 | 18.433 | 31.2 |
| 2.467 | 151.8 | 6.467 | 80.4 | 10.467 | 68.2 | 14.466 | 53.6 | 18.466 | 31.0 |
| 2.500 | 145.1 | 6.500 | 79.9 | 10.500 | 68.1 | 14.500 | 53.4 | 18.500 | 30.8 |
| 2.533 | 139.2 | 6.533 | 79.5 | 10.533 | 68.0 | 14.533 | 53.3 | 18.533 | 30.7 |
| 2.567 | 134.2 | 6.567 | 79.1 | 10.567 | 68.0 | 14.566 | 53.1 | 18.566 | 30.5 |
| 2.600 | 129.7 | 6.600 | 78.8 | 10.600 | 67.9 | 14.600 | 52.9 | 18.600 | 30.4 |
| 2.633 | 125.4 | 6.633 | 78.4 | 10.633 | 67.8 | 14.633 | 52.7 | 18.633 | 30.2 |
| 2.667 | 121.3 | 6.667 | 78.1 | 10.667 | 67.7 | 14.666 | 52.5 | 18.666 | 30.1 |
| 2.700 | 117.6 | 6.700 | 77.8 | 10.700 | 67.7 | 14.700 | 52.3 | 18.700 | 29.9 |
| 2.733 | 114.5 | 6.733 | 77.5 | 10.733 | 67.6 | 14.733 | 52.1 | 18.733 | 29.8 |
| 2.767 | 111.7 | 6.767 | 77.1 | 10.767 | 67.5 | 14.766 | 51.9 | 18.766 | 29.6 |
| 2.800 | 109.1 | 6.800 | 76.8 | 10.800 | 67.4 | 14.800 | 51.7 | 18.800 | 29.5 |
| 2.833 | 106.9 | 6.833 | 76.5 | 10.833 | 67.3 | 14.833 | 51.5 | 18.833 | 29.3 |
| 2.867 | 105.8 | 6.867 | 76.2 | 10.867 | 67.2 | 14.866 | 51.3 | 18.866 | 29.2 |
| 2.900 | 107.1 | 6.900 | 75.9 | 10.900 | 67.2 | 14.900 | 51.1 | 18.900 | 29.0 |
| 2.933 | 111.0 | 6.933 | 75.6 | 10.933 | 67.1 | 14.933 | 51.0 | 18.933 | 28.9 |

$\Delta Q = 228 \text{ CFS}$

|       |       |       |      |        |      |        |      |        |      |
|-------|-------|-------|------|--------|------|--------|------|--------|------|
| 2.967 | 115.7 | 6.967 | 75.3 | 10.967 | 67.0 | 14.966 | 50.8 | 18.966 | 28.8 |
| 3.000 | 118.9 | 7.000 | 75.1 | 11.000 | 66.9 | 15.000 | 50.6 | 19.000 | 28.6 |
| 3.033 | 119.6 | 7.033 | 74.8 | 11.033 | 66.8 | 15.033 | 50.4 | 19.033 | 28.5 |
| 3.067 | 118.7 | 7.067 | 74.5 | 11.067 | 66.7 | 15.066 | 50.2 | 19.066 | 28.3 |
| 3.100 | 117.3 | 7.100 | 74.3 | 11.100 | 66.6 | 15.100 | 50.0 | 19.100 | 28.2 |
| 3.133 | 115.8 | 7.133 | 74.0 | 11.133 | 66.6 | 15.133 | 49.8 | 19.133 | 28.1 |
| 3.167 | 114.3 | 7.167 | 73.7 | 11.167 | 66.5 | 15.166 | 49.6 | 19.166 | 27.9 |
| 3.200 | 112.9 | 7.200 | 73.4 | 11.200 | 66.4 | 15.200 | 49.4 | 19.200 | 27.8 |
| 3.233 | 111.6 | 7.233 | 73.2 | 11.233 | 66.3 | 15.233 | 49.2 | 19.233 | 27.6 |
| 3.267 | 110.5 | 7.267 | 72.9 | 11.267 | 66.2 | 15.266 | 49.0 | 19.266 | 27.5 |
| 3.300 | 109.4 | 7.300 | 72.7 | 11.300 | 66.1 | 15.300 | 48.8 | 19.300 | 27.3 |
| 3.333 | 108.5 | 7.333 | 72.4 | 11.333 | 66.0 | 15.333 | 48.7 | 19.333 | 27.2 |
| 3.367 | 107.6 | 7.367 | 72.2 | 11.367 | 65.9 | 15.366 | 48.5 | 19.366 | 26.9 |
| 3.400 | 106.8 | 7.400 | 72.1 | 11.400 | 65.8 | 15.400 | 48.3 | 19.400 | 26.7 |
| 3.433 | 106.0 | 7.433 | 72.1 | 11.433 | 65.7 | 15.433 | 48.1 | 19.433 | 26.4 |
| 3.467 | 105.3 | 7.467 | 72.0 | 11.467 | 65.6 | 15.466 | 47.9 | 19.466 | 26.1 |
| 3.500 | 104.7 | 7.500 | 72.0 | 11.500 | 65.5 | 15.500 | 47.7 | 19.500 | 25.7 |
| 3.533 | 104.1 | 7.533 | 72.0 | 11.533 | 65.4 | 15.533 | 47.6 | 19.533 | 25.4 |
| 3.567 | 103.5 | 7.567 | 72.0 | 11.567 | 65.3 | 15.566 | 47.4 | 19.566 | 25.1 |
| 3.600 | 103.0 | 7.600 | 72.0 | 11.600 | 65.2 | 15.600 | 47.2 | 19.600 | 24.8 |
| 3.633 | 102.5 | 7.633 | 72.0 | 11.633 | 65.1 | 15.633 | 47.0 | 19.633 | 24.5 |
| 3.667 | 102.0 | 7.667 | 72.0 | 11.667 | 65.0 | 15.666 | 46.9 | 19.666 | 24.2 |
| 3.700 | 101.6 | 7.700 | 72.0 | 11.700 | 64.9 | 15.700 | 46.7 | 19.700 | 23.9 |
| 3.733 | 101.2 | 7.733 | 72.0 | 11.733 | 64.8 | 15.733 | 46.5 | 19.733 | 23.6 |
| 3.767 | 100.8 | 7.767 | 72.0 | 11.767 | 64.7 | 15.766 | 46.3 | 19.766 | 23.3 |
| 3.800 | 100.5 | 7.800 | 71.9 | 11.800 | 64.6 | 15.800 | 46.1 | 19.800 | 23.0 |
| 3.833 | 100.2 | 7.833 | 71.9 | 11.833 | 64.5 | 15.833 | 46.0 | 19.833 | 22.8 |
| 3.867 | 99.9  | 7.867 | 71.9 | 11.867 | 64.4 | 15.866 | 45.8 | 19.866 | 22.5 |
| 3.900 | 99.6  | 7.900 | 71.9 | 11.900 | 64.3 | 15.900 | 45.6 | 19.900 | 22.2 |
| 3.933 | 99.4  | 7.933 | 71.9 | 11.933 | 64.2 | 15.933 | 45.5 | 19.933 | 21.9 |
| 3.967 | 99.1  | 7.967 | 71.9 | 11.967 | 64.1 | 15.966 | 45.3 | 19.966 | 21.7 |

RUNOFF VOLUME = 1.62162 INCHES = 140.3007 ACRE-FEET  
PEAK DISCHARGE RATE = 978.45 CFS AT 1.600 HOURS BASIN AREA = 1.6222 SQ. MI.

# DESERT GARDENS SUBDIVISION, PROJECT #6705.B1

4

\*S CALC ONSITE FLOW

\*S

COMPUTE NM HYD

\*\*\*\*\*

ID=1 HYD NO=ONSITE DA=0.02441 SQ MI

PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0

TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 56.859 CFS UNIT VOLUME = .9991 B = 526.28 P60 = 1.9000  
 AREA = .014402 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
 UNIT PEAK = 24.592 CFS UNIT VOLUME = .9998 B = 327.55 P60 = 1.9000  
 AREA = .010008 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD

ID=1 CODE=0

## HYDROGRAPH FROM AREA ONSITE

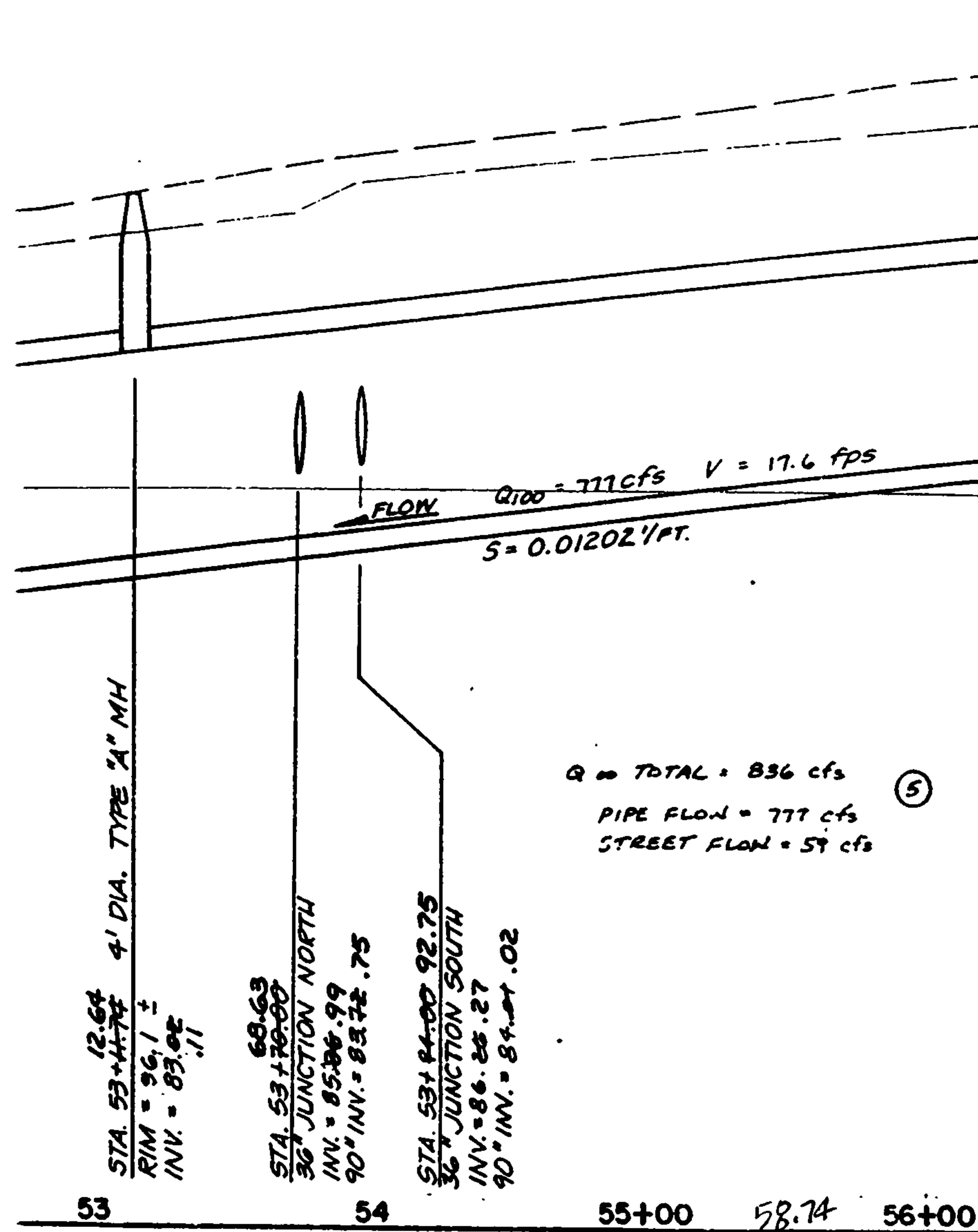
| TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS | TIME<br>HRS | FLOW<br>CFS |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| .000        | .0          | 1.432       | 38.2        | 2.864       | .7          | 4.296       | .2          | 5.728       | .3          |
| .033        | .0          | 1.465       | 48.6        | 2.897       | .6          | 4.329       | .2          | 5.761       | .3          |
| .067        | .0          | 1.499       | 54.1        | 2.930       | .6          | 4.362       | .2          | 5.794       | .3          |
| .100        | .0          | 1.532       | 52.3        | 2.964       | .6          | 4.396       | .2          | 5.827       | .3          |
| .133        | .0          | 1.565       | 46.0        | 2.997       | .5          | 4.429       | .2          | 5.861       | .3          |
| .167        | .0          | 1.598       | 38.9        | 3.030       | .5          | 4.462       | .2          | 5.894       | .3          |
| .200        | .0          | 1.632       | 32.9        | 3.064       | .5          | 4.495       | .2          | 5.927       | .3          |
| .233        | .0          | 1.665       | 28.3        | 3.097       | .4          | 4.529       | .2          | 5.961       | .3          |
| .266        | .0          | 1.698       | 24.7        | 3.130       | .4          | 4.562       | .2          | 5.994       | .3          |
| .300        | .0          | 1.732       | 21.9        | 3.163       | .4          | 4.595       | .2          | 6.027       | .3          |
| .333        | .0          | 1.765       | 19.8        | 3.197       | .4          | 4.629       | .2          | 6.061       | .3          |
| .366        | .0          | 1.798       | 17.9        | 3.230       | .4          | 4.662       | .2          | 6.094       | .2          |
| .400        | .0          | 1.832       | 16.3        | 3.263       | .4          | 4.695       | .2          | 6.127       | .2          |
| .433        | .0          | 1.865       | 15.0        | 3.297       | .3          | 4.729       | .2          | 6.160       | .1          |
| .466        | .0          | 1.898       | 13.9        | 3.330       | .3          | 4.762       | .2          | 6.194       | .1          |
| .500        | .0          | 1.931       | 13.0        | 3.363       | .3          | 4.795       | .2          | 6.227       | .1          |
| .533        | .0          | 1.965       | 12.2        | 3.397       | .3          | 4.828       | .2          | 6.260       | .0          |
| .566        | .0          | 1.998       | 11.4        | 3.430       | .3          | 4.862       | .2          | 6.294       | .0          |
| .599        | .0          | 2.031       | 10.7        | 3.463       | .3          | 4.895       | .2          | 6.327       | .0          |
| .633        | .0          | 2.065       | 9.7         | 3.496       | .3          | 4.928       | .2          | 6.360       | .0          |
| .666        | .0          | 2.098       | 8.3         | 3.530       | .3          | 4.962       | .2          | 6.394       | .0          |
| .699        | .0          | 2.131       | 6.7         | 3.563       | .3          | 4.995       | .2          | 6.427       | .0          |
| .733        | .0          | 2.165       | 5.4         | 3.596       | .3          | 5.028       | .2          | 6.460       | .0          |
| .766        | .0          | 2.198       | 4.4         | 3.630       | .3          | 5.062       | .2          | 6.493       | .0          |
| .799        | .0          | 2.231       | 3.7         | 3.663       | .3          | 5.095       | .2          | 6.527       | .0          |
| .832        | .0          | 2.264       | 3.2         | 3.696       | .2          | 5.128       | .2          | 6.560       | .0          |
| .866        | .0          | 2.298       | 2.9         | 3.730       | .2          | 5.161       | .2          | 6.593       | .0          |
| .899        | .0          | 2.331       | 2.6         | 3.763       | .2          | 5.195       | .2          | 6.627       | .0          |
| .932        | .0          | 2.364       | 2.3         | 3.796       | .2          | 5.228       | .2          | 6.660       | .0          |
| .966        | .0          | 2.398       | 2.1         | 3.829       | .2          | 5.261       | .2          | 6.693       | .0          |
| .999        | .0          | 2.431       | 1.9         | 3.863       | .2          | 5.295       | .2          | 6.727       | .0          |
| 1.032       | .0          | 2.464       | 1.8         | 3.896       | .2          | 5.328       | .2          | 6.760       | .0          |
| 1.066       | .0          | 2.497       | 1.6         | 3.929       | .2          | 5.361       | .2          | 6.793       | .0          |
| 1.099       | .0          | 2.531       | 1.5         | 3.963       | .2          | 5.395       | .2          | 6.826       | .0          |
| 1.132       | .0          | 2.564       | 1.4         | 3.996       | .2          | 5.428       | .2          | 6.860       | .0          |
| 1.166       | .0          | 2.597       | 1.2         | 4.029       | .2          | 5.461       | .2          | 6.893       | .0          |
| 1.199       | .4          | 2.631       | 1.1         | 4.063       | .2          | 5.494       | .2          | 6.926       | .0          |
| 1.232       | 1.8         | 2.664       | 1.1         | 4.096       | .2          | 5.528       | .2          | 6.960       | .0          |
| 1.265       | 4.4         | 2.697       | 1.0         | 4.129       | .2          | 5.561       | .2          | 6.993       | .0          |

|       |      |       |    |       |    |       |    |       |    |
|-------|------|-------|----|-------|----|-------|----|-------|----|
| 1.299 | 7.9  | 2.731 | .9 | 4.162 | .2 | 5.594 | .2 | 7.026 | .0 |
| 1.332 | 12.5 | 2.764 | .8 | 4.196 | .2 | 5.628 | .2 | 7.060 | .0 |
| 1.365 | 18.8 | 2.797 | .8 | 4.229 | .2 | 5.661 | .3 |       |    |
| 1.399 | 27.5 | 2.830 | .7 | 4.262 | .2 | 5.694 | .3 |       |    |

RUNOFF VOLUME = 1.44632 INCHES = 1.8829 ACRE-FEET  
 PEAK DISCHARGE RATE = 54.07 CFS AT 1.499 HOURS BASIN AREA = .0244 SQ. MI.

5

REVISION  
M3  
6



5100  
5095  
5090  
5085  
5080  
5075  
5070

**RECORD DRAWINGS**

THESE DRAWINGS HAVE BEEN REVISED TO REFLECT AS-CONSTRUCTED CONDITIONS IN ACCORDANCE WITH INFORMATION FURNISHED BY THE CONTRACTOR (ALBUQUERQUE UNDERGROUND) AND THE CITY OF ALBUQUERQUE, WHICH PERFORMED ON-SITE INSPECTION DURING CONSTRUCTION AND CONSTRUCTION SURVEYS.

MOK  
9-16-98

**URS Greiner**

5971 JEFFERSON BLVD. NE  
SUITE 101  
ALBUQUERQUE, NM 87109  
(505) 345-3999

83.50  
83.33

CITY OF ALBUQUERQUE  
PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION  
TITLE: AMOLE DEL NORTE STORM DIVERSION FACILITIES PHASE ONE  
TIERRA BATITA DRAINAGE FACILITIES  
BRIDGE BOULEVARD STA. 44+21 TO STA 56+21 STORM

Design Review Committee  
**APPROVED**  
MAR 26 1998  
DESIGN REVIEW COMMITTEE

City Engineer Approved  
**APPROVED**  
MAR 28 1998  
CITY ENGINEER

City Project No. 4076.93 Zone Map No. K-9, L-10 Sheet 4

CITY OF ALBUQUERQUE

STA. 44+42.47 BACK =  
STA. 44+36.24 AHEAD =  
4' DIA. TYPE "A" M.H.  
M.H. RIM = 87.07  
INV. = 72.50.75

95  
100  
105  
110

12/11/01  
KCD  
⑦

PREVIOUSLY USED  
PREVIOUS ASSUMPTION FOR  
ANALYSIS  
HGL ASSUMED  
REVISED

EXISTING GROUND  
& PIPE

TOP OF PIPE

100 YR HGL

80.57 = EL.  
73.07 + 90/12 = 80.57

FLOW  
Q100 = 872 cfs V = 1  
S = 0.01202'/FT.

FLOW  
Q100 = 872 cfs V = 19.7 FPS  
S = 0.01202'/FT.

STA. 44+42.47 BACK =  
STA. 44+36.24 AHEAD =  
4' DIA. TYPE "A" M.H.  
M.H. RIM = 87.07  
INV. = 72.50.75  
36" 50 JUNCTION NORTH  
STA. 44+46.00  
INV. = 74.85 75.14  
90" INV. = 72.64 .89  
STA. 44+56.80  
24" 50 JUNCTION SOUTH  
INV. = 75.48 .82  
90" INV. = 72.75  
73.07

STA. 48+86.24  
4' DIA. TYPE "A" M.H.  
RIM = 91.47  
INV. = 77.71  
78.36

Q100 TOTAL = 946 cfs  
PIPE FLOW = 872 cfs  
STREET FLOW = 74 cfs

PIPE

44+00 45+00 46 47 48 49 50+00 51

8

Hydraulic Grade Line Computations for North Branch Connection to Bridge Blvd. Storm Drain (Greiner Basin 21-D)

MANNING'S n = 0.013  
STARTING HGL = 80.57 ← SOFFIT @ 24" WYE

| INPUT             |              |    |      |        |       |          |       |               |              | OUTPUT |         |        |         |         |      |      |      |      |             |            |           |         |            |           |  |       |
|-------------------|--------------|----|------|--------|-------|----------|-------|---------------|--------------|--------|---------|--------|---------|---------|------|------|------|------|-------------|------------|-----------|---------|------------|-----------|--|-------|
| STRCT.<br>STATION | TYPE<br>SIZE | D  | Q    | L      | Delta | JUNCTION |       | INVERT<br>out | INVERT<br>in | A      | V       | K      | Sl      | LOSSES  |      |      |      |      | S<br>LOSSES | EGL<br>out | EGL<br>In | Hv      | MGL<br>out | MGL<br>in |  |       |
|                   |              |    |      |        |       | Dia.     | Theta |               |              |        |         |        |         | Hf      | Hb   | HI   | Hmh  | Ht   |             |            |           |         |            |           |  |       |
| 0+00              | 24" WYE      |    |      |        |       |          |       |               | 75.66        |        |         |        |         |         |      |      |      |      | 1.10        |            | 82.13     |         | 1.56       |           |  | 80.57 |
|                   |              | 24 | 31.5 | 56.65  |       |          |       |               |              | 3.14   | 10.03   | 226.22 | 1.94    | 1.10    |      |      |      |      | 1.10        |            |           |         | 1.56       |           |  |       |
| 56+65             | MH           |    |      |        | 45.0  |          |       | 78.00         | 78.00        |        |         |        |         |         | 0.22 | 0.00 | 0.00 | 0.00 | 0.22        | 83.23      | 83.45     |         | 81.67      | 82.65     |  |       |
|                   | 4            | 24 | 22.5 | 27.57  |       |          |       |               |              | 3.14   | 7.16    | 226.22 | 0.99    | 0.27    |      | 0.16 | 0.64 | 0.00 | 0.00        | 0.27       |           |         | 0.80       |           |  |       |
| 84+22             | DBL A        |    |      |        | 90.0  | 30       | 90.0  | 78.76         | 78.76        |        |         |        |         |         |      |      |      |      | 0.80        | 83.72      | 84.52     |         | 82.93      | 84.36     |  |       |
|                   |              | 24 | 10.0 | 125.60 |       |          |       |               |              | 3.14   | 3.18    | 226.22 | 0.20    | 0.25    |      |      |      |      | 0.25        |            |           | 0.16    |            |           |  |       |
| 209+82            | DBL A        |    |      |        |       | 24       | 90.0  | 82.23         | 82.23        |        |         |        |         |         | 0.00 | 0.19 | 0.00 | 0.00 | 0.19        | 84.77      | 84.96     |         | 84.61      | 84.83     |  |       |
|                   |              | 18 | 5.0  | 28.00  |       |          |       |               |              | 1.77   | 2.83    | 105.04 | 0.23    | 0.06    |      |      |      |      | 0.06        |            |           | 0.12    |            |           |  |       |
| 237+82            | DBL A        |    |      |        |       |          |       | 83.00         | 83.00        |        |         |        |         |         | 0.00 | 0.00 | 0.00 | 0.00 | 0.00        | 85.02      | #DIV/0!   |         | 84.90      | #DIV/0!   |  |       |
|                   |              |    |      |        |       |          |       |               |              | 0.00   | #DIV/0! | 0.00   | #DIV/0! | #DIV/0! |      |      |      |      | #DIV/0!     |            |           | #DIV/0! |            |           |  |       |

FLOW LINE EL. = 85.68 ✓  
@ GRATES ON SCOTTISH  
BROOM ROAD.



# ***City of Albuquerque***

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 29, 2001

Mr. Kevin Daggett, P.E.  
Daggett Engineering and Surveying  
2125 Corte de Chamisa NW  
Albuquerque, NM 87120

**Re: Grading and Drainage Plan for Tracts 11 and 12, V.E. Barrett  
Subdivision, (L10/D19), Engineer stamp dated 5/24/01.**

Dear Mr. Daggett,

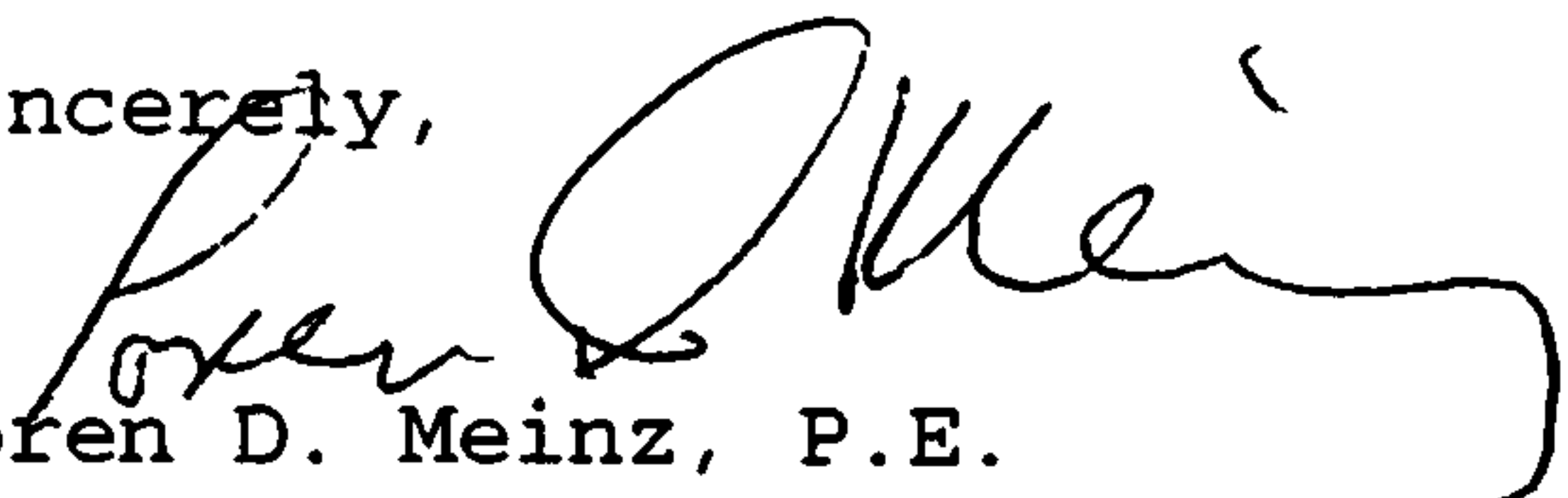
The above referenced plan/report is approved for Grading and  
Drainage, and Preliminary Plat action by DRB.

Per our discussion, please add the inlet and connector pipe on  
Sunset Gardens Rd. near the intersection of Unser.

Engineer Certification for grading and drainage per the DPM  
checklist is required prior to release of Financial Guarantees.

If you have questions, contact me at 924-3980.

Sincerely,

  
Loren D. Mainz, P.E.  
Hydrology Division

c: Terri Martin  
File



# *City of Albuquerque*

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 3, 2001

Mr. Kevin Daggett, P.E.  
Daggett Engineering and Surveying  
2125 Corte de Chamisa NW  
Albuquerque, NM 87120

**Re: Grading and Drainage Plan Tracts 11 and 12, V.E. Barrett  
Subdivision, (L10/D19), Engineer stamp dated 4/17/01.**

Dear Mr. Daggett,

The above referenced report has been reviewed, and the following comments will need to be addressed.

1. Please provide additional information on Bridge Blvd drainage. Show street slopes, cross-sections of developed condition, and address the off-site conditions to the west. Does any drainage from the west enter this section of Bridge Blvd, or is there sufficient inlet capacity to accept all drainage into the pipe? Bridge Blvd. drainage must address DPM standards for arterial classification.
2. Provide a drainage basin map in the report for offsite and on-site basins mentioned in the report.
3. Show proposed street flows on the grading plan for all streets.
4. Inlets on "D" street should be double grate, double throats per the information in the report.
5. The proposed overflow spillway will create a Tract for public maintenance. This needs to be discussed with staff, and may possibly be eliminated with grading plan, and adequate inlet capacities.
6. Flood zone treatment will have to be discussed with the Floodplain Administrator, Carlos Montoya.
7. The proposed 10" curb height at the sump condition is not City standard.

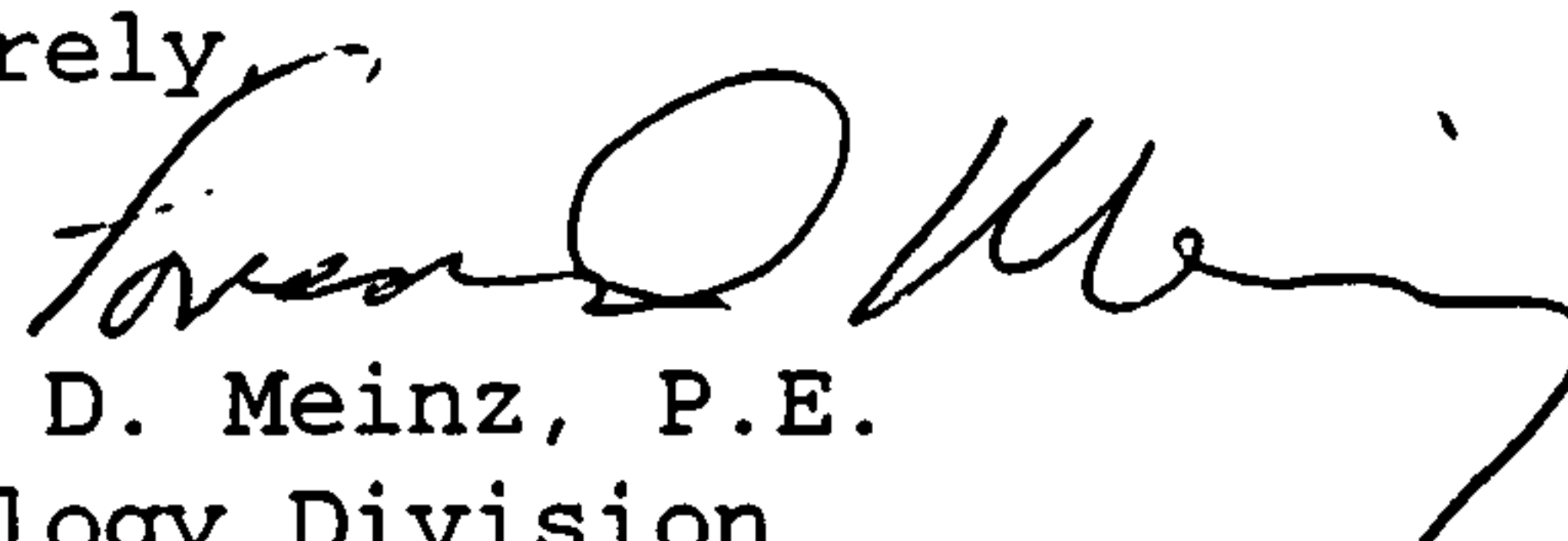
L10/D19

Page 2

I would be happy to meet with you to discuss some of the changes.

If you have any questions, please call me at 924-3980.

Sincerely,

  
Loren D. Mainz, P.E.  
Hydrology Division

c: Terri Martin  
File



# ***City of Albuquerque***

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

May 3, 2001

Mr. Kevin Daggett, P.E.  
Daggett Engineering and Surveying  
2125 Corte de Chamisa NW  
Albuquerque, NM 87120

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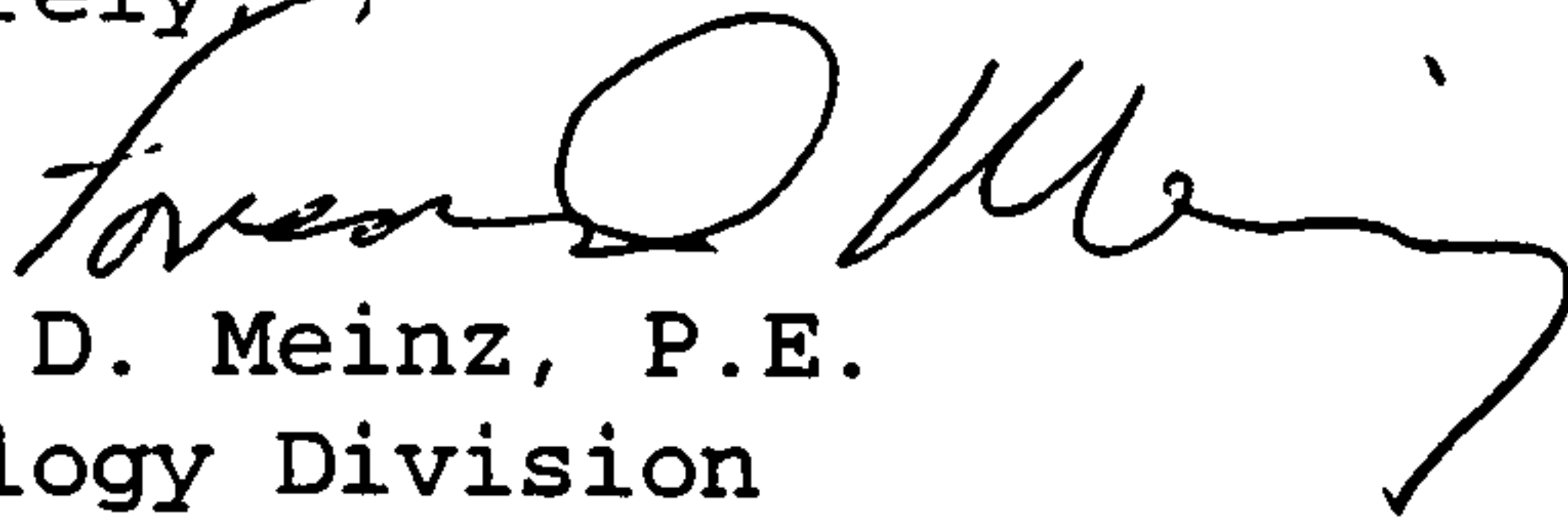
L10/D19

Page 2

I would be happy to meet with you to discuss some of the changes.

If you have any questions, please call me at 924-3980.

Sincerely,

A handwritten signature in black ink, appearing to read "Loren D. Mainz". The signature is fluid and cursive, with a large loop for the 'L' and a long, sweeping tail for the 'z'.

Loren D. Mainz, P.E.  
Hydrology Division

c: Terri Martin  
File

# DRAINAGE INFORMATION SHEET

L10/D19

PROJECT TITLE: TRACTS 11 & 12, VERBARETT ZONE MAP/DRG. FILE #: L-10-Z  
 DRB #: \_\_\_\_\_ EPC#: \_\_\_\_\_ WORK ORDER#: \_\_\_\_\_

LEGAL DESCRIPTION: ABOVE  
 CITY ADDRESS: \_\_\_\_\_

ENGINEERING FIRM: DAGGETT ENGINEERING & SURVEYING CONTACT: KEVIN DAGGETT  
 ADDRESS: 2125 CORTE DE CHAMISA, NW PHONE: 228-7821  
 CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87120

OWNER: BROOKSIDE HOLDINGS CONTACT: NICK BELL  
 ADDRESS: 919 SALAMANCA, NW PHONE: 341-4324  
 CITY, STATE: ALBUQUERQUE, NM ZIP CODE: 87107

ARCHITECT: N/A CONTACT: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_  
 CITY, STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

SURVEYOR: DAGGETT ENGINEERING & SURVEYING CONTACT: \_\_\_\_\_  
 ADDRESS: S/A ABOVE PHONE: \_\_\_\_\_  
 CITY, STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

CONTRACTOR: N/A CONTACT: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_ PHONE: \_\_\_\_\_  
 CITY, STATE: \_\_\_\_\_ ZIP CODE: \_\_\_\_\_

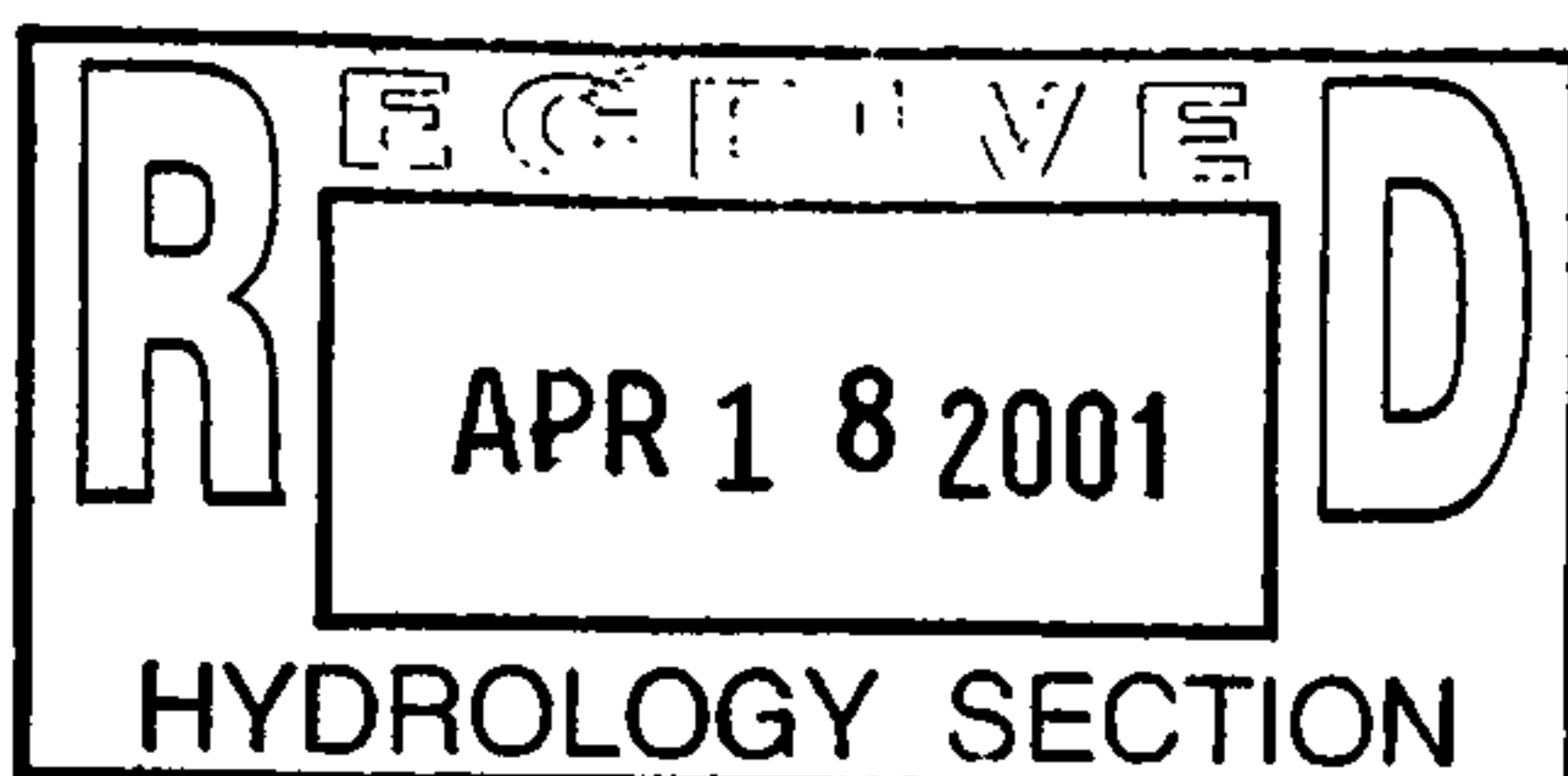
- TYPE OF SUBMITTAL:**
- ☒ DRAINAGE REPORT
  - ☐ DRAINAGE PLAN
  - ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
  - ☐ GRADING PLAN
  - ☐ EROSION CONTROL PLAN
  - ☐ ENGINEER'S CERTIFICATION
  - ☐ CLOMR/LOMR
  - ☐ OTHER
- WAS A PRE-DESIGN CONFERENCE ATTENDED:**
- ☒ YES
  - ☐ NO
  - ☐ COPY PROVIDED

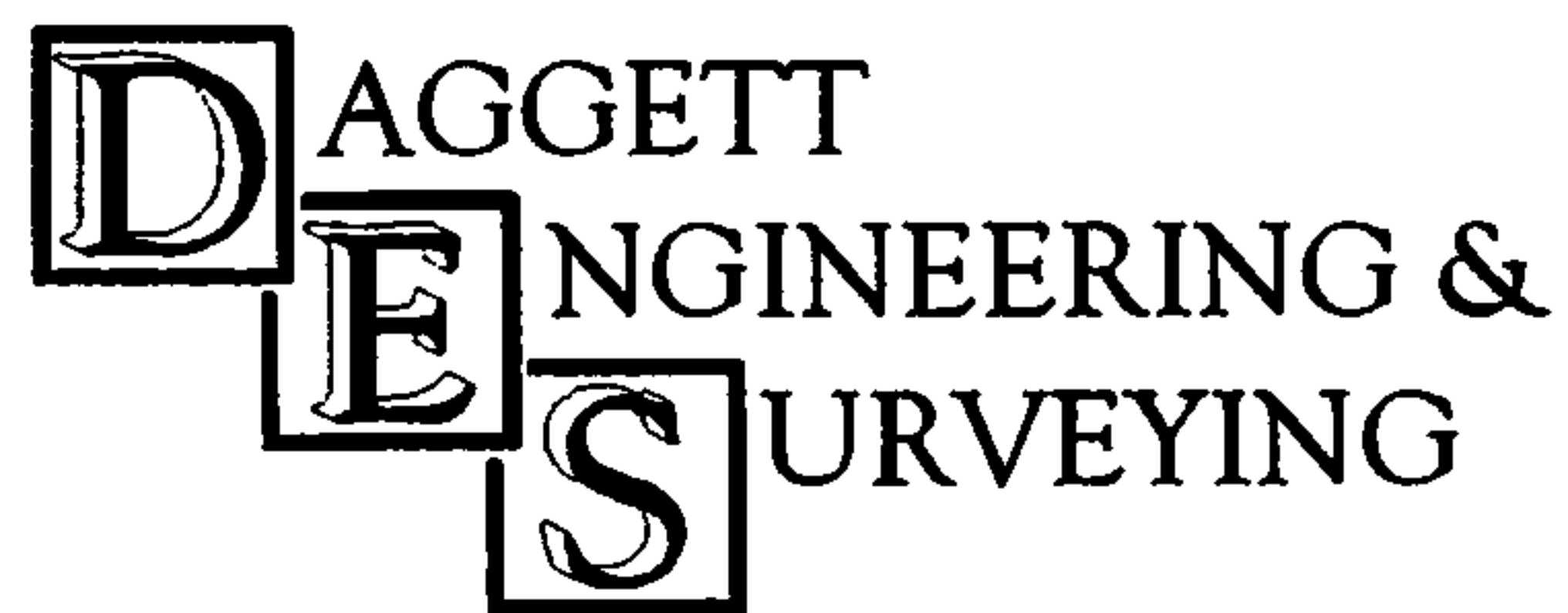
- CHECK TYPE OF APPROVAL SOUGHT:**
- ☐ SIA / FINANCIAL GUARANTEE RELEASE
  - ☐ PRELIMINARY PLAT APPROVAL
  - ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
  - ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
  - ☐ SECTOR PLAN APPROVAL
  - ☒ FINAL PLAT APPROVAL
  - ☐ FOUNDATION PERMIT APPROVAL
  - ☐ BUILDING PERMIT APPROVAL
  - ☐ CERTIFICATE OF OCCUPANCY APPROVAL
  - ☐ GRADING PERMIT APPROVAL
  - ☐ PAVING PERMIT APPROVAL
  - ☐ WORK ORDER APPROVAL
  - ☐ OTHER (SPECIFY)

DATE SUBMITTED: 4/18/01 BY: KEVIN DAGGETT

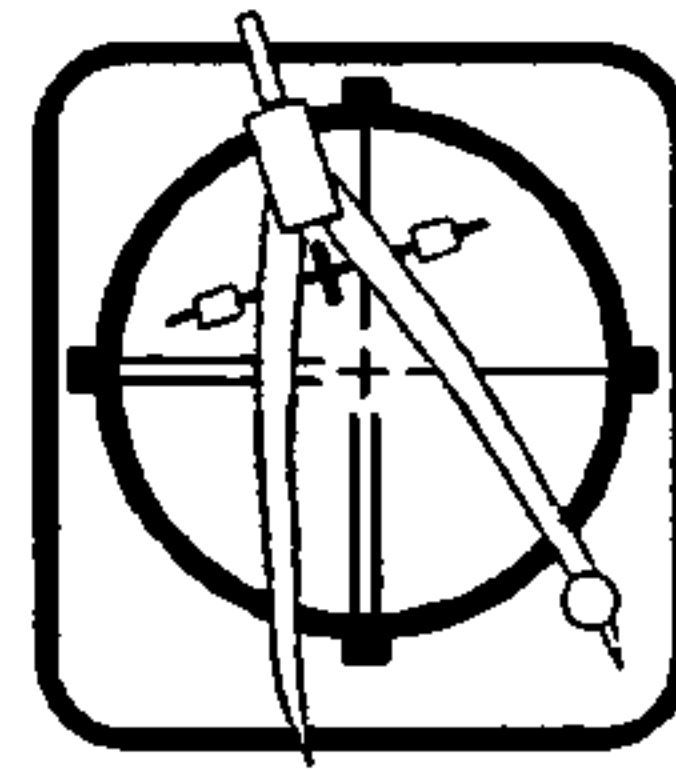
Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or more.





2125 Corte De Chamisa, N.W.  
Albuquerque, N.M. 87120  
kcd@swcp.com (E-mail)



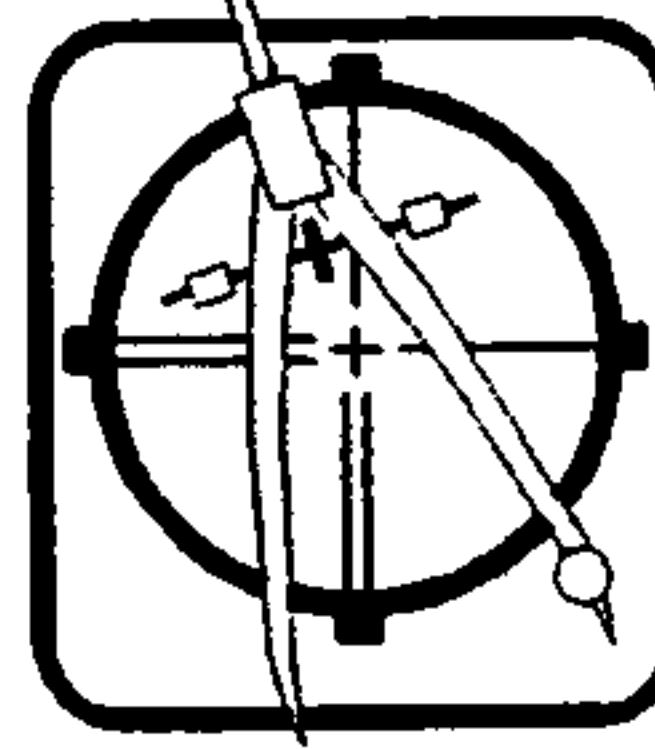
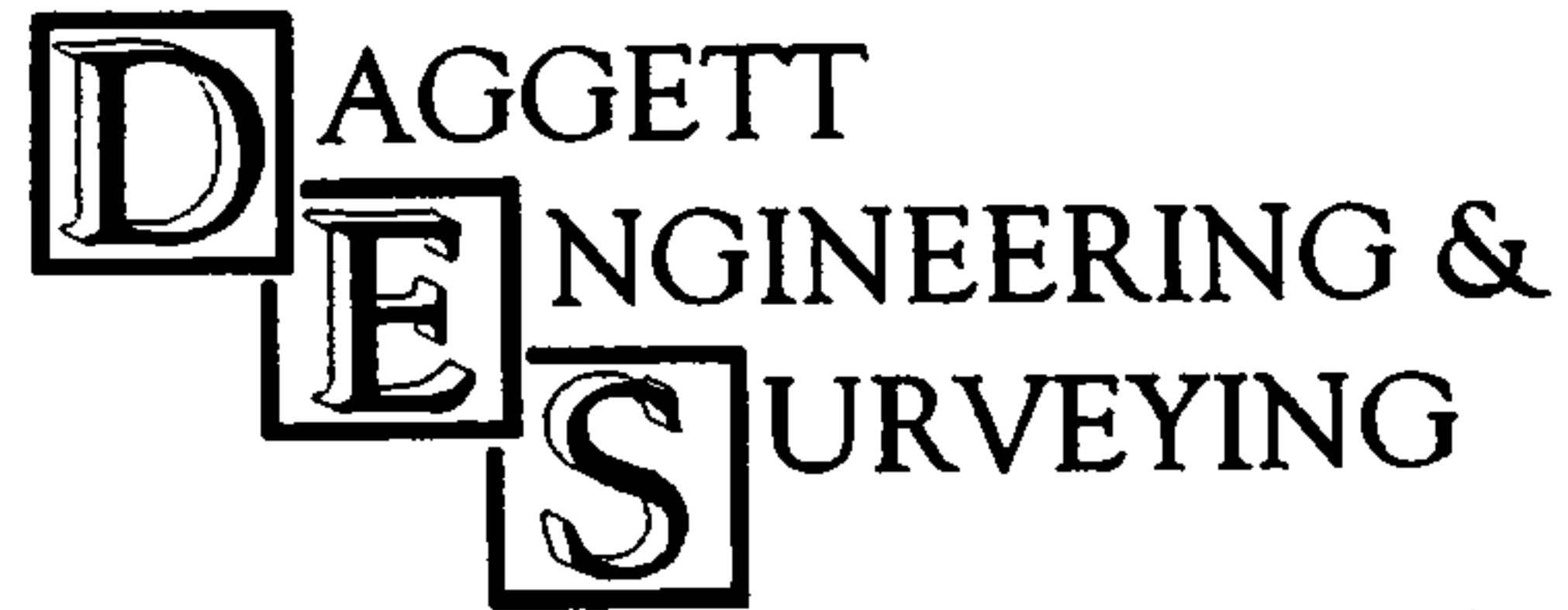
(505) 352-5279 (Office)  
(505) 228-7821 (Mobile)  
(505) 352-1165 (Fax)

**DRAINAGE REPORT**  
**FOR**  
**PROPOSED SINGLE FAMILY DETACHED**  
**RESIDENTIAL DEVELOPMENT**  
**ON**  
**TRACTS 11 & 12**  
**V.E. BARRETT SUBDIVISION**

Prepared for

Brookside Holdings  
919 Salamanca NW  
Albuquerque, NM 87107

APRIL 2001



2125 Corte De Chamisa, N.W.  
Albuquerque, N.M. 87120  
kcd@swcp.com (E-mail)

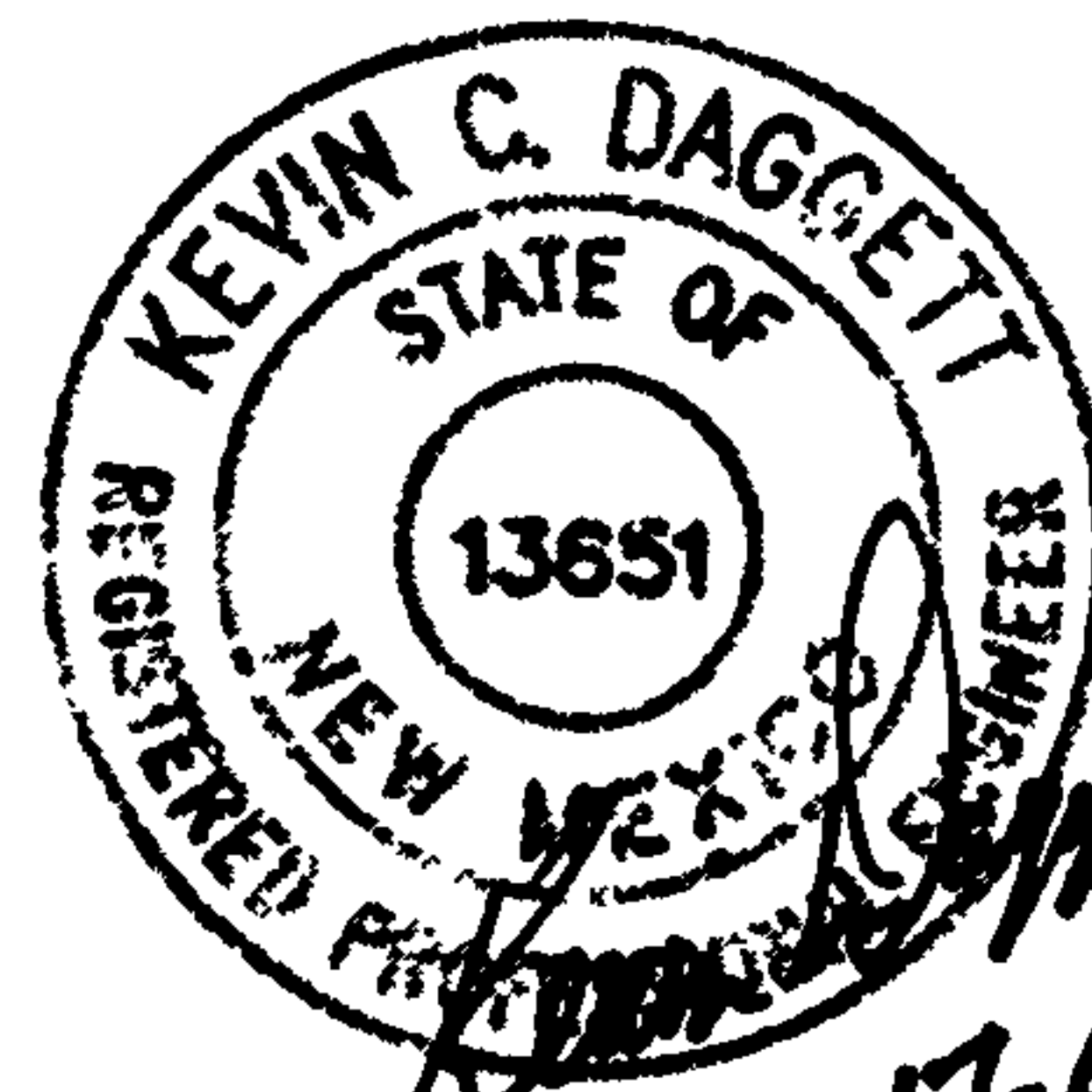
(505) 352-5279 (Office)  
(505) 228-7821 (Mobile)  
(505) 352-1165 (Fax)

**DRAINAGE REPORT**  
  
**FOR**  
  
**PROPOSED SINGLE FAMILY DETACHED  
RESIDENTIAL DEVELOPMENT**  
  
**ON**  
  
**TRACTS 11 & 12  
V.E. BARRETT SUBDIVISION**

Prepared for

Brookside Holdings  
919 Salamanca NW  
Albuquerque, NM 87107

APRIL 2001



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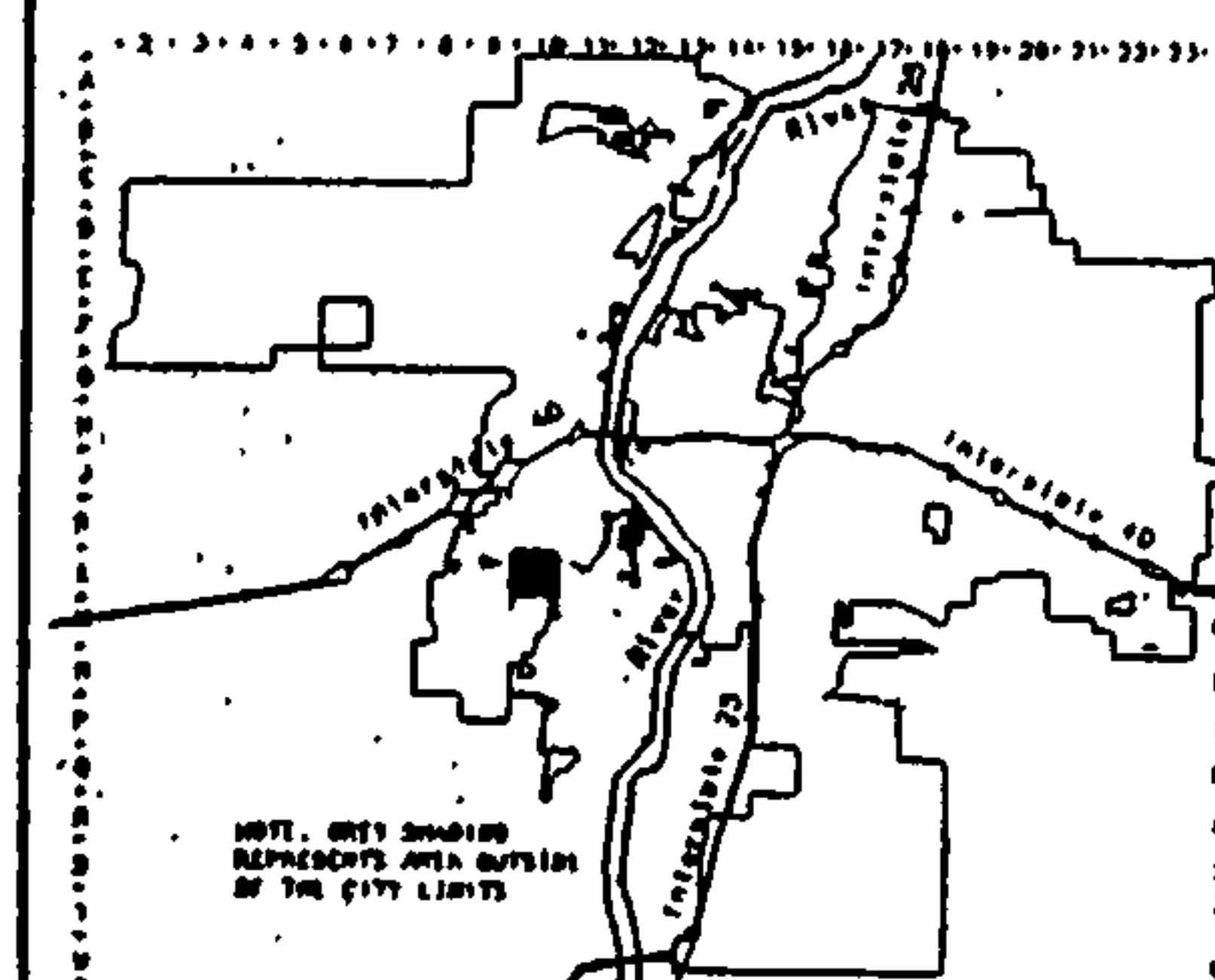
- PRELIMINARY PLAT
- GRADING PLAN
- DESIGN PLAN & PROFILE FOR PROPOSED CONNECTOR PIPES



CITY OF  
Albuquerque  
A large Geographic Information System  
PLANNING DEPARTMENT  
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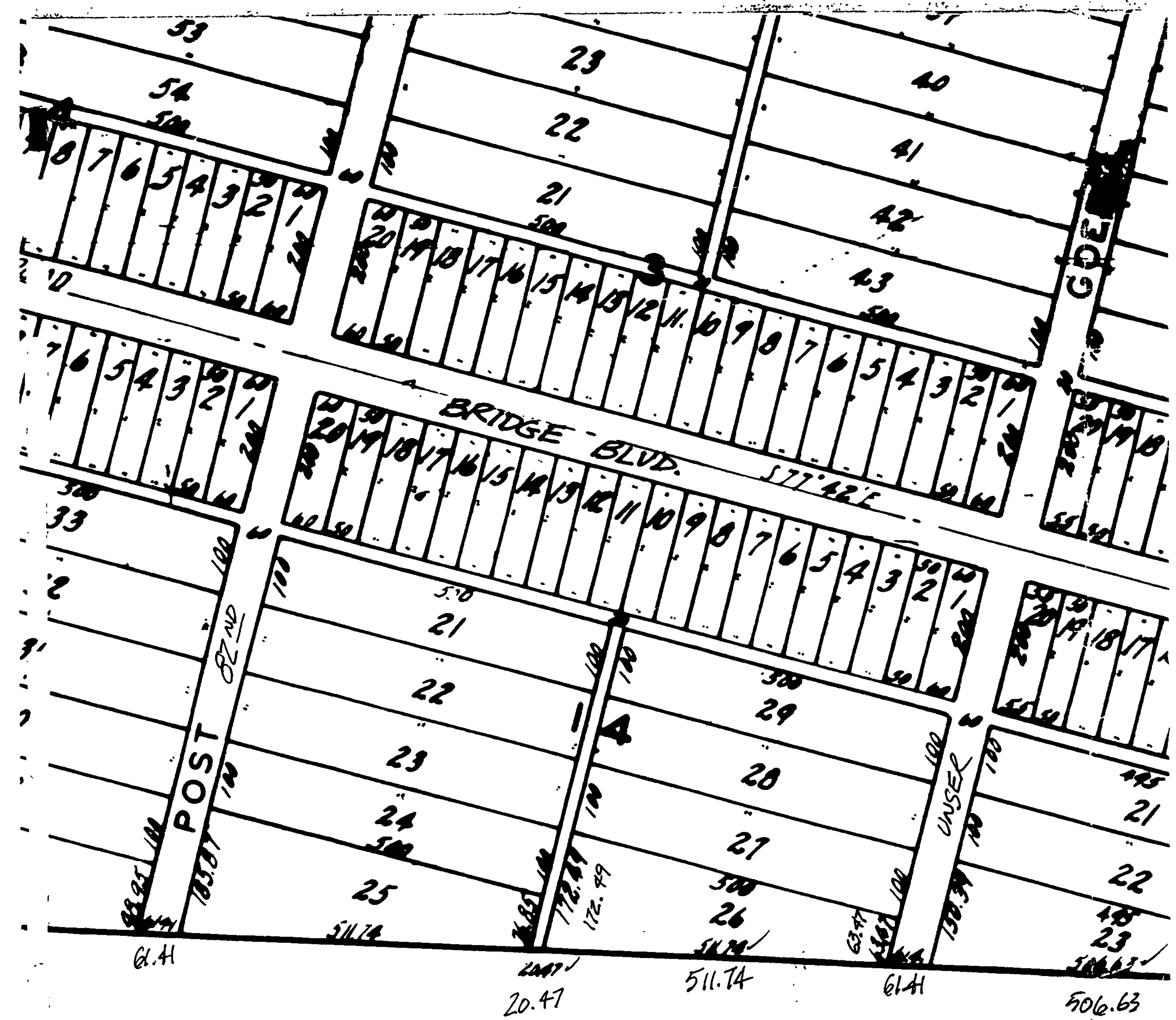


GRAPHIC SCALE IN FEET



Zone Atlas Page  
**L-10-Z**

Map Amended through  
December 20, 1999



**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM**

**FLOOD INSURANCE RATE MAP**

**BERNALILLO COUNTY,  
NEW MEXICO AND  
INCORPORATED AREAS**

**PANEL 328 OF 825**

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS  
COMMUNITY

NUMBER PANEL SUFFIX

ALBUQUERQUE, CITY OF  
BERNALILLO COUNTY  
UNINCORPORATED AREAS

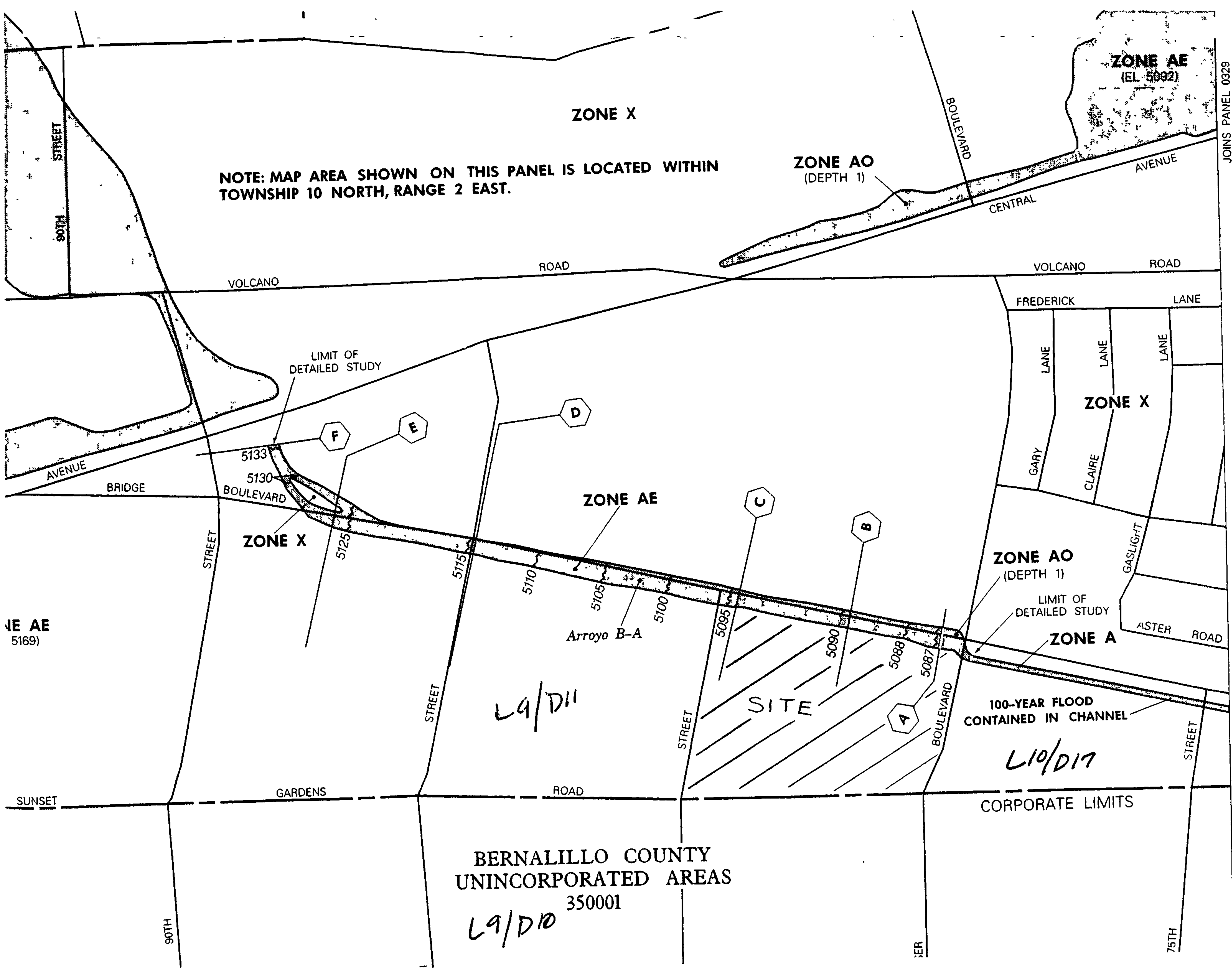
|        |      |   |
|--------|------|---|
| 350002 | 0328 | D |
| 350001 | 0328 | D |

**MAP NUMBER  
35001C0328 D**

**EFFECTIVE DATE:  
SEPTEMBER 20, 1996**



**Federal Emergency Management Agency**



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 10 NORTH, RANGE 2 EAST.

ZONE X

ZONE AO  
(DEPTH 1)

ZONE AE  
(EL 5092)

VOLCANO

ROAD

VOLCANO

ROAD

FREDERICK

LANE

LANE

LANE

LANE

ZONE X

GARY

CLAIRE

GASLIGHT

ASTER

ROAD

ZONE AO  
(DEPTH 1)

LIMIT OF  
DETAILED STUDY

ZONE A

100-YEAR FLOOD  
CONTAINED IN CHANNEL

CORPORATE LIMITS

BERNALILLO COUNTY  
UNINCORPORATED AREAS

350001

L9/D10

L9/D11

L10/D17

JOINS PANEL 0329

90TH

75TH

35R

## PURPOSE

The purpose of this report is to present the Drainage Management and Grading Plan for Final Plat and Work Order approvals for Tracts 11 & 12 of the V.E. Barrett Subdivision and portions of Bridge Boulevard, S.W. and Unser Boulevard, S.W., within the City of Albuquerque. The Zoning for Tracts 11 and 12 is currently being changed from O-1 to RT.

## EXISTING CONDITIONS

- The undeveloped site is located on the southwest mesa (Zone Atlas L-10-Z) between Bridge Boulevard and Sunset Gardens Road (north to south) and Unser Boulevard and 82<sup>nd</sup> Street (east to west).
- Total area of the site is 15.6997 acres. After proposed street dedication (Unser) and vacation (Bridge) the area will be 15.6078 acres. A landscape buffer of 6' is being provided along the Unser and Bridge frontages (principal arterial and collector respectively) as required by the West Route 66 Sector Development Plan. This buffer will not drain internally to the subdivision, therefore the on-site hydrologic basin for the development has an area of 15.6230 acres.
- The site is surrounded on three sides by recently constructed residential developments: Encanto Village, Unit 1 on the east, Bridgepoint Apartments on the west and Whispering Pointe, Unit 1 on the south. The latter two developments have built paving and utility improvements in Sunset Gardens Road and 82<sup>nd</sup> Street. Unser Boulevard street improvements have not yet been constructed by Encanto Village, Unit 1.
- A 100-year floodplain is mapped in Bridge Boulevard along the north side of the site. The AE Zone is depicted on Bernalillo County FIRM Panel 328 of 825, Map Number 35001C0328 D. An existing earthen berm along the north property line of the site contains the flood zone within the existing right-of-way of Bridge Boulevard. For this development, proposed pad elevations along Bridge Boulevard have been set at one (1) foot above the 100 year water surface elevations as published on the FIRM.
- The floodplain "water" has been physically removed by recently constructed drainage improvements associated with the "Amole Del Norte Storm Diversion Facilities Project". These include of a 96" storm drain and inlets in Bridge Boulevard and detention ponds upstream near 98<sup>th</sup> Street and Central Avenue (Amole Del Norte, Phase IIID, COA Project #4076.93 & Phase IIIC, COA Project #4076.92).
- A 72" storm drain exists along the south and east sides of the project. This storm drain is part of the Amole Del Norte Storm Diversion Facilities and is termed the Sunset Gardens/Unser Boulevard Storm Drain (COA Project #5226.92).
- Off-site flows do not impact this site. Runoff from the north-northwest is currently mitigated by a combination of temporary and permanent drainage improvements in the Bridge Boulevard right-of-way. These include the above referenced 96" storm drain and berm, the asphalt-paved swale on the north side of the berm (built by the Bridgepoint Apartments Development, COA Project #5226.90) and the five large inlet structures located between 82<sup>nd</sup> Street and Unser Boulevard (COA Project #4076.93). Runoff from the west-southwest is currently mitigated by the above referenced 72" storm drain.

Need Basin Map.

## PROPOSED MANAGEMENT PLAN

Tracts 11 and 12 of the V.E. Barrett Subdivision will ultimately be developed into 105 single-family detached residential lots (6.73 DU/Ac.). On-site storm runoff will be conveyed by surface flow in streets to inlets located on the eastern and northeastern side of the project. Flow collected by these inlets will discharge to both the Bridge and Sunset Gardens/Unser ("SG/Unser") storm drains.

Per the "Final Design Report, Amole Del Norte Storm Diversion Facilities, Tierra Bayita Drainage Facilities, Phase III, COA Project #4076.93, Dated March 1998, by URS Greiner, Inc., the north 200' of tract 11 drains to the Bridge Storm Drain ("Basin 21-D" in the report) while the remainder of Tracts 11 and 12 drain to the SG/Unser Storm Drain ("Basin Y" in the report). This assumption in the model may go back to the "Original Townsite of Westland" plat on which both sides of Bridge are platted with 50' by 200' commercial lots (see attached copy of plat). In the report, "Basin 21-D" produces a peak discharge of 24.83 c.f.s. from 6.46 acres which includes 82<sup>nd</sup> north of the water block and the south half of Bridge between 82<sup>nd</sup> and Unser. "Basin Y" produces a peak discharge of 52.58 c.f.s. from 12.51 acres which includes all of Unser between Sunset Gardens and Bridge. Land treatments for the two basins are identical: D=70%, C=5% and B=25%. The high percentage of impervious area is appropriate given the O-1 (office) zoning and the mix with adjoining streets.

Under this plan, the site will conform to the Greiner report producing peak discharges under those referenced above. The peak discharge to the Bridge Storm Drain from this project will be 18.51 c.f.s. which is less than the 24.83 c.f.s. allowable (8.51 c.f.s. from offsite Basin S-B-1 and 10.0 c.f.s. intercepted by onsite inlets). The peak discharge to the SG/Unser Storm Drain from this project will be 51.76 c.f.s. which is less than the 52.58 c.f.s. allowable (44.07 c.f.s. from onsite inlets and 7.70 c.f.s. from offsite Unser basins E-U-2 and W-U-2. Refer to Ahymo files in Appendix A.

Hydraulic grade line analysis was performed using "Storm Plus, County of Los Angeles" and verified using standard COA DPM methodology in spreadsheet form. Refer to Appendix B for the results of the HGL analysis.

Inlets for this project are planned in the following locations:

1. 2 - Type A, double grated, ~~single~~ <sup>double</sup> throated inlets at the onsite sump in Street D.
2. 1 - Type A, double grated, double throated inlet at the offsite sump in Unser Boulevard.
3. 1 - Type C, double grated inlet as a replacement for the existing inlet adjacent to the site on the south side of Bridge Boulevard just west of Unser Boulevard.
4. 1 - Type A, double grated, single throated inlet in Bridge Boulevard.
5. 2 - Type A, double grated, single throated inlets in Street E.

Calculations are as follows:

## LAND TREATMENTS:

$$\text{ON-SITE AREA} = 15.6997 \text{ AC.}$$

- SUBTRACT 6' BUFFER ALONG UNDER & BRIDGE

$$15.6997 - 0.0767 = \underline{15.6230 \text{ AC. TOTAL AREA}}$$

- CALC. IMPERVIOUS AREA FOR LOTS

$$\# \text{ PADS} \times (\text{DRIVEWAY AREA} + \text{PAD AREA}) =$$

$$105 (17 \times 20' + 35 \times 65') / 43560 = 6.3034 \text{ AC.}$$

- CALC. IMPERVIOUS AREA FOR STREETS (46' R/W)

$$\text{AREA OF STREETS (FROM AUTOCAD)} = 3.5247 \text{ AC.}$$

$$\% \text{ D IN X-SECTION} = [28 + 2(.625) + 2(4)] / 46' = 80.98\%$$

- CALC. TOTAL IMPERVIOUS AREA

$$6.3034 + .81(3.5247) = 9.1584 \text{ AC}$$

- CALC. % IMPERVIOUS ON-SITE

$$9.1584 / 15.6230 = 58.62\% \approx \underline{59\%}$$

- ASSUME ON-SITE LAND TREATMENTS AS FOLLOWS:

$$A = 0$$

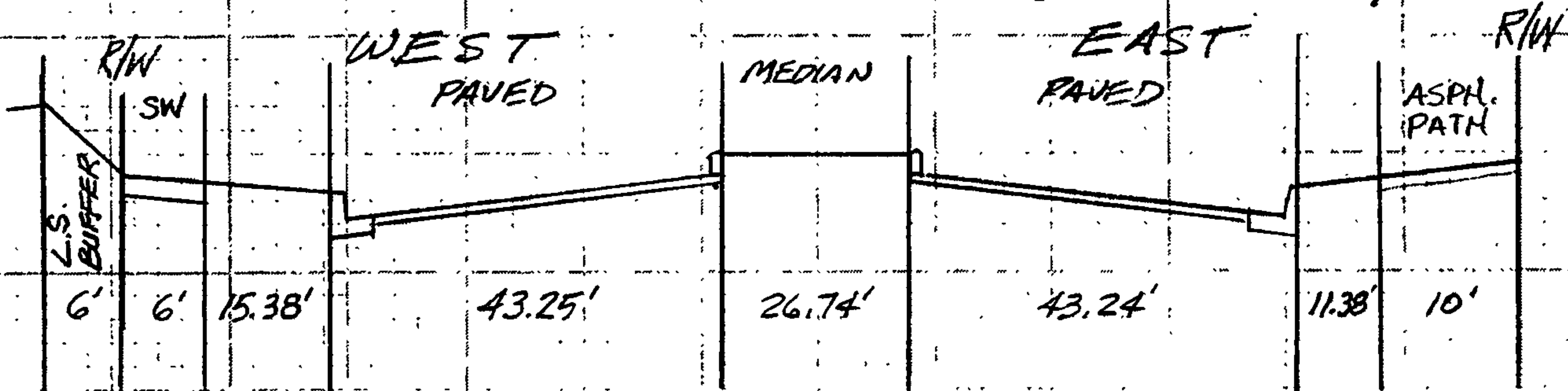
$$B = 41$$

$$C = 0$$

$$D = 59$$

## LAND TREATMENTS (CONTINUED)

- CALC. LAND TREATMENT FOR USER (BASINS W-U-2 & E-U-2)



### WEST HALF (W-U-2)

FIND % B:  $(6 + 15.38 + \frac{26.74}{2}) / (78 + 6) = 0.41 \Rightarrow 41\%$

FIND % D:  $(6 + 43.25) / (78 + 6) = 0.59 \Rightarrow 59\%$

### EAST HALF (E-U-2)

FIND % B:  $(11.38 + \frac{26.74}{2}) / 78 \approx 0.32 \Rightarrow 32\%$

FIND % D:  $(43.24 + 10) / 78 \approx 0.68 \Rightarrow 68\%$

- CALC. AREAS AREA OF USER BASIN = 2.148 AC. (AUTOCAD)

WEST HALF  $A = (78 + 6) / (156 + 6) \times 2.148 = 1.1138 \text{ AC.}$

EAST HALF  $A = 78 / (156 + 6) \times 2.148 = 1.0342 \text{ AC.}$

- CALC LAND TREATMENTS FOR BRIDGE & 82ND (BASIN S-B-1)

82ND:  $\%D = \frac{40' + .625 \times 2 + 4' \times 2}{60'} = 0.82$

BRIDGE:  $\%D = \frac{60' + .625 \times 2 + 6' \times 2}{80 + 6 + 6} = 0.80$

L.S. BUFFER

COMBINED  $\%D = \frac{0.82(0.7989 \text{ AC}) + 0.80(1.3338 \text{ AC})}{2.1327 \text{ AC}} = 0.81$

$D = 81\% \quad B = 19\%$

CALCULATE MOUNTABLE TO STANDARD CURB TRANSITION LOCATIONS ON A  $Q_p$ /LOT BASIS:

$$\left. \begin{array}{l} Q_{p100} = 54.07 \text{ CFS} \\ \# \text{ LOTS} = 105 \end{array} \right\} 54.07/105 = 0.52 \text{ CFS/LOT}$$

- DETERMINE THE # OF LOTS BEFORE TRANSITION FOR STREET E

$$\text{SLOPE ST. E} = 1.01\%$$

\* CAPACITY FROM LOOK UP TABLE ON FOLLOW PAGE = 12.45 CFS @ 1.01%

$$\therefore 12.45/0.52 = 23.94 \approx 24 \text{ LOTS (TOTAL BOTH SIDES)}$$

ANS. { COUNTING LOTS FROM DIVIDE IN STREET B THE  
TRANSITION SHOULD OCCUR AT THE INTERSECTION  
WITH STREET A.

- DETERMINE THE # OF LOTS TO TRANSITION FOR STREET C

$$\text{SLOPE ST. C} = 0.71\%$$

\* FROM LOOK UP TABLE  $Q_{cap} = 10.41 \text{ CFS @ } 0.71\%$

$$\therefore 10.41/0.52 = 20 \text{ LOTS}$$

ANS. { COUNTING FROM DIVIDE TRANSITION OCCURS AT  
THE WEST P.C. OF STREET C.

CHECK STREET CAPACITY WITH STANDARD CURB ON BOTH SIDES OF THE ON-SITE SUMA.

$$\text{NORTH SIDE: } 38 \text{ LOTS} \times 0.52 = 19.57 \text{ CFS @ } 1.01\% \text{ SLOPE}$$

$$19.57 \text{ CFS} - 10.0 = 9.57 \text{ CFS}$$

\* FROM STD CURB LOOK UP TABLE  $Q_{cap} = 43.54 \text{ CFS} \checkmark \text{ OK}$

$$\text{SOUTH SIDE: } 67 \text{ LOT} \times 0.52 = 34.50 \text{ CFS @ } 0.71\% \text{ SLOPE}$$

\* FROM LOOK UP TABLE  $Q_{cap} = 45.22 \text{ CFS} \checkmark \text{ OK}$

\* LOOK UP TABLES FOR MOUNTABLE & STANDARD CURB CAPACITIES AT VARIOUS SLOPES USE AUTOCAD DERIVED CROSS SECTIONAL GEOMETRIC DATA.

HYDRAULIC STREET CAPACITIES AT VARIOUS SLOPES  
28' F-F IN 46' R.O.W.

MOUNTABLE CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

n = 0.017  
g = 32.2  
EGLmax = 0.50 COA ALLOWABLE

| S           | EGL   | Q     | V     | F    | Vhead | HGL    | A      | WP      | TW      | R      | D      |
|-------------|-------|-------|-------|------|-------|--------|--------|---------|---------|--------|--------|
| [ft. / ft.] | [ft.] | [CFS] | [FPS] |      | [ft.] | [ft.]  | [SF]   | [ft.]   | [ft.]   | [ft.]  | [ft.]  |
| 0.005       | 0.39  | 8.80  | 1.84  | 0.80 | 0.05  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.006       | 0.40  | 9.64  | 2.02  | 0.88 | 0.06  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.007       | 0.41  | 10.41 | 2.18  | 0.95 | 0.07  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.008       | 0.42  | 11.13 | 2.33  | 1.02 | 0.08  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.009       | 0.43  | 11.81 | 2.47  | 1.08 | 0.09  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.010       | 0.44  | 12.45 | 2.61  | 1.14 | 0.11  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.011       | 0.45  | 13.05 | 2.73  | 1.19 | 0.12  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.012       | 0.46  | 13.63 | 2.85  | 1.24 | 0.13  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.013       | 0.47  | 14.19 | 2.97  | 1.30 | 0.14  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.014       | 0.48  | 14.73 | 3.08  | 1.34 | 0.15  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.015       | 0.49  | 15.24 | 3.19  | 1.39 | 0.16  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.016       | 0.50  | 15.74 | 3.30  | 1.44 | 0.17  | 0.3333 | 4.7766 | 29.3507 | 29.2500 | 0.1627 | 0.1633 |
| 0.017       | 0.49  | 14.75 | 3.29  | 1.47 | 0.17  | 0.3233 | 4.4867 | 28.9498 | 28.8498 | 0.1550 | 0.1555 |
| 0.018       | 0.50  | 15.18 | 3.38  | 1.51 | 0.18  | 0.3233 | 4.4867 | 28.9498 | 28.8498 | 0.1550 | 0.1555 |
| 0.019       | 0.49  | 14.02 | 3.34  | 1.54 | 0.17  | 0.3133 | 4.1991 | 28.7838 | 28.6850 | 0.1459 | 0.1464 |
| 0.020       | 0.50  | 14.39 | 3.43  | 1.58 | 0.18  | 0.3133 | 4.1991 | 28.7838 | 28.6850 | 0.1459 | 0.1464 |
| 0.021       | 0.48  | 13.14 | 3.36  | 1.61 | 0.18  | 0.3033 | 3.9129 | 28.6563 | 28.9591 | 0.1365 | 0.1351 |
| 0.022       | 0.49  | 13.45 | 3.44  | 1.65 | 0.18  | 0.3033 | 3.9129 | 28.6563 | 28.9591 | 0.1365 | 0.1351 |
| 0.023       | 0.50  | 13.75 | 3.52  | 1.69 | 0.19  | 0.3033 | 3.9129 | 28.6563 | 28.9591 | 0.1365 | 0.1351 |
| 0.024       | 0.50  | 14.05 | 3.59  | 1.72 | 0.20  | 0.3033 | 3.9129 | 28.6563 | 28.9591 | 0.1365 | 0.1351 |
| 0.025       | 0.49  | 12.98 | 3.57  | 1.73 | 0.20  | 0.2933 | 3.6320 | 27.6304 | 27.5352 | 0.1314 | 0.1319 |
| 0.026       | 0.50  | 13.23 | 3.64  | 1.77 | 0.21  | 0.2933 | 3.6320 | 27.6304 | 27.5352 | 0.1314 | 0.1319 |
| 0.027       | 0.49  | 12.18 | 3.62  | 1.79 | 0.20  | 0.2833 | 3.3622 | 26.5352 | 26.4424 | 0.1267 | 0.1272 |
| 0.028       | 0.49  | 12.41 | 3.69  | 1.82 | 0.21  | 0.2833 | 3.3622 | 26.5352 | 26.4424 | 0.1267 | 0.1272 |
| 0.029       | 0.50  | 12.63 | 3.76  | 1.86 | 0.22  | 0.2833 | 3.3622 | 26.5352 | 26.4424 | 0.1267 | 0.1272 |
| 0.030       | 0.49  | 11.55 | 3.72  | 1.88 | 0.22  | 0.2733 | 3.1032 | 25.4492 | 25.3590 | 0.1219 | 0.1224 |

HYDRAULIC STREET CAPACITIES AT VARIOUS SLOPES  
28' F-F IN 46' R.O.W.

STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
g = 32.2  
EGLmax = 0.85 COA ALLOWABLE

— ?

| S           | EGL   | Q     | V     | F    | Vhead | HGL    | A       | WP      | TW      | R      | D      |
|-------------|-------|-------|-------|------|-------|--------|---------|---------|---------|--------|--------|
| [ft. / ft.] | [ft.] | [CFS] | [FPS] |      | [ft.] | [ft.]  | [SF]    | [ft.]   | [ft.]   | [ft.]  | [ft.]  |
| 0.005       | 0.85  | 44.54 | 3.52  | 0.93 | 0.19  | 0.6604 | 12.6442 | 29.3860 | 28.4309 | 0.4303 | 0.4447 |
| 0.006       | 0.86  | 45.31 | 3.75  | 1.01 | 0.22  | 0.6404 | 12.0769 | 29.2831 | 28.3393 | 0.4124 | 0.4262 |
| 0.007       | 0.86  | 45.22 | 3.93  | 1.09 | 0.24  | 0.6204 | 11.5104 | 29.2357 | 28.3143 | 0.3937 | 0.4065 |
| 0.008       | 0.86  | 44.49 | 4.06  | 1.15 | 0.26  | 0.6004 | 10.9442 | 29.1942 | 28.3033 | 0.3749 | 0.3867 |
| 0.009       | 0.85  | 43.23 | 4.17  | 1.21 | 0.27  | 0.5804 | 10.3782 | 29.1530 | 28.2933 | 0.3560 | 0.3668 |
| 0.010       | 0.86  | 43.54 | 4.31  | 1.27 | 0.29  | 0.5704 | 10.0953 | 29.1324 | 28.2883 | 0.3465 | 0.3569 |
| 0.011       | 0.85  | 41.52 | 4.36  | 1.32 | 0.29  | 0.5504 | 9.5296  | 29.0911 | 28.2783 | 0.3276 | 0.3370 |
| 0.012       | 0.85  | 41.26 | 4.46  | 1.37 | 0.31  | 0.5404 | 9.2469  | 29.0705 | 28.2733 | 0.3181 | 0.3271 |
| 0.013       | 0.85  | 40.80 | 4.55  | 1.42 | 0.32  | 0.5304 | 8.9642  | 29.0499 | 28.2683 | 0.3086 | 0.3171 |
| 0.014       | 0.85  | 40.15 | 4.63  | 1.47 | 0.33  | 0.5204 | 8.6815  | 29.0293 | 28.2633 | 0.2991 | 0.3072 |
| 0.015       | 0.85  | 39.35 | 4.69  | 1.51 | 0.34  | 0.5104 | 8.3989  | 29.0087 | 28.2583 | 0.2895 | 0.2972 |
| 0.016       | 0.85  | 38.41 | 4.73  | 1.56 | 0.35  | 0.5004 | 8.1163  | 28.9880 | 28.2533 | 0.2800 | 0.2873 |
| 0.017       | 0.84  | 37.34 | 4.77  | 1.59 | 0.35  | 0.4904 | 7.8338  | 28.9674 | 28.2483 | 0.2704 | 0.2773 |
| 0.018       | 0.86  | 38.42 | 4.90  | 1.64 | 0.37  | 0.4904 | 7.8338  | 28.9674 | 28.2483 | 0.2704 | 0.2773 |
| 0.019       | 0.86  | 37.15 | 4.92  | 1.68 | 0.38  | 0.4804 | 7.5514  | 28.9468 | 28.2433 | 0.2609 | 0.2674 |
| 0.020       | 0.85  | 35.78 | 4.92  | 1.71 | 0.38  | 0.4704 | 7.2690  | 28.9262 | 28.2383 | 0.2513 | 0.2574 |
| 0.021       | 0.84  | 34.34 | 4.92  | 1.74 | 0.38  | 0.4604 | 6.9866  | 28.9056 | 28.2333 | 0.2417 | 0.2475 |
| 0.022       | 0.85  | 35.15 | 5.03  | 1.78 | 0.39  | 0.4604 | 6.9866  | 28.9056 | 28.2333 | 0.2417 | 0.2475 |
| 0.023       | 0.84  | 33.57 | 5.01  | 1.81 | 0.39  | 0.4504 | 6.7043  | 28.8850 | 28.2283 | 0.2321 | 0.2375 |
| 0.024       | 0.86  | 34.29 | 5.11  | 1.85 | 0.41  | 0.4504 | 6.7043  | 28.8850 | 28.2283 | 0.2321 | 0.2375 |
| 0.025       | 0.84  | 32.59 | 5.07  | 1.87 | 0.40  | 0.4404 | 6.4220  | 28.8643 | 28.2233 | 0.2225 | 0.2275 |
| 0.026       | 0.86  | 33.24 | 5.18  | 1.91 | 0.42  | 0.4404 | 6.4220  | 28.8643 | 28.2233 | 0.2225 | 0.2275 |
| 0.027       | 0.84  | 31.44 | 5.12  | 1.93 | 0.41  | 0.4304 | 6.1398  | 28.8437 | 28.2183 | 0.2129 | 0.2176 |
| 0.028       | 0.85  | 32.02 | 5.21  | 1.97 | 0.42  | 0.4304 | 6.1398  | 28.8437 | 28.2183 | 0.2129 | 0.2176 |
| 0.029       | 0.87  | 32.58 | 5.31  | 2.00 | 0.44  | 0.4304 | 6.1398  | 28.8437 | 28.2183 | 0.2129 | 0.2176 |
| 0.030       | 0.85  | 30.66 | 5.23  | 2.02 | 0.43  | 0.4204 | 5.8577  | 28.8231 | 28.2133 | 0.2032 | 0.2076 |

POOL DEPTH AT STREET INTERSECTIONS  
 28' F-F IN 46' R.O.W.  
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: STREET C & F

# OF LOTS= 35.00  
 Q/LOT= 0.51  
 Q = 18.02

| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | 0.57         | 18.52      | 2.76       | 1.00    | 0.12           | 0.4504       | 6.7043    | 28.8850     | 28.2283     | 0.2321     | 0.2375     |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

0.57' < 0.85' OK

POOL DEPTH AT STREET INTERSECTIONS  
 28' F-F IN 46' R.O.W.  
MOUNTABLE CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.50 COA ALLOWABLE

INTERSECTION: STREET E & F

# OF LOTS= 18.00  
 Q/LOT= 0.51  
 Q = 9.27

| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.010            | 0.40         | 10.17      | 2.42       | 1.12    | 0.09           | 0.3133       | 4.1991    | 28.7838     | 28.6850     | 0.1459     | 0.1464     |
| 0.011            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.012            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

0.40' < 0.50' OK  
 ~~~~~

POOL DEPTH AT STREET INTERSECTIONS
 28' F-F IN 46' R.O.W.
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017
 g = 32.2
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: STREET C & G

OF LOTS= 49.00
 CFS/LOT= 0.51
 Q = 25.23

S	EGL	Q	V	F	Vhead	HGL	A	WP	TW	R	D
[ft. / ft.]	[ft.]	[CFS]	[FPS]		[ft.]	[ft.]	[SF]	[ft.]	[ft.]	[ft.]	[ft.]
0.005	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.006	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.007	0.65	25.40	3.13	1.03	0.15	0.5004	8.1163	28.9880	28.2533	0.2800	0.2873
0.008	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.009	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!

0.65' < 0.85' OK

POOL DEPTH AT STREET INTERSECTIONS
 28' F-F IN 46' R.O.W.
STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017
 g = 32.2
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: STREET C & SE STUB

OF LOTS= 58.00
 CFS/LOT= 0.51
 Q = 29.87

S	EGL	Q	V	F	Vhead	HGL	A	WP	TW	R	D
[ft. / ft.]	[ft.]	[CFS]	[FPS]		[ft.]	[ft.]	[SF]	[ft.]	[ft.]	[ft.]	[ft.]
0.005	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.006	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.007	0.70	29.94	3.34	1.05	0.17	0.5304	8.9642	29.0499	28.2683	0.3086	0.3171
0.008	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!
0.009	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					#DIV/0!	#DIV/0!

0.70' < 0.85' OK
 ~~~~~

POOL DEPTH AT STREET SUMP  
 28' F-F IN 46' R.O.W.  
 STANDARD CURB WITH 2% CROSS SLOPE IN STREET

*Sump.*

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: SUMP APPROACH FROM SOUTH

# OF LOTS= 84.00  
 CFS/LOT= 0.51  
 Q = 43.26

| S           | EGL     | Q       | V       | F       | Vhead   | HGL    | A       | WP      | TW      | R       | D       |
|-------------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|
| [ft. / ft.] | [ft.]   | [CFS]   | [FPS]   |         | [ft.]   | [ft.]  | [SF]    | [ft.]   | [ft.]   | [ft.]   | [ft.]   |
| 0.005       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |         |         |         | #DIV/0! | #DIV/0! |
| 0.006       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |         |         |         | #DIV/0! | #DIV/0! |
| 0.007       | 0.86    | 45.22   | 3.93    | 1.09    | 0.24    | 0.6204 | 11.5104 | 29.2357 | 28.3143 | 0.3937  | 0.4065  |
| 0.008       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |         |         |         | #DIV/0! | #DIV/0! |
| 0.009       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |         |         |         | #DIV/0! | #DIV/0! |

45.22 CFS < 43.26 CFS OK

DEPTH AT STREET INLETS FOR CAPACITY  
 28' F-F IN 46' R.O.W.  
 STANDARD CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.85 COA ALLOWABLE

INTERSECTION: STREET E INLETS ON GRADE

# OF LOTS= 32.00  
 CFS/LOT= 0.51  
 Q = 16.48

| S           | EGL     | Q       | V       | F       | Vhead   | HGL    | A      | WP      | TW      | R       | D       |
|-------------|---------|---------|---------|---------|---------|--------|--------|---------|---------|---------|---------|
| [ft. / ft.] | [ft.]   | [CFS]   | [FPS]   |         | [ft.]   | [ft.]  | [SF]   | [ft.]   | [ft.]   | [ft.]   | [ft.]   |
| 0.005       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |        |         |         | #DIV/0! | #DIV/0! |
| 0.006       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |        |         |         | #DIV/0! | #DIV/0! |
| 0.007       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |        |         |         | #DIV/0! | #DIV/0! |
| 0.008       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |        |         |         | #DIV/0! | #DIV/0! |
| 0.009       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |        |         |         | #DIV/0! | #DIV/0! |
| 0.010       | 0.54    | 16.31   | 2.93    | 1.16    | 0.13    | 0.4104 | 5.5756 | 28.8025 | 28.2083 | 0.1936  | 0.1977  |
| 0.011       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |        |         |         | #DIV/0! | #DIV/0! |
| 0.012       | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |        |        |         |         | #DIV/0! | #DIV/0! |

0.41' OF DEPTH

FROM PLATE 22.3 D-6, CHAP. 22, DPM

INLET CAPACITY = 5.0 CFS/INLET

TOTAL REMOVED FROM STREET = 10 CFS

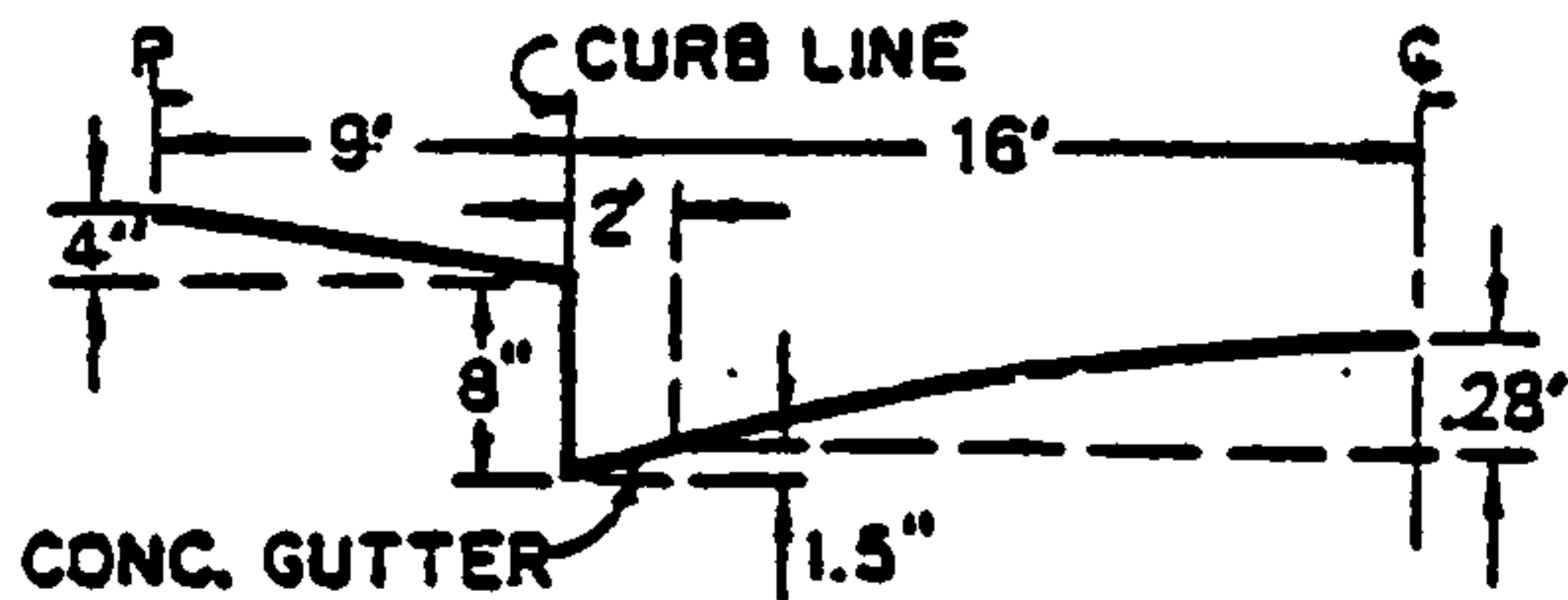
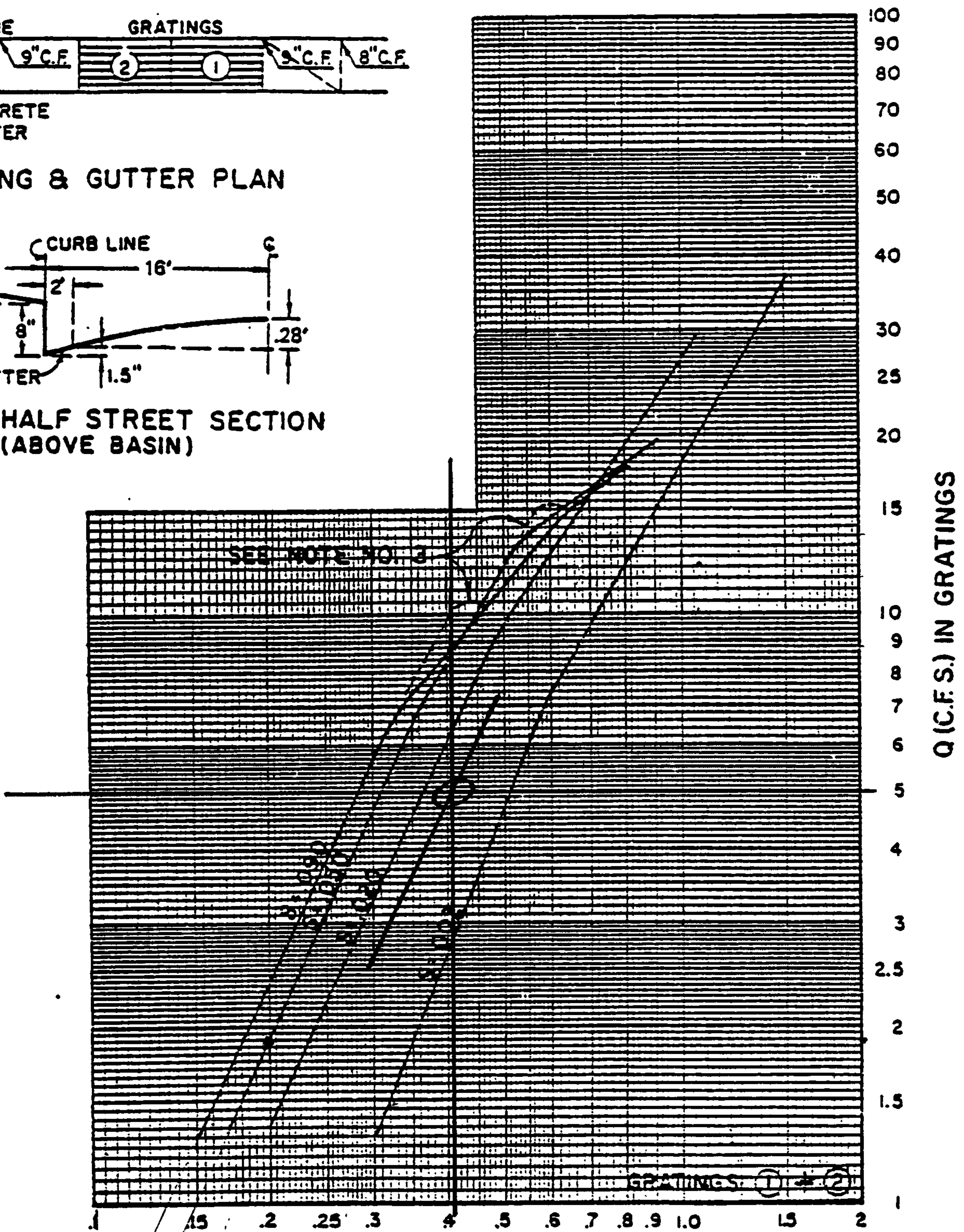
16.48 - 10.0 = 6.48 BYPASS

## GRATING CAPACITIES FOR TYPE DOUBLE

"C," AND "D"



GRATING &amp; GUTTER PLAN

TYPICAL HALF STREET SECTION  
(ABOVE BASIN)

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

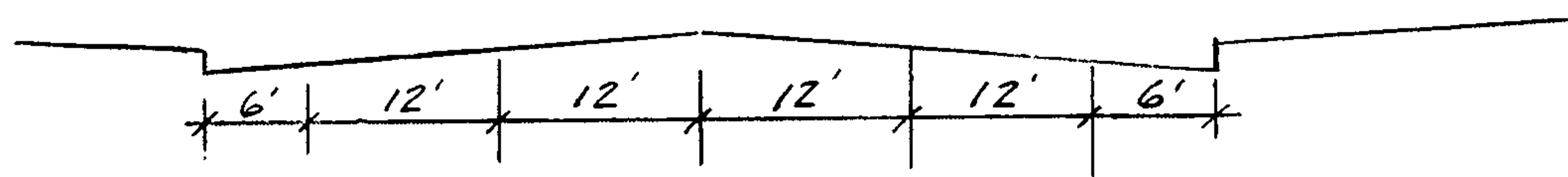
W-SITE: 2-TYPE A, DG, ST ON 1.01% GRADE5 CFS x 2 = 10 CFS CAPACITY

HY .....IES AT VARIOUS SLOPES  
 F-F IN 86' R.O.W.  
 STA ..... CURB WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{(2/3)} \cdot S^{(1/2)}$$

n = 0.017  
 g = 32.2  
 EGLmax = 0.85 COA ALLOWABLE

BRIDGE BLVD.



| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.010            | 0.86         | 29.96      | 3.73       | 1.24    | 0.22           | 0.6404       | 8.0215    | 28.7261     | 28.2514     | 0.2792     | 0.2839     |
| 0.011            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.012            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

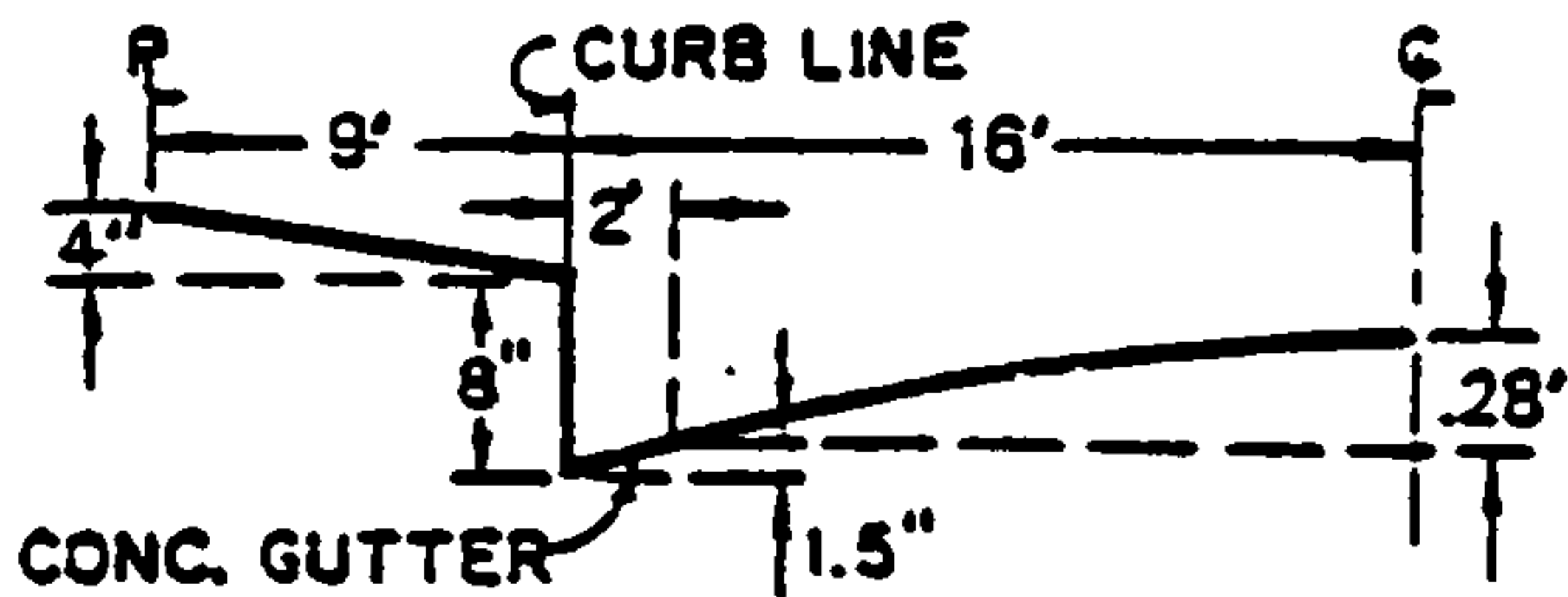
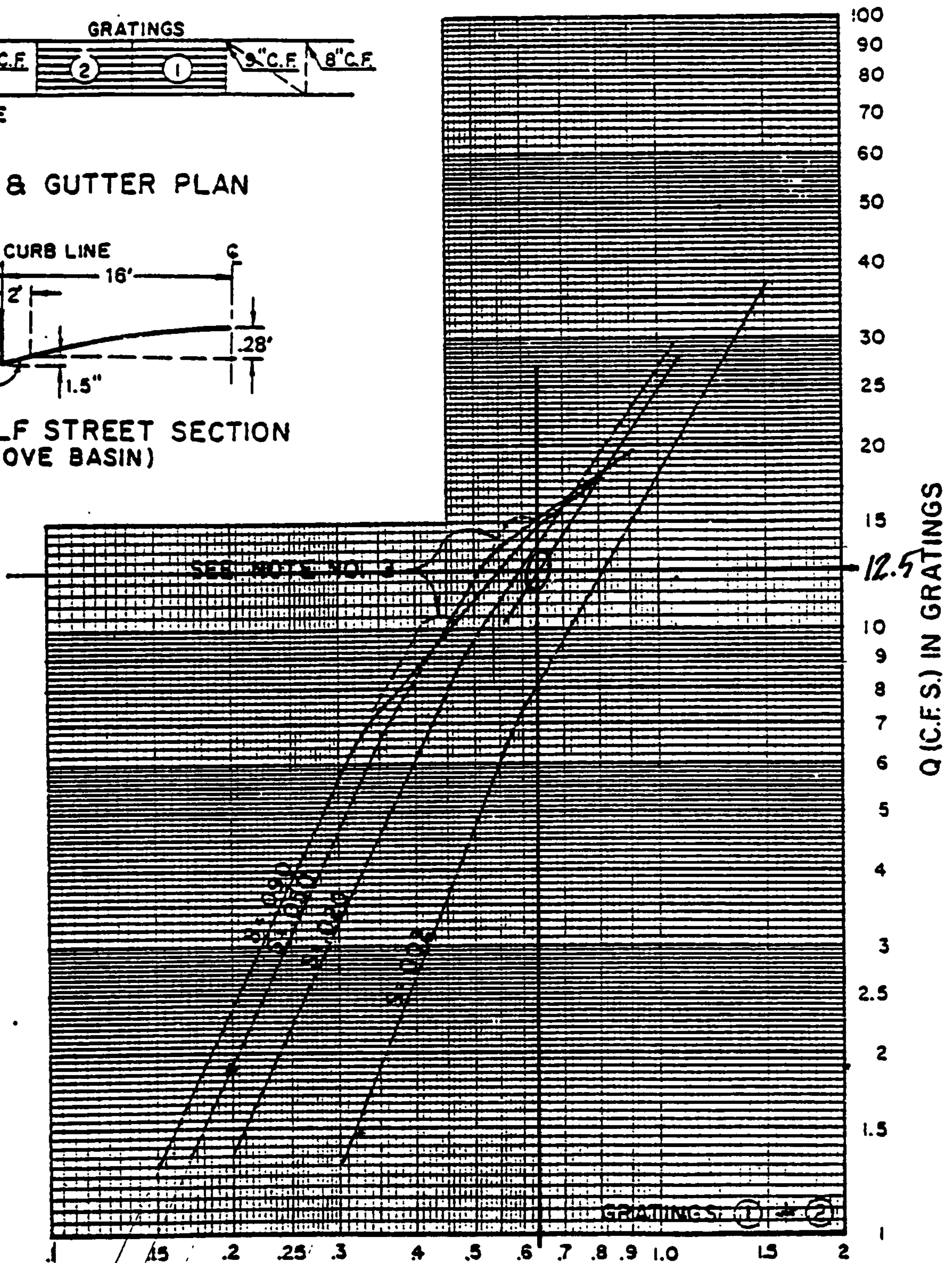
FIRST INLET - ASSUME STREET @ CAPACITY,  $Q = 30.0$  CFS/HALF ST.  
 $d = 0.64'$

## GRATING CAPACITIES FOR TYPE DOUBLE

"C," AND "D"



GRATING &amp; GUTTER PLAN

TYPICAL HALF STREET SECTION  
(ABOVE BASIN)

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

BRIDGE BLVD. 1 - TYPE A, DG, ST 1.01% GRADE

ASSUME STREET AT CAPACITY

75  $d = 0.64'$ 

REV 3-83

PLATE 22.3 D-6

30 CFS - 12.5 CFS = 17.5 CFS BY PASS

HY ... AT VARIOUS SLOPES

... IN 86' R.O.W.

STA ... WITH 2% CROSS SLOPE IN STREET

$$Q = 1.486/n \cdot A \cdot R^{2/3} \cdot S^{1/2}$$

n = 0.017

g = 32.2

EGLmax = 0.85 COA ALLOWABLE

| S<br>[ft. / ft.] | EGL<br>[ft.] | Q<br>[CFS] | V<br>[FPS] | F       | Vhead<br>[ft.] | HGL<br>[ft.] | A<br>[SF] | WP<br>[ft.] | TW<br>[ft.] | R<br>[ft.] | D<br>[ft.] |
|------------------|--------------|------------|------------|---------|----------------|--------------|-----------|-------------|-------------|------------|------------|
| 0.005            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.006            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.007            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.008            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.009            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.010            | 0.71         | 17.91      | 3.29       | 1.20    | 0.17           | 0.5404       | 5.4483    | 23.6191     | 23.2187     | 0.2307     | 0.2347     |
| 0.011            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.012            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |
| 0.013            | #DIV/0!      | #DIV/0!    | #DIV/0!    | #DIV/0! | #DIV/0!        |              |           |             |             | #DIV/0!    | #DIV/0!    |

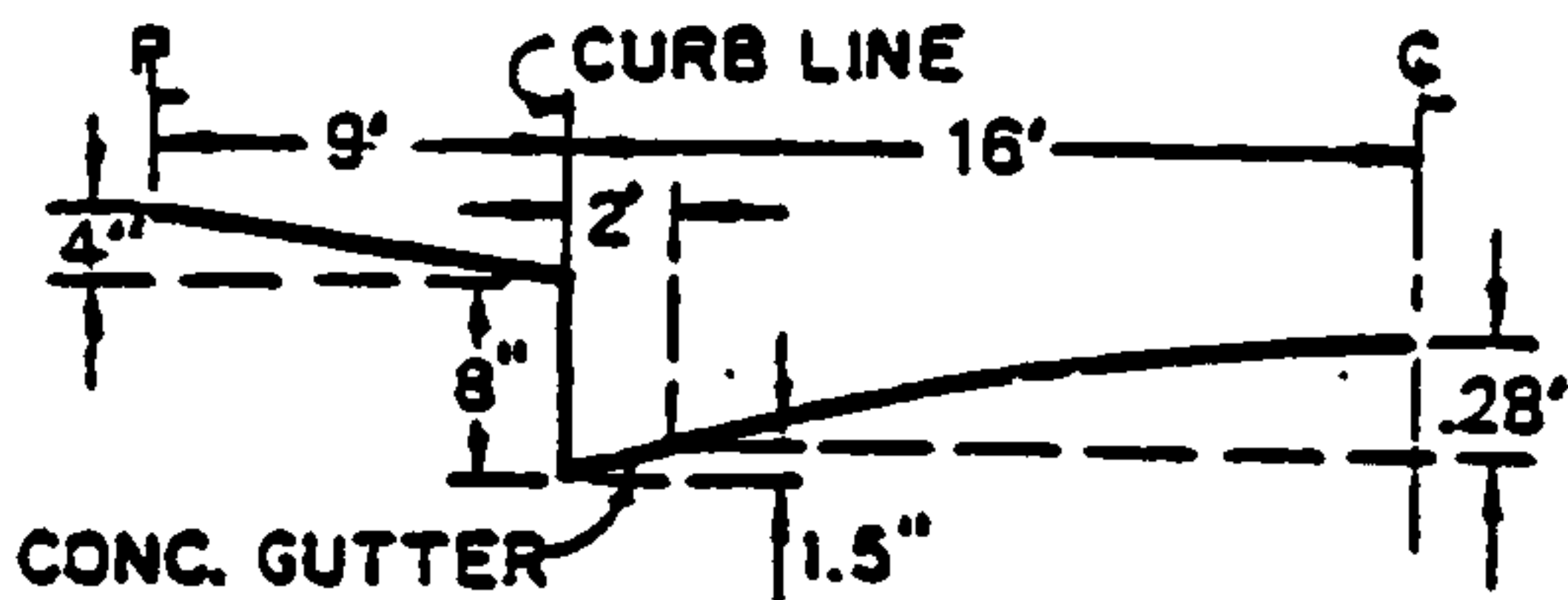
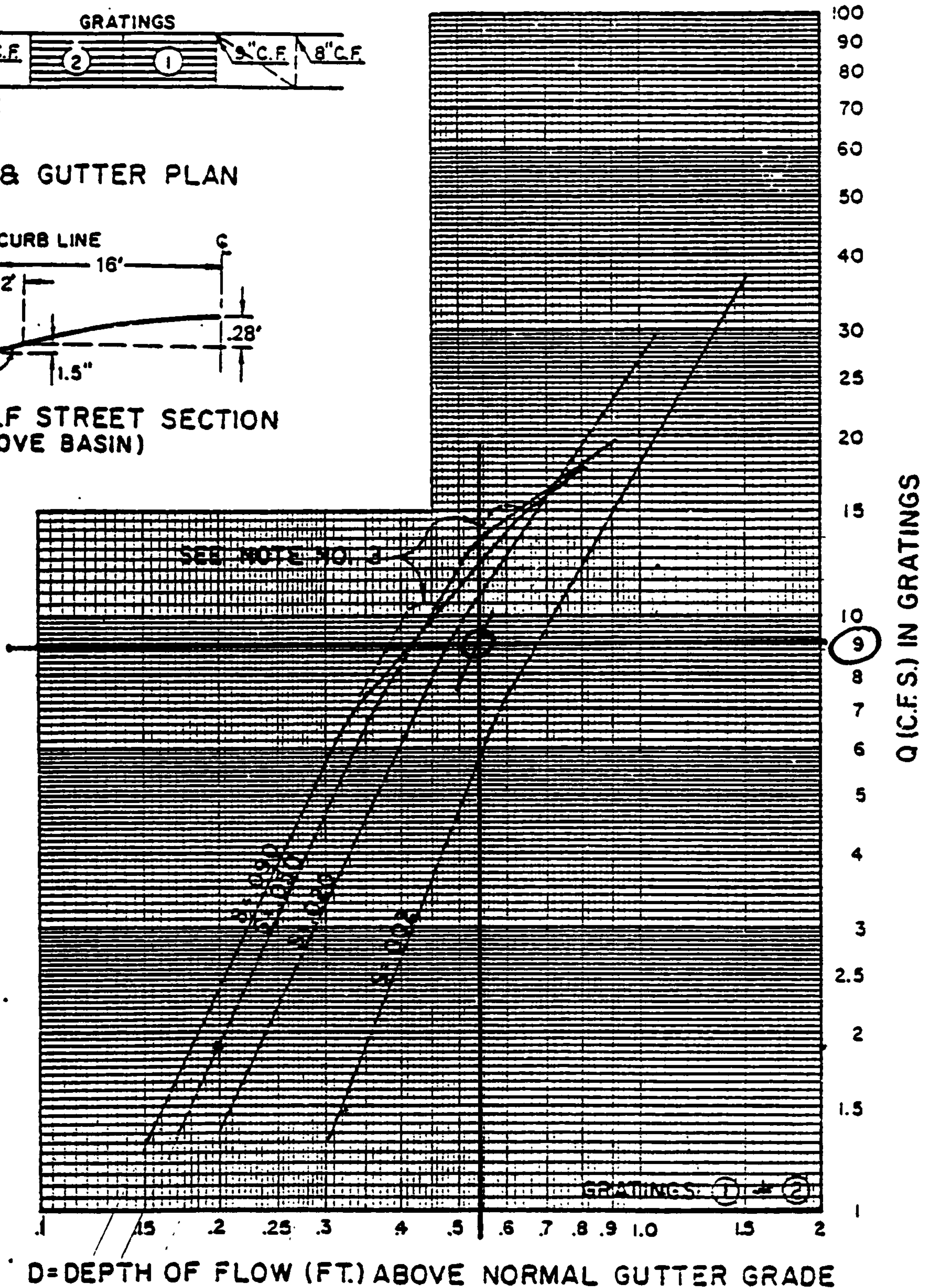
BYPASS  $Q = 17.5 \text{ CFS} \approx 17.91 \text{ CFS} \therefore d \approx 0.54'$

## GRATING CAPACITIES FOR TYPE DOUBLE

"C," AND "D"



GRATING &amp; GUTTER PLAN

TYPICAL HALF STREET SECTION  
(ABOVE BASIN)

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

RIDGE BLVD. 1 - TYPE C, DGBYPASS OF INLET #1 = 17.5 CFS  $\Rightarrow d = 0.54$

$$6.5 + 3 + 4 = 13.5'$$

Sump Weir

$$Q = 3.3 L (h)^{3/2}$$

$$44.1 \text{ cfs} \div 2 = 22.05 \text{ cfs per side}$$

$$22.05 = 3.3 (L) (0.67)^{1.5} \Rightarrow L = 12.2'$$

$$L = 6.5 (2) = 13'$$

+ 4 grate

17 provided.

$$F_s = \frac{34}{24.4} = 1.4$$

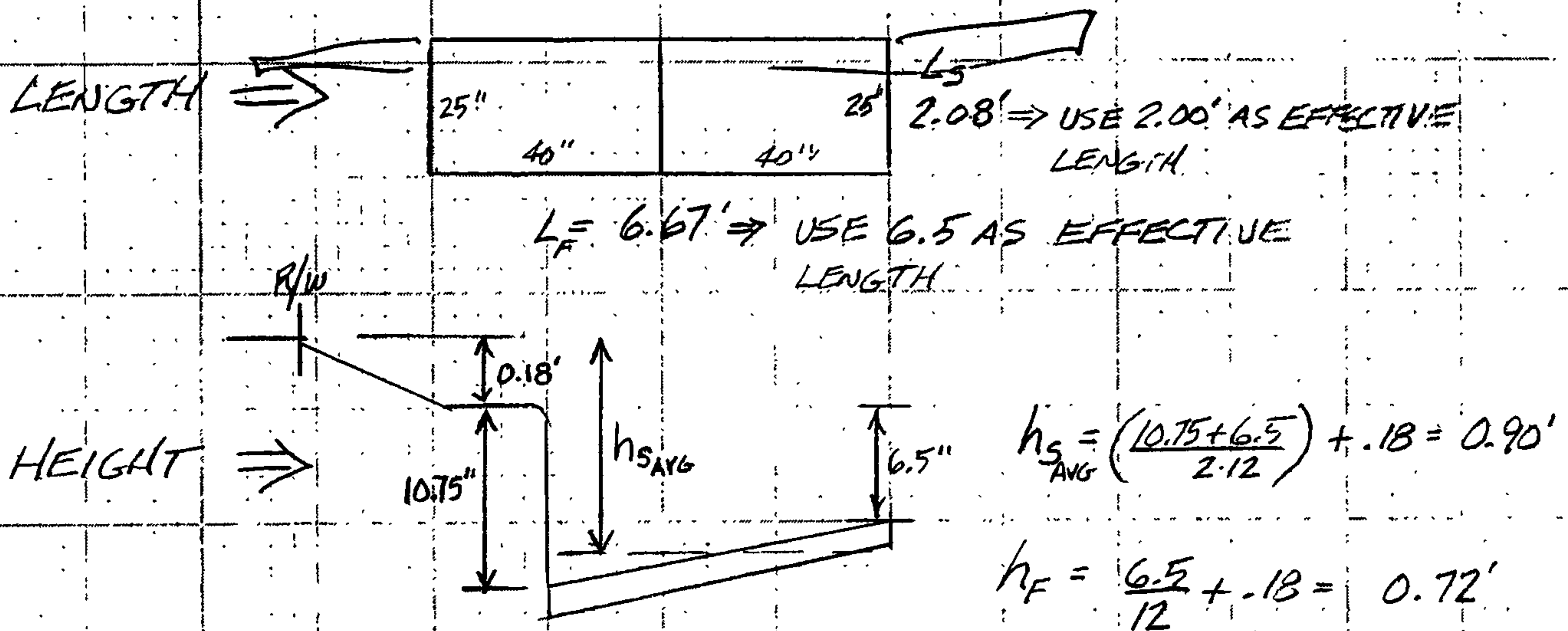
$$30.8 \times 2 = 61.6$$

$$F_s = \frac{61.6}{44.1} = 1.4$$

## SUMP INLET CAPACITIES

\* USE WEIR EQ. FOR FRONT & SIDES OF GRATE

INLET IS TYPE A, DG, DT



TO OBTAIN REQUIRED CAPACITY (44.07 CFS) PLUS AN ADEQUATE FACTOR OF SAFETY FOR CLOGGING ADD 2" TO CURB HEIGHT FOR A 10" HIGH STD. CURB  
 CAN'T DO

2 - TYPE A, DOUBLE GRATE, DOUBLE THROAT

$$T) Q_F = 3.0 \times 6.5 \times \left( \frac{6.5 + 2}{12} + .18 \right)^{3/2} = 17.32 \text{ CFS}$$

$$S) Q_S = 3.0 \times (2 \times 2) \times \left( \frac{(10.75 + 6.5)/2 + 2}{12} + .18 \right)^{3/2} = 12.79 \text{ CFS}$$

30.11 CFS/INLET

$$\frac{\text{AVOIDED } Q}{\text{REQUIRED } Q} = \frac{(30.11 \times 2)}{44.07} = \underline{\underline{1.4 FS}} \checkmark$$

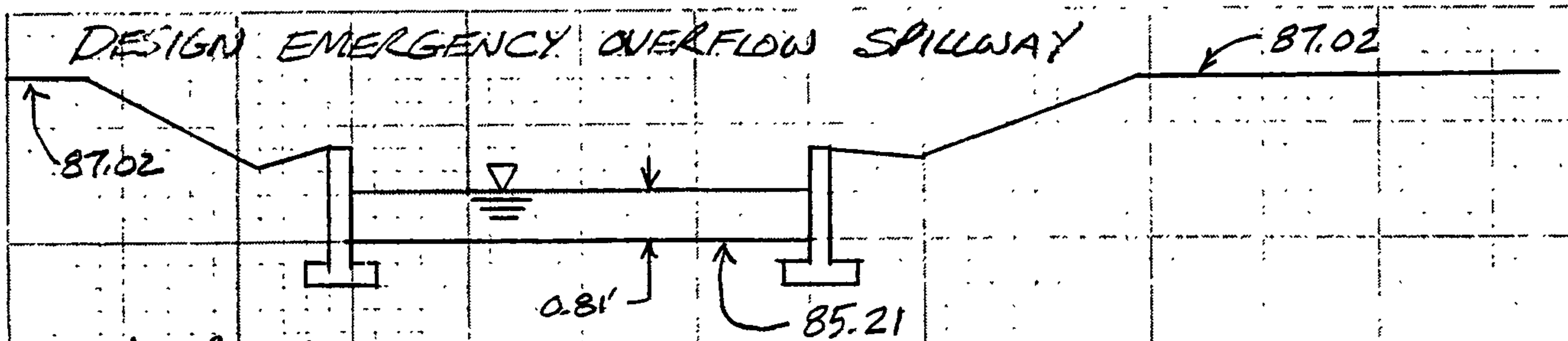
water will pond  
outside right-of-way.

Project Name \_\_\_\_\_

Project No. \_\_\_\_\_ Date \_\_\_\_\_

Subject \_\_\_\_\_

By \_\_\_\_\_ Sheet \_\_\_\_\_ of \_\_\_\_\_



WEIR EQ:

$$Q = CLH^{3/2}$$

$$44.07 = (3 \times 20) H^{3/2} \quad H = 0.81'$$

ELEV. OF TOP OF CURB @ SUMP + H + 1.0' = MIN. PAD ELEV.

$$85.21 + 0.81 + 1 = 87.02$$

MANNINGS EQ:

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

$$S = \frac{85.21 - 84.58}{106.49'} = .0059$$

$$44.07 = \frac{1.49}{.022} (20Y) \left( \frac{20Y}{2Y+20} \right)^{2/3} (.0059)^{1/2}$$

$$Y = 0.61'$$

$$0.61' < 0.81' \text{ OK}$$

APPENDIX A

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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994  
 INPUT FILE = TR11-12B.DAT

RUN DATE (MON/DAY/YR) = 04/17/2001  
 USER NO. = DAGGETTK.S94

| COMMAND                                                             | HYDROGRAPH IDENTIFICATION                       | FROM ID NO. | TO ID NO. | AREA (SQ MI) | PEAK DISCHARGE (CFS) | RUNOFF VOLUME (AC-FT) | RUNOFF (INCHES) | TIME TO PEAK (HOURS) | CFS PER ACRE | PAGE = 1<br>NOTATION |
|---------------------------------------------------------------------|-------------------------------------------------|-------------|-----------|--------------|----------------------|-----------------------|-----------------|----------------------|--------------|----------------------|
| *S                                                                  | O-1 45x100 LOT SUBDIVISION DEVELOPED CONDITIONS |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | BY: KCD DATE: 4-17-2001                         |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | ACTUAL AREAS FOR TRTMNTS MEASURED WITH AUTOCAD  |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | 100 YEAR - 6 HOUR STORM                         |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| START                                                               |                                                 |             |           |              |                      |                       |                 |                      |              | TIME= .00            |
| RAINFALL TYPE= 1                                                    |                                                 |             |           |              |                      |                       |                 |                      |              | RAIN6= 2.210         |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S CALC ONSITE FLOW                                                 |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD                                                      | ONSITE -                                        | 1           |           | .02441       | 54.07                | 1.883                 | 1.44632         | 1.499                | 3.461        | PER IMP= 59.00       |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S SEPARATE 10 CFS FOR BRIDGE STORM DRAIN                           |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| DIVIDE HYD                                                          | S-B-1                                           | 1           | 5         | .01175       | 10.00                | .906                  | 1.44630         | 1.332                | 1.330        |                      |
|                                                                     | ONSITE-10 AND                                   | 2           |           | .01266       | 44.07                | .977                  | 1.44630         | 1.499                | 5.439        |                      |
| *S CALC FLOW IN WEST HALF UNSER                                     |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S (SUNSET GARDENS TO BRIDGE BLVD. NOTE: INCLUDES 6' LS BUFFER)     |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S FLOW TO WEST SUMP INLET IN UNSER FROM THIS BASIN                 |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD                                                      | W-U-2 -                                         | 1           |           | .00174       | 3.87                 | .134                  | 1.44631         | 1.499                | 3.474        | PER IMP= 59.00       |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S ADD FLOW FROM ONSITE BASIN TO FLOW FROM WEST HALF OF UNSER       |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| ADD HYD                                                             | W-U-2+ONSITE                                    | 1& 2        | 3         | .01440       | 47.94                | 1.111                 | 1.44628         | 1.499                | 5.201        |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S CALC FLOW IN EAST HALF UNSER (SG TO BRIDGE)                      |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD                                                      | E-U-2 -                                         | 1           |           | .00162       | 3.83                 | .135                  | 1.56262         | 1.499                | 3.689        | PER IMP= 68.00       |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S ADD FLOWS FROM ONSITE BASIN, WEST HALF UNSER & EAST HALF UNSER   |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| ADD HYD                                                             | UNSER+ONSITE                                    | 1& 3        | 2         | .01602       | 51.76                | 1.246                 | 1.45803         | 1.499                | 5.048        |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S CALC FLOW FROM SOUTH HALF OF BRIDGE BLVD. AND ALL OF 82ND STREET |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S (82ND STREET TO UNSER BLVD. NOTE: INCLUDES 6' LS BUFFER)         |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| COMPUTE NM HYD                                                      | S-B-1 -                                         | 1           |           | .00333       | 8.51                 | .307                  | 1.73062         | 1.499                | 3.992        | PER IMP= 81.00       |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| *S ADD 10 CFS FROM ONSITE BASIN TO BRIDGE BLVD.                     |                                                 |             |           |              |                      |                       |                 |                      |              |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| ADD HYD                                                             | BRDG+ONSITE                                     | 1& 5        | 3         | .01508       | 18.51                | 1.214                 | 1.50907         | 1.499                | 1.918        |                      |
| *S                                                                  | *****                                           |             |           |              |                      |                       |                 |                      |              |                      |
| FINISH                                                              |                                                 |             |           |              |                      |                       |                 |                      |              |                      |

S/A GREINER "BASIN Y"

S/A GREINER "BASIN 21-D"

PER GREINER REPORT: "BASIN Y" = 52.58 CFS

"BASIN 21-D" = 24.33 CFS

51.76 < 52.58 OK

18.51 < 24.83 OK

```

*S          O-1 45x100 LOT SUBDIVISION DEVELOPED CONDITIONS
*S          BY: KCD      DATE: 4-17-2001
*S          ACTUAL AREAS FOR TRTMNTS MEASURED WITH AUTOCAD
*S          *****
*S          100 YEAR - 6 HOUR STORM
*S          *****
START       TIME=0.0 HR PUNCH CODE=0
RAINFALL    TYPE=1 RAIN QUARTER=0.0
            RAIN ONE=1.90 IN RAIN SIX=2.21 IN
            RAIN DAY=2.70 IN DT=0.0333 HRS
*S          *****
*S CALC ONSITE FLOW
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=ONSITE DA=0.02441 SQ MI
                   PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S SEPARATE 10 CFS FOR BRIDGE STORM DRAIN
DIVIDE HYD         ID=1 Q=10.0 ID I=5  HYD NO=S-B-1
                   ID II=2 HYD NO=ONSITE-10
*S CALC FLOW IN WEST HALF UNSER
*S (SUNSET GARDENS TO BRIDGE BLVD. NOTE: INCLUDES 6' LS BUFFER)
*S FLOW TO WEST SUMP INLET IN UNSER FROM THIS BASIN
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=W-U-2 DA=0.00174 SQ MI
                   PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S ADD FLOW FROM ONSITE BASIN TO FLOW FROM WEST HALF OF UNSER
*S          *****
ADD HYD             ID=3 HYD NO=W-U-2+ONSITE ID I=1 ID II=2
PRINT HYD          ID=3 CODE=1
*S          *****
*S CALC FLOW IN EAST HALF UNSER (SG TO BRIDGE)
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=E-U-2 DA=0.00162 SQ MI
                   PER A=00.0 PER B=32.0 PER C=0.0 PER D=68.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S ADD FLOWS FROM ONSITE BASIN, WEST HALF UNSER & EAST HALF UNSER
*S          *****
ADD HYD             ID=2 HYD NO=UNSER+ONSITE ID I=1 ID II=3
PRINT HYD          ID=2 CODE=1
*S          *****
*S CALC FLOW FROM SOUTH HALF OF BRIDGE BLVD. AND ALL OF 82ND STREET
*S (82ND STREET TO UNSER BLVD. NOTE: INCLUDES 6' LS BUFFER)
*S          *****
COMPUTE NM HYD      ID=1 HYD NO=S-B-1 DA=0.00333 SQ MI
                   PER A=00.0 PER B=19.0 PER C=0.0 PER D=81.0
                   TP=-0.1333 HR MASS RAIN=-1
PRINT HYD          ID=1 CODE=1
*S          *****
*S ADD 10 CFS FROM ONSITE BASIN TO BRIDGE BLVD.
*S          *****
ADD HYD             ID=3 HYD NO=BRDG+ONSITE ID I=1 ID II=5
PRINT HYD          ID=3 CODE=1
*S          *****
END

```

AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994  
RUN DATE (MON/DAY/YR) = 04/17/2001  
START TIME (HR:MIN:SEC) = 05:28:32 USER NO.= DAGGETTK.S94  
INPUT FILE = TR11-12B.DAT

\*S O-1 45x100 LOT SUBDIVISION DEVELOPED CONDITIONS  
\*S BY: KCD DATE: 4-17-2001  
\*S ACTUAL AREAS FOR TRTMNTS MEASURED WITH AUTOCAD  
\*S \*\*\*\*\*  
\*S 100 YEAR - 6 HOUR STORM  
\*S \*\*\*\*\*  
START TIME=0.0 HR PUNCH CODE=0  
RAINFALL TYPE=1 RAIN QUARTER=0.0  
RAIN ONE=1.90 IN RAIN SIX=2.21 IN  
RAIN DAY=2.70 IN DT=0.0333 HRS

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

| DT =   | .033300 HOURS | END TIME = | 5.994000 HOURS |
|--------|---------------|------------|----------------|
| .0000  | .0014         | .0029      | .0043          |
| .0106  | .0122         | .0139      | .0157          |
| .0231  | .0251         | .0272      | .0293          |
| .0386  | .0412         | .0438      | .0466          |
| .0589  | .0624         | .0662      | .0714          |
| .1237  | .1675         | .2304      | .3165          |
| .9738  | 1.1848        | 1.2714     | 1.3442         |
| 1.5721 | 1.6191        | 1.6631     | 1.7045         |
| 1.8485 | 1.8798        | 1.9096     | 1.9379         |
| 1.9829 | 1.9880        | 1.9929     | 1.9975         |
| 2.0144 | 2.0183        | 2.0220     | 2.0256         |
| 2.0391 | 2.0422        | 2.0453     | 2.0483         |
| 2.0596 | 2.0623        | 2.0650     | 2.0675         |
| 2.0774 | 2.0797        | 2.0821     | 2.0843         |
| 2.0931 | 2.0952        | 2.0973     | 2.0993         |
| 2.1072 | 2.1091        | 2.1110     | 2.1129         |
| 2.1201 | 2.1219        | 2.1236     | 2.1253         |
| 2.1320 | 2.1336        | 2.1352     | 2.1368         |
| 2.1430 | 2.1445        | 2.1460     | 2.1475         |
| 2.1533 | 2.1548        | 2.1562     | 2.1576         |
| 2.1630 | 2.1644        | 2.1657     | 2.1670         |
| 2.1722 | 2.1735        | 2.1747     | 2.1760         |
| 2.1809 | 2.1821        | 2.1833     | 2.1845         |
| 2.1892 | 2.1903        | 2.1914     | 2.1926         |
| 2.1970 | 2.1981        | 2.1992     | 2.2003         |
| 2.2046 | 2.2057        | 2.2067     | 2.2077         |

\*S \*\*\*\*\*  
\*S CALC ONSITE FLOW  
\*S \*\*\*\*\*  
COMPUTE NM HYD ID=1 HYD NO=ONSITE DA=0.02441 SQ MI  
PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0  
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 56.859 CFS UNIT VOLUME = .9991 B = 526.28 P60 = 1.9000  
AREA = .014402 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
UNIT PEAK = 24.592 CFS UNIT VOLUME = .9998 B = 327.55 P60 = 1.9000  
AREA = .010008 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

HYDROGRAPH FROM AREA ONSITE

RUNOFF VOLUME = 1.44632 INCHES = 1.8829 ACRE-FEET  
PEAK DISCHARGE RATE = 54.07 CFS AT 1.499 HOURS BASIN AREA = .0244 SQ. MI.

\*S \*\*\*\*\*  
\*S SEPARATE 10 CFS FOR BRIDGE STORM DRAIN  
DIVIDE HYD ID=1 Q=10.0 ID I=5 HYD NO=S-B-1  
ID II=2 HYD NO=ONSITE-10  
\*S CALC FLOW IN WEST HALF UNSER

\*S (SUNSET GARDENS TO BRIDGE BLVD. NOTE: INCLUDES 6' LS BUFFER)  
 \*S FLOW TO WEST SUMP INLET IN UNSER FROM THIS BASIN  
 \*S \*\*\*\*\*  
 COMPUTE NM HYD ID=1 HYD NO=W-U-2 DA=0.00174 SQ MI  
 PER A=00.0 PER B=41.0 PER C=0.0 PER D=59.0  
 TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 4.0531 CFS UNIT VOLUME = .9965 B = 526.28 P60 = 1.9000  
 AREA = .001027 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
 UNIT PEAK = 1.7530 CFS UNIT VOLUME = .9926 B = 327.55 P60 = 1.9000  
 AREA = .000713 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

#### HYDROGRAPH FROM AREA W-U-2

RUNOFF VOLUME = 1.44631 INCHES = .1342 ACRE-FEET  
 PEAK DISCHARGE RATE = 3.87 CFS AT 1.499 HOURS BASIN AREA = .0017 SQ. MI.

\*S \*\*\*\*\*  
 \*S ADD FLOW FROM ONSITE BASIN TO FLOW FROM WEST HALF OF UNSER  
 \*S \*\*\*\*\*  
 ADD HYD ID=3 HYD NO=W-U-2+ONSITE ID I=1 ID II=2  
 PRINT HYD ID=3 CODE=1

#### HYDROGRAPH FROM AREA W-U-2+ONSITE

RUNOFF VOLUME = 1.44628 INCHES = 1.1108 ACRE-FEET  
 PEAK DISCHARGE RATE = 47.94 CFS AT 1.499 HOURS BASIN AREA = .0144 SQ. MI.

\*S \*\*\*\*\*  
 \*S CALC FLOW IN EAST HALF UNSER (SG TO BRIDGE)  
 \*S \*\*\*\*\*  
 COMPUTE NM HYD ID=1 HYD NO=E-U-2 DA=0.00162 SQ MI  
 PER A=00.0 PER B=32.0 PER C=0.0 PER D=68.0  
 TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
 UNIT PEAK = 4.3492 CFS UNIT VOLUME = .9969 B = 526.28 P60 = 1.9000  
 AREA = .001102 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
 UNIT PEAK = 1.2738 CFS UNIT VOLUME = .9894 B = 327.55 P60 = 1.9000  
 AREA = .000518 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

#### HYDROGRAPH FROM AREA E-U-2

RUNOFF VOLUME = 1.56262 INCHES = .1350 ACRE-FEET  
 PEAK DISCHARGE RATE = 3.83 CFS AT 1.499 HOURS BASIN AREA = .0016 SQ. MI.

\*S \*\*\*\*\*  
 \*S ADD FLOWS FROM ONSITE BASIN, WEST HALF UNSER & EAST HALF UNSER  
 \*S \*\*\*\*\*  
 ADD HYD ID=2 HYD NO=UNSER+ONSITE ID I=1 ID II=3  
 PRINT HYD ID=2 CODE=1

#### HYDROGRAPH FROM AREA UNSER+ONSITE

RUNOFF VOLUME = 1.45803 INCHES = 1.2458 ACRE-FEET  
PEAK DISCHARGE RATE = 51.76 CFS AT 1.499 HOURS BASIN AREA = .0160 SQ. MI.

\*S \*\*\*\*\*  
\*S CALC FLOW FROM SOUTH HALF OF BRIDGE BLVD. AND ALL OF 82ND STREET  
\*S (82ND STREET TO UNSER BLVD. NOTE: INCLUDES 6' LS BUFFER)  
\*S \*\*\*\*\*  
COMPUTE NM HYD ID=1 HYD NO=S-B-1 DA=0.00333 SQ MI  
PER A=00.0 PER B=19.0 PER C=0.0 PER D=81.0  
TP=-0.1333 HR MASS RAIN=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420  
UNIT PEAK = 10.649 CFS UNIT VOLUME = .9982 B = 526.28 P60 = 1.9000  
AREA = .002697 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

K = .130761HR TP = .133300HR K/TP RATIO = .980950 SHAPE CONSTANT, N = 3.599930  
UNIT PEAK = 1.5547 CFS UNIT VOLUME = .9919 B = 327.55 P60 = 1.9000  
AREA = .000633 SQ MI IA = .50000 INCHES INF = 1.25000 INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033300

PRINT HYD ID=1 CODE=1

#### HYDROGRAPH FROM AREA S-B-1

RUNOFF VOLUME = 1.73062 INCHES = .3074 ACRE-FEET  
PEAK DISCHARGE RATE = 8.51 CFS AT 1.499 HOURS BASIN AREA = .0033 SQ. MI.

\*S \*\*\*\*\*  
\*S ADD 10 CFS FROM ONSITE BASIN TO BRIDGE BLVD.  
\*S \*\*\*\*\*  
ADD HYD ID=3 HYD NO=UNSER+ONSITE ID I=1 ID II=5  
PRINT HYD ID=3 CODE=1

#### HYDROGRAPH FROM AREA UNSER+ONSITE

RUNOFF VOLUME = 1.50907 INCHES = 1.2136 ACRE-FEET  
PEAK DISCHARGE RATE = 18.51 CFS AT 1.499 HOURS BASIN AREA = .0151 SQ. MI.

\*S \*\*\*\*\*  
END  
COMMAND NOT IN TABLE  
NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 05:28:32

APPENDIX B

•  
•  
•  
•

• • • •

## STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works  
Portions Copyrighted by CIVILSOFT, 1986, 1987, 1989

Version 00000  
Serial Number 00000000

Apr 16, 2001 10:38:11

Input file : SGU2.DAT  
Output file: SGU2.OUT

## INPUT FILE LISTING

*EAST BRANCH CONNECTION TO SUNSET GARDENS/UNSER  
STORM DRAIN (GREINER BASIN Y)*

T1 TR 11 & 12 CONNECTOR PIPE TO UNSER/SUNSET GARDENS STORM DRAIN

T2 ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

T3 SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

|    |         |       |   |   |      |      |       |       |  |      |   |  |  |  |  |  |  |  |  |
|----|---------|-------|---|---|------|------|-------|-------|--|------|---|--|--|--|--|--|--|--|--|
| SO | 0000.00 | 71.60 | 4 |   |      |      | 80.00 |       |  |      |   |  |  |  |  |  |  |  |  |
| R  | 0073.87 | 76.70 | 4 |   | .013 |      |       |       |  | 58.9 | 1 |  |  |  |  |  |  |  |  |
| JX | 0073.87 | 76.70 | 4 | 3 | .013 | 3.9  |       | 78.20 |  | 90.0 |   |  |  |  |  |  |  |  |  |
| JX | 0231.32 | 79.00 | 4 | 2 | .013 | 22.0 |       | 79.00 |  | 90.0 |   |  |  |  |  |  |  |  |  |
| TS | 0233.32 | 80.00 | 2 |   | .013 |      |       |       |  |      |   |  |  |  |  |  |  |  |  |
| R  | 0259.32 | 80.40 | 2 |   | .013 |      |       |       |  |      |   |  |  |  |  |  |  |  |  |
| SH |         |       | 2 |   |      |      |       |       |  |      |   |  |  |  |  |  |  |  |  |

1

SP

## WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING

PAGE 1

| 0 | CARD | SECT | CHN  | NO OF | AVE PIER | HEIGHT 1 | BASE  | ZL | ZR | INV  | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|---|------|------|------|-------|----------|----------|-------|----|----|------|------|------|------|------|------|------|------|------|------|-------|
|   | CODE | NO   | TYPE | PIERS | WIDTH    | DIAMETER | WIDTH |    |    | DROP |      |      |      |      |      |      |      |      |      |       |
|   | CD   | 1    | 4    |       |          | 2.50     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |
|   | CD   | 2    | 4    |       |          | 2.00     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |
|   | CD   | 3    | 4    |       |          | 1.50     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |
|   | CD   | 4    | 4    |       |          | 3.00     |       |    |    |      |      |      |      |      |      |      |      |      |      |       |

PAGE NO 1

1

## WATER SURFACE PROFILE - TITLE CARD LISTING

0 OHEADING LINE NO 1 IS -

TR 11 & 12 CONNECTOR PIPE TO UNSER/SUNSET GARDENS STORM DRAIN

0 OHEADING LINE NO 2 IS -

ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

0 OHEADING LINE NO 3 IS -

SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

PAGE NO 2

1

## WATER SURFACE PROFILE - ELEMENT CARD LISTING

0 ELEMENT NO 1 IS A SYSTEM OUTLET

| U/S DATA | STATION | INVERT | SECT | W S ELEV |
|----------|---------|--------|------|----------|
|          | .00     | 71.60  | 4    | 80.00    |

0 ELEMENT NO 2 IS A REACH

| U/S DATA | STATION | INVERT | SECT | N    | RADIUS | ANGLE | ANG PT | MAN H |
|----------|---------|--------|------|------|--------|-------|--------|-------|
|          | 73.87   | 76.70  | 4    | .013 | .00    | .00   | 58.90  | 1     |

0 ELEMENT NO 3 IS A JUNCTION

| U/S DATA | STATION | INVERT | SECT | LAT-1 | LAT-2 | N    | Q3  | Q4 | INVERT-3 | INVERT-4 | PHI 3 | PHI 4 |
|----------|---------|--------|------|-------|-------|------|-----|----|----------|----------|-------|-------|
|          | 73.87   | 76.70  | 4    | 3     | 0     | .013 | 3.9 | .0 | 78.20    | .00      | 90.00 | .00   |

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

THE ABOVE ELEMENT CONTAINED AN INVERT ELEV WHICH WAS NOT GREATER THAN THE PREVIOUS INVERT ELEV -WARNING

0 ELEMENT NO 4 IS A JUNCTION  
 U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4  
 231.32 79.00 4 2 0 .013 22.0 .0 79.00 .00 90.00 .00

0 ELEMENT NO 5 IS A TRANSITION  
 U/S DATA STATION INVERT SECT N  
 233.32 80.00 2 .013

0 ELEMENT NO 6 IS A REACH  
 U/S DATA STATION INVERT SECT N RADIUS ANGLE ANG PT MAN H  
 259.32 80.40 2 .013 .00 .00 .00 0

0 ELEMENT NO 7 IS A SYSTEM HEADWORKS  
 U/S DATA STATION INVERT SECT W S ELEV  
 259.32 80.40 2 .00

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

\*\* WARNING NO. 2 \*\* - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

PAGE 1

# WATER SURFACE PROFILE LISTING

TR 11 & 12 CONNECTOR PIPE TO UNSER/SUNSET GARDENS STORM DRAIN

ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

| 0 STATION  | INVERT<br>ELEV | DEPTH<br>OF FLOW | W.S.<br>ELEV | Q    | VEL  | VEL<br>HEAD<br>SF AVE | ENERGY<br>GRD.EL.<br>HF | SUPER<br>ELEV | CRITICAL<br>DEPTH |            | HGT/<br>DIA | BASE/<br>ID NO. | ZL<br>ZR | NO<br>PIER | AVBPR |
|------------|----------------|------------------|--------------|------|------|-----------------------|-------------------------|---------------|-------------------|------------|-------------|-----------------|----------|------------|-------|
| 0 L/ELEM   | SO             |                  |              |      |      |                       |                         |               |                   | NORM DEPTH |             |                 |          |            |       |
| 0 .00      | 71.60          | 8.40             | 80.00        | 47.9 | 6.78 | .71                   | 80.71                   | .00           | 2.25              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0 73.87    | .06904         |                  |              |      |      | .00516                | .38                     |               |                   | 1.07       |             |                 | .00      |            |       |
| 0 73.87    | 76.70          | 3.86             | 80.56        | 47.9 | 6.78 | .71                   | 81.27                   | .00           | 2.25              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0JUNCT STR | .00000         |                  |              |      |      | .00475                | .00                     |               |                   |            |             |                 | .00      |            |       |
| 0 73.87    | 76.70          | 4.08             | 80.78        | 44.0 | 6.22 | .60                   | 81.38                   | .00           | 2.16              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0JUNCT STR | .01461         |                  |              |      |      | .00272                | .43                     |               |                   |            |             |                 | .00      |            |       |
| 0 231.32   | 79.00          | 3.11             | 82.11        | 22.0 | 3.11 | .15                   | 82.26                   | .00           | 1.51              |            | 3.00        | .00             | .00      | 0          | .00   |
| 0TRANS STR | .50000         |                  |              |      |      |                       |                         |               |                   |            |             |                 | .00      |            |       |
| 0 233.32   | 80.00          | 1.43             | 81.43        | 22.0 | 9.14 | 1.30                  | 82.73                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 4.65     | .01539         |                  |              |      |      | .01256                | .06                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 237.97   | 80.07          | 1.45             | 81.52        | 22.0 | 9.04 | 1.27                  | 82.79                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 13.34    | .01539         |                  |              |      |      | .01176                | .16                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 251.31   | 80.28          | 1.51             | 81.79        | 22.0 | 8.62 | 1.15                  | 82.94                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 6.21     | .01539         |                  |              |      |      | .01057                | .07                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 257.52   | 80.37          | 1.59             | 81.96        | 22.0 | 8.22 | 1.05                  | 83.01                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |
| 0 1.80     | .01539         |                  |              |      |      | .00957                | .02                     |               |                   | 1.33       |             |                 | .00      |            |       |
| 0 259.32   | 80.40          | 1.67             | 82.08        | 22.0 | 7.83 | .95                   | 83.03                   | .00           | 1.67              |            | 2.00        | .00             | .00      | 0          | .00   |

Hydraulic Grade Line Computations for East Branch Connection to Sunset Gardens\Unser Storm Drain (Greiner Basin Y)

|                |       |
|----------------|-------|
| MANNING'S n =  | 0.013 |
| STARTING HGL = | 80.00 |

| INPUT          |         |    |      |        |       |          |       |            |           | OUTPUT |      |        |      |        |      |         |      |      |          |         |         |      |         |         |
|----------------|---------|----|------|--------|-------|----------|-------|------------|-----------|--------|------|--------|------|--------|------|---------|------|------|----------|---------|---------|------|---------|---------|
| STRCT. STATION | TYPE    | D  | Q    | L      | Delta | JUNCTION |       | INVERT out | INVERT in | A      | V    | K      | Sf   | LOSSES |      |         |      |      | S LOSSES | EGL out | EGL in  | Hv   | HGL out | HGL in  |
|                | SIZE    |    |      |        |       | Dia.     | Theta |            |           |        |      |        |      | Hf     | Hb   | Hj      | Hmh  | Ht   |          |         |         |      |         |         |
| 0.00           | 36" WYE |    |      |        |       |          |       |            | 71.60     |        |      |        |      |        |      |         |      |      |          |         | 80.71   |      |         | 80.00   |
|                |         | 36 | 47.9 | 73.87  |       |          |       |            |           | 7.07   | 6.78 | 666.98 | 0.52 | 0.38   |      |         |      |      | 0.38     |         |         | 0.71 |         |         |
| 73.87          | MH      |    |      |        | 58.9  | 18       | 90.0  | 76.70      | 76.70     |        |      |        |      |        | 0.12 | 0.11    | 0.00 | 0.00 | 0.23     | 81.09   | 81.32   |      | 80.38   | 80.72   |
|                |         | 36 | 44.0 | 157.45 |       |          |       |            |           | 7.07   | 6.22 | 666.98 | 0.44 | 0.69   |      |         |      |      | 0.69     |         |         | 0.60 |         |         |
| 231.32         | DBL A   |    |      |        |       | 24       | 90.0  | 79.00      | 79.00     |        |      |        |      |        | 0.00 | 0.89    | 0.00 | 0.00 | 0.89     | 82.60   | 83.49   |      | 82.00   | 82.73   |
|                |         | 24 | 22.0 | 28.00  |       |          |       |            |           | 3.14   | 7.00 | 226.22 | 0.95 | 0.26   |      |         |      |      | 0.26     |         |         | 0.76 |         |         |
| 259.32         | DBL A   |    |      |        |       | 24       | 90.0  | 80.40      | 80.40     |        |      |        |      |        | 0.00 | #DIV/0! | 0.00 | 0.00 | #DIV/0!  | 83.76   | #DIV/0! |      | 82.99   | #DIV/0! |

STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works  
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Version 00000  
Serial Number 00000000

Apr 16, 2001 12:13:41

Input file : SGU3.DAT  
Output file: SGU3.OUT

INPUT FILE LISTING

BRANCH TO UNSER SUMP INLET

T1 UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN  
T2 ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001  
T3 SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92  
SO 0073.87 78.20 1 80.78  
R 0113.35 80.50 1 .013  
SH 1

| WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING |      |      |       |          |          |       |    |    |      | PAGE |      |
|----------------------------------------------------|------|------|-------|----------|----------|-------|----|----|------|------|------|
| 0 CARD                                             | SECT | CHN  | NO OF | AVE PIER | HEIGHT 1 | BASE  | ZL | ZR | INV  | Y(1) | Y(2) |
| CODE                                               | NO   | TYPE | PIERS | WIDTH    | DIAMETER | WIDTH |    |    | DROP | Y(3) | Y(4) |
| CD                                                 | 1    | 4    |       |          | 1.50     |       |    |    |      |      |      |
| CD                                                 | 2    | 4    |       |          | 2.00     |       |    |    |      |      |      |
| CD                                                 | 3    | 4    |       |          | 2.50     |       |    |    |      |      |      |

PAGE NO 1

1  
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OHEADING LINE NO 1 IS -  
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OHEADING LINE NO 2 IS -  
0  
OHEADING LINE NO 3 IS -  
0  
WATER SURFACE PROFILE - TITLE CARD LISTING  
UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN  
ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001  
SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

PAGE NO 2

| WATER SURFACE PROFILE - ELEMENT CARD LISTING |            |   |      |                  |         |        |      |      |          |       |        |
|----------------------------------------------|------------|---|------|------------------|---------|--------|------|------|----------|-------|--------|
| 0                                            | ELEMENT NO | 1 | IS A | SYSTEM OUTLET    | *       | *      | *    |      |          |       |        |
|                                              |            |   |      | U/S DATA         | STATION | INVERT | SECT |      | W S ELEV |       |        |
|                                              |            |   |      |                  | 73.87   | 78.20  | 1    |      | 80.78    |       |        |
| 0                                            | ELEMENT NO | 2 | IS A | REACH            | *       | *      | *    |      |          |       |        |
|                                              |            |   |      | U/S DATA         | STATION | INVERT | SECT | N    | RADIUS   | ANGLE | ANG PT |
|                                              |            |   |      |                  | 113.35  | 80.50  | 1    | .013 | .00      | .00   | .00    |
|                                              |            |   |      |                  |         |        |      |      |          |       | 0      |
| 0                                            | ELEMENT NO | 3 | IS A | SYSTEM HEADWORKS |         | *      | *    |      |          |       |        |
|                                              |            |   |      | U/S DATA         | STATION | INVERT | SECT |      | W S ELEV |       |        |
|                                              |            |   |      |                  | 113.35  | 80.50  | 1    |      | .00      |       |        |

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

\*\* WARNING NO. 2 \*\* - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC  
PAGE 1

1  
WATER SURFACE PROFILE LISTING  
UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN  
ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

| SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92 |         |                |                  |              |     |      |                       |                         |               |                   |            |             |                 |     |            |       |
|-----------------------------------------------|---------|----------------|------------------|--------------|-----|------|-----------------------|-------------------------|---------------|-------------------|------------|-------------|-----------------|-----|------------|-------|
| 0                                             | STATION | INVERT<br>ELEV | DEPTH<br>OF FLOW | W.S.<br>ELEV | Q   | VEL  | VEL<br>HEAD<br>SF AVE | ENERGY<br>GRD.EL.<br>HF | SUPER<br>ELEV | CRITICAL<br>DEPTH | NORM DEPTH | HGT/<br>DIA | BASE/<br>ID NO. | ZL  | NO<br>PIER | AVBPR |
| 0                                             | L/ELEM  | SO             |                  |              |     |      |                       |                         |               |                   |            |             |                 | ZR  |            |       |
| *****                                         |         |                |                  |              |     |      |                       |                         |               |                   |            |             |                 |     |            |       |
| 0                                             | 73.87   | 78.20          | 2.58             | 80.78        | 3.9 | 2.21 | .08                   | 80.86                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 18.99   | .05826         |                  |              |     |      | .00136                | .03                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 92.86   | 79.31          | 1.50             | 80.81        | 3.9 | 2.21 | .08                   | 80.88                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 2.30    | .05826         |                  |              |     |      | .00128                | .00                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 95.16   | 79.44          | 1.36             | 80.80        | 3.9 | 2.31 | .08                   | 80.88                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 1.26    | .05826         |                  |              |     |      | .00125                | .00                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 96.42   | 79.51          | 1.28             | 80.79        | 3.9 | 2.43 | .09                   | 80.89                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 1.02    | .05826         |                  |              |     |      | .00135                | .00                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 97.44   | 79.57          | 1.21             | 80.79        | 3.9 | 2.55 | .10                   | 80.89                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | .29     | .05826         |                  |              |     |      | .00144                | .00                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 97.73   | 79.59          | 1.19             | 80.78        | 3.9 | 2.59 | .10                   | 80.88                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| HYDRAULIC JUMP                                |         |                |                  |              |     |      |                       |                         |               |                   |            |             |                 | .00 |            |       |
| 0                                             | 97.73   | 79.59          | .45              | 80.04        | 3.9 | 8.63 | 1.16                  | 81.20                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | .67     | .05826         |                  |              |     |      | .03414                | .02                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 98.40   | 79.63          | .46              | 80.09        | 3.9 | 8.54 | 1.13                  | 81.22                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 3.26    | .05826         |                  |              |     |      | .03154                | .10                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 101.66  | 79.82          | .47              | 80.29        | 3.9 | 8.15 | 1.03                  | 81.32                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 2.51    | .05826         |                  |              |     |      | .02763                | .07                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 104.16  | 79.96          | .49              | 80.45        | 3.9 | 7.77 | .94                   | 81.39                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 2.00    | .05826         |                  |              |     |      | .02420                | .05                     |               |                   | .40        |             |                 | .00 |            |       |
| 0                                             | 106.17  | 80.08          | .51              | 80.59        | 3.9 | 7.41 | .85                   | 81.44                   | .00           | .75               |            | 1.50        | .00             | .00 | 0          | .00   |
| 0                                             | 1.60    | .05826         |                  |              |     |      | .02120                | .03                     |               |                   | .40        |             |                 | .00 |            |       |
|                                               |         |                |                  |              |     |      |                       |                         |               |                   |            |             |                 |     | PAGE       | 2     |

## WATER SURFACE PROFILE LISTING

UNSER SUMP INLET WEST CONNECTOR TO UNSER/SUNSET GARDENS STORM DRAIN

ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

SEE RYALS ENGRG. DESIGN COA PROJECT # 5226.92

[illegible]

Hydraulic Grade Line Computations for East Branch Connection to Sunset Gardens\Unser Storm Drain (Greiner Basin Y)

|                |       |
|----------------|-------|
| MANNING'S n =  | 0.013 |
| STARTING HGL = | 80.78 |

| INPUT             |       |    |     |       |       |          |       |               |              | OUTPUT |      |        |      |        |      |      |      |      |             |            |           |       |            |           |       |
|-------------------|-------|----|-----|-------|-------|----------|-------|---------------|--------------|--------|------|--------|------|--------|------|------|------|------|-------------|------------|-----------|-------|------------|-----------|-------|
| STRCT.<br>STATION | TYPE  | D  | Q   | L     | Delta | JUNCTION |       | INVERT<br>out | INVERT<br>in | A      | V    | K      | Sf   | LOSSES |      |      |      |      | S<br>LOSSES | EGL<br>out | EGL<br>in | Hv    | HGL<br>out | HGL<br>in |       |
|                   | SIZE  |    |     |       |       | Dia.     | Theta |               |              |        |      |        |      | Hf     | Hb   | Hj   | Hmh  | Ht   |             |            |           |       |            |           |       |
| 73.87             | 6' MH |    |     |       |       |          |       |               | 78.20        |        |      |        |      |        |      |      |      |      |             |            |           | 80.86 |            |           | 80.78 |
|                   |       | 18 | 3.9 | 59.48 |       |          |       |               |              | 1.77   | 2.21 | 105.04 | 0.14 | 0.08   |      |      |      |      | 0.08        |            |           | 0.08  |            |           |       |
| 133.35            | DBL A |    |     |       |       |          |       | 80.50         | 80.50        |        |      |        |      |        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00        | 82.08      | 84.10     |       | 82.00      | 83.50     |       |

## STORM DRAIN ANALYSIS PLUS

Original version by Los Angeles County Public Works  
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Version 00000  
Serial Number 00000000

Apr 16, 2001 10:37:43

Input file : BG2.DAT  
Output file: BG2.OUT

## INPUT FILE LISTING

*NORTH BRANCH CONNECTION TO BRIDGE STORM DRAIN  
(GREINER BASIN 21-D)*

T1 BRIDGE STORM DRAIN HGL CALCULATIONS FOR TR 11 & 12  
T2 ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001  
T3 SEE GREINER DESIGN COA PROJECT # 4076.93

|    |         |       |   |   |      |      |       |  |      |      |  |  |  |  |  |  |  |  |  |
|----|---------|-------|---|---|------|------|-------|--|------|------|--|--|--|--|--|--|--|--|--|
| SO | 0000.00 | 75.66 | 1 |   |      |      | 83.30 |  |      |      |  |  |  |  |  |  |  |  |  |
| JX | 0056.65 | 78.00 | 1 | 1 | .013 | 09.0 | 78.00 |  | 90.0 | 45.0 |  |  |  |  |  |  |  |  |  |
| JX | 0084.22 | 78.76 | 1 | 1 | .013 | 12.5 | 78.76 |  | 90.0 | 90.0 |  |  |  |  |  |  |  |  |  |
| TS | 0085.89 | 78.85 | 2 |   | .013 |      |       |  |      |      |  |  |  |  |  |  |  |  |  |
| JX | 0209.82 | 82.23 | 2 | 2 | .013 | 05.0 | 82.23 |  | 90.0 |      |  |  |  |  |  |  |  |  |  |
| TS | 0211.49 | 82.32 | 4 |   | .013 |      |       |  |      |      |  |  |  |  |  |  |  |  |  |
| R  | 0237.82 | 83.00 | 4 |   | .013 |      |       |  |      |      |  |  |  |  |  |  |  |  |  |
| SH |         |       | 4 |   |      |      |       |  |      |      |  |  |  |  |  |  |  |  |  |

| WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING |      |      |      |       |          |          |       |    |    | PAGE 1 |      |      |      |      |      |      |      |      |      |       |
|----------------------------------------------------|------|------|------|-------|----------|----------|-------|----|----|--------|------|------|------|------|------|------|------|------|------|-------|
| 0                                                  | CARD | SECT | CHN  | NO OF | AVE PIER | HEIGHT 1 | BASE  | ZL | ZR | INV    | Y(1) | Y(2) | Y(3) | Y(4) | Y(5) | Y(6) | Y(7) | Y(8) | Y(9) | Y(10) |
|                                                    | CODE | NO   | TYPE | PIERS | WIDTH    | DIAMETER | WIDTH |    |    | DROP   |      |      |      |      |      |      |      |      |      |       |
|                                                    | CD   | 1    | 4    |       |          | 2.50     |       |    |    |        |      |      |      |      |      |      |      |      |      |       |
|                                                    | CD   | 2    | 4    |       |          | 2.00     |       |    |    |        |      |      |      |      |      |      |      |      |      |       |
|                                                    | CD   | 3    | 4    |       |          | 3.00     |       |    |    |        |      |      |      |      |      |      |      |      |      |       |
|                                                    | CD   | 4    | 4    |       |          | 1.50     |       |    |    |        |      |      |      |      |      |      |      |      |      |       |

PAGE NO 1

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OHEADING LINE NO 1 IS -  
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OHEADING LINE NO 3 IS -  
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WATER SURFACE PROFILE - TITLE CARD LISTING  
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OHEADING LINE NO 1 IS -  
0  
OHEADING LINE NO 2 IS -  
0  
OHEADING LINE NO 3 IS -  
0  
1  
0  
WATER SURFACE PROFILE - ELEMENT CARD LISTING  
0  
ELEMENT NO 1 IS A SYSTEM OUTLET  
U/S DATA STATION INVERT SECT  
.00 75.66 1  
0  
ELEMENT NO 2 IS A JUNCTION  
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4  
56.65 78.00 1 1 0 .013 9.0 .0 78.00 .00 90.00 45.00  
0  
ELEMENT NO 3 IS A JUNCTION  
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4  
84.22 78.76 1 1 0 .013 12.5 .0 78.76 .00 90.00 90.00  
0  
ELEMENT NO 4 IS A TRANSITION  
U/S DATA STATION INVERT SECT LAT-1 LAT-2 N Q3 Q4 INVERT-3 INVERT-4 PHI 3 PHI 4

PAGE NO 2

|   |            |                         |         |        |      |       |       |      |     |    |          |          |        |       |        |       |
|---|------------|-------------------------|---------|--------|------|-------|-------|------|-----|----|----------|----------|--------|-------|--------|-------|
|   |            | U/S DATA                | STATION | INVERT | SECT |       | N     |      |     |    |          |          |        |       |        |       |
|   |            |                         | 85.89   | 78.85  | 2    |       | .013  |      |     |    |          |          |        |       |        |       |
| 0 | ELEMENT NO | 5 IS A JUNCTION         |         |        |      |       |       |      |     |    |          |          |        |       |        |       |
|   |            | U/S DATA                | STATION | INVERT | SECT | LAT-1 | LAT-2 | N    | Q3  | Q4 | INVERT-3 | INVERT-4 | PHI 3  | PHI 4 |        |       |
|   |            |                         | 209.82  | 82.23  | 2    | 2     | 0     | .013 | 5.0 | .0 | 82.23    | .00      | 90.00  | .00   |        |       |
| 0 | ELEMENT NO | 6 IS A TRANSITION       |         |        |      |       |       |      |     |    |          |          |        |       |        |       |
|   |            | U/S DATA                | STATION | INVERT | SECT |       |       | N    |     |    |          |          |        |       |        |       |
|   |            |                         | 211.49  | 82.32  | 4    |       |       | .013 |     |    |          |          |        |       |        |       |
| 0 | ELEMENT NO | 7 IS A REACH            |         |        |      |       |       |      |     |    |          |          |        |       |        |       |
|   |            | U/S DATA                | STATION | INVERT | SECT |       |       | N    |     |    |          |          | RADIUS | ANGLE | ANG PT | MAN H |
|   |            |                         | 237.82  | 83.00  | 4    |       |       | .013 |     |    |          |          | .00    | .00   | .00    | 0     |
| 0 | ELEMENT NO | 8 IS A SYSTEM HEADWORKS |         |        |      |       |       |      |     |    |          |          |        |       |        |       |
|   |            | U/S DATA                | STATION | INVERT | SECT |       |       |      |     |    | W S ELEV |          |        |       |        |       |
|   |            |                         | 237.82  | 83.00  | 4    |       |       |      |     |    | .00      |          |        |       |        |       |

NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

\*\* WARNING NO. 2 \*\* - WATER SURFACE ELEVATION GIVEN IS LESS THAN OR EQUALS INVERT ELEVATION IN HDWKDS, W.S.ELEV = INV + DC

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# WATER SURFACE PROFILE LISTING

BRIDGE STORM DRAIN HGL CALCULATIONS FOR TR 11 & 12

ENTERED BY KEVIN DAGGETT DATE: APRIL 16, 2001

SEE GREINER DESIGN COA PROJECT # 4076.93

| 0     | STATION    | INVERT | DEPTH   | W.S.  | Q    | VEL  | VEL    | ENERGY  | SUPER | CRITICAL |     | HGT/ | EASE/  | ZL  | NO   | AVBPR |
|-------|------------|--------|---------|-------|------|------|--------|---------|-------|----------|-----|------|--------|-----|------|-------|
|       |            | ELEV   | OF FLOW | ELEV  |      |      | HEAD   | GRD.EL. | ELEV  | DEPTH    |     | DIA  | ID NO. |     | PIER |       |
| 0     | L/ELEM     | SO     |         |       |      |      | SF AVE | HF      |       |          |     |      |        |     |      |       |
| ***** |            |        |         |       |      |      |        |         |       |          |     |      |        |     |      |       |
| 0     | .00        | 75.66  | 7.64    | 83.30 | 31.5 | 6.42 | .64    | 83.94   | .00   | 1.91     |     | 2.50 | .00    | .00 | 0    | .00   |
|       | 0JUNCT STR | .04131 |         |       |      |      | .00445 | .25     |       |          |     |      |        | .00 |      |       |
| 0     | 56.65      | 78.00  | 6.18    | 84.18 | 22.5 | 4.58 | .33    | 84.51   | .00   | 1.61     |     | 2.50 | .00    | .00 | 0    | .00   |
|       | 0JUNCT STR | .02757 |         |       |      |      | .00180 | .05     |       |          |     |      |        | .00 |      |       |
| 0     | 84.22      | 78.76  | 5.99    | 84.75 | 10.0 | 2.04 | .06    | 84.82   | .00   | 1.06     |     | 2.50 | .00    | .00 | 0    | .00   |
|       | 0TRANS STR | .05389 |         |       |      |      | .00127 | .00     |       |          |     |      |        | .00 |      |       |
| 0     | 85.89      | 78.85  | 5.83    | 84.68 | 10.0 | 3.18 | .16    | 84.84   | .00   | 1.13     |     | 2.00 | .00    | .00 | 0    | .00   |
|       | 0JUNCT STR | .02727 |         |       |      |      | .00122 | .15     |       |          |     |      |        | .00 |      |       |
| 0     | 209.82     | 82.23  | 2.84    | 85.07 | 5.0  | 1.59 | .04    | 85.11   | .00   | .79      |     | 2.00 | .00    | .00 | 0    | .00   |
|       | 0TRANS STR | .05389 |         |       |      |      | .00138 | .00     |       |          |     |      |        | .00 |      |       |
| 0     | 211.49     | 82.32  | 2.68    | 85.00 | 5.0  | 2.83 | .12    | 85.13   | .00   | .86      |     | 1.50 | .00    | .00 | 0    | .00   |
| 0     | 26.33      | .02583 |         |       |      |      | .00227 | .06     |       |          | .56 |      |        | .00 |      |       |
| 0     | 237.82     | 83.00  | 2.06    | 85.06 | 5.0  | 2.83 | .12    | 85.19   | .00   | .86      |     | 1.50 | .00    | .00 | 0    | .00   |

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Hydraulic Grade Line Computations for North Branch Connection to Bridge Blvd. Storm Drain (Greiner Basin 21-D)

|                |       |
|----------------|-------|
| MANNING'S n =  | 0.013 |
| STARTING HGL = | 83.30 |

| STRCT.<br>STATION | TYPE<br>SIZE | INPUT |      |        |       |          |       |               |              | OUTPUT |      |        |      |        |      |      |      |      |             |            |           |       |            |           |  |       |
|-------------------|--------------|-------|------|--------|-------|----------|-------|---------------|--------------|--------|------|--------|------|--------|------|------|------|------|-------------|------------|-----------|-------|------------|-----------|--|-------|
|                   |              | D     | Q    | L      | Delta | JUNCTION |       | INVERT<br>out | INVERT<br>in | A      | V    | K      | Sf   | LOSSES |      |      |      |      | S<br>LOSSES | EGL<br>out | EGL<br>in | Hv    | HGL<br>out | HGL<br>in |  |       |
|                   |              |       |      |        |       | Dia.     | Theta |               |              |        |      |        |      | Hf     | Hb   | Hj   | Hmh  | Ht   |             |            |           |       |            |           |  |       |
| 0.00              | 24" WYE      |       |      |        |       |          |       |               | 75.66        |        |      |        |      |        |      |      |      |      |             |            |           | 83.94 |            |           |  | 83.30 |
| 56.65             | DBL C        | 30    | 31.5 | 56.65  |       |          |       |               |              | 4.91   | 6.42 | 410.17 | 0.59 | 0.33   |      |      |      |      | 0.33        |            |           | 0.64  |            |           |  |       |
|                   |              | 30    | 22.5 | 27.57  | 45.0  | 30       | 90.0  | 78.00         | 78.00        |        |      |        |      |        | 0.09 | 0.31 | 0.00 | 0.00 | 0.40        | 84.27      | 84.68     |       | 83.63      | 84.35     |  |       |
| 84.22             | DBL A        |       |      |        | 90.0  |          |       | 78.76         | 78.76        | 4.91   | 4.58 | 410.17 | 0.30 | 0.08   |      |      |      |      | 0.08        |            |           | 0.33  |            |           |  |       |
|                   |              | 24    | 10.0 | 125.60 |       |          |       |               |              |        |      |        |      |        | 0.07 | 0.00 | 0.00 | 0.00 | 0.07        | 84.76      | 84.83     |       | 84.43      | 84.67     |  |       |
| 209.82            | DBL A        |       |      |        |       | 24       | 90.0  | 82.23         | 82.23        | 3.14   | 3.18 | 226.22 | 0.20 | 0.25   |      |      |      |      | 0.25        |            |           | 0.16  |            |           |  |       |
|                   |              | 18    | 5.0  | 28.00  |       |          |       |               |              |        |      |        |      |        | 0.00 | 0.19 | 0.00 | 0.00 | 0.19        | 85.07      | 85.26     |       | 84.91      | 85.14     |  |       |
| 237.82            | DBL A        |       |      |        |       |          |       | 83.00         | 83.00        | 1.77   | 2.83 | 105.04 | 0.23 | 0.06   |      |      |      |      | 0.06        |            |           | 0.12  |            |           |  |       |
|                   |              |       |      |        |       |          |       |               |              |        |      |        |      |        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00        | 85.32      | #DIV/0!   |       | 85.20      | #DIV/0!   |  |       |