

FILE COPY



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

HYDROLOGY SECTION  
123 Central NW, Albuquerque, NM 87102  
(505) 766-7644

November 12, 1986

James Topmiller  
Bohannon-Huston, Inc.  
7500 Jefferson Street, NE  
Albuquerque, New Mexico 87109

RE: REVISION TO LOT 7, BLOCK 3; FOREST HILLS SUBDIVISION  
(E-18/D26)

Dear James:

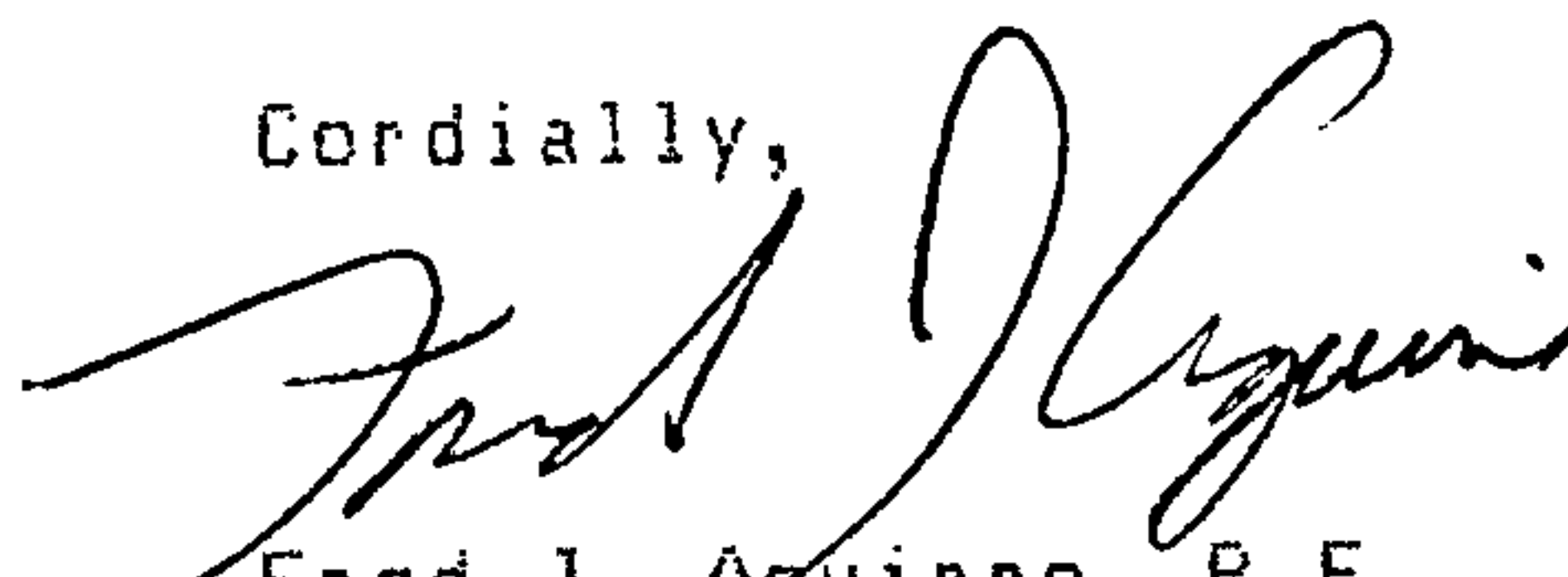
I concur with the proposed revision and have signed your letter dated November 5, 1986, (copy attached) indicating my approval.

Upon Mr. Andrade's recording of the 5' required drainage easements, please advise your client to forward a copy for our records.

It is recommended that your client consider vacating the drainage easement along the west property line, since it is no longer required. This vacation action will require a public hearing and a replat.

If you should have any questions regarding this matter, please call me at 768-2650.

Cordially,

  
Fred J. Aguirre, P.E.  
City Hydrologist

cc: Sam Andrade

Attachment

FJA/bsj

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER





# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION  
123 Central NW, Albuquerque, NM 87102  
(505) 766-7644

May 21, 1984

Mr. Brian Burnett  
Bohannon-Huston, INC.  
4125 Carlisle Boulevard NE  
Albuquerque, NM 87107

*City Proj. 1104*

REF: UPDATE TO FOREST HILLS SUBDIVISION DRAINAGE REPORT (E18-D22) RECEIVED  
MAY 11, 1984

Dear Brian:

Based on review of the above referenced submittal, approval is hereby granted for the drainage plan for the subject project.

Please be advised that it is recommended that a detailed grading plan reflecting the proposed drainage scheme be submitted for review prior to final sign-off.

Also, coordination with the City Design Section or City Engineer will be required for determination as to the City's participation or construction of the outfall to the North Pino.

It is understood that the ponds may become the permanent solution should the outfall scheme fail to materialize.

Should you have any questions or comments, please contact me.

Sincerely yours,

Billy J. Goolsby, PE  
City/County Flood Plain Admin.

BJG:mrk

MUNICIPAL DEVELOPMENT DEPARTMENT

C. Dwayne Sheppard, P.E., City Engineer

ENGINEERING DIVISION

Telephone (505) 766-7467

AN EQUAL OPPORTUNITY EMPLOYER



REFERENCE FOR  
FOREST HILLS SUBDIVISION  
STORM DRAIN OUTFALL  
E18-D26

A GRADING & DRAINAGE PLAN

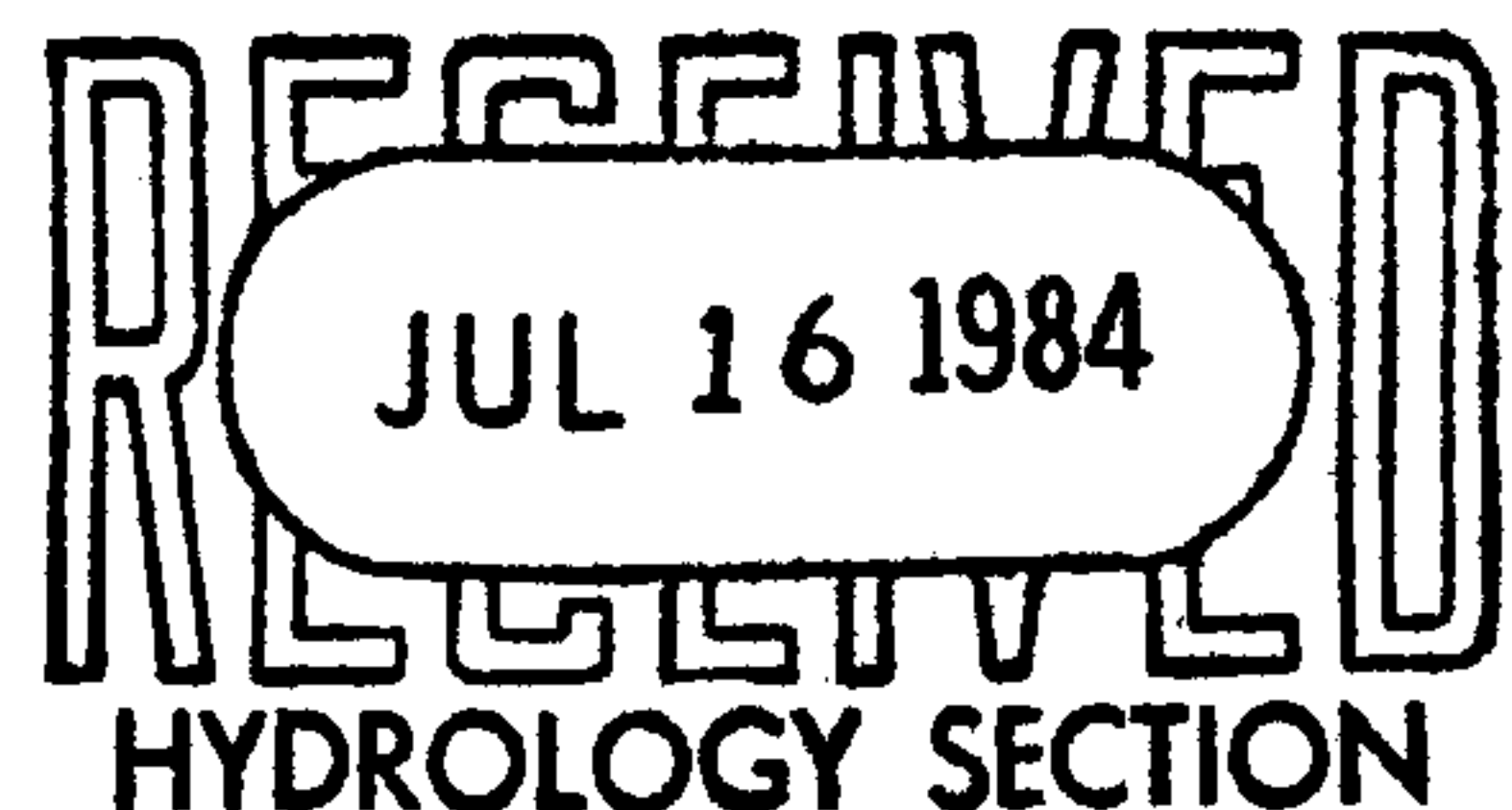
for the

New Heart Center  
near  
San Mateo Blvd. and I-25  
Albuquerque, New Mexico

Prepared for  
Dorman, Nelson & Breen  
1512 Paseo de Peralta  
Santa Fe, New Mexico 87501

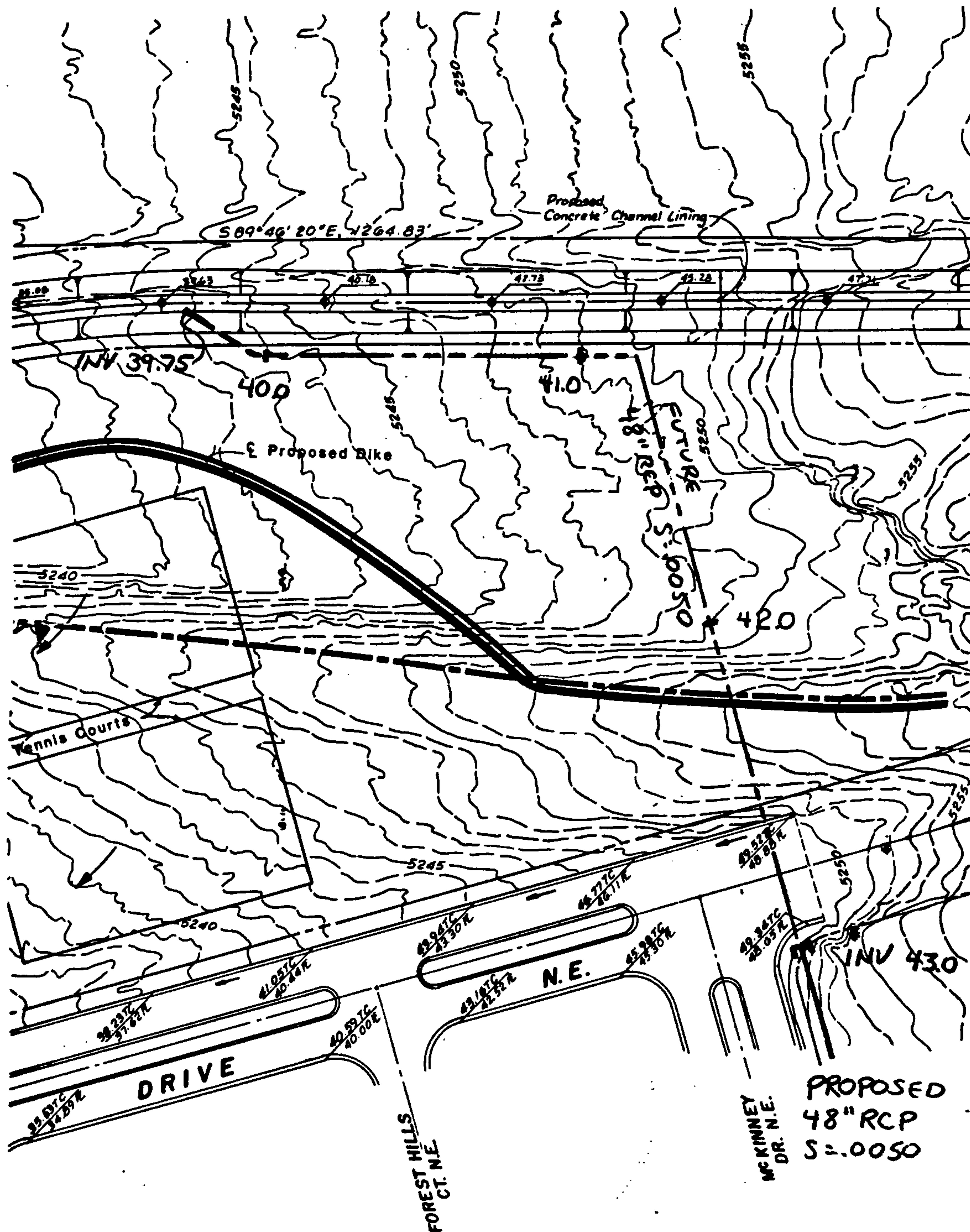
Prepared by:  
Scanlon & Associates, Inc.  
8008 Pennsylvania Circle NE  
Albuquerque, New Mexico 87110

January 27, 1984  
Scanlon Job No. 84109





1"=100'



**LEGEND**

— 5240 — SURFACE ELEVATION CONTOUR LINE  
 - - - - - PROPERTY LINE

**DEVELOPED**

AREA A - North of Channel R/W  
 AREA B - Channel R/W

**A PORTION  
 OF  
 NEW HEART CENTER  
 DRAINAGE PLAN**

**RECEIVED**  
 JUL 16 1984  
**HYDROLOGY SECTION**



## FOREST HILLS STORM DRAIN CAPACITY

SINCE NO OUTFALL HAS YET BEEN ESTABLISHED TO DATE. THE CAPACITY OF THE 48" LINE PARALLEL TO MCKINNEY DR CAN ONLY BE ESTABLISHED ON PIPE FLOWING FULL CAPACITY.

48" RCP  $S = .0050$   $n = .013$

BY MANNINGS EQUATION

$Q_{FULL} = 101.8 \text{ CFS}$   $V = 8.1 \text{ FPS}$

$101.8 - 42.6 = 59.2 \text{ CFS EXCESS CAP.}$   
THIS EXCESS CAPACITY COULD BE USED BY ADDING INLETS ON MCKINNEY DR.

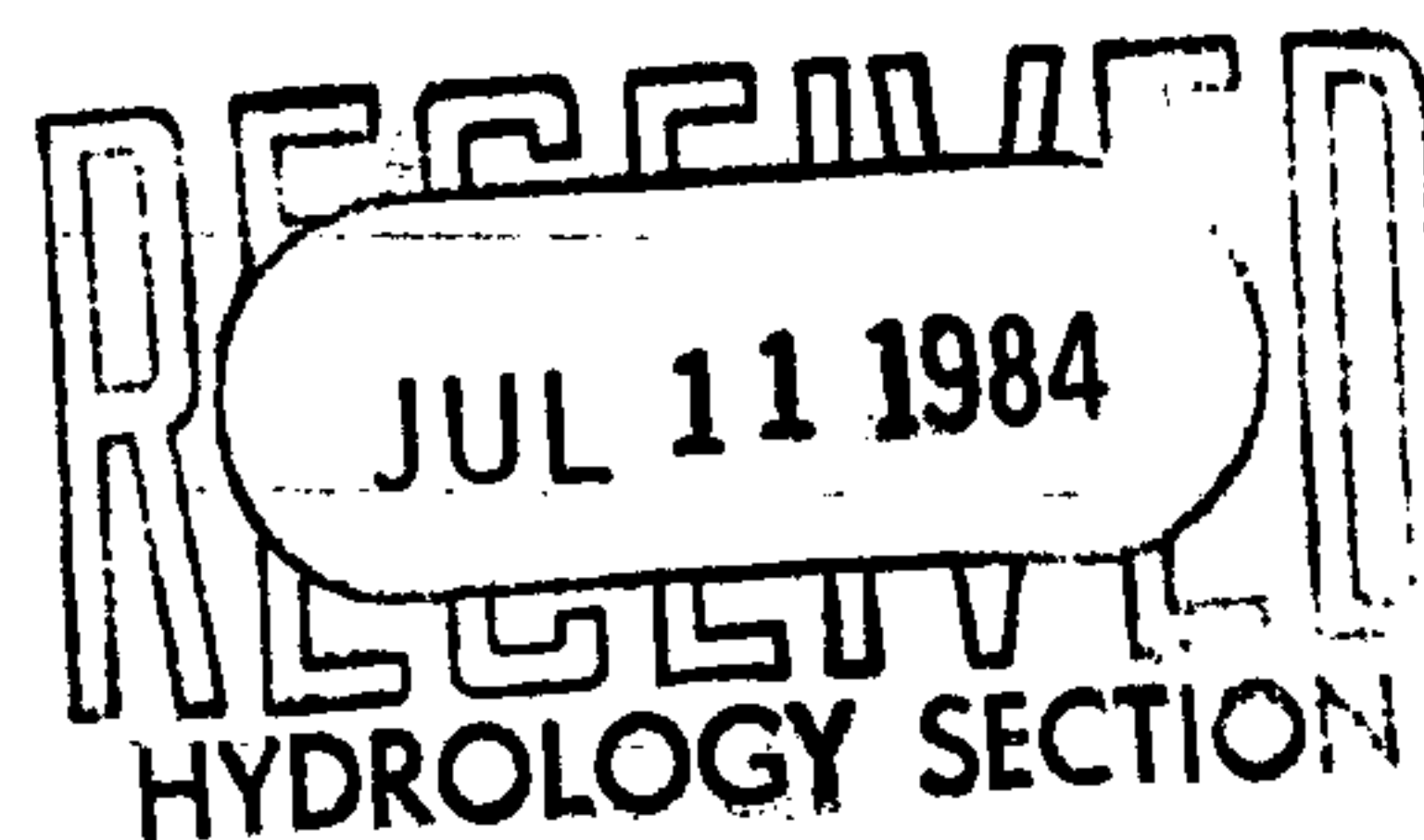
24" RCP  $S = .0492$   $n = .013$

THE FLOW IN THIS LINE IS CONTROLLED BY THE CAPACITY OF THE INLETS WHICH IS 42.6 CFS.

DEPTH OF FLOW  $1.414'$   $V = 17.98 \text{ FPS}$   $Q = 42.6 \text{ CFS}$

$Q_{FULL} = 50.34 \text{ CFS}$   $V_{FULL} = 16.02 \text{ FPS}$

IF INLETS ARE NOT TO BE ADDED IN MCKINNEY A 36" RCP WOULD BE ADEQUATE  $Q_{FULL} = 47.3 \text{ CFS}$





ROAD

32' STREET 50' ROW 2% CROWN  
MOUNTABLE CURB

MANNINGS N=.0170

SLOPE =.0050

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|
| 0.02        | 0.02         | 0.02                    | 0.01                  | 2.00                  | 0.29                 | 2.00                           |
| 0.04        | 0.04         | 0.08                    | 0.04                  | 4.01                  | 0.45                 | 3.99                           |
| 0.06        | 0.06         | 0.18                    | 0.11                  | 6.01                  | 0.60                 | 5.99                           |
| 0.08        | 0.08         | 0.32                    | 0.23                  | 8.01                  | 0.72                 | 7.98                           |
| 0.10        | 0.10         | 0.50                    | 0.42                  | 10.02                 | 0.84                 | 9.98                           |
| 0.12        | 0.12         | 0.72                    | 0.68                  | 12.02                 | 0.95                 | 11.98                          |
| 0.14        | 0.14         | 0.98                    | 1.02                  | 14.02                 | 1.05                 | 13.97                          |
| 0.16        | 0.16         | 1.28                    | 1.46                  | 16.02                 | 1.14                 | 15.97                          |
| 0.18        | 0.18         | 1.62                    | 2.00                  | 18.03                 | 1.24                 | 17.97                          |
| 0.20        | 0.20         | 2.00                    | 2.65                  | 20.03                 | 1.33                 | 19.96                          |
| 0.22        | 0.22         | 2.42                    | 3.42                  | 22.03                 | 1.42                 | 21.96                          |
| 0.24        | 0.24         | 2.87                    | 4.31                  | 24.04                 | 1.50                 | 23.95                          |
| 0.26        | 0.26         | 3.37                    | 5.34                  | 26.04                 | 1.58                 | 25.95                          |
| 0.28        | 0.28         | 3.91                    | 6.51                  | 28.04                 | 1.66                 | 27.95                          |
| 0.30        | 0.30         | 4.49                    | 7.82                  | 30.05                 | 1.74                 | 29.94                          |
| TC 0.32     | 0.32         | 5.11                    | 9.29                  | 32.05                 | 1.82                 | 31.94                          |
| 0.34        | 0.34         | 5.76                    | 11.08                 | 33.11                 | 1.92                 | 33.00                          |
| 0.36        | 0.36         | 6.44                    | 12.83                 | 35.11                 | 1.99                 | 35.00                          |
| 0.38        | 0.38         | 7.16                    | 14.76                 | 37.11                 | 2.06                 | 37.00                          |
| 0.40        | 0.40         | 7.92                    | 16.86                 | 39.11                 | 2.13                 | 39.00                          |
| 0.42        | 0.42         | 8.72                    | 19.15                 | 41.11                 | 2.20                 | 41.00                          |
| 0.44        | 0.44         | 9.56                    | 21.63                 | 43.12                 | 2.26                 | 43.00                          |
| 0.46        | 0.46         | 10.44                   | 24.30                 | 45.12                 | 2.33                 | 45.00                          |
| 0.48        | 0.48         | 11.36                   | 27.18                 | 47.12                 | 2.39                 | 47.00                          |
| 0.50        | 0.50         | 12.32                   | 30.27                 | 49.12                 | 2.46                 | 49.00                          |
| 0.51        | 0.51         | 12.81                   | 31.89                 | 50.12                 | 2.49                 | 50.00                          |



## ROAD

MANNINGS N=.0170

SLOPE =.0100

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|
| 0.02        | 0.02         | 0.02                    | 0.01                  | 2.00                  | 0.40                 | 2.00                           |
| 0.04        | 0.04         | 0.08                    | 0.05                  | 4.01                  | 0.64                 | 3.99                           |
| 0.06        | 0.06         | 0.18                    | 0.15                  | 6.01                  | 0.84                 | 5.99                           |
| 0.08        | 0.08         | 0.32                    | 0.33                  | 8.01                  | 1.02                 | 7.98                           |
| 0.10        | 0.10         | 0.50                    | 0.59                  | 10.02                 | 1.18                 | 9.98                           |
| 0.12        | 0.12         | 0.72                    | 0.96                  | 12.02                 | 1.34                 | 11.98                          |
| 0.14        | 0.14         | 0.98                    | 1.45                  | 14.02                 | 1.48                 | 13.97                          |
| 0.16        | 0.16         | 1.28                    | 2.07                  | 16.02                 | 1.62                 | 15.97                          |
| 0.18        | 0.18         | 1.62                    | 2.83                  | 18.03                 | 1.75                 | 17.97                          |
| 0.20        | 0.20         | 2.00                    | 3.75                  | 20.03                 | 1.88                 | 19.96                          |
| 0.22        | 0.22         | 2.42                    | 4.84                  | 22.03                 | 2.00                 | 21.96                          |
| 0.24        | 0.24         | 2.87                    | 6.10                  | 24.04                 | 2.12                 | 23.95                          |
| 0.26        | 0.26         | 3.37                    | 7.55                  | 26.04                 | 2.24                 | 25.95                          |
| 0.28        | 0.28         | 3.91                    | 9.20                  | 28.04                 | 2.35                 | 27.95                          |
| 0.30        | 0.30         | 4.49                    | 11.06                 | 30.05                 | 2.46                 | 29.94                          |
| 0.32        | 0.32         | 5.11                    | 13.14                 | 32.05                 | 2.57                 | 31.94                          |
| 0.34        | 0.34         | 5.76                    | 15.67                 | 33.11                 | 2.72                 | 33.00                          |
| 0.36        | 0.36         | 6.44                    | 18.15                 | 35.11                 | 2.82                 | 35.00                          |
| 0.38        | 0.38         | 7.16                    | 20.87                 | 37.11                 | 2.92                 | 37.00                          |
| 0.40        | 0.40         | 7.92                    | 23.85                 | 39.11                 | 3.01                 | 39.00                          |
| 0.42        | 0.42         | 8.72                    | 27.08                 | 41.11                 | 3.11                 | 41.00                          |
| 0.44        | 0.44         | 9.56                    | 30.59                 | 43.12                 | 3.20                 | 43.00                          |
| 0.46        | 0.46         | 10.44                   | 34.37                 | 45.12                 | 3.29                 | 45.00                          |
| 0.48        | 0.48         | 11.36                   | 38.44                 | 47.12                 | 3.39                 | 47.00                          |
| 0.50        | 0.50         | 12.32                   | 42.80                 | 49.12                 | 3.48                 | 49.00                          |
| 0.51        | 0.51         | 12.81                   | 45.10                 | 50.12                 | 3.52                 | 50.00                          |

TC



## ROAD

MANNINGS N=.0170

SLOPE =.0150

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL    | DEPTH | FLOW    | FLOW  | WETTED | FLOW  | TOPWID       |
|---------|-------|---------|-------|--------|-------|--------------|
| FT.     | INC   | AREA    | RATE  | PER    | VEL   | PLUS         |
|         |       | SQ. FT. | (CFS) | (FT)   | (FPS) | OBSTRUCTIONS |
| 0.02    | 0.02  | 0.02    | 0.01  | 2.00   | 0.50  | 2.00         |
| 0.04    | 0.04  | 0.08    | 0.06  | 4.01   | 0.79  | 3.99         |
| 0.06    | 0.06  | 0.18    | 0.19  | 6.01   | 1.03  | 5.99         |
| 0.08    | 0.08  | 0.32    | 0.40  | 8.01   | 1.25  | 7.98         |
| 0.10    | 0.10  | 0.50    | 0.72  | 10.02  | 1.45  | 9.98         |
| 0.12    | 0.12  | 0.72    | 1.18  | 12.02  | 1.64  | 11.98        |
| 0.14    | 0.14  | 0.98    | 1.77  | 14.02  | 1.81  | 13.97        |
| 0.16    | 0.16  | 1.28    | 2.53  | 16.02  | 1.98  | 15.97        |
| 0.18    | 0.18  | 1.62    | 3.47  | 18.03  | 2.15  | 17.97        |
| 0.20    | 0.20  | 2.00    | 4.59  | 20.03  | 2.30  | 19.96        |
| 0.22    | 0.22  | 2.42    | 5.92  | 22.03  | 2.45  | 21.96        |
| 0.24    | 0.24  | 2.87    | 7.47  | 24.04  | 2.60  | 23.95        |
| 0.26    | 0.26  | 3.37    | 9.25  | 26.04  | 2.74  | 25.95        |
| 0.28    | 0.28  | 3.91    | 11.27 | 28.04  | 2.88  | 27.95        |
| 0.30    | 0.30  | 4.49    | 13.54 | 30.05  | 3.02  | 29.94        |
| 0.32    | 0.32  | 5.11    | 16.09 | 32.05  | 3.15  | 31.94        |
| TC 0.34 | 0.34  | 5.76    | 19.19 | 33.11  | 3.33  | 33.00        |
| 0.36    | 0.36  | 6.44    | 22.23 | 35.11  | 3.45  | 35.00        |
| 0.38    | 0.38  | 7.16    | 25.56 | 37.11  | 3.57  | 37.00        |
| 0.40    | 0.40  | 7.92    | 29.21 | 39.11  | 3.69  | 39.00        |
| 0.42    | 0.42  | 8.72    | 33.17 | 41.11  | 3.81  | 41.00        |
| 0.44    | 0.44  | 9.56    | 37.46 | 43.12  | 3.92  | 43.00        |
| 0.46    | 0.46  | 10.44   | 42.09 | 45.12  | 4.03  | 45.00        |
| 0.48    | 0.48  | 11.36   | 47.08 | 47.12  | 4.15  | 47.00        |
| 0.50    | 0.50  | 12.32   | 52.42 | 49.12  | 4.26  | 49.00        |
| 0.51    | 0.51  | 12.81   | 55.23 | 50.12  | 4.31  | 50.00        |



## ROAD

MANNINGS N=.0170

SLOPE =.0200

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|
| 0.02        | 0.02         | 0.02                    | 0.01                  | 2.00                  | 0.57                 | 2.00                           |
| 0.04        | 0.04         | 0.08                    | 0.07                  | 4.01                  | 0.91                 | 3.99                           |
| 0.06        | 0.06         | 0.18                    | 0.21                  | 6.01                  | 1.19                 | 5.99                           |
| 0.08        | 0.08         | 0.32                    | 0.46                  | 8.01                  | 1.44                 | 7.98                           |
| 0.10        | 0.10         | 0.50                    | 0.84                  | 10.02                 | 1.67                 | 9.98                           |
| 0.12        | 0.12         | 0.72                    | 1.36                  | 12.02                 | 1.89                 | 11.98                          |
| 0.14        | 0.14         | 0.98                    | 2.05                  | 14.02                 | 2.09                 | 13.97                          |
| 0.16        | 0.16         | 1.28                    | 2.93                  | 16.02                 | 2.29                 | 15.97                          |
| 0.18        | 0.18         | 1.62                    | 4.01                  | 18.03                 | 2.48                 | 17.97                          |
| 0.20        | 0.20         | 2.00                    | 5.30                  | 20.03                 | 2.66                 | 19.96                          |
| 0.22        | 0.22         | 2.42                    | 6.84                  | 22.03                 | 2.83                 | 21.96                          |
| 0.24        | 0.24         | 2.87                    | 8.63                  | 24.04                 | 3.00                 | 23.95                          |
| 0.26        | 0.26         | 3.37                    | 10.68                 | 26.04                 | 3.17                 | 25.95                          |
| 0.28        | 0.28         | 3.91                    | 13.01                 | 28.04                 | 3.33                 | 27.95                          |
| 0.30        | 0.30         | 4.49                    | 15.64                 | 30.05                 | 3.48                 | 29.94                          |
| TC- 0.32    | 0.32         | 5.11                    | 18.58                 | 32.05                 | 3.64                 | 31.94                          |
| 0.34        | 0.34         | 5.76                    | 22.16                 | 33.11                 | 3.85                 | 33.00                          |
| 0.36        | 0.36         | 6.44                    | 25.67                 | 35.11                 | 3.99                 | 35.00                          |
| 0.38        | 0.38         | 7.16                    | 29.52                 | 37.11                 | 4.13                 | 37.00                          |
| 0.40        | 0.40         | 7.92                    | 33.72                 | 39.11                 | 4.26                 | 39.00                          |
| 0.42        | 0.42         | 8.72                    | 38.30                 | 41.11                 | 4.39                 | 41.00                          |
| 0.44        | 0.44         | 9.56                    | 43.26                 | 43.12                 | 4.53                 | 43.00                          |
| 0.46        | 0.46         | 10.44                   | 48.61                 | 45.12                 | 4.66                 | 45.00                          |
| 0.48        | 0.48         | 11.36                   | 54.36                 | 47.12                 | 4.79                 | 47.00                          |
| 0.50        | 0.50         | 12.32                   | 60.53                 | 49.12                 | 4.92                 | 49.00                          |
| 0.51        | 0.51         | 12.81                   | 63.78                 | 50.12                 | 4.98                 | 50.00                          |



## ROAD

MANNINGS N=.0170

SLOPE =.0250

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|
| 0.02        | 0.02         | 0.02                    | 0.01                  | 2.00                  | 0.64                 | 2.00                           |
| 0.04        | 0.04         | 0.08                    | 0.08                  | 4.01                  | 1.02                 | 3.99                           |
| 0.06        | 0.06         | 0.18                    | 0.24                  | 6.01                  | 1.33                 | 5.99                           |
| 0.08        | 0.08         | 0.32                    | 0.52                  | 8.01                  | 1.61                 | 7.98                           |
| 0.10        | 0.10         | 0.50                    | 0.93                  | 10.02                 | 1.87                 | 9.98                           |
| 0.12        | 0.12         | 0.72                    | 1.52                  | 12.02                 | 2.11                 | 11.98                          |
| 0.14        | 0.14         | 0.98                    | 2.29                  | 14.02                 | 2.34                 | 13.97                          |
| 0.16        | 0.16         | 1.28                    | 3.27                  | 16.02                 | 2.56                 | 15.97                          |
| 0.18        | 0.18         | 1.62                    | 4.48                  | 18.03                 | 2.77                 | 17.97                          |
| 0.20        | 0.20         | 2.00                    | 5.93                  | 20.03                 | 2.97                 | 19.96                          |
| 0.22        | 0.22         | 2.42                    | 7.65                  | 22.03                 | 3.17                 | 21.96                          |
| 0.24        | 0.24         | 2.87                    | 9.64                  | 24.04                 | 3.35                 | 23.95                          |
| 0.26        | 0.26         | 3.37                    | 11.94                 | 26.04                 | 3.54                 | 25.95                          |
| 0.28        | 0.28         | 3.91                    | 14.55                 | 28.04                 | 3.72                 | 27.95                          |
| 0.30        | 0.30         | 4.49                    | 17.48                 | 30.05                 | 3.89                 | 29.94                          |
| TC 0.32     | 0.32         | 5.11                    | 20.77                 | 32.05                 | 4.06                 | 31.94                          |
| 0.34        | 0.34         | 5.76                    | 24.77                 | 33.11                 | 4.30                 | 33.00                          |
| 0.36        | 0.36         | 6.44                    | 28.69                 | 35.11                 | 4.46                 | 35.00                          |
| 0.38        | 0.38         | 7.16                    | 33.00                 | 37.11                 | 4.61                 | 37.00                          |
| 0.40        | 0.40         | 7.92                    | 37.71                 | 39.11                 | 4.76                 | 39.00                          |
| 0.42        | 0.42         | 8.72                    | 42.82                 | 41.11                 | 4.91                 | 41.00                          |
| 0.44        | 0.44         | 9.56                    | 48.36                 | 43.12                 | 5.06                 | 43.00                          |
| 0.46        | 0.46         | 10.44                   | 54.34                 | 45.12                 | 5.21                 | 45.00                          |
| 0.48        | 0.48         | 11.36                   | 60.78                 | 47.12                 | 5.35                 | 47.00                          |
| 0.50        | 0.50         | 12.32                   | 67.68                 | 49.12                 | 5.50                 | 49.00                          |
| 0.51        | 0.51         | 12.81                   | 71.31                 | 50.12                 | 5.57                 | 50.00                          |



## ROAD

MANNINGS N=.0170

SLOPE =.0300

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL | DEPTH | FLOW    | FLOW  | WETTED | FLOW  | TOPWID       |
|------|-------|---------|-------|--------|-------|--------------|
| FT.  | INC   | AREA    | RATE  | PER    | VEL   | PLUS         |
|      |       | SQ. FT. | (CFS) | (FT)   | (FPS) | OBSTRUCTIONS |
| 0.02 | 0.02  | 0.02    | 0.01  | 2.00   | 0.70  | 2.00         |
| 0.04 | 0.04  | 0.08    | 0.09  | 4.01   | 1.11  | 3.99         |
| 0.06 | 0.06  | 0.18    | 0.26  | 6.01   | 1.46  | 5.99         |
| 0.08 | 0.08  | 0.32    | 0.56  | 8.01   | 1.77  | 7.98         |
| 0.10 | 0.10  | 0.50    | 1.02  | 10.02  | 2.05  | 9.98         |
| 0.12 | 0.12  | 0.72    | 1.66  | 12.02  | 2.32  | 11.98        |
| 0.14 | 0.14  | 0.98    | 2.51  | 14.02  | 2.57  | 13.97        |
| 0.16 | 0.16  | 1.28    | 3.58  | 16.02  | 2.80  | 15.97        |
| 0.18 | 0.18  | 1.62    | 4.91  | 18.03  | 3.03  | 17.97        |
| 0.20 | 0.20  | 2.00    | 6.50  | 20.03  | 3.25  | 19.96        |
| 0.22 | 0.22  | 2.42    | 8.38  | 22.03  | 3.47  | 21.96        |
| 0.24 | 0.24  | 2.87    | 10.56 | 24.04  | 3.68  | 23.95        |
| 0.26 | 0.26  | 3.37    | 13.08 | 26.04  | 3.88  | 25.95        |
| 0.28 | 0.28  | 3.91    | 15.94 | 28.04  | 4.07  | 27.95        |
| 0.30 | 0.30  | 4.49    | 19.15 | 30.05  | 4.26  | 29.94        |
| 0.32 | 0.32  | 5.11    | 22.75 | 32.05  | 4.45  | 31.94        |
| 0.34 | 0.34  | 5.76    | 27.14 | 33.11  | 4.72  | 33.00        |
| 0.36 | 0.36  | 6.44    | 31.43 | 35.11  | 4.88  | 35.00        |
| 0.38 | 0.38  | 7.16    | 36.15 | 37.11  | 5.05  | 37.00        |
| 0.40 | 0.40  | 7.92    | 41.30 | 39.11  | 5.22  | 39.00        |
| 0.42 | 0.42  | 8.72    | 46.91 | 41.11  | 5.38  | 41.00        |
| 0.44 | 0.44  | 9.56    | 52.98 | 43.12  | 5.54  | 43.00        |
| 0.46 | 0.46  | 10.44   | 59.53 | 45.12  | 5.70  | 45.00        |
| 0.48 | 0.48  | 11.36   | 66.58 | 47.12  | 5.86  | 47.00        |
| 0.50 | 0.50  | 12.32   | 74.14 | 49.12  | 6.02  | 49.00        |
| 0.51 | 0.51  | 12.81   | 78.11 | 50.12  | 6.10  | 50.00        |

TC



## ROAD

MANNINGS N=.0170

SLOPE =.0350

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|
| 0.02        | 0.02         | 0.02                    | 0.02                  | 2.00                  | 0.76                 | 2.00                           |
| 0.04        | 0.04         | 0.08                    | 0.10                  | 4.01                  | 1.20                 | 3.99                           |
| 0.06        | 0.06         | 0.18                    | 0.28                  | 6.01                  | 1.58                 | 5.99                           |
| 0.08        | 0.08         | 0.32                    | 0.61                  | 8.01                  | 1.91                 | 7.98                           |
| 0.10        | 0.10         | 0.50                    | 1.11                  | 10.02                 | 2.21                 | 9.98                           |
| 0.12        | 0.12         | 0.72                    | 1.80                  | 12.02                 | 2.50                 | 11.98                          |
| 0.14        | 0.14         | 0.98                    | 2.71                  | 14.02                 | 2.77                 | 13.97                          |
| 0.16        | 0.16         | 1.28                    | 3.87                  | 16.02                 | 3.03                 | 15.97                          |
| 0.18        | 0.18         | 1.62                    | 5.30                  | 18.03                 | 3.28                 | 17.97                          |
| 0.20        | 0.20         | 2.00                    | 7.02                  | 20.03                 | 3.52                 | 19.96                          |
| 0.22        | 0.22         | 2.42                    | 9.05                  | 22.03                 | 3.75                 | 21.96                          |
| 0.24        | 0.24         | 2.87                    | 11.41                 | 24.04                 | 3.97                 | 23.95                          |
| 0.26        | 0.26         | 3.37                    | 14.13                 | 26.04                 | 4.19                 | 25.95                          |
| 0.28        | 0.28         | 3.91                    | 17.21                 | 28.04                 | 4.40                 | 27.95                          |
| 0.30        | 0.30         | 4.49                    | 20.69                 | 30.05                 | 4.61                 | 29.94                          |
| 0.32        | 0.32         | 5.11                    | 24.57                 | 32.05                 | 4.81                 | 31.94                          |
| 0.34        | 0.34         | 5.76                    | 29.31                 | 33.11                 | 5.09                 | 33.00                          |
| 0.36        | 0.36         | 6.44                    | 33.95                 | 35.11                 | 5.28                 | 35.00                          |
| 0.38        | 0.38         | 7.16                    | 39.05                 | 37.11                 | 5.46                 | 37.00                          |
| 0.40        | 0.40         | 7.92                    | 44.61                 | 39.11                 | 5.64                 | 39.00                          |
| 0.42        | 0.42         | 8.72                    | 50.67                 | 41.11                 | 5.81                 | 41.00                          |
| 0.44        | 0.44         | 9.56                    | 57.22                 | 43.12                 | 5.99                 | 43.00                          |
| 0.46        | 0.46         | 10.44                   | 64.30                 | 45.12                 | 6.16                 | 45.00                          |
| 0.48        | 0.48         | 11.36                   | 71.91                 | 47.12                 | 6.33                 | 47.00                          |
| 0.50        | 0.50         | 12.32                   | 80.08                 | 49.12                 | 6.50                 | 49.00                          |
| 0.51        | 0.51         | 12.81                   | 84.37                 | 50.12                 | 6.59                 | 50.00                          |

TC



## ROAD

MANNINGS N=.0170

SLOPE =.0400

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|
| 0.02        | 0.02         | 0.02                    | 0.02                  | 2.00                  | 0.81                 | 2.00                           |
| 0.04        | 0.04         | 0.08                    | 0.10                  | 4.01                  | 1.29                 | 3.99                           |
| 0.06        | 0.06         | 0.18                    | 0.30                  | 6.01                  | 1.68                 | 5.99                           |
| 0.08        | 0.08         | 0.32                    | 0.65                  | 8.01                  | 2.04                 | 7.98                           |
| 0.10        | 0.10         | 0.50                    | 1.18                  | 10.02                 | 2.37                 | 9.98                           |
| 0.12        | 0.12         | 0.72                    | 1.92                  | 12.02                 | 2.67                 | 11.98                          |
| 0.14        | 0.14         | 0.98                    | 2.90                  | 14.02                 | 2.96                 | 13.97                          |
| 0.16        | 0.16         | 1.28                    | 4.14                  | 16.02                 | 3.24                 | 15.97                          |
| 0.18        | 0.18         | 1.62                    | 5.66                  | 18.03                 | 3.50                 | 17.97                          |
| 0.20        | 0.20         | 2.00                    | 7.50                  | 20.03                 | 3.76                 | 19.96                          |
| 0.22        | 0.22         | 2.42                    | 9.67                  | 22.03                 | 4.00                 | 21.96                          |
| 0.24        | 0.24         | 2.87                    | 12.20                 | 24.04                 | 4.24                 | 23.95                          |
| 0.26        | 0.26         | 3.37                    | 15.10                 | 26.04                 | 4.48                 | 25.95                          |
| 0.28        | 0.28         | 3.91                    | 18.40                 | 28.04                 | 4.70                 | 27.95                          |
| 0.30        | 0.30         | 4.49                    | 22.12                 | 30.05                 | 4.92                 | 29.94                          |
| 0.32        | 0.32         | 5.11                    | 26.27                 | 32.05                 | 5.14                 | 31.94                          |
| 0.34        | 0.34         | 5.76                    | 31.33                 | 33.11                 | 5.44                 | 33.00                          |
| 0.36        | 0.36         | 6.44                    | 36.30                 | 35.11                 | 5.64                 | 35.00                          |
| 0.38        | 0.38         | 7.16                    | 41.74                 | 37.11                 | 5.83                 | 37.00                          |
| 0.40        | 0.40         | 7.92                    | 47.69                 | 39.11                 | 6.03                 | 39.00                          |
| 0.42        | 0.42         | 8.72                    | 54.16                 | 41.11                 | 6.22                 | 41.00                          |
| 0.44        | 0.44         | 9.56                    | 61.17                 | 43.12                 | 6.40                 | 43.00                          |
| 0.46        | 0.46         | 10.44                   | 68.74                 | 45.12                 | 6.59                 | 45.00                          |
| 0.48        | 0.48         | 11.36                   | 76.88                 | 47.12                 | 6.77                 | 47.00                          |
| 0.50        | 0.50         | 12.32                   | 85.61                 | 49.12                 | 6.95                 | 49.00                          |
| 0.51        | 0.51         | 12.81                   | 90.20                 | 50.12                 | 7.04                 | 50.00                          |

TC



ROAD

MANNINGS N=.0170

SLOPE =.0450

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL    | DEPTH | FLOW    | FLOW  | WETTED | FLOW  | TOPWID       |
|---------|-------|---------|-------|--------|-------|--------------|
| FT.     | INC   | AREA    | RATE  | PER    | VEL   | PLUS         |
|         |       | SQ. FT. | (CFS) | (FT)   | (FPS) | OBSTRUCTIONS |
| 0.02    | 0.02  | 0.02    | 0.02  | 2.00   | 0.86  | 2.00         |
| 0.04    | 0.04  | 0.08    | 0.11  | 4.01   | 1.36  | 3.99         |
| 0.06    | 0.06  | 0.18    | 0.32  | 6.01   | 1.79  | 5.99         |
| 0.08    | 0.08  | 0.32    | 0.69  | 8.01   | 2.16  | 7.98         |
| 0.10    | 0.10  | 0.50    | 1.25  | 10.02  | 2.51  | 9.98         |
| 0.12    | 0.12  | 0.72    | 2.04  | 12.02  | 2.84  | 11.98        |
| 0.14    | 0.14  | 0.98    | 3.07  | 14.02  | 3.14  | 13.97        |
| 0.16    | 0.16  | 1.28    | 4.39  | 16.02  | 3.43  | 15.97        |
| 0.18    | 0.18  | 1.62    | 6.01  | 18.03  | 3.72  | 17.97        |
| 0.20    | 0.20  | 2.00    | 7.96  | 20.03  | 3.99  | 19.96        |
| 0.22    | 0.22  | 2.42    | 10.26 | 22.03  | 4.25  | 21.96        |
| 0.24    | 0.24  | 2.87    | 12.94 | 24.04  | 4.50  | 23.95        |
| 0.26    | 0.26  | 3.37    | 16.02 | 26.04  | 4.75  | 25.95        |
| 0.28    | 0.28  | 3.91    | 19.52 | 28.04  | 4.99  | 27.95        |
| 0.30    | 0.30  | 4.49    | 23.46 | 30.05  | 5.22  | 29.94        |
| TC 0.32 | 0.32  | 5.11    | 27.86 | 32.05  | 5.45  | 31.94        |
| 0.34    | 0.34  | 5.76    | 33.23 | 33.11  | 5.77  | 33.00        |
| 0.36    | 0.36  | 6.44    | 38.50 | 35.11  | 5.98  | 35.00        |
| 0.38    | 0.38  | 7.16    | 44.28 | 37.11  | 6.19  | 37.00        |
| 0.40    | 0.40  | 7.92    | 50.59 | 39.11  | 6.39  | 39.00        |
| 0.42    | 0.42  | 8.72    | 57.45 | 41.11  | 6.59  | 41.00        |
| 0.44    | 0.44  | 9.56    | 64.88 | 43.12  | 6.79  | 43.00        |
| 0.46    | 0.46  | 10.44   | 72.91 | 45.12  | 6.99  | 45.00        |
| 0.48    | 0.48  | 11.36   | 81.54 | 47.12  | 7.18  | 47.00        |
| 0.50    | 0.50  | 12.32   | 90.80 | 49.12  | 7.37  | 49.00        |
| 0.51    | 0.51  | 12.81   | 95.67 | 50.12  | 7.47  | 50.00        |



## ROAD

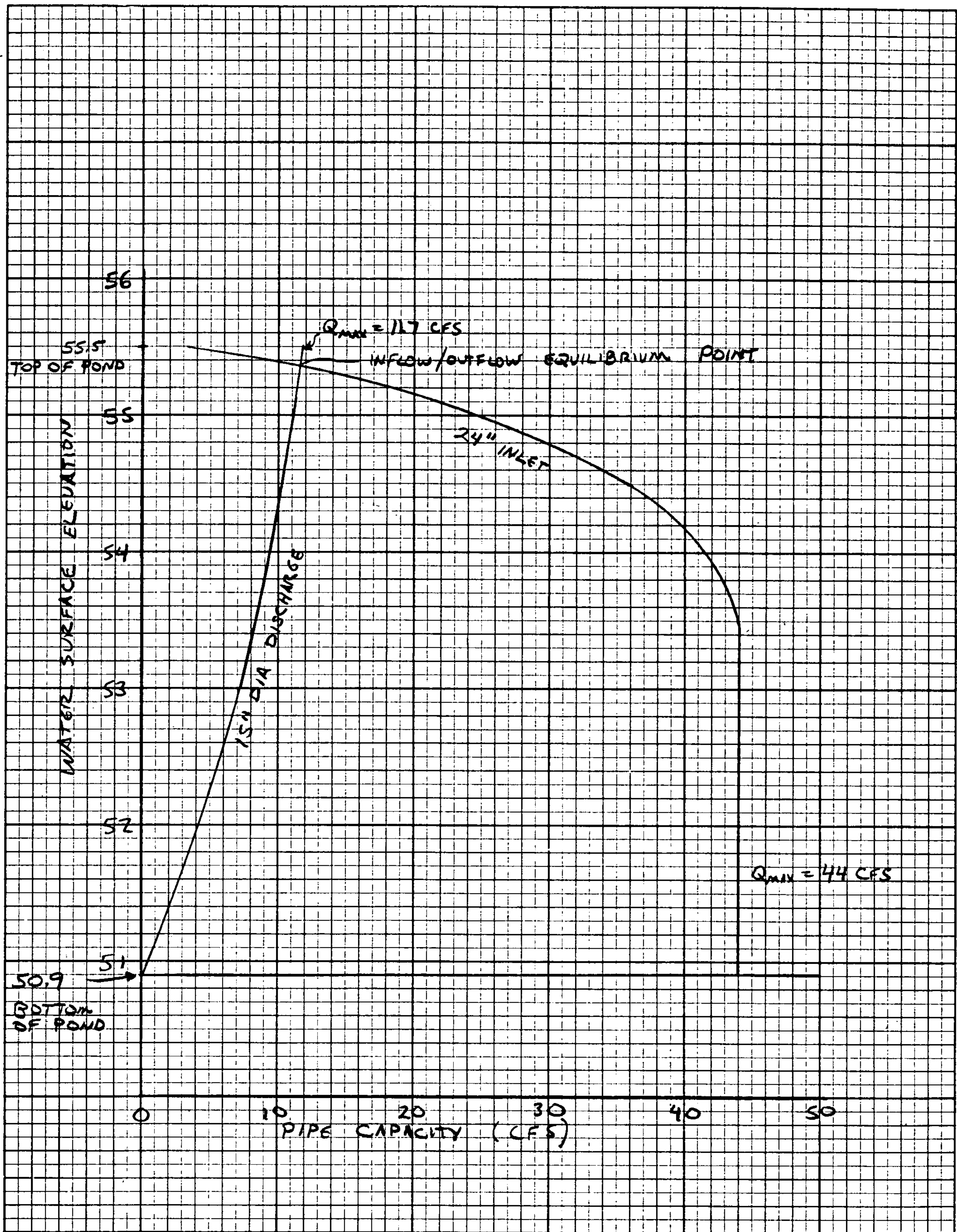
MANNINGS N=.0170

SLOPE =.0500

| POINT | DIST  | ELEV | POINT | DIST  | ELEV | POINT | DIST  | ELEV |
|-------|-------|------|-------|-------|------|-------|-------|------|
| 1     | 0.00  | 0.51 | 4     | 25.00 | 0.32 | 7     | 50.00 | 0.51 |
| 2     | 9.00  | 0.33 | 5     | 40.00 | 0.00 |       |       |      |
| 3     | 10.00 | 0.00 | 6     | 41.00 | 0.33 |       |       |      |

| WSEL<br>FT. | DEPTH<br>INC | FLOW<br>AREA<br>SQ. FT. | FLOW<br>RATE<br>(CFS) | WETTED<br>PER<br>(FT) | FLOW<br>VEL<br>(FPS) | TOPWID<br>PLUS<br>OBSTRUCTIONS |
|-------------|--------------|-------------------------|-----------------------|-----------------------|----------------------|--------------------------------|
| 0.02        | 0.02         | 0.02                    | 0.02                  | 2.00                  | 0.91                 | 2.00                           |
| 0.04        | 0.04         | 0.08                    | 0.11                  | 4.01                  | 1.44                 | 3.99                           |
| 0.06        | 0.06         | 0.18                    | 0.34                  | 6.01                  | 1.88                 | 5.99                           |
| 0.08        | 0.08         | 0.32                    | 0.73                  | 8.01                  | 2.28                 | 7.98                           |
| 0.10        | 0.10         | 0.50                    | 1.32                  | 10.02                 | 2.65                 | 9.98                           |
| 0.12        | 0.12         | 0.72                    | 2.15                  | 12.02                 | 2.99                 | 11.98                          |
| 0.14        | 0.14         | 0.98                    | 3.24                  | 14.02                 | 3.31                 | 13.97                          |
| 0.16        | 0.16         | 1.28                    | 4.63                  | 16.02                 | 3.62                 | 15.97                          |
| 0.18        | 0.18         | 1.62                    | 6.33                  | 18.03                 | 3.92                 | 17.97                          |
| 0.20        | 0.20         | 2.00                    | 8.39                  | 20.03                 | 4.20                 | 19.96                          |
| 0.22        | 0.22         | 2.42                    | 10.81                 | 22.03                 | 4.48                 | 21.96                          |
| 0.24        | 0.24         | 2.87                    | 13.64                 | 24.04                 | 4.74                 | 23.95                          |
| 0.26        | 0.26         | 3.37                    | 16.88                 | 26.04                 | 5.00                 | 25.95                          |
| 0.28        | 0.28         | 3.91                    | 20.57                 | 28.04                 | 5.26                 | 27.95                          |
| 0.30        | 0.30         | 4.49                    | 24.73                 | 30.05                 | 5.51                 | 29.94                          |
| 0.32        | 0.32         | 5.11                    | 29.37                 | 32.05                 | 5.75                 | 31.94                          |
| 0.34        | 0.34         | 5.76                    | 35.03                 | 33.11                 | 6.09                 | 33.00                          |
| 0.36        | 0.36         | 6.44                    | 40.58                 | 35.11                 | 6.31                 | 35.00                          |
| 0.38        | 0.38         | 7.16                    | 46.67                 | 37.11                 | 6.52                 | 37.00                          |
| 0.40        | 0.40         | 7.92                    | 53.32                 | 39.11                 | 6.74                 | 39.00                          |
| 0.42        | 0.42         | 8.72                    | 60.56                 | 41.11                 | 6.95                 | 41.00                          |
| 0.44        | 0.44         | 9.56                    | 68.39                 | 43.12                 | 7.16                 | 43.00                          |
| 0.46        | 0.46         | 10.44                   | 76.85                 | 45.12                 | 7.36                 | 45.00                          |
| 0.48        | 0.48         | 11.36                   | 85.95                 | 47.12                 | 7.57                 | 47.00                          |
| 0.50        | 0.50         | 12.32                   | 95.71                 | 49.12                 | 7.77                 | 49.00                          |
| 0.51        | 0.51         | 12.81                   | 100.84                | 50.12                 | 7.87                 | 50.00                          |





PROJECT NAME FOREST HILLS

SHEET \_\_\_\_\_ OF \_\_\_\_\_

PROJECT NO. 41470

BY W DATE 5/3/84

SUBJECT DETENTION POND PIPE CAPACITIES

CH'D \_\_\_\_\_ DATE \_\_\_\_\_





PROJECT NAME FOREST HILLS SUBDIVISION

SHEET

OF

PROJECT NO. 4147.0

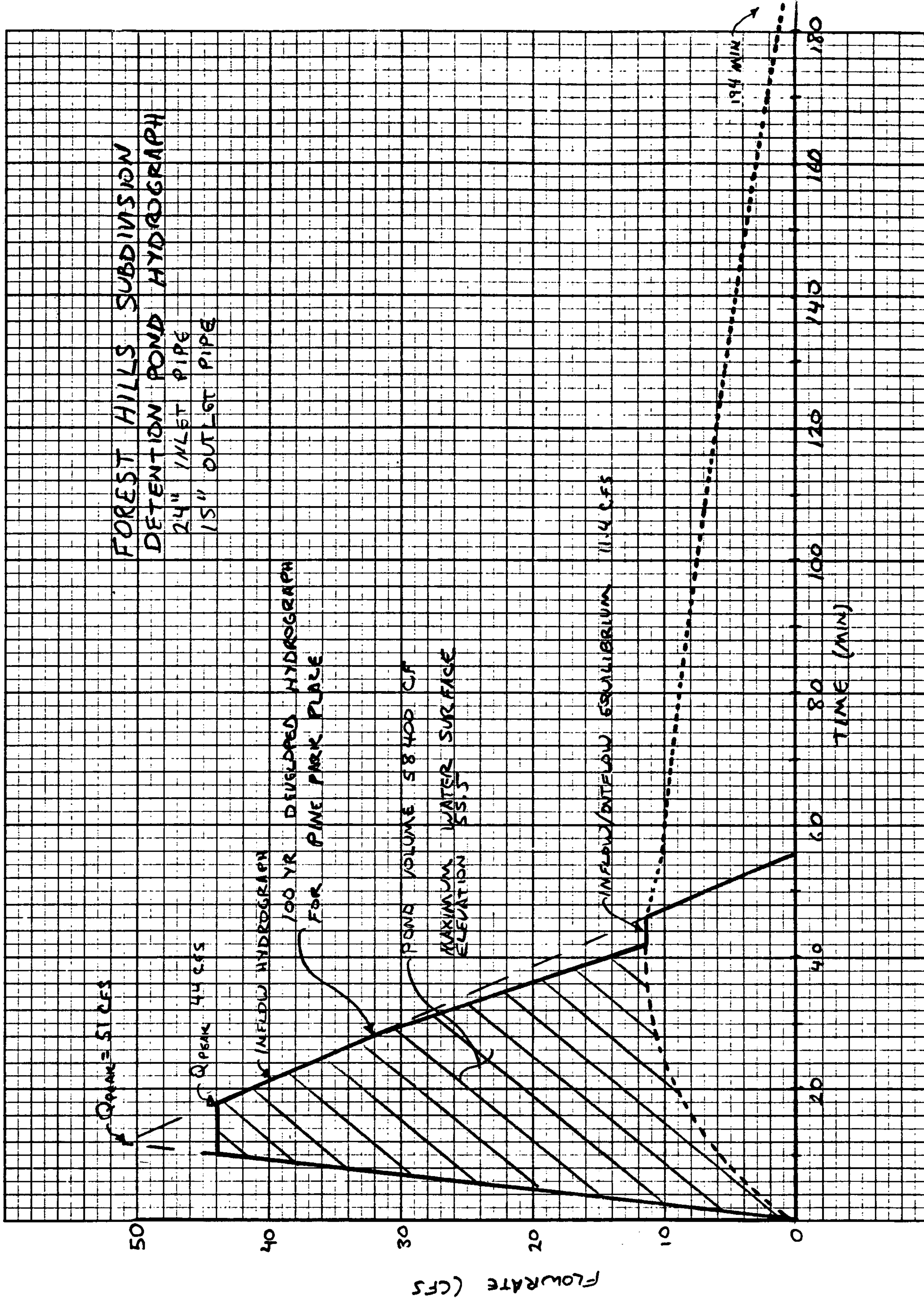
BY AV

DATE 5/3/84

SUBJECT DETENTION POND HYDROGRAPH

CH'D

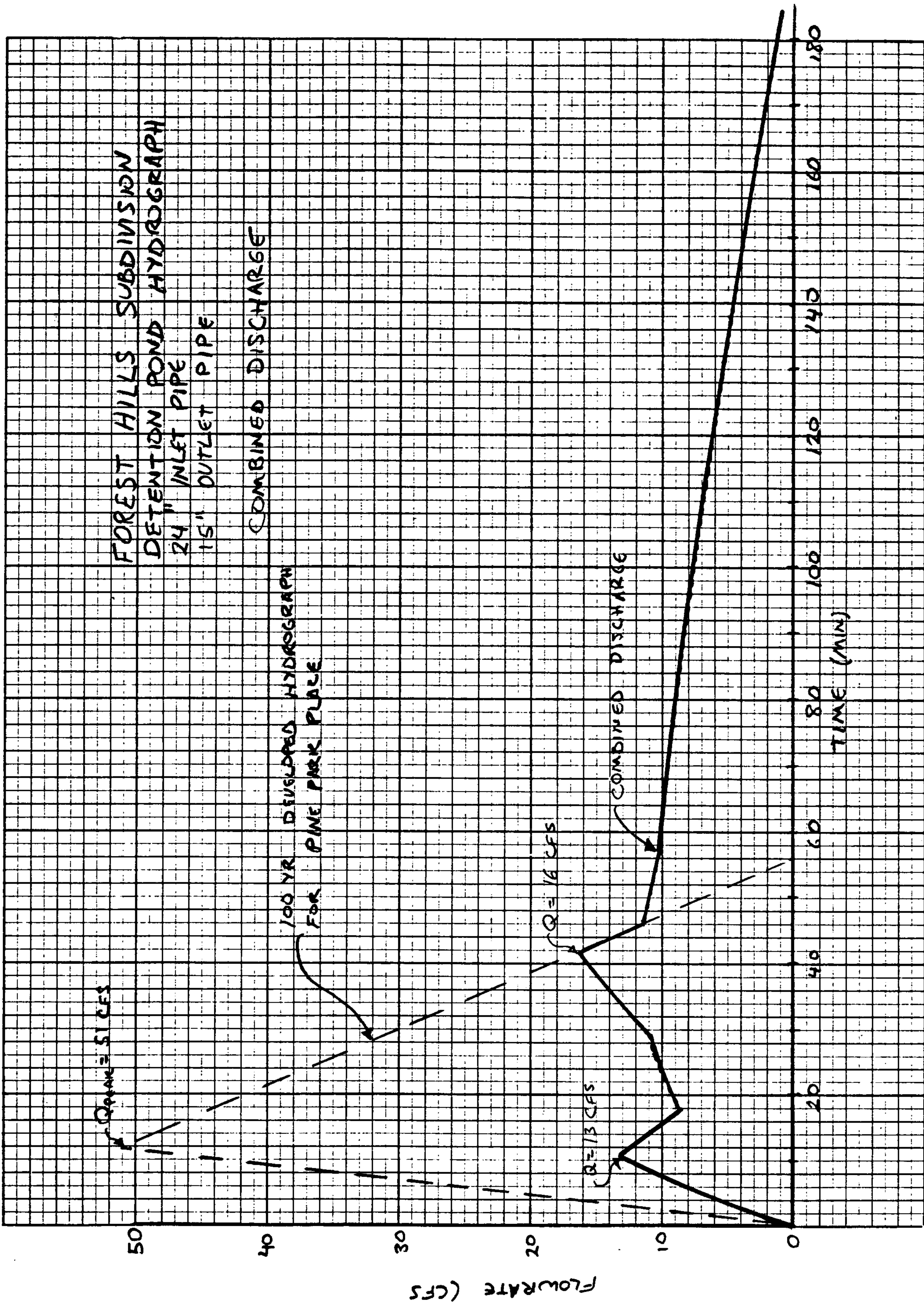
DATE







PROJECT NAME FOREST HILLS SUBDIVISION SHEET \_\_\_\_\_ OF \_\_\_\_\_  
PROJECT NO. 41470 BY W DATE 5/3/84  
SUBJECT DETENTION POND HYDROGRAPH CH'D \_\_\_\_\_ DATE \_\_\_\_\_





# MCKINNEY ROAD HYDRAULIC SUMMARY

|             | $Q_{100}$ | $Q_{10}$ | $D_{100}$ | $D_{10}$ |
|-------------|-----------|----------|-----------|----------|
| UNDEVELOPED | 65.9 CFS  | 43.3 CFS | .68'      | .59'     |
| DEVELOPED   | 67.2 CFS  | 45.1 CFS | .68'      | .59'     |

## UPLAND BASIN FOR MCKINNEY ROAD

AREA 11.4 AC

$C = 7$

$I = 2.4\%$

$T_c = 10 \text{ MIN}$

$Q_{100} = 38.6 \text{ CFS}$

$Q_{10} = 25.3 \text{ CFS}$



PROJECT NAME FOREST HILLS

PROJECT NO. 41470

SUBJECT MCKINNEY ROAD

SHEET \_\_\_\_\_ OF \_\_\_\_\_

BY ND

CH'D \_\_\_\_\_

DATE 5/7/84

DATE \_\_\_\_\_



Shl. of 2

PROJECT FORREST HILLS  
DESIGN FREQUENCY 100YR

CALCULATED BY W  
DATE 6/24/84

## 22.3

[illegible]

482







**AMENDED  
DRAINAGE ANALYSIS  
FOR  
FOREST HILLS SUBDIVISION**

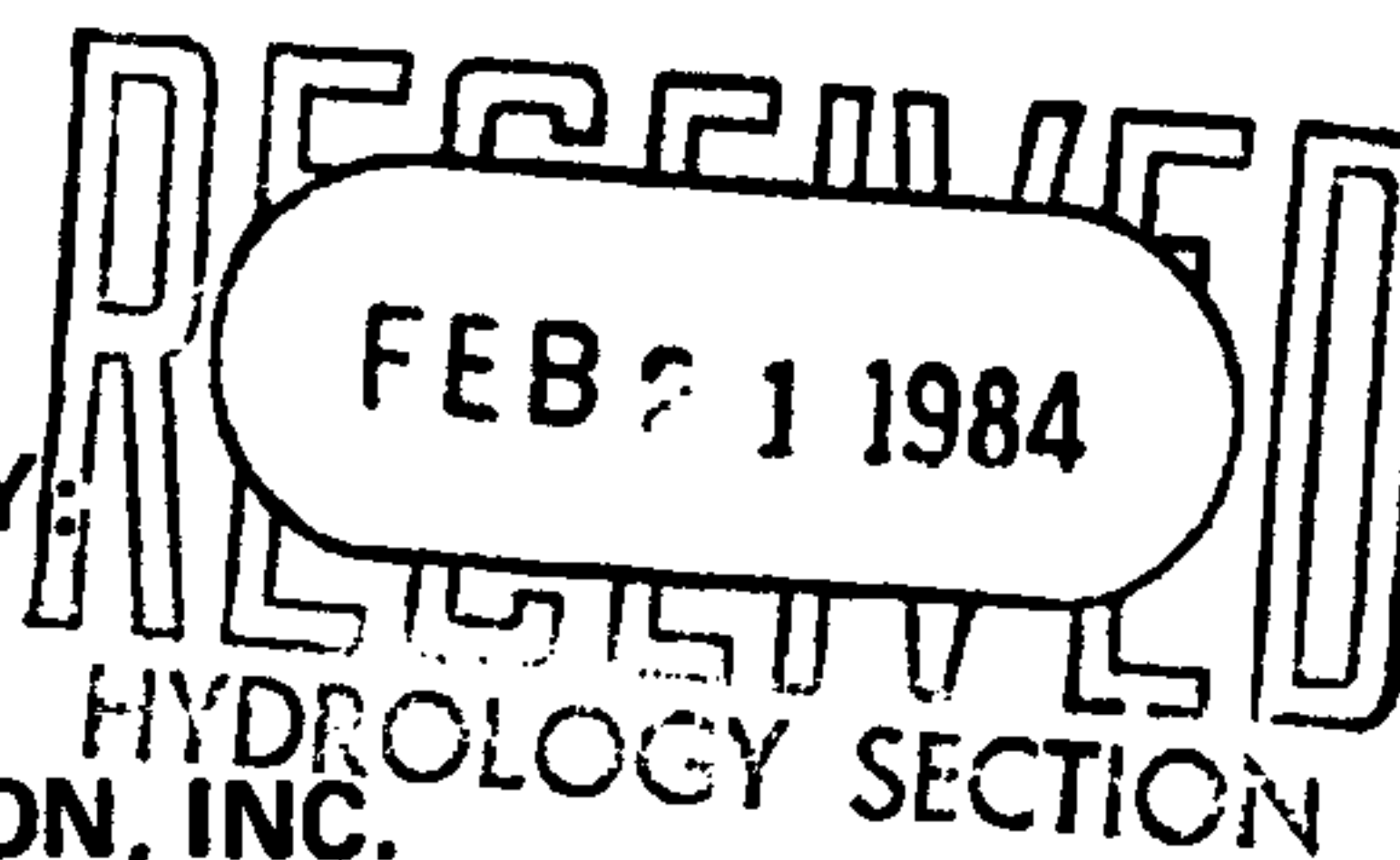
**February, 1984**

**PREPARED FOR:**

**PETE DASKALOS  
5321 MENAUL BLVD., N.E.  
ALBUQUERQUE, NM 87110**

**PREPARED BY:**

**BOHANNAN-HUSTON, INC.  
4125 CARLISLE BLVD., N.E.  
ALBUQUERQUE, NM 87107**



A handwritten signature in cursive script, reading "Brian G. Burnett".

**Brian G. Burnett, P.E.  
N.M.P.E. No. 8541**



## **PURPOSE**

The purpose of this report is to review and amend, where appropriate, information contained in Drainage Report E18-D26 (submitted to the City in March, 1981). This analysis complies with criteria and requirements outlined in the City Drainage Ordinance and Development Process Manual (DPM).

## **PROJECT LOCATION AND DESCRIPTION**

The Forest Hills Subdivision is located in northeast Albuquerque immediately south of Forest Hills Drive and east of McKinney Drive. The site contains approximately 14.5 acres. Three (3) acres of the site is zoned C-1, while the remaining 11.5 acres are zoned R-LT for townhouses. Figure 1 identifies the site's location.

## **EXISTING CONDITION**

The site is bounded on the north by Forest Hills Drive, which is currently unpaved. McKinney Drive borders the site on the west. This street is paved and classified as a Collector thoroughfare. The Academy Acres Subdivision borders the site on the south and east.

## **HIGHLIGHTS FROM PREVIOUS REPORT**

The following information highlights the important features of the previous drainage report. If previous assumptions and criteria are now invalid, current criteria will be identified.

- A. Peak runoff rates were computed using the Rational Formula. Plates 1 and 2 (in rear pocket) identify the undeveloped and developed drainage basins for the site. Table 1 lists flow rates from the previous report along with values utilizing current DPM criteria. As the computations indicate, both analyses yield very similar results.
- B. The proposed phasing for the project today is the same as outlined in 1981. The commercial tract will develop in the future. Construction of the townhouses will occur in the near future.



- C. The original plan looked at an interim and final solution. The interim plan called for a storm sewer to be constructed on Pine Park Drive and discharge runoff from Basins I through VII to a temporary ponding area (see grading plan in rear pocket). This pond is located in three lots located at the northeast corner of McKinney Drive and Pine Park Drive. The ponding area was designed to store approximately 59,000 cu. ft. Based on the Interim Drainage Guidelines, which were in effect at the time the report was prepared, release from the pond was proposed at a controlled rate of 11.0 cfs. This rate represented the 5-year undeveloped flow.

The final solution called for abandoning the ponding area and extending the storm sewer system to tie with improvements to the Pino Arroyo. This connection would be made when the channel construction took place.

Current drainage policy states that the downstream capacity of any drainage system must not be exceeded. The next section will address the interim and final solutions based on this criteria.

- D. Basin IX was proposed to drain into a backyard ponding area. This type of retention ponding is no longer in accordance with the City Drainage Ordinance. This aspect is also covered in the next section.
- E. The 1981 report discusses the impact of the Pino Arroyo on the site. The 100-year flow rate in the arroyo is 1300 cfs. Improvements to this arroyo system have been under study for several years. Prior to these improvements, the plan called for the top of pavement elevations on Forest Hills Drive to be placed at an elevation one foot higher than the 100-year flood plain. By designing the grades at this elevation, the subdivision would be adequately protected.



## PROPOSED MANAGEMENT PLAN

As indicated in the previous section, criteria and development guidelines have changed in the last three years. This section will look at the drainage management plan for the site plan based on this current thinking.

### A. Determination of Downstream Capacity

As per Section 12 of the Drainage Ordinance, runoff from the site cannot exceed the capacity of any downstream drainage system. For this site, McKinney Drive is the first system that must be investigated from this standpoint.

The slope along McKinney Drive, adjacent to the subdivision, is approximately 0.004. Based on a 10-year curb flow depth of 0.5 feet and a 100-year curb flow depth of 0.87 feet, the associated street capacities are 9 cfs and 44 cfs (from Plate 22.3 D-3). In the existing condition, a watershed of approximately 24 acres contributes flows to the east half of McKinney Drive (see Figure 2). Based on the following criteria, the 10- and 100-year flows for the basin can be computed:

|                      | 10-Yr.    | 100-Yr.   |
|----------------------|-----------|-----------|
| Rainfall             | 1.6"      | 2.4"      |
| tc                   | 10 min.   | 10 min.   |
| Intensity            | 3.4 in/hr | 5.1 in/hr |
| 'C' (40% Impervious) | .52       | .52       |
| Q                    | 42 cfs    | 64 cfs    |

As the numbers reflect, street capacity is already exceeded in the existing conditions. Therefore, any release to McKinney Drive should be at a minimal, controlled rate.

Directing runoff to Forest Hills Drive has also been investigated. In January, 1982, Boyle Engineering prepared plans for the extension of Forest Hills Drive from Barnhart Street to the I-25 Frontage Road (see Appendix). Basically, the plans called for the southern half of Forest Hills Drive to be constructed with a cattle guard inlet at the I-25 Frontage Road intersection. This inlet was designed to collect a total flow rate of 97 cfs generated from a watershed of 42 acres. Since Forest Hills is identified as a collector street, street criteria has been checked for the reach of Forest Hills Drive at a slope of 0.0117. This represents the portion of the street with the lowest slope.



In existing conditions, approximately 36 acres discharge to this reach of street (see Figure 2 for watershed). Utilizing the same flow rate criteria listed above, the 10- and 100-year flow rate values are 64 cfs and 95 cfs, respectively. Based on Plate 22.3 D-3, the street capacities during the 10- and 100-year storm are 15 cfs and 72 cfs. It is obvious that this street does not meet current criteria, and any release to Forest Hills Drive should be at a minimal rate, as well.

In summary, the street capacities in McKinney Drive and Forest Hills Drive are exceeded in the existing condition 10- and 100-year runoff events. The following section will outline an interim and final drainage management approach for the subdivision.

#### B. Interim Solution

1. A temporary pond will be provided on Lots 1, 2, and 3 (see grading plan in rear pocket). By utilizing retaining walls, the volume of this pond is approximately 59,000 cu. ft. This amount represents the 50-year developed volume from the subdivision. A positive discharge to McKinney Drive will be provided in the pond. The developer shall be responsible for maintaining the facility.

*How much?  
what impacts does  
it have on McKinney?*

Runoff generated from storms greater than the 50-year event will flow to McKinney Drive via a spillway provided in the black wall. Figure 3 depicts the 100-year developed hydrograph for the subdivision. It should be noted that rate directed to McKinney Drive from events greater than the 50-year storm is approximately the same as the historic rate reaching the same point today.

2. A storm sewer will be constructed in Pine Park Drive. The pipe will be constructed along the west side of the commercial tract to a point just south of the proposed San Pedro Boulevard/Forest Hills Drive alignment (see plat in rear pocket for configuration). At this location the pipe will be plugged. Until such time that the storm sewer is extended northward to the Pino Arroyo improvement, runoff from the collection system will be directed to the pond. The proposed configuration of the storm sewer is included as a plate in the rear pocket (White Pine Place Plan and Profile and Storm Sewer Line A).



### C. Final Solution

Figure 4 contains a sketch which graphically depicts the final solution. This sketch should be referenced when reviewing the proposals outlined below.

1. When improvements are made to the Pino Arroyo, it is proposed that the plugged storm sewer from the subdivision be extended under Forest Hills Drive and into the conveyance structure. The cost of this extension would be borne by the City as part of construction of the channel. An easement through the property north of Forest Hills Drive could be acquired either at the time the site plan is reviewed (the property is zoned SU-1) or through condemnation when the channel construction plans are prepared.

We believe that this proposal has definite public benefit for the following reasons and that the funding proposal is consistent with Section 9A of the Drainage Ordinance:

- a. This system can be used to collect flows along McKinney Drive, which would improve the hydraulic capacity of this portion of the street.
  - b. By directing the flows from the subdivision and McKinney Drive northward to the Pino Arroyo, flow conditions along Forest Hills Drive will also improve.
2. A plat has been included in the rear pocket which conceptually depicts how Forest Hills Drive will be graded. Final grades will be established once the City has established grades for San Pedro Boulevard and the Pino Arroyo Improvements.
3. The Forest Hills Subdivision plat has recently been submitted to the DRB for the subdivision. As stated earlier, this plat shows the configuration of San Pedro Boulevard and Forest Hills Drive. It is anticipated that any runoff running south in San Pedro Boulevard will be directed to the Pino Arroyo improvements. Necessary drainage easements (both temporary and permanent) will be dedicated on this plat. The area north of the subdivision and south of



the Pino Arroyo will be provided with a grading plan once the grades for the arroyo improvements and San Pedro Boulevard have been established.

*Where?  
Not shown on plans.*

4. Basin IX will be provided with a positive discharge to McKinney Drive.
5. A water block will be designed for Forest Hills Drive and Glendora Road to insure that runoff, currently directed northward to the arroyo along Glendora, stays in this historic path.

### EROSION CONTROL

The contractor grading the subdivision will be directed to place hay bales at the western edge of the property prior to work beginning. These bales shall remain until the subdivision improvements and landscaping have been installed. The bales placed along the commercial tract boundary shall remain until such time that development takes place on this parcel.

### SUMMARY

A. This report has attempted to update an earlier document for the Forest Hills Subdivision based on current criteria and ordinances.

B. Per Section 6H of the Drainage Ordinance, we are requesting a variance from the normal 100-year ponding requirement. As stated earlier, a temporary pond has been provided for the 50-year developed volume, with any overflow directed to McKinney Drive.

C. We believe that the final solution has definite public benefits and that the funding proposal is consistent with Section 9A of the City Drainage Ordinance.

*what about street analysis on-site?  
What is the capacity of the transverse  
grate in Pine Park Place? Will the ponded  
water back up through the system and cause  
the inflow to bypass the grate and discharge to  
McKinney? What is the discharge rate out of the pond?  
Hydraulics?*







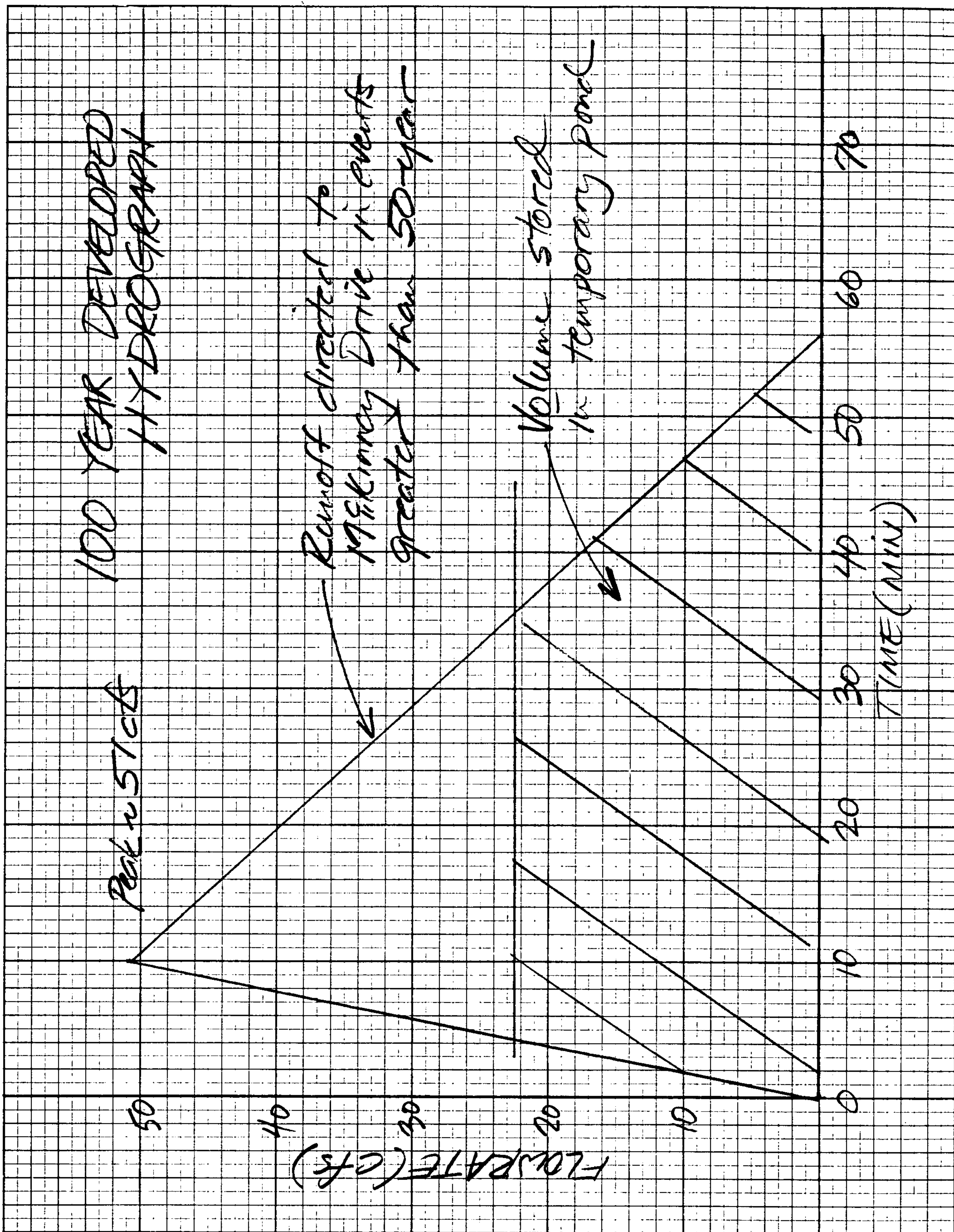


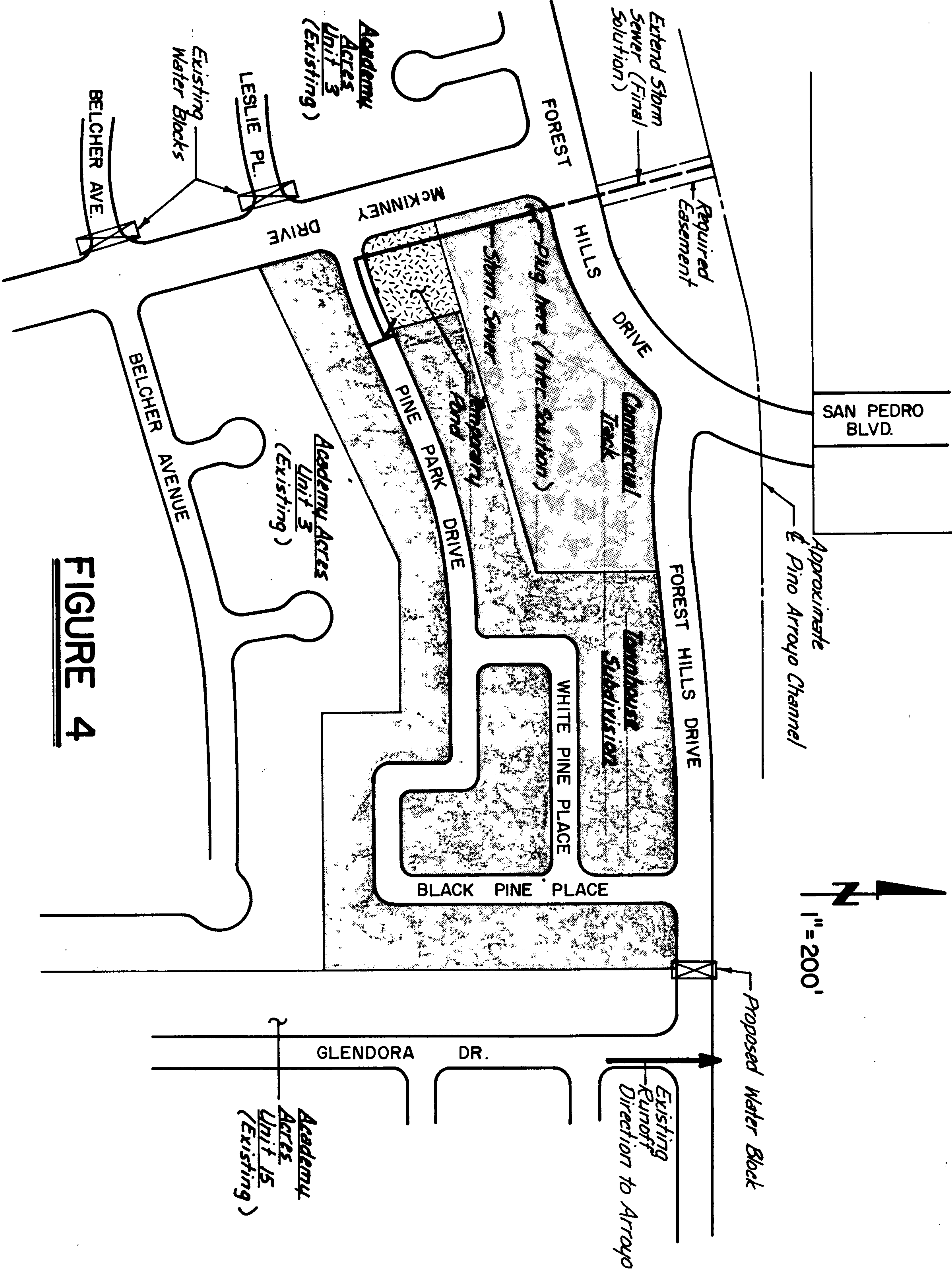
FIGURE 3



PROJECT NAME Forest Hills Sub  
 PROJECT NO. 32182  
 SUBJECT Runoff Hydrograph

SHEET \_\_\_\_\_ OF \_\_\_\_\_  
 BY BGB DATE 2-84  
 CH'D \_\_\_\_\_ DATE \_\_\_\_\_





**FIGURE 4**



## TABLE 1

## Undeveloped Flow Rates

| Area       | 1981 Report |        |         | Current Criteria* |        |         |
|------------|-------------|--------|---------|-------------------|--------|---------|
|            | 5-yr.       | 10-yr. | 100-yr. | 5-yr.             | 10-yr. | 100-yr. |
| 11.5 acres | 8.9         | 15.3   | 21.7    | 11.0              | 13.3   | 19.9    |
| 2.94 acres | 2.2         | 7.9    | 5.6     | 2.8               | 3.4    | 5.6     |

### Developed Flow Rates

| Basin | Area | 1981 Report |         | Current Criteria* |         |
|-------|------|-------------|---------|-------------------|---------|
|       |      | 10-yr.      | 100-yr. | 10-yr.            | 100-yr. |
| I     | 1.89 | 6.0         | 9.2     | 4.5               | 6.8     |
| II    | 0.92 | 2.9         | 4.5     | 2.2               | 3.3     |
| III   | 2.07 | 6.5         | 10.1    | 4.9               | 7.4     |
| IV    | 2.05 | 6.5         | 10.0    | 4.8               | 7.3     |
| V     | 0.88 | 2.8         | 4.3     | 2.1               | 3.1     |
| VI    | 2.3  | 7.2         | 11.1    | 5.4               | 8.2     |
| VII   | 0.97 | 3.1         | 4.7     | 2.3               | 3.5     |
| VIII  | 2.88 | 9.9         | 15.2    | 6.8               | 10.3    |
| IX    | 0.34 | 1.1         | 1.7     | 0.8               | 1.2     |

\* Tc = 10 min. Intensity = 5.1 in/hr (100)  
 C undeveloped = 0.34 = 3.4 in/hr (10)  
 C developed = 0.70 (70% Impervious) = 2.8 in/hr (5)  
 Rainfall = 2.4" (100)  
           = 1.6" (10)  
           = 1.3" (5)