DRAINAGE STUDY
FOR

Basin D Kaiser Commerce Center

Valley Blvd. and Commerce Center Dr.
Fontana, California 92335
PARCEL 5 OF PARCEL MAP NO. 15118, IN THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AS SHOWN ON A MAP FILED IN BOOK 195, PAGES 43 THROUGH 46, INCLUSIVE OF PAREL MAPS, IN THE OFFICE OF THE COUNTY RECORDER IN SAID COUNTY.

Prepared For:
Catellus
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(949) 251-6183

Prepared By:
Danjon Engineering, Inc.
895 E. Yorba Linda Blvd, Suite 202
Placentia, CA 92870
(714) 572-6800

Prepared: August 18, 2008

Job Number 08684

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INDEX

INTRODUCTION

DANJON ENGINEERING INC. has prepared this hydraulic analysis to determine and show

1) The pipe sizes needed to drain the site,

2) Protection of the structures for a 100 year storm event

3) The maximum available flow in the pipes based on hydraulic calculations.

This analysis addresses the flow tributary to each point along the storm drain system of this development.

DANJON prepared the hydraulic flow analysis based on the hydrology included with this report. A licensed copy of the WSPG program provided by Woodcrest Engineering is used for the analysis. Addition Hydraulics are hand calculated using formulas found in the King's Handbook.

The AES Rational Method Hydrology (Ver 7.1) Computer Program is used for calculation of runoff for a 100-year event storm

Design on the system is for a 100-year storm.

EXISTING SITE DESCRIPTION

This site is 8.28 Ac with an existing 15 foot deep detention basin.. This existing detention basin services water flows from 287 Ac and receives flows of 513 cfs. Three storm drains enter the site and one pipe drains from the basin.

EXISTING DRAINAGE DESCRIPTION

This site is a drainage collection point, and currently collects drainage from 287 Ac. There are three pipes entering the site, and one site carrying water out.

PROPOSED SITE DESCRIPTION

The existing 15 foot deep detention basin will be filled in and cut in rough grading to the approximate elevation of a new, unproposed building. When the detention basin is filled, its evelevation shall be set subgrade of future elevations of sidewalks, etc.

PROPOSED DRAINAGE DESCRIPTION

This site will connect to a new storm drain and flow out to the San Sevaine Channel along with the drainage from projects that previously flowed to the existing detention basin. The 287 Ac and 513 cfs will be re-routed off of this site through the storm drain system. Drainage that formerly flowed into the detention basin from the three storm drain outlets will be re-routed underground to the storm drain system in the northeastern corner of the site.

The new sediment basin shall be on the western side in the southern portion of the site, and will measure 124 ft x 212 ft x 1.3 ft. The sediment basin will empty to the storm drain and be routed to the southeastern corner of the site, where it will meet the storm drain from the northeaster corner of the site.

SITE DESCRIPTION

HYDROLOGY CALCULATIONS

The following hydrology information is taken from the Approved Associated Engineers Drainage Study that can be found in section E in the back of this report.

The areas to the north of the existing basin are contributing a total of 389.0 cfs to the new storm drain system. The areas to the west are contributing a total of 146.6 cfs to the new storm drain system. The site was a detention basin designed to handle most of these flows, however the new storm drain system connecting the inlets to the outlet will need to handle all of these flows.

Section D.8. of the San Bernardino County Hydrology manual was used to calculate the confluence Q of the two systems to determine the flow exiting the site. In order to determine which formula for confluencing is to be used, the time of concentration, intensities, and the area-averaged maximum loss rate for both flows entering the site need to be determined. These factors have been determined by Associated Engineers and approved by the county. The original report can be found in section E of this report.

It was determined that the values from the areas to the north of the basin are as follows:
Q100=389.0cfs this is Q2 in the formula
Tc=15.61min
I=3.051
Fm=0.09

It was determined that the values from the areas to the west of the basin are as follows:
Q100=146.6cfs this is Q1 in the formula
Tc=24.57min
I=2.307
Fm=0.09

From the county hydrology manual formula D.6 shall be used in this case.

Formula D.6:

$$Qp = Q2 + \frac{(I2-Fm1)\,(T2)}{(I1-Fm1)\,(T1)}\,Q1$$

Where:
Q2 is greater than Q1

$$Qp = 389cfs + \frac{(3.051-0.09)\,(15.61)}{(2.307-0.09)\,(24.57)}\,(146.6cfs)$$

$$Qp = 513.4cfs$$

HYDRAULIC DESIGN

Hydraulic design for the temporary desilting basin located on the south west portion of the project site. This basin will be removed when final construction is completed.

Design for riser collecting waters in the basin:

Using Kings handbook fifth edition formula for weir:

$Q=CLH^{3/2}$

Where:

Q is the runoff calculated by Associated Engineers for the proposed site. Associated Engineers calculated the Q to be 16.2cfs.

C is the coefficient. A value of 1 will be used to be conservative.

L is the circumference of the weir. The weir is 4' in diameter which equates to a circumference of 12.56.

Solving for H:

$H=(Q/CL)^{2/3}$
$H=(16.2/12.56)^{2/3}$
$H=1.2ft$

Actual height of riser used:

Design for 36" pipe connected to the riser:

Output is from Autodesk Civil 3D Land development desktop 2006 Hydrology for Manning's formula pipe calculator.

Manning Pipe Calculator

Given Input Data:
- Shape ..... Circular
- Solving for ..... Depth of Flow
- Diameter ..... 36.0000 in
- Flowrate ..... 16.2000 cfs
- Slope ..... 0.0060 ft/ft
- Manning's n 0.0130

Computed Results:
- Depth ..... 13.8465 in

Area 7.0686 ft2
Wetted Area 2.5052 ft2
Wetted Perimeter ..... 48.1661 in
Perimeter ..... 113.0973 in
Velocity ..... 6.4666 fps
Hydraulic Radius ..... 7.4897 in
Percent Full ..... 38.4624 %
Full flow Flowrate ..... 51.6644 cfs
Full flow velocity ..... 7.3090 fps

Water Surface Pressure Gradient Calculations for mainlines

PROPOSED RETENTION BASIN

PROPOSED RETENTION BASIN

48" RISER

36" PVC

STORM DRAIN LINE 'C'

STORMDRAIN LINE 'A'

STORMDRAIN LINE 'B'

1032.72 INV-84"RCP

PT = 1+59.02

1033.49 INV-36

1022.23 BOTTOM

1032.88 INV

1+00

PC = 0+69.75

PT = 1+23.75

1032.09 INV

PC = 0+18.32

1031.47 INV

13+76.93

1032.38 INV-84"RCP

PT = 13+76.93

1030.93 INV

1028.78 INV

1028.73 INV

PC = 0+42.86

0+00.08 LINE C

PC = 13+40.67

1023.73 INV-60"

1024.99 INV-6"

1025.71 INV-6"

1025.55 INV-6"

1027.89 INV

1027.09 INV

1029.22 INV

1028.94 INV

1027.98 INV

1027.90 INV

1026.67 INV

1028.58 INV-72"RCP

1026.44 INV

PC = 11+56.72

PT = 11+77.31

1025.37 INV

PT = 8+15.42

1025.05 INV

PT = 5+94.47

PC = 5+70.91

1024.93 INV

1024.86 INV

1024.71 INV-66"RCP

PC = 7+80.07

7+80.50 LINE B

1025.25 INV

1025.23 INV

PT = 6+91.08

PC = 6+67.52

1025.54 INV

1025.42 INV

1025.40 INV

4+58.30

1042

1041

1040

1039

1038

1037

1036

1043

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)

1 inch = 30 ft.

NO.	DATE	DESCRIPTION	BY

DANJON ENGINEERING, INC.
895 E. Yorba Linda Blvd., Ste 202
Placentia, CA 92870
(714)572-6800 FAX(714)572-6850

RCE _____ DATE _____

GRADING PLAN

DESIGNED BY _____ DRAWN BY _____ CHECKED BY _____

Line A

```
0
T1 PROJ NO 08684
T2 LINE A 100 year
T3 8-18-08
SO    100.001009.63 66                          1017.63
R     387.611020.75 66       .013
R     458.301023.48 66       .013                                  90.
JX    462.971023.65 66 24 24.013     7.5    12.91025.321025.32 42.    90.
R     536.051024.60 66       .013
JX    555.551024.86 66 72    .013   124.4         1025.19         45.
R     570.911024.93 84       .013
R     594.471025.05 84       .013                                  90.
R     667.521025.42 84       .013                                        1
R     691.081025.54 84       .013                                  90.
R     827.231026.22 84       .013
R     997.661027.07 84       .013                                        2.
R    1002.331027.09 84       .013                                        1
R    1162.381027.89 84       .013
R    1330.171028.73 84       .013                                        2.
JX   1340.671028.78 84 36    .013    38.7         1030.75         45.
R    1376.921032.38 84       .013
SH                  84
CD   1  3               8.5     7.08
CD   2  4               5.0
CD   3  4               7.5
CD   4  4               3.75
CD  12  4  00  00.      1.0   000.  00.  00.  00.
CD  18  4  00  00.      1.5   000.  00.  00.  00.
CD  24  4  00  00.      2.0   000.  00.  00.  00.
CD  30  4  00  00.      2.5   000.  00.  00.  00.
CD  36  4  00  00.      3.0   000.  00.  00.  00.
CD  42  4  00  00.      3.5   000.  00.  00.  00.
CD  48  4  00  00.      4.0   000.  00.  00.  00.
CD  54  4  00  00.      4.5   000.  00.  00.  00.
CD  60  4  00  00.      5.0   000.  00.  00.  00.
CD  66  4  00  00.      5.5   000.  00.  00.  00.
CD  72  4  00  00.      6.0   000.  00.  00.  00.
CD  84  4  00  00.      7.0   000.  00.  00.  00.
```

```
CD  87  4  00  00.     7.25  000.  00.  00.  00.
CD  90  4  00  00.     7.5   000.  00.  00.  00.
```

DATE: 8/19/2008
TIME: 15: 1

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	8.50	7.08	0.00	0.00	0.00										
CD	2	4			5.00														
CD	3	4			7.50														
CD	4	4			3.75														
CD	12	4			1.00														
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	84	4			7.00														
CD	87	4			7.25														
CD	90	4			7.50														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS - PROJ NO 08684

HEADING LINE NO 2 IS - LINE A 100 year

HEADING LINE NO 3 IS - 8-18-08

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	100.00	1009.63	66	1017.63

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	387.61	1020.75	66	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	458.30	1023.48	66	0.013	0.00	90.00	0.00	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
	462.97	1023.65	66	24	24	0.013	7.5	12.9	1025.32	1025.32	42.00	90.00

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	536.05	1024.60	66	0.013	0.00	0.00	0.00	0

ELEMENT NO 6 IS A JUNCTION * * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	555.55	1024.86	66	72	0	0.013	124.4	0.0	1025.19	0.00	45.00	0.00

WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	570.91	1024.93	84	0.013	0.00	0.00	0.00	0

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	594.47	1025.05	84	0.013	0.00	90.00	0.00	0

```
ELEMENT NO   9 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                               667.52 1025.42   84              0.013                                 0.00   0.00    0.00      1

ELEMENT NO  10 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                               691.08 1025.54   84              0.013                                 0.00  90.00    0.00      0

ELEMENT NO  11 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                               827.23 1026.22   84              0.013                                 0.00   0.00    0.00      0

                                                F 0 5 1 5 P                                                    PAGE NO   3

                          WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO  12 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                               997.66 1027.07   84              0.013                                 0.00   0.00    2.00      0

ELEMENT NO  13 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              1002.33 1027.09   84              0.013                                 0.00   0.00    0.00      1

ELEMENT NO  14 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              1162.38 1027.89   84              0.013                                 0.00   0.00    0.00      0

ELEMENT NO  15 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              1330.17 1028.73   84              0.013                                 0.00   0.00    2.00      0

ELEMENT NO  16 IS A JUNCTION           *         *     *     *             *                 *              *
                  U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4     INVERT-3 INVERT-4  PHI 3   PHI 4
                              1340.67 1028.78   84    36     0  0.013    38.7      0.0  1030.75     0.00   45.00    0.00

ELEMENT NO  17 IS A REACH              *         *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              1376.92 1032.38   84              0.013                                 0.00   0.00    0.00      0

ELEMENT NO  18 IS A SYSTEM HEADWORKS                 *                 *
                  U/S DATA   STATION    INVERT  SECT                                W S ELEV
                              1376.92 1032.38   84                                    0.00
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
```

LICENSEE: DANJON ENGINEERING, INC. F0515P PAGE 1

WATER SURFACE PROFILE LISTING

PROJ NO 08684
LINE A 100 year
8-18-08

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
100.00	1009.63	3.972	1013.602	533.8	29.06	13.110	1026.712	0.00	5.397		5.50	0.00	0.00	0	0.00
9.24	0.03866					.033199	0.31			3.750			0.00		
109.24	1009.99	3.980	1013.967	533.8	28.99	13.050	1027.017	0.00	5.397		5.50	0.00	0.00	0	0.00
137.66	0.03866					.031397	4.32			3.750			0.00		
246.90	1015.31	4.166	1019.476	533.8	27.64	11.864	1031.340	0.00	5.397		5.50	0.00	0.00	0	0.00
83.61	0.03866					.028228	2.36			3.750			0.00		
330.51	1018.54	4.372	1022.914	533.8	26.35	10.785	1033.699	0.00	5.397		5.50	0.00	0.00	0	0.00
57.10	0.03866					.025569	1.46			3.750			0.00		
387.61	1020.75	4.605	1025.355	533.8	25.13	9.805	1035.160	0.00	5.397		5.50	0.00	0.00	0	0.00
11.64	0.03862					.024098	0.28			3.751			0.00		
399.25	1021.20	4.669	1025.869	533.8	24.82	9.568	1035.437	0.00	5.397		5.50	0.00	0.00	0	0.00
37.17	0.03862					.023019	0.86			3.751			0.00		
436.42	1022.63	4.959	1027.594	533.8	23.67	8.699	1036.293	0.00	5.397		5.50	0.00	0.00	0	0.00
21.88	0.03862					.022450	0.49			3.751			0.00		
458.30	1023.48	5.397	1028.877	533.8	22.57	7.907	1036.784	0.00	5.397		5.50	0.00	0.00	0	0.00
JUNCT STR	0.03640					.023033	0.11						0.00		
462.97	1023.65	6.563	1030.213	513.4	21.61	7.251	1037.464	0.00	5.380		5.50	0.00	0.00	0	0.00

73.08	0.01300					.023374	1.71			5.500			0.00		
536.05	1024.60	7.321	1031.921	513.4	21.61	7.251	1039.172	0.00	5.380		5.50	0.00	0.00	0	0.00
JUNCT STR	0.01333					.018396	0.36						0.00		
555.55	1024.86	13.091	1037.951	389.0	10.11	1.587	1039.538	0.00	5.199		7.00	0.00	0.00	0	0.00
15.36	0.00456					.003708	0.06			5.201			0.00		

WATER SURFACE PROFILE LISTING

PROJ NO 08684
LINE A 100 year
8-18-08

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
570.91	1024.93	13.078	1038.008	389.0	10.11	1.587	1039.595	0.00	5.199		7.00	0.00	0.00	0	0.00
23.56	0.00509					.003708	0.09			4.972			0.00		
594.47	1025.05	13.362	1038.412	389.0	10.11	1.587	1039.999	0.00	5.199		7.00	0.00	0.00	0	0.00
73.05	0.00507					.003708	0.27			4.983			0.00		
667.52	1025.42	13.342	1038.762	389.0	10.11	1.587	1040.349	0.00	5.199		7.00	0.00	0.00	0	0.00
23.56	0.00509					.003708	0.09			4.972			0.00		
691.08	1025.54	13.627	1039.167	389.0	10.11	1.587	1040.754	0.00	5.199		7.00	0.00	0.00	0	0.00
136.15	0.00499					.003708	0.50			5.011			0.00		
827.23	1026.22	13.452	1039.672	389.0	10.11	1.587	1041.259	0.00	5.199		7.00	0.00	0.00	0	0.00
170.43	0.00499					.003708	0.63			5.013			0.00		
997.66	1027.07	13.244	1040.314	389.0	10.11	1.587	1041.901	0.00	5.199		7.00	0.00	0.00	0	0.00
4.67	0.00428					.003708	0.02			5.344			0.00		
1002.33	1027.09	13.321	1040.411	389.0	10.11	1.587	1041.998	0.00	5.199		7.00	0.00	0.00	0	0.00

160.05	0.00500					.003708	0.59			5.009			0.00		
1162.38	1027.89	13.114	1041.004	389.0	10.11	1.587	1042.591	0.00	5.199		7.00	0.00	0.00	0	0.00
167.79	0.00501					.003708	0.62			5.006			0.00		
1330.17	1028.73	12.907	1041.637	389.0	10.11	1.587	1043.224	0.00	5.199		7.00	0.00	0.00	0	0.00
JUNCT STR	0.00476					.003358	0.04						0.00		
1340.67	1028.78	13.371	1042.151	350.3	9.10	1.287	1043.438	0.00	4.933		7.00	0.00	0.00	0	0.00
36.25	0.09931					.003007	0.11			1.976			0.00		
1376.92	1032.38	9.880	1042.260	350.3	9.10	1.287	1043.547	0.00	4.933		7.00	0.00	0.00	0	0.00

PROJ NO 08684
LINE A 100 year
8-18-08

```
                .         .         .         .         .         .         .         .         .         .         .
   100.00     .I          W   CH                                  E                                                .    R
   126.06     . I          W   CH                                 E                                                .    R
   152.12     .                                                                                                    .
   178.18     .                                                                                                    .
   204.24     .                                                                                                    .
   230.30     .                                                                                                    .
   256.36     .                I            W  X                                 E                               .    R
   282.42     .                                                                                                    .
   308.48     .                                                                                                    .
   334.54     .                         I            W  X                                 E                        .    R
   360.60     .                                                                                                    .
   386.66     .                                                                                                    .
   412.72     .                              I            W CH                                 E                   .    R
   438.77     .                                 I            W  X                                 E              .    R
   464.83     .                                    I             W X                                 E           .    R
   490.89     .                                      I               XH                                 E        .    JX
   516.95     .                                      I               X  W                                 E      .    R
   543.01     .                                         I              CH    W                                E   .    JX
   569.07     .                                         I              C     H                          W    E   .    R
   595.13     .                                           I            C     H                          W    E   .    R
   621.19     .                                           I            C      H                           W    E  .    R
   647.25     .                                                                                                    .
   673.31     .                                             I             C      H                           W    E  .    R
   699.37     .                                             I               C    H                             W   E  .    R
```

```
  725.43    .                                                                                                .
  751.49    .                                                                                                .
  777.55    .                                                                                                .
  803.61    .                                                                                                .
  829.67    .                                I              C    H                    W    E                .    R
  855.73    .                                                                                                .
  881.79    .                                                                                                .
  907.85    .                                                                                                .
  933.91    .                                                                                                .
  959.97    .                                                                                                .
  986.03    .                                                                                                .
 1012.09    .                                I              C    H                    W    E                .    R
 1038.15    .                                I              C    H                    W    E                .    R
 1064.20    .                                                                                                .
 1090.26    .                                                                                                .
 1116.32    .                                                                                                .
 1142.38    .                                                                                                .
 1168.44    .                                I              C    H                    W    E                .    R
 1194.50    .                                                                                                .
 1220.56    .                                                                                                .
 1246.62    .                                                                                                .
 1272.68    .                                                                                                .
 1298.74    .                                                                                                .
 1324.80    .                                                                                                .
 1350.86    .                                I              C    H                    W    E                .    JX
 1376.92    .                                I              C    H                    W    E                .    R
            .         .         .         .         .         .         .         .         .         .         .

         1009.63   1013.02   1016.41   1019.81   1023.20   1026.59   1029.98   1033.37   1036.76   1040.16   1043.55
```

N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

Line B

```
0
T1 PROJ NO 08684
T2 LINE B 100 year
T3 8-18-08
SO    764.921025.19 72                          1037.95
R     780.071025.25 72       .013
R     815.421025.37 72       .013                                45.
R    1073.481026.19 72       .013
JX   1085.481026.23 72 36    .013     16.2       1027.78        45.
R    1152.061026.44 72       .013
R    1156.751026.67 72       .013                                          1
R    1177.311028.58 72       .013
SH                   72
CD   1  3               8.5      7.08
CD   2  4               5.0
CD   3  4               7.5
CD   4  4               3.75
CD  12  4  00  00.      1.0    000.  00.  00.  00.
CD  18  4  00  00.      1.5    000.  00.  00.  00.
CD  24  4  00  00.      2.0    000.  00.  00.  00.
CD  30  4  00  00.      2.5    000.  00.  00.  00.
CD  36  4  00  00.      3.0    000.  00.  00.  00.
CD  42  4  00  00.      3.5    000.  00.  00.  00.
CD  48  4  00  00.      4.0    000.  00.  00.  00.
CD  54  4  00  00.      4.5    000.  00.  00.  00.
CD  60  4  00  00.      5.0    000.  00.  00.  00.
CD  66  4  00  00.      5.5    000.  00.  00.  00.
CD  72  4  00  00.      6.0    000.  00.  00.  00.
CD  84  4  00  00.      7.0    000.  00.  00.  00.
CD  87  4  00  00.      7.25   000.  00.  00.  00.
CD  90  4  00  00.      7.5    000.  00.  00.  00.
```

DATE: 8/19/2008

DATE: 8/20/2008
TIME: 15:39

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	8.50	7.08	0.00	0.00	0.00										
CD	2	4			5.00														
CD	3	4			7.50														
CD	4	4			3.75														
CD	12	4			1.00														
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	84	4			7.00														
CD	87	4			7.25														
CD	90	4			7.50														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS - PROJ NO 08684

HEADING LINE NO 2 IS - LINE B 100 year

HEADING LINE NO 3 IS - 8-18-08

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	764.92	1025.19	72	1037.95

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	780.07	1025.25	72	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	815.42	1025.37	72	0.013	0.00	45.00	0.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1073.48	1026.19	72	0.013	0.00	0.00	0.00	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
	1085.48	1026.23	72	36	0	0.013	16.2	0.0	1027.78	0.00	45.00	0.00

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1152.06	1026.44	72	0.013	0.00	0.00	0.00	0

ELEMENT NO 7 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1156.75	1026.67	72	0.013	0.00	0.00	0.00	1

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1177.31	1028.58	72	0.013	0.00	0.00	0.00	0

```
 ELEMENT NO   9 IS A SYSTEM HEADWORKS                  *                    *
                    U/S DATA   STATION    INVERT  SECT                          W S ELEV
                                1177.31 1028.58   72                              0.00
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

LICENSEE: DANJON ENGINEERING, INC.                        F0515P                                                  PAGE    1
                                                  WATER SURFACE PROFILE LISTING
                       PROJ NO 08684
                       LINE B 100 year
                       8-18-08

 STATION     INVERT   DEPTH      W.S.        Q       VEL      VEL      ENERGY   SUPER  CRITICAL          HGT/   BASE/     ZL   NO  AVBPR
              ELEV    OF FLOW    ELEV                         HEAD     GRD.EL.  ELEV   DEPTH             DIA    ID NO.          PIER

 L/ELEM       SO                                          SF AVE     HF                    NORM DEPTH                ZR
**********************************************************************************************************************************

   764.92  1025.19   12.760  1037.950     146.6    5.18    0.417  1038.367   0.00   3.288             6.00    0.00    0.00   0   0.00
    15.15  0.00396                                        .001198     0.02                3.176                    0.00
   780.07  1025.25   12.718  1037.968     146.6    5.18    0.417  1038.385   0.00   3.288             6.00    0.00    0.00   0   0.00
    35.35  0.00340                                        .001198     0.04                3.329                    0.00
   815.42  1025.37   12.700  1038.070     146.6    5.18    0.417  1038.487   0.00   3.288             6.00    0.00    0.00   0   0.00
   258.06  0.00318                                        .001198     0.31                3.399                    0.00
  1073.48  1026.19   12.189  1038.379     146.6    5.18    0.417  1038.796   0.00   3.288             6.00    0.00    0.00   0   0.00
JUNCT STR  0.00333                                        .001073     0.01                                         0.00
  1085.48  1026.23   12.307  1038.537     130.4    4.61    0.330  1038.867   0.00   3.092             6.00    0.00    0.00   0   0.00
    66.58  0.00315                                        .000948     0.06                3.169                    0.00
  1152.06  1026.44   12.160  1038.600     130.4    4.61    0.330  1038.930   0.00   3.092             6.00    0.00    0.00   0   0.00
     4.69  0.04904                                        .000948     0.00                1.511                    0.00
  1156.75  1026.67   11.951  1038.621     130.4    4.61    0.330  1038.951   0.00   3.092             6.00    0.00    0.00   0   0.00
    20.56  0.09290                                        .000948     0.02                1.288                    0.00
  1177.31  1028.58   10.061  1038.641     130.4    4.61    0.330  1038.971   0.00   3.092             6.00    0.00    0.00   0   0.00
```

```
 PROJ NO 08684
LINE B 100 year
8-18-08


                .         .         .         .         .         .         .         .         .         .         .
  764.92    .I                    C                   H                                       W  E      .    R
  773.34    .                                                                                           .
  781.75    .I                    C                   H                                       W  E      .    R
  790.17    .                                                                                           .
  798.58    .                                                                                           .
  807.00    .                                                                                           .
  815.42    .                                                                                           .
  823.83    . I                   C                   H                                       W  E      .    R
  832.25    .                                                                                           .
  840.67    .                                                                                           .
  849.08    .                                                                                           .
  857.50    .                                                                                           .
  865.91    .                                                                                           .
  874.33    .                                                                                           .
  882.75    .                                                                                           .
  891.16    .                                                                                           .
  899.58    .                                                                                           .
  907.99    .                                                                                           .
  916.41    .                                                                                           .
  924.83    .                                                                                           .
  933.24    .                                                                                           .
  941.66    .                                                                                           .
  950.07    .                                                                                           .
  958.49    .                                                                                           .
  966.91    .                                                                                           .
  975.32    .                                                                                           .
  983.74    .                                                                                           .
  992.16    .                                                                                           .
 1000.57    .                                                                                           .
 1008.99    .                                                                                           .
 1017.40    .                                                                                           .
 1025.82    .                                                                                           .
 1034.24    .                                                                                           .
 1042.65    .                                                                                           .
 1051.07    .                                                                                           .
 1059.48    .                                                                                           .
 1067.90    .                                                                                           .
 1076.32    .         I                       C                   H                           W  E      .    JX
 1084.73    .                                                                                           .
 1093.15    .         I                     C                     H                           W  E      .    R
 1101.56    .                                                                                           .
```

```
   1109.98    .                                                                .
   1118.40    .                                                                .
   1126.81    .                                                                .
   1135.23    .                                                                .
   1143.65    .                                                                .
   1152.06    .         I                   C                   H            W E .    R
   1160.48    .          I                    C                    H          W E .    R
   1168.89    .                                                                .
   1177.31    .                       I                   C                   H          W  E.    R
              .         .         .         .         .         .         .         .         .         .         .

            1025.19   1026.57   1027.95   1029.32   1030.70   1032.08   1033.46   1034.84   1036.21   1037.59   1038.97
```

N O T E S
1. GLOSSARY
   I = INVERT ELEVATION
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   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY

Line C

```
                                                                  0
T1 PROJ NO 08684
T2 LINE C 100 year
T3 8-18-08
SO    005.031030.82 36                              1042.15
R     042.861031.47 36      .013
R     078.321032.09 36      .013                                      45.
R     123.751032.09 36      .013
R     159.021033.49 36      .013                                      22.5
SH                  36
CD   1  3              8.5     7.08
CD   2  4              5.0
CD   3  4              7.5
CD   4  4              3.75
CD  12  4  00  00.     1.0   000.  00.  00.  00.
CD  18  4  00  00.     1.5   000.  00.  00.  00.
CD  24  4  00  00.     2.0   000.  00.  00.  00.
CD  30  4  00  00.     2.5   000.  00.  00.  00.
CD  36  4  00  00.     3.0   000.  00.  00.  00.
CD  42  4  00  00.     3.5   000.  00.  00.  00.
CD  48  4  00  00.     4.0   000.  00.  00.  00.
CD  54  4  00  00.     4.5   000.  00.  00.  00.
CD  60  4  00  00.     5.0   000.  00.  00.  00.
CD  66  4  00  00.     5.5   000.  00.  00.  00.
CD  72  4  00  00.     6.0   000.  00.  00.  00.
CD  84  4  00  00.     7.0   000.  00.  00.  00.
CD  87  4  00  00.     7.25  000.  00.  00.  00.
CD  90  4  00  00.     7.5   000.  00.  00.  00.
```

DATE: 8/19/2008
TIME: 16:12

F0515P
WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIERS	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	3	0	0.00	8.50	7.08	0.00	0.00	0.00										
CD	2	4			5.00														
CD	3	4			7.50														
CD	4	4			3.75														
CD	12	4			1.00														
CD	18	4			1.50														
CD	24	4			2.00														
CD	30	4			2.50														
CD	36	4			3.00														
CD	42	4			3.50														
CD	48	4			4.00														
CD	54	4			4.50														
CD	60	4			5.00														
CD	66	4			5.50														
CD	72	4			6.00														
CD	84	4			7.00														
CD	87	4			7.25														
CD	90	4			7.50														

F 0 5 1 5 P PAGE NO 3

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS - PROJ NO 08684

HEADING LINE NO 2 IS - LINE C 100 year

HEADING LINE NO 3 IS - 8-18-08

F 0 5 1 5 P PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	5.03	1030.82	36	1042.15

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	42.86	1031.47	36	0.013	0.00	0.00	0.00	0

ELEMENT NO 3 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	78.32	1032.09	36	0.013	0.00	45.00	0.00	0

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	123.75	1032.09	36	0.013	0.00	0.00	0.00	0

ELEMENT NO 5 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	159.02	1033.49	36	0.013	0.00	22.50	0.00	0

ELEMENT NO 6 IS A SYSTEM HEADWORKS * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	159.02	1033.49	36	0.00

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

LICENSEE: DANJON ENGINEERING, INC. F0515P PAGE 1
WATER SURFACE PROFILE LISTING

PROJ NO 08684
LINE C 100 year
8-18-08

STATION	INVERT ELEV	DEPTH OF FLOW	W.S. ELEV	Q	VEL	VEL HEAD	ENERGY GRD.EL.	SUPER ELEV	CRITICAL DEPTH		HGT/ DIA	BASE/ ID NO.	ZL	NO PIER	AVBPR
L/ELEM	SO					SF AVE	HF			NORM DEPTH			ZR		
5.03	1030.82	11.330	1042.150	38.7	5.47	0.465	1042.615	0.00	2.025		3.00	0.00	0.00	0	0.00
37.83	0.01718					.003367	0.13			1.397			0.00		
42.86	1031.47	10.807	1042.277	38.7	5.47	0.465	1042.742	0.00	2.025		3.00	0.00	0.00	0	0.00
35.46	0.01748					.003367	0.12			1.390			0.00		
78.32	1032.09	10.373	1042.463	38.7	5.47	0.465	1042.928	0.00	2.025		3.00	0.00	0.00	0	0.00
45.43	0.00000					.003367	0.15			0.000			0.00		
123.75	1032.09	10.526	1042.616	38.7	5.47	0.465	1043.081	0.00	2.025		3.00	0.00	0.00	0	0.00
35.27	0.03969					.003367	0.12			1.110			0.00		
159.02	1033.49	9.291	1042.781	38.7	5.47	0.465	1043.246	0.00	2.025		3.00	0.00	0.00	0	0.00

PROJ NO 08684
LINE C 100 year
8-18-08

```
                .         .         .         .         .         .         .         .         .         .         .
    5.03    .I              C         H                                                       W   E         .     R
    8.17    .                                                                                             .
   11.32    .                                                                                             .
   14.46    .                                                                                             .
   17.60    .                                                                                             .
   20.74    .                                                                                             .
   23.89    .                                                                                             .
   27.03    .                                                                                             .
   30.17    .                                                                                             .
   33.31    .                                                                                             .
```

```
 36.46   .                                                                              .
 39.60   .                                                                              .
 42.74   .                                                                              .
 45.88   .   I          C    H                                                  W E     .   R
 49.03   .                                                                              .
 52.17   .                                                                              .
 55.31   .                                                                              .
 58.46   .                                                                              .
 61.60   .                                                                              .
 64.74   .                                                                              .
 67.88   .                                                                              .
 71.03   .                                                                              .
 74.17   .                                                                              .
 77.31   .                                                                              .
 80.45   .      I          C    H                                                W   E  .   R
 83.60   .                                                                              .
 86.74   .                                                                              .
 89.88   .                                                                              .
 93.02   .                                                                              .
 96.17   .                                                                              .
 99.31   .                                                                              .
102.45   .                                                                              .
105.59   .                                                                              .
108.74   .                                                                              .
111.88   .                                                                              .
115.02   .                                                                              .
118.17   .                                                                              .
121.31   .                                                                              .
124.45   .      I          C    H                                                 W   E .   R
127.59   .                                                                              .
130.74   .                                                                              .
133.88   .                                                                              .
137.02   .                                                                              .
140.16   .                                                                              .
143.31   .                                                                              .
146.45   .                                                                              .
149.59   .                                                                              .
152.73   .                                                                              .
155.88   .                                                                              .
159.02   .            I          C    H                                            W  E.   R
          .     .     .     .     .     .     .     .     .     .     .

        1030.82  1032.06  1033.31  1034.55  1035.79  1037.03  1038.28  1039.52  1040.76  1042.00  1043.25
```

N O T E S
1. GLOSSARY

```
   I = INVERT ELEVATION
   C = CRITICAL DEPTH
   W = WATER SURFACE ELEVATION
   H = HEIGHT OF CHANNEL
   E = ENERGY GRADE LINE
   X = CURVES CROSSING OVER
   B = BRIDGE ENTRANCE OR EXIT
   Y = WALL ENTRANCE OR EXIT
2. STATIONS FOR POINTS AT A JUMP MAY NOT BE PLOTTED EXACTLY
```

Basin Calculations

A. Volume-Based BMP Design per San Bernardino WQMP requirements

1) Calculate the "Watershed Imperviousness Ratio", i, which is equal to the percent of impervious area in the BMP Drainage Area divided by 100.

2) Calculate the composite runoff coefficient C_{BMP} for the Drainage Area above using the following equation:

$$C_{BMP} = 0.858 * 0.90^3 - 0.78 * 0.90^2 + 0.774 * 0.90 + 0.04$$
$$C_{BMP} = (0.858 * 0.729) - (0.78 * 0.81) + (0.774 * 0.90) + 0.04 = 0.73$$

where: C_{BMP} = composite runoff coefficient; and, **0.73**
i = watershed imperviousness ratio. **0.90**

1. Determine which Region the Drainage Area is located in (Valley, Mountain or Desert). **VALLEY**

2. Determine the area-averaged "6-hour Mean Storm Rainfall", P6, for the Drainage Area. This is calculated by multiplying the area averaged 2-year 1-hour value by the appropriate regression coefficient from Table D-1. **0.58 * 1.4807 = 0.86**

3. Determine the appropriate drawdown time. Use the regression constant a = 1.582 for 24 hours and a = 1.963 for 48 hours. *Note: Regression constants are provided for both 24 hour and 48 hour drawdown times; however, 48 hour drawdown times should be used in most areas of California. Drawdown times in excess of 48 hours should be used with caution as vector breeding can be a problem after water has stood in excess of 72 hours. (Use of the 24 hour drawdown time should be limited to drainage areas with coarse soils that readily settle and to watersheds where warming may be detrimental to downstream fisheries.)* **a = 1.963**

4. Calculate the "Maximized Detention Volume", P_0, using the following equation:

$$P_0 = a \cdot CBMP \cdot P6$$
$$P_0 = 1.963 * 0.73 * 0.86 = 1.23$$

where: P_0 = Maximized Detention Volume, in inches
a = 1.582 for 24 hour and a = 1.963 for 48 hour drawdown,
C_{BMP} = composite runoff coefficient; and,
P_6 = 6-hour Mean Storm Rainfall, in inches

5. Calculate the "Target Capture Volume", V_0, using the following equation:

$V_0 = (P_0 \cdot A) / 12$

$V_0 = (1.23 * 11.4) / 12 = 1.17$

where:

V_0 = Target Capture Volume, in acre-feet

P_0 = Maximized Detention Volume, in inches; and,

A = BMP Drainage Area, in acres

Table B-2
C Values Based on Impervious/Pervious Area Ratios

% Impervious	% Pervious	C
0	100	0.15
5	95	0.19
10	90	0.23
15	85	0.26
20	80	0.30
25	75	0.34
30	70	0.38
35	65	0.41
40	60	0.45
45	55	0.49
50	50	0.53
55	45	0.56
60	40	0.60
65	35	0.64
70	30	0.68
75	25	0.71
80	20	0.75
85	15	0.79
90	10	0.83
95	5	0.86
100	0	0.90

NOTE:

Obtain individual runoff coefficient C-Factors from the local agency or from the local flood control district.

If C-Factors are not available locally, obtain factors from hydrology text books or estimate using this table.

Composite the individual C-Factors using area-weighted averages to calculate the Composite C Factor for the area draining to a treatment control BMP.

Do not use the C-Factors in this table for flood control design or related work.

B. Basin Volume Calculations

Volume of water that needs to be retained = 1.17 ac-ft.
1.17 ac-ft = 50,965 cu-ft = 381,248 gallons

Note: The retention basin is designed to be used as a treatment facility. This is to verify the minimum volume required to mitigate total volume outflow from the current site. The system is designed with one 60" diameter Hancor HDPE pipe with rock. See the pipe details for more information.
To determine the length of detention storage area needed, we will determine the volume of water per foot of pipe.

Area calculation

Area for three 60" diameter pipe.

Area = $\prod r^2$
Area = 3.14(6.25sf)*3 = 58.87sf
One foot of three 60" pipe in system will hold 58.87 cu-ft of water

Area of rock surrounding the pipe.
7.0 ft times 26.0 ft = 182sf
182 sf minus the area of the three pipes
the outside diameter of the pipe is approximately 6 feet
Area = $\prod r^2$
Area = 3.14(9.00sf) * 3 = 84.78sf
Area of rock = 182sf – 84.78sf = 97.22sf
One foot of system has 97.22 cu-ft of rock
Only 40 percent of the rock can be used for water storage
97.22 cu-ft (0.4) = 38.9 cu-ft of water.

Volume

Total available volume of pipe and voids is 38.9 cf (voids in rock) + 58.87 cf (pipe) = 97.77 cf
This site needs 50,965 cf of storage for Vm = **522 ft of pipe needed + 10% safety factor = 574.2 length of system needed.**
Actual length of system used = 580

The soils engineer recommends a factored hydraulic conductivity value of 2 inches/hour (30 gallons/sf/day) to be used for design of the basin.

381,248 gallons / 60 gallons per sf for 48 hours = 6355 sf minimum basin bottom.
Actual basin bottom used = 15080 sf

Minimum volume of basin needed = 50,965 cu-ft
Actual volume of basin used = 56,700 cu-ft

Supplemental Hydrology Report

KAISER COMMERCE CENTER

DRAINAGE STUDY

August 2001

Prepared by: **Associated Engineers**
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JOB KAISER COMMERCE
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

ALLOW NO MORE THAN Q_2 DISCHARGE INTO SAN SEVAINE.

Q_2 FLOWS

SMC	19.8 CFS
INTO BASIN	161.9 "
FROM ON-SITE	60.1 "
INTO CHANNEL	8.7 "

$\Sigma_2 = 250.5$ CFS

Q_{100} INTO CHANNEL

SMC	46.1 CFS
FROM STREETS	20.3 "
FROM BASIN	156.0 "

$\Sigma_{100} = 222.4$ CFS

$Q_{100}(222.4) < Q_2(250.5)$ ∴ OK

RATIONAL METHOD STUDIES

- 100-Year Frequency Analysis
- 2-Year Frequency Analysis

100-YEAR STUDY

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
       (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
     (c) Copyright 1983-2001 Advanced Engineering Software (aes)
         Ver. 8.0  Release Date: 01/01/2001  License ID 1404

                        Analysis prepared by:

                          ASSOCIATED ENGINEERS
                        Consulting Civil Engineers
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 ************************* DESCRIPTION OF STUDY *************************
* KAISER COMMERCE CENTER                                                 *
* 100 YEAR ANALYSIS                                                      *
* REVISED SITE DRAINAGE STUDY                                            *
 ************************************************************************

  FILE NAME: 96082FE\CCG100YR.DAT
  TIME/DATE OF STUDY: 14:03 08/15/2001
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3500

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)     SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   52.0     26.0    0.020/0.020/0.020   0.67    1.50 0.0208 0.125 0.0150
  2   40.0     20.0    0.020/0.020/0.020   0.67    1.50 0.0208 0.125 0.0150
  3   38.0     19.0    0.020/0.020/0.020   0.67    1.50 0.0208 0.125 0.0150
  4   22.0     11.0    0.020/0.020/0.020   0.67    1.50 0.0208 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

  UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
    WATERSHED LAG = 0.80 * Tc
    VALLEY(DEVELOPED) S-GRAPH USED.
    SIERRA MADRE DEPTH-AREA FACTORS USED.
                    AREA-AVERAGED
        DURATION    RAINFALL(INCH)
        5-MINUTES         0.49
       30-MINUTES         1.01
        1-HOUR            1.35
        3-HOUR            2.45
        6-HOUR            3.61
       24-HOUR            7.60
*ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR UNIT HYDROGRAPH METHOD*

+------------------------------------------------------------------------+
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| This is the major stream thread within the Kaiser Commerce Center      |
| Development.  It primarily consists of the backbone storm drain system |
| commencing at the EXEL building and discharging into the on-site basin. |
+-------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE       1.01 TO NODE       1.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =   1107.30  DOWNSTREAM(FEET) =   1104.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.586
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.335
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        1.05      0.80       0.10     52    8.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =       4.02
  TOTAL AREA(ACRES) =       1.05   PEAK FLOW RATE(CFS) =       4.02

****************************************************************************
  FLOW PROCESS FROM NODE       1.02 TO NODE       1.03 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1098.90  DOWNSTREAM(FEET) =  1097.90
  FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.02
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   9.43
  LONGEST FLOWPATH FROM NODE       1.01 TO NODE       1.03 =   600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       1.03 TO NODE       1.03 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =   9.43
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.096
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        2.42      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     2.42      SUBAREA RUNOFF(CFS) =     8.75
  EFFECTIVE AREA(ACRES) =     3.47   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     3.47       PEAK FLOW RATE(CFS) =      12.54

****************************************************************************
  FLOW PROCESS FROM NODE       1.03 TO NODE       1.04 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1097.90  DOWNSTREAM(FEET) =  1096.80
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     12.54
 PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =  10.10
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.04 =   820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.04 TO NODE      1.04 IS CODE =  81
----------------------------------------------------------------------------
 >>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.932
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        2.58      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.58      SUBAREA RUNOFF(CFS) =    8.95
 EFFECTIVE AREA(ACRES) =     6.05   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     6.05       PEAK FLOW RATE(CFS) =      20.98

****************************************************************************
 FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1096.80  DOWNSTREAM(FEET) =  1095.70
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.98
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =  10.70
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =  1040.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.70
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.799
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        2.58      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.58      SUBAREA RUNOFF(CFS) =    8.64
 EFFECTIVE AREA(ACRES) =     8.63   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     8.63       PEAK FLOW RATE(CFS) =      28.89

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1095.70  DOWNSTREAM(FEET) =  1094.60
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     28.89
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =  11.24
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.06 =  1260.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      1.06 TO NODE      1.06 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.24
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.688
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.61      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.61      SUBAREA RUNOFF(CFS) =     8.48
 EFFECTIVE AREA(ACRES) =    11.24    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    11.24        PEAK FLOW RATE(CFS) =      36.51

****************************************************************************
 FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1094.60  DOWNSTREAM(FEET) =  1093.50
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
 ESTIMATED          PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     36.51
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =  11.75
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.07 =  1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.07 TO NODE      1.07 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.592
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.58      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.58      SUBAREA RUNOFF(CFS) =     8.16
 EFFECTIVE AREA(ACRES) =    13.82    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    13.82        PEAK FLOW RATE(CFS) =      43.68

****************************************************************************
 FLOW PROCESS FROM NODE      1.07 TO NODE      1.08 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1093.50  DOWNSTREAM(FEET) =  1092.30
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.55
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     43.68
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =  12.25
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.08 =  1710.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.08 TO NODE      1.08 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.25
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.502
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.97      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.97      SUBAREA RUNOFF(CFS) =    9.15
 EFFECTIVE AREA(ACRES) =   16.79   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    16.79      PEAK FLOW RATE(CFS) =      51.71

****************************************************************************
 FLOW PROCESS FROM NODE      1.08 TO NODE      1.09 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1092.30  DOWNSTREAM(FEET) =  1091.50
 FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     51.71
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  12.51
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.09 =  1840.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.09 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1090.50  DOWNSTREAM(FEET) =  1090.00
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.44
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     51.71
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =  12.75
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.10 =  1950.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.14      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.43
 EFFECTIVE AREA(ACRES) =   17.93   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    17.93      PEAK FLOW RATE(CFS) =      53.88

****************************************************************************
 FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1090.00  DOWNSTREAM(FEET) =  1089.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     53.88
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =  13.15
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.11 =  2140.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.15
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.356
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.57      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.68
 EFFECTIVE AREA(ACRES) =    18.50   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    18.50       PEAK FLOW RATE(CFS) =      54.55

****************************************************************************
 FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1089.00  DOWNSTREAM(FEET) =  1088.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.00
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     54.55
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =  13.55
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =  2330.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.55
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.297
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.57      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.65
 EFFECTIVE AREA(ACRES) =    19.07   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    19.07       PEAK FLOW RATE(CFS) =      55.22

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1088.00  DOWNSTREAM(FEET) =  1087.10
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     55.22
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =  13.96
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.13 =  2520.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.96
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.238
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.30      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.30     SUBAREA RUNOFF(CFS) =    0.85
 EFFECTIVE AREA(ACRES) =   19.37   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    19.37      PEAK FLOW RATE(CFS) =      55.22
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE      1.13 TO NODE      1.14 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1087.10  DOWNSTREAM(FEET) =  1086.70
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.82
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     55.22
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  14.13
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.14 =  2600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.14 TO NODE      1.14 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  14.13
 RAINFALL INTENSITY(INCH/HR) =   3.21
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =   19.37
 TOTAL STREAM AREA(ACRES) =   19.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     55.22

+--------------------------------------------------------------------------+
| The following stream thread runs along the west edge of the EXEL         |
| building and ties into the on-site storm drain.                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      1.01 TO NODE      2.01 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   520.00
 ELEVATION DATA: UPSTREAM(FEET) =   1107.30  DOWNSTREAM(FEET) =   1103.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.028
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.949
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        2.64      0.80       0.10     52   10.03
```

```
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      9.19
 TOTAL AREA(ACRES) =      2.64   PEAK FLOW RATE(CFS) =      9.19

****************************************************************************
 FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1098.40  DOWNSTREAM(FEET) =  1097.20
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.19
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =  10.77
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.02 =   750.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.02 TO NODE      2.02 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.77
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.784
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.43      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.43      SUBAREA RUNOFF(CFS) =    8.10
 EFFECTIVE AREA(ACRES) =     5.07   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     5.07       PEAK FLOW RATE(CFS) =      16.90

****************************************************************************
 FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1097.20  DOWNSTREAM(FEET) =  1096.10
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.95
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.90
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =  11.38
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.03 =   970.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.03 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.38
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.660
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.45      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    7.89
 EFFECTIVE AREA(ACRES) =     7.52   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     7.52       PEAK FLOW RATE(CFS) =      24.23
```

```
****************************************************************************
  FLOW PROCESS FROM NODE       2.03 TO NODE       2.04 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1096.10  DOWNSTREAM(FEET) =  1095.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.47
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     24.23
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =  11.95
  LONGEST FLOWPATH FROM NODE       1.01 TO NODE       2.04 =  1190.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       2.04 TO NODE       2.04 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.95
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.555
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        2.45      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     2.45      SUBAREA RUNOFF(CFS) =     7.66
  EFFECTIVE AREA(ACRES) =     9.97    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     9.97        PEAK FLOW RATE(CFS) =      31.18

****************************************************************************
  FLOW PROCESS FROM NODE       2.04 TO NODE       2.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1095.00  DOWNSTREAM(FEET) =  1093.90
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.90
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     31.18
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =  12.48
  LONGEST FLOWPATH FROM NODE       1.01 TO NODE       2.05 =  1410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       2.05 TO NODE       2.05 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  12.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.463
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        2.49      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     2.49      SUBAREA RUNOFF(CFS) =     7.58
  EFFECTIVE AREA(ACRES) =    12.46    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     12.46       PEAK FLOW RATE(CFS) =      37.94

****************************************************************************
  FLOW PROCESS FROM NODE       2.05 TO NODE       2.06 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1093.90  DOWNSTREAM(FEET) =  1092.80
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     37.94
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =  12.99
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.06 =  1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.06 TO NODE      2.06 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  12.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.382
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        2.46      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     2.46      SUBAREA RUNOFF(CFS) =     7.31
  EFFECTIVE AREA(ACRES) =    14.92    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     14.92      PEAK FLOW RATE(CFS) =      44.34

****************************************************************************
  FLOW PROCESS FROM NODE      2.06 TO NODE      2.07 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1092.80  DOWNSTREAM(FEET) =  1091.40
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.41
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     44.34
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =  13.62
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.07 =  1910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.07 TO NODE      2.07 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  13.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        3.01      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     3.01      SUBAREA RUNOFF(CFS) =     8.69
  EFFECTIVE AREA(ACRES) =    17.93    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     17.93      PEAK FLOW RATE(CFS) =      51.76

****************************************************************************
  FLOW PROCESS FROM NODE      2.07 TO NODE      1.14 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1091.40  DOWNSTREAM(FEET) =  1086.70
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.60
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  24.00     NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     51.76
 PIPE TRAVEL TIME(MIN.) =   0.06     Tc(MIN.) =  13.67
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.14 =  1980.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.14 TO NODE      1.14 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.67
 RAINFALL INTENSITY(INCH/HR) =   3.28
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =   17.93
 TOTAL STREAM AREA(ACRES) =   17.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     51.76

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      55.22  14.13     3.214   0.80( 0.08) 0.10     19.4        1.01
     2      51.76  13.67     3.279   0.80( 0.08) 0.10     17.9        1.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     106.28  13.67     3.279   0.80( 0.08) 0.10     36.7        1.01
     2     105.93  14.13     3.214   0.80( 0.08) 0.10     37.3        1.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    106.28    Tc(MIN.) =    13.67
 EFFECTIVE AREA(ACRES) =    36.67   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     37.30
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.14 =  2600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.14 TO NODE      1.15 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1086.70  DOWNSTREAM(FEET) =  1067.80
 FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.23
 ESTIMATED PIPE DIAMETER(INCH) =  39.00     NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    106.28
 PIPE TRAVEL TIME(MIN.) =   0.73     Tc(MIN.) =  14.40
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.15 =  3350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.15 TO NODE      1.15 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+----------------------------------------------------------------------+
| Nodes in the "3.X" series represent surface flows within Private Drive |
| intercepted at catch basins and entering into the backbone storm drain. |
| These flows are computed to size respective catch basins and laterals. |
+----------------------------------------------------------------------+
```

```
 ****************************************************************************
  FLOW PROCESS FROM NODE       3.01 TO NODE       3.02 IS CODE =  21
 ----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 ============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
  ELEVATION DATA: UPSTREAM(FEET) =   1094.00  DOWNSTREAM(FEET) =   1089.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.400
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.170
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.29      0.80       0.10     52    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.33
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.33

 ****************************************************************************
  FLOW PROCESS FROM NODE       3.02 TO NODE       3.03 IS CODE =  62
 ----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
 ============================================================================
  UPSTREAM ELEVATION(FEET) = 1089.50  DOWNSTREAM ELEVATION(FEET) = 1075.30
  STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 22.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   2.70   Tc(MIN.) =   9.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.186
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        0.35      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.35      SUBAREA RUNOFF(CFS) =     1.29
  EFFECTIVE AREA(ACRES) =    0.64     AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    0.64        PEAK FLOW RATE(CFS) =      2.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.85
  FLOW VELOCITY(FEET/SEC.) =  3.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.03 =   775.00 FEET.

 ****************************************************************************
  FLOW PROCESS FROM NODE       3.03 TO NODE       3.03 IS CODE =   1
 ----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 ============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
 TIME OF CONCENTRATION(MIN.) =    9.10
 RAINFALL INTENSITY(INCH/HR) =    4.19
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =     0.64
 TOTAL STREAM AREA(ACRES) =     0.64
   K FLOW RATE(CFS) AT CONFLUENCE =      2.37

****************************************************************************
 FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
 ELEVATION DATA: UPSTREAM(FEET) =   1094.00  DOWNSTREAM(FEET) =   1089.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.686
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.037
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        0.43      0.80       0.10     52    6.69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.92
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.92

****************************************************************************
 FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1089.50  DOWNSTREAM ELEVATION(FEET) = 1075.30
 STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.56
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    8.14
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
 STREET FLOW TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =   9.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.151
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.35      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.35      SUBAREA RUNOFF(CFS) =     1.28
 EFFECTIVE AREA(ACRES) =     0.78    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     0.78        PEAK FLOW RATE(CFS) =       2.86

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.59
 FLOW VELOCITY(FEET/SEC.) =  3.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.98
```

```
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.03 =   795.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.23
 RAINFALL INTENSITY(INCH/HR) =   4.15
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    0.78
 TOTAL STREAM AREA(ACRES) =    0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.86

 ** CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)    NODE
     1      2.37   9.10     4.186   0.80( 0.08) 0.10      0.6        3.01
     2      2.86   9.23     4.151   0.80( 0.08) 0.10      0.8        3.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)    NODE
     1      5.21   9.10     4.186   0.80( 0.08) 0.10      1.4        3.01
     2      5.20   9.23     4.151   0.80( 0.08) 0.10      1.4        3.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      5.21    Tc(MIN.) =     9.10
 EFFECTIVE AREA(ACRES) =     1.41   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      1.42
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.03 =   795.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      1.15 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)    NODE
     1      5.21   9.10     4.186   0.80( 0.08) 0.10      1.4        3.01
     2      5.20   9.23     4.151   0.80( 0.08) 0.10      1.4        3.01
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      1.15 =   795.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)    NODE
     1    106.28  14.40     3.179   0.80( 0.08) 0.10     36.7        1.01
     2    105.93  14.86     3.119   0.80( 0.08) 0.10     37.3        1.01
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.15 =  3350.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)    NODE
     1     94.21   9.10     4.186   0.80( 0.08) 0.10     24.6        3.01
     2     94.69   9.23     4.151   0.80( 0.08) 0.10     24.9        3.01
     3    110.24  14.40     3.179   0.80( 0.08) 0.10     38.1        1.01
     4    109.82  14.86     3.119   0.80( 0.08) 0.10     38.7        1.01
   TOTAL AREA(ACRES) =     38.72

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =      110.24  Tc(MIN.) =   14.399
 EFFECTIVE AREA(ACRES) =     38.09  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     38.72
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.15 =  3350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.15 TO NODE      1.16 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1067.80  DOWNSTREAM(FEET) =  1053.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.04
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    110.24
 PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =  15.13
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.16 =  4050.00 FEET.

+--------------------------------------------------------------------------+
| The following area represents the ungraded pad between the EXCEL and SMC |
| buildings that will ultimately generate flows into the storm drain       |
| system.                                                                  |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      1.16 TO NODE      1.16 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  15.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.086
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A       31.88      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =   31.88      SUBAREA RUNOFF(CFS) =   86.26
 EFFECTIVE AREA(ACRES) =    69.97   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    70.60       PEAK FLOW RATE(CFS) =     189.32

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)        (ACRES)    NODE
     1    198.62    9.87     3.988  0.80( 0.08) 0.10    56.5       3.01
     2    198.51    9.97     3.963  0.80( 0.08) 0.10    56.8       3.01
     3    189.32   15.13     3.086  0.80( 0.08) 0.10    70.0       1.01
     4    187.52   15.59     3.031  0.80( 0.08) 0.10    70.6       1.01
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =    198.62  Tc(MIN.) =   9.87
 AREA-AVERAGED Fm(INCH/HR) =  0.08  AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10  EFFECTIVE AREA(ACRES) =     56.46

****************************************************************************
 FLOW PROCESS FROM NODE      1.16 TO NODE      1.17 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1053.00  DOWNSTREAM(FEET) =  1051.00
 FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.02
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    198.62
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =  10.28
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.17 =  4350.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      1.17 TO NODE      1.17 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.04 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
 ELEVATION DATA: UPSTREAM(FEET) =   1075.30  DOWNSTREAM(FEET) =   1063.80

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.792
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.989
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        0.28      0.80       0.10     52    6.79
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.24
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
 FLOW PROCESS FROM NODE      3.04 TO NODE      3.05 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1063.80  DOWNSTREAM ELEVATION(FEET) = 1058.40
 STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    9.18
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
 STREET FLOW TRAVEL TIME(MIN.) =   5.00   Tc(MIN.) =  11.79
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.583
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.41      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.29
 EFFECTIVE AREA(ACRES) =    0.69    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    0.69        PEAK FLOW RATE(CFS) =      2.18

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.70
 FLOW VELOCITY(FEET/SEC.) =  2.08   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =  1000.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE       3.05 TO NODE       3.05 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  11.79
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =    0.69
  TOTAL STREAM AREA(ACRES) =    0.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE       3.03 TO NODE       3.04 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
  ELEVATION DATA: UPSTREAM(FEET) =   1075.30  DOWNSTREAM(FEET) =   1063.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.792
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.989
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.28      0.80       0.10     52    6.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE       3.04 TO NODE       3.05 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1063.80  DOWNSTREAM ELEVATION(FEET) = 1058.40
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 22.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   5.00   Tc(MIN.) =  11.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.583
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        0.41      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.29
```

```
 EFFECTIVE AREA(ACRES) =    0.69    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    0.69        PEAK FLOW RATE(CFS) =       2.18

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.70
 FLOW VELOCITY(FEET/SEC.) =  2.08   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =  1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.05 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  11.79
 RAINFALL INTENSITY(INCH/HR) =   3.58
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    0.69
 TOTAL STREAM AREA(ACRES) =    0.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.18

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1       2.18   11.79     3.583  0.80( 0.08) 0.10      0.7        3.03
     2       2.18   11.79     3.583  0.80( 0.08) 0.10      0.7        3.03

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1       4.35   11.79     3.583  0.80( 0.08) 0.10      1.4        3.03
     2       4.35   11.79     3.583  0.80( 0.08) 0.10      1.4        3.03

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      4.35    Tc(MIN.) =    11.79
 EFFECTIVE AREA(ACRES) =     1.38   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      1.38
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =  1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      1.17 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1       4.35   11.79     3.583  0.80( 0.08) 0.10      1.4        3.03
     2       4.35   11.79     3.583  0.80( 0.08) 0.10      1.4        3.03
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      1.17 =  1000.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     198.62   10.28     3.890  0.80( 0.08) 0.10     56.5        3.01
     2     198.51   10.39     3.867  0.80( 0.08) 0.10     56.8        3.01
     3     189.32   15.54     3.036  0.80( 0.08) 0.10     70.0        1.01
     4     187.52   16.01     2.983  0.80( 0.08) 0.10     70.6        1.01
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.17 =  4350.00 FEET.

 ** PEAK FLOW RATE TABLE **
```

```
 STREAM      Q      Tc    Intensity    Fp(Fm)       Ap    Ae       HEADWATER
 NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)            (ACRES)     NODE
    1     202.74  10.28     3.890   0.80( 0.08)  0.10     57.7        3.01
    2     202.65  10.39     3.867   0.80( 0.08)  0.10     58.0        3.01
    3     200.35  11.79     3.583   0.80( 0.08)  0.10     61.8        3.03
    4     200.35  11.79     3.583   0.80( 0.08)  0.10     61.8        3.03
    5     192.99  15.54     3.036   0.80( 0.08)  0.10     71.3        1.01
    6     191.13  16.01     2.983   0.80( 0.08)  0.10     72.0        1.01
  TOTAL AREA(ACRES) =     71.98

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      202.74  Tc(MIN.) =   10.281
 EFFECTIVE AREA(ACRES) =     57.67  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     71.98
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.17 =  4350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.17 TO NODE      1.18 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1051.00  DOWNSTREAM(FEET) =  1050.40
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  49.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.22
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    202.74
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  10.44
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.18 =  4460.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.18 TO NODE      1.18 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.44
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.854
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.98      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.98      SUBAREA RUNOFF(CFS) =   10.12
 EFFECTIVE AREA(ACRES) =    60.65   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    74.96       PEAK FLOW RATE(CFS) =     206.00

****************************************************************************
 FLOW PROCESS FROM NODE      1.18 TO NODE      1.19 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1050.40  DOWNSTREAM(FEET) =  1048.90
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  66.0 INCH PIPE IS  49.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.85
 ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    206.00
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =  10.92
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.19 =  4770.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.19 TO NODE      1.19 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.92
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.752
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        3.22      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     3.22      SUBAREA RUNOFF(CFS) =   10.64
 EFFECTIVE AREA(ACRES) =    63.87    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    78.18        PEAK FLOW RATE(CFS) =     211.10

****************************************************************************
 FLOW PROCESS FROM NODE      1.19 TO NODE      1.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1048.90  DOWNSTREAM(FEET) =  1046.90
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.15
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    211.10
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =  11.35
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.20 =  5080.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.35
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.667
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        3.97      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     3.97      SUBAREA RUNOFF(CFS) =   12.82
 EFFECTIVE AREA(ACRES) =    67.84    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    82.15        PEAK FLOW RATE(CFS) =     219.03

****************************************************************************
 FLOW PROCESS FROM NODE      1.20 TO NODE      1.21 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1046.90  DOWNSTREAM(FEET) =  1042.50
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.35
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    219.03
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =  11.66
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.21 =  5390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.21 TO NODE      1.21 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| The following subarea accounts for the proposed "BNSF" site.  This pad   |
| will sheet flow into the southeast corner and be picked up the backbone  |
| storm drain system and conveyed into the on-site detention basin.        |
+--------------------------------------------------------------------------+
```

```
****************************************************************************
  FLOW PROCESS FROM NODE       4.01 TO NODE       4.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1140.00
  ELEVATION DATA: UPSTREAM(FEET) =   1082.30  DOWNSTREAM(FEET) =   1074.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.690
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.276
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        9.40      0.80       0.10     52   13.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =     27.04
  TOTAL AREA(ACRES) =      9.40   PEAK FLOW RATE(CFS) =     27.04

****************************************************************************
  FLOW PROCESS FROM NODE       4.02 TO NODE       4.03 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1074.30
  DOWNSTREAM NODE ELEVATION(FEET) =   1069.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1030.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
  MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.510
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A       20.14      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     48.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.50   FLOOD WIDTH(FEET) =  130.49
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   7.65   Tc(MIN.) =  21.34
  SUBAREA AREA(ACRES) =   20.14       SUBAREA RUNOFF(CFS) =   44.06
  EFFECTIVE AREA(ACRES) =   29.54     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =   29.54         PEAK FLOW RATE(CFS) =      64.62

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOOD WIDTH(FEET) =  145.66
  FLOW VELOCITY(FEET/SEC.) =   2.39   DEPTH*VELOCITY(FT*FT/SEC) =   1.30
  LONGEST FLOWPATH FROM NODE       4.01 TO NODE       4.03 =  2170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       4.03 TO NODE       4.04 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1069.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1064.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   890.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
  MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.182
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
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```
 COMMERCIAL                A       22.62      0.80      0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     86.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.64
 AVERAGE FLOW DEPTH(FEET) =   0.58   FLOOD WIDTH(FEET) =  160.20
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   5.62   Tc(MIN.) =  26.96
 SUBAREA AREA(ACRES) =   22.62       SUBAREA RUNOFF(CFS) =   42.80
 EFFECTIVE AREA(ACRES) =   52.16     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   52.16         PEAK FLOW RATE(CFS) =      98.69

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.60   FLOOD WIDTH(FEET) =  169.05
 FLOW VELOCITY(FEET/SEC.) =   2.72   DEPTH*VELOCITY(FT*FT/SEC) =   1.64
 LONGEST FLOWPATH FROM NODE      4.01 TO NODE      4.04 =  3060.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.04 TO NODE      4.05 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1064.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1058.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1190.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
 MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  1.893
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A       27.70      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    121.28
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.75
 AVERAGE FLOW DEPTH(FEET) =   0.65   FLOOD WIDTH(FEET) =  186.75
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   7.21   Tc(MIN.) =  34.17
 SUBAREA AREA(ACRES) =   27.70       SUBAREA RUNOFF(CFS) =   45.20
 EFFECTIVE AREA(ACRES) =   79.86     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   79.86         PEAK FLOW RATE(CFS) =     130.31

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.66   FLOOD WIDTH(FEET) =  191.81
 FLOW VELOCITY(FEET/SEC.) =   2.80   DEPTH*VELOCITY(FT*FT/SEC) =   1.84
 LONGEST FLOWPATH FROM NODE      4.01 TO NODE      4.05 =  4250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.05 TO NODE      4.06 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1058.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1055.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
 MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  1.793
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A       25.52      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    150.00
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.86
```

```
 AVERAGE FLOW DEPTH(FEET) =   0.69   FLOOD WIDTH(FEET) =  203.82
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.20   Tc(MIN.) =  37.37
 SUBAREA AREA(ACRES) =   25.52       SUBAREA RUNOFF(CFS) =   39.36
 EFFECTIVE AREA(ACRES) =  105.38     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =  105.38         PEAK FLOW RATE(CFS) =     162.55

    OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.70   FLOOD WIDTH(FEET) =  210.14
 FLOW VELOCITY(FEET/SEC.) =   2.92   DEPTH*VELOCITY(FT*FT/SEC) =   2.05
 LONGEST FLOWPATH FROM NODE      4.01 TO NODE      4.06 =  4800.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.06 TO NODE      4.06 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  37.37
 RAINFALL INTENSITY(INCH/HR) =   1.79
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =  105.38
 TOTAL STREAM AREA(ACRES) =  105.38
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    162.55

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.06 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
 ELEVATION DATA: UPSTREAM(FEET) =   1058.40  DOWNSTREAM(FEET) =   1056.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.636
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.045
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        0.28      0.80        0.10    52    9.64
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.00
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
 FLOW PROCESS FROM NODE      3.06 TO NODE      3.07 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1056.40  DOWNSTREAM ELEVATION(FEET) = 1051.20
 STREET LENGTH(FEET) =   635.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.59
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
```

```
    HALFSTREET FLOOD WIDTH(FEET) =     8.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =     1.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =     0.54
  STREET FLOW TRAVEL TIME(MIN.) =    5.66   Tc(MIN.) =  15.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.065
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A       0.44      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.44     SUBAREA RUNOFF(CFS) =     1.18
  EFFECTIVE AREA(ACRES) =     0.72     AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     0.72        PEAK FLOW RATE(CFS) =        1.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.40
  FLOW VELOCITY(FEET/SEC.) =  1.96   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE      3.05 TO NODE      3.07 =  1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.06 TO NODE      3.07 IS CODE =  1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  15.30
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =     0.72
  TOTAL STREAM AREA(ACRES) =     0.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.93

****************************************************************************
  FLOW PROCESS FROM NODE      3.05 TO NODE      3.06 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
  ELEVATION DATA: UPSTREAM(FEET) =   1058.40  DOWNSTREAM(FEET) =   1056.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.636
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.045
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A       0.28      0.80       0.10     52    9.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE      3.06 TO NODE      3.07 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1056.40  DOWNSTREAM ELEVATION(FEET) = 1051.30
  STREET LENGTH(FEET) =   635.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 22.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.59
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.29
  HALFSTREET FLOOD WIDTH(FEET) =    8.74
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
 STREET FLOW TRAVEL TIME(MIN.) =   5.75   Tc(MIN.) =  15.39
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.055
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.44      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.18
 EFFECTIVE AREA(ACRES) =    0.72    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    0.72        PEAK FLOW RATE(CFS) =       1.93

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.48
 FLOW VELOCITY(FEET/SEC.) =  1.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
 LONGEST FLOWPATH FROM NODE      3.05 TO NODE      3.07 =  1035.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.07 TO NODE      3.07 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  15.39
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.055
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.52      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.52      SUBAREA RUNOFF(CFS) =    4.07
 EFFECTIVE AREA(ACRES) =    2.24    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    2.24        PEAK FLOW RATE(CFS) =       6.00

****************************************************************************
 FLOW PROCESS FROM NODE      3.07 TO NODE      3.07 IS CODE =  1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =  15.39
 RAINFALL INTENSITY(INCH/HR) =   3.05
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.24
 TOTAL STREAM AREA(ACRES) =    2.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.00

 **CONFLUENCE DATA **
 STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
 NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
    1    162.55  37.37    1.793  0.80( 0.08) 0.10   105.4        4.01
    2      1.93  15.30    3.065  0.80( 0.08) 0.10     0.7        3.05
    3      6.00  15.39    3.055  0.80( 0.08) 0.10     2.2        3.05
```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.83	15.30	3.065	0.80(0.08)	0.10	46.1	3.05
2	124.09	15.39	3.055	0.80(0.08)	0.10	46.3	3.05
3	167.12	37.37	1.793	0.80(0.08)	0.10	108.3	4.01

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 167.12 Tc(MIN.) = 37.37
EFFECTIVE AREA(ACRES) = 108.34 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.80 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 108.34
LONGEST FLOWPATH FROM NODE 4.01 TO NODE 3.07 = 4800.00 FEET.

****
FLOW PROCESS FROM NODE 3.07 TO NODE 1.21 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
==========

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.83	15.30	3.065	0.80(0.08)	0.10	46.1	3.05
2	124.09	15.39	3.055	0.80(0.08)	0.10	46.3	3.05
3	167.12	37.37	1.793	0.80(0.08)	0.10	108.3	4.01

LONGEST FLOWPATH FROM NODE 4.01 TO NODE 1.21 = 4800.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	219.03	11.66	3.607	0.80(0.08)	0.10	67.8	3.01
2	218.91	11.77	3.588	0.80(0.08)	0.10	68.2	3.01
3	215.09	13.18	3.352	0.80(0.08)	0.10	71.9	3.03
4	215.09	13.18	3.352	0.80(0.08)	0.10	71.9	3.03
5	208.03	16.95	2.882	0.80(0.08)	0.10	81.5	1.01
6	206.13	17.41	2.836	0.80(0.08)	0.10	82.1	1.01

LONGEST FLOWPATH FROM NODE 1.01 TO NODE 1.21 = 5390.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	330.56	11.66	3.607	0.80(0.08)	0.10	103.0	3.01
2	330.83	11.77	3.588	0.80(0.08)	0.10	103.6	3.01
3	332.01	13.18	3.352	0.80(0.08)	0.10	111.6	3.03
4	332.01	13.18	3.352	0.80(0.08)	0.10	111.6	3.03
5	334.95	15.30	3.065	0.80(0.08)	0.10	123.4	3.05
6	335.04	15.39	3.055	0.80(0.08)	0.10	123.9	3.05
7	335.18	16.95	2.882	0.80(0.08)	0.10	132.3	1.01
8	334.18	17.41	2.836	0.80(0.08)	0.10	134.2	1.01
9	295.28	37.37	1.793	0.80(0.08)	0.10	190.5	4.01

TOTAL AREA(ACRES) = 190.49

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 335.18 Tc(MIN.) = 16.950
EFFECTIVE AREA(ACRES) = 132.27 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.80 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 190.49
LONGEST FLOWPATH FROM NODE 1.01 TO NODE 1.21 = 5390.00 FEET.

****
FLOW PROCESS FROM NODE 1.21 TO NODE 1.22 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 1040.50 DOWNSTREAM(FEET) = 1040.30

```
   FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
   DEPTH OF FLOW IN  84.0 INCH PIPE IS  64.2 INCHES
   PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
   ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
   PIPE-FLOW(CFS) =    335.18
   PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =  17.04
   LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.22 =  5450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| The following confluence accumulates the flows within San Bernardino     |
| Avenue and a portion of the SMC parking lot and adds them into the       |
| primary storm drain system.                                              |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      5.01 TO NODE      5.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =   1052.90  DOWNSTREAM(FEET) =   1051.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.135
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.477
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.43      0.80       0.10    52    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.70

****************************************************************************
  FLOW PROCESS FROM NODE      5.02 TO NODE      5.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1051.30  DOWNSTREAM ELEVATION(FEET) = 1050.20
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 38.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
```

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.65
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   13.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.39
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.53
 STREET FLOW TRAVEL TIME(MIN.) =   4.80   Tc(MIN.) =  12.94
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.63      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.88
 EFFECTIVE AREA(ACRES) =    1.06    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.06        PEAK FLOW RATE(CFS) =       3.16

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  14.45
 FLOW VELOCITY(FEET/SEC.) =  1.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
 LONGEST FLOWPATH FROM NODE      5.01 TO NODE      5.03 =   680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.94
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.28      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.83
 EFFECTIVE AREA(ACRES) =    1.34    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.34        PEAK FLOW RATE(CFS) =       3.99

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.94
 RAINFALL INTENSITY(INCH/HR) =   3.39
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.34
 TOTAL STREAM AREA(ACRES) =    1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.99

****************************************************************************
 FLOW PROCESS FROM NODE      5.01 TO NODE      5.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =   1053.20  DOWNSTREAM(FEET) =   1051.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.135
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.477
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        0.31      0.80       0.10     52    8.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.23
 TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.23

****************************************************************************
 FLOW PROCESS FROM NODE      5.02 TO NODE      5.02 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   8.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.477
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        1.66      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    6.57
 EFFECTIVE AREA(ACRES) =     1.97   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     1.97       PEAK FLOW RATE(CFS) =       7.80

****************************************************************************
 FLOW PROCESS FROM NODE      5.02 TO NODE      5.03 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1051.60  DOWNSTREAM ELEVATION(FEET) = 1050.50
 STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.59
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.54
   HALFSTREET FLOOD WIDTH(FEET) =   21.34
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
 STREET FLOW TRAVEL TIME(MIN.) =   3.61   Tc(MIN.) =  11.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.591
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.50      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.58
 EFFECTIVE AREA(ACRES) =    2.47    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    2.47        PEAK FLOW RATE(CFS) =       7.81
```

```
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.53  HALFSTREET FLOOD WIDTH(FEET) =  20.52
 FLOW VELOCITY(FEET/SEC.) =  1.81  DEPTH*VELOCITY(FT*FT/SEC.) =  0.95
 LONGEST FLOWPATH FROM NODE      5.01 TO NODE      5.03 =   680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.591
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.21      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.21      SUBAREA RUNOFF(CFS) =     0.66
 EFFECTIVE AREA(ACRES) =     2.68    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     2.68        PEAK FLOW RATE(CFS) =       8.47

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  11.75
 RAINFALL INTENSITY(INCH/HR) =   3.59
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.68
 TOTAL STREAM AREA(ACRES) =    2.68
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.47

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1       3.99  12.94     3.389   0.80( 0.08) 0.10      1.3        5.01
     2       8.47  11.75     3.591   0.80( 0.08) 0.10      2.7        5.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      12.32  11.75     3.591   0.80( 0.08) 0.10      3.9        5.01
     2      11.97  12.94     3.389   0.80( 0.08) 0.10      4.0        5.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     12.32    Tc(MIN.) =    11.75
 EFFECTIVE AREA(ACRES) =     3.90   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      4.02
 LONGEST FLOWPATH FROM NODE      5.01 TO NODE      5.03 =   680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      1.22 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
```

```
    1     12.32  11.75     3.591  0.80( 0.08) 0.10      3.9        5.01
    2     11.97  12.94     3.389  0.80( 0.08) 0.10      4.0        5.01
 LONGEST FLOWPATH FROM NODE      5.01 TO NODE      1.22 =   680.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1     330.56  11.76     3.590  0.80( 0.08) 0.10    103.0        3.01
    2     330.83  11.86     3.571  0.80( 0.08) 0.10    103.6        3.01
    3     332.01  13.27     3.338  0.80( 0.08) 0.10    111.6        3.03
    4     332.01  13.27     3.338  0.80( 0.08) 0.10    111.6        3.03
    5     334.95  15.39     3.054  0.80( 0.08) 0.10    123.4        3.05
    6     335.04  15.48     3.043  0.80( 0.08) 0.10    123.9        3.05
    7     335.18  17.04     2.873  0.80( 0.08) 0.10    132.3        1.01
    8     334.18  17.51     2.827  0.80( 0.08) 0.10    134.2        1.01
    9     295.28  37.47     1.791  0.80( 0.08) 0.10    190.5        4.01
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.22 =  5450.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1     342.79  11.75     3.591  0.80( 0.08) 0.10    106.8        5.01
    2     342.88  11.76     3.590  0.80( 0.08) 0.10    106.9        3.01
    3     343.11  11.86     3.571  0.80( 0.08) 0.10    107.5        3.01
    4     343.70  12.94     3.389  0.80( 0.08) 0.10    113.8        5.01
    5     343.79  13.27     3.338  0.80( 0.08) 0.10    115.7        3.03
    6     343.79  13.27     3.338  0.80( 0.08) 0.10    115.7        3.03
    7     345.71  15.39     3.054  0.80( 0.08) 0.10    127.4        3.05
    8     345.77  15.48     3.043  0.80( 0.08) 0.10    127.9        3.05
    9     345.28  17.04     2.873  0.80( 0.08) 0.10    136.3        1.01
   10     344.12  17.51     2.827  0.80( 0.08) 0.10    138.2        1.01
   11     301.47  37.47     1.791  0.80( 0.08) 0.10    194.5        4.01
  TOTAL AREA(ACRES) =    194.51

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      345.77  Tc(MIN.) =   15.480
 EFFECTIVE AREA(ACRES) =    127.91  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    194.51
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.22 =  5450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.22 TO NODE      1.23 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1040.30  DOWNSTREAM(FEET) =  1032.80
 FLOW LENGTH(FEET) =  2100.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  84.0 INCH PIPE IS  64.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.98
 ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    345.77
 PIPE TRAVEL TIME(MIN.) =   3.19    Tc(MIN.) =  18.67
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.23 =  7550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.23 TO NODE      1.23 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| The nodes numbered "6.X" represent street flows within Commerce Drive    |
| to be intercepted into the master storm drain system.                    |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      6.01 TO NODE      6.02 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  ELEVATION DATA: UPSTREAM(FEET) =   1051.70  DOWNSTREAM(FEET) =   1048.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.907
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.978
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.58      0.80       0.10    52    9.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.03

********************************************************************************
  FLOW PROCESS FROM NODE      6.02 TO NODE      6.03 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) = 1048.30  DOWNSTREAM ELEVATION(FEET) = 1045.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   12.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   5.51   Tc(MIN.) =  15.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.051
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        0.73      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    1.95
  EFFECTIVE AREA(ACRES) =    1.31    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    1.31        PEAK FLOW RATE(CFS) =      3.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  13.10
  FLOW VELOCITY(FEET/SEC.) =  1.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE      6.01 TO NODE      6.03 =  1110.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE      6.03 TO NODE      6.03 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN) =  15.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.051
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  COMMERCIAL                  A       14.49      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =   14.49      SUBAREA RUNOFF(CFS) =   38.75
  EFFECTIVE AREA(ACRES) =    15.80   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    15.80       PEAK FLOW RATE(CFS) =      42.26

****************************************************************************
  FLOW PROCESS FROM NODE      6.03 TO NODE      6.03 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  15.41
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =   15.80
  TOTAL STREAM AREA(ACRES) =   15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     42.26

****************************************************************************
  FLOW PROCESS FROM NODE      6.01 TO NODE      6.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  ELEVATION DATA: UPSTREAM(FEET) =   1051.70  DOWNSTREAM(FEET) =   1048.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.907
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.978
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.57      0.80       0.10     52    9.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE      6.02 TO NODE      6.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1048.30  DOWNSTREAM ELEVATION(FEET) = 1045.10
  STREET LENGTH(FEET) =   585.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.95
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   12.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   5.28   Tc(MIN.) =  15.19
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.078
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.70      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.70      SUBAREA RUNOFF(CFS) =     1.89
 EFFECTIVE AREA(ACRES) =    1.27     AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.27        PEAK FLOW RATE(CFS) =       3.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.95
 FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
 LONGEST FLOWPATH FROM NODE      6.01 TO NODE      6.03 =  1085.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.03 TO NODE      6.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  15.19
 RAINFALL INTENSITY(INCH/HR) =   3.08
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.27
 TOTAL STREAM AREA(ACRES) =    1.27
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.43

 ** CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     42.26  15.41     3.051   0.80( 0.08) 0.10    15.8        6.01
     2      3.43  15.19     3.078   0.80( 0.08) 0.10     1.3        6.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     45.45  15.19     3.078   0.80( 0.08) 0.10    16.8        6.01
     2     45.65  15.41     3.051   0.80( 0.08) 0.10    17.1        6.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     45.65    Tc(MIN.) =    15.41
 EFFECTIVE AREA(ACRES) =    17.07   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     17.07
 LONGEST FLOWPATH FROM NODE      6.01 TO NODE      6.03 =  1110.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.03 TO NODE      1.23 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     45.45  15.19     3.078   0.80( 0.08) 0.10    16.8        6.01
     2     45.65  15.41     3.051   0.80( 0.08) 0.10    17.1        6.01
 LONGEST FLOWPATH FROM NODE      6.01 TO NODE      1.23 =  1110.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
```

```
 NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)        (ACRES)    NODE
    1    342.79   14.94     3.109  0.80( 0.08) 0.10   106.8       5.01
    2    342.88   14.95     3.108  0.80( 0.08) 0.10   106.9       3.01
    3    343.11   15.05     3.095  0.80( 0.08) 0.10   107.5       3.01
    4    343.70   16.13     2.970  0.80( 0.08) 0.10   113.8       5.01
    5    343.79   16.46     2.933  0.80( 0.08) 0.10   115.7       3.03
    6    343.79   16.46     2.933  0.80( 0.08) 0.10   115.7       3.03
    7    345.71   18.58     2.728  0.80( 0.08) 0.10   127.4       3.05
    8    345.77   18.67     2.720  0.80( 0.08) 0.10   127.9       3.05
    9    345.28   20.23     2.592  0.80( 0.08) 0.10   136.3       1.01
   10    344.12   20.70     2.557  0.80( 0.08) 0.10   138.2       1.01
   11    301.47   40.80     1.701  0.80( 0.08) 0.10   194.5       4.01
LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.23 =  7550.00 FEET.

** PEAK FLOW RATE TABLE **
 STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)        (ACRES)    NODE
    1    387.95   14.94     3.109  0.80( 0.08) 0.10   123.4       5.01
    2    388.04   14.95     3.108  0.80( 0.08) 0.10   123.4       3.01
    3    388.40   15.05     3.095  0.80( 0.08) 0.10   124.2       3.01
    4    388.64   15.19     3.078  0.80( 0.08) 0.10   125.2       6.01
    5    388.97   15.41     3.051  0.80( 0.08) 0.10   126.7       6.01
    6    388.10   16.13     2.970  0.80( 0.08) 0.10   130.8       5.01
    7    387.64   16.46     2.933  0.80( 0.08) 0.10   132.7       3.03
    8    387.64   16.46     2.933  0.80( 0.08) 0.10   132.7       3.03
    9    386.39   18.58     2.728  0.80( 0.08) 0.10   144.5       3.05
   10    386.33   18.67     2.720  0.80( 0.08) 0.10   145.0       3.05
   11    383.88   20.23     2.592  0.80( 0.08) 0.10   153.4       1.01
   12    382.18   20.70     2.557  0.80( 0.08) 0.10   155.3       1.01
   13    326.39   40.80     1.701  0.80( 0.08) 0.10   211.6       4.01
 TOTAL AREA(ACRES) =    211.58

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      388.97  Tc(MIN.) =   15.413
EFFECTIVE AREA(ACRES) =    126.71  AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =    211.58
LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.23 =  7550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.23 TO NODE      1.24 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1032.80  DOWNSTREAM(FEET) =  1032.10
 FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  81.0 INCH PIPE IS  65.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.51
 ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    388.97
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =  15.61
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.24 =  7695.00 FEET.

+--------------------------------------------------------------------------+
| The following flows are generated from the east edge of the SMC building |
| and will freely discharge into the San Sevaine Channel through an        |
| existing outlet connection.                                              |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      7.01 TO NODE      7.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
 ELEVATION DATA: UPSTREAM(FEET) =   1062.00  DOWNSTREAM(FEET) =   1057.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.890
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.560
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        0.59      0.80       0.10     52    7.89
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      2.38
 TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
 FLOW PROCESS FROM NODE      7.02 TO NODE      7.03 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1052.70  DOWNSTREAM(FEET) =  1052.30
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.67
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.38
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   8.25
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.03 =   450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.03 TO NODE      7.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   8.25
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.439
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.77      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.77     SUBAREA RUNOFF(CFS) =     3.02
 EFFECTIVE AREA(ACRES) =     1.36   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     1.36       PEAK FLOW RATE(CFS) =       5.34

****************************************************************************
 FLOW PROCESS FROM NODE      7.03 TO NODE      7.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1052.30  DOWNSTREAM(FEET) =  1051.70
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.64
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.34
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   8.65
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.04 =   560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.04 TO NODE      7.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   8.65
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.316
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.72      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
```

```
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     2.74
 EFFECTIVE AREA(ACRES) =     2.08    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     2.08        PEAK FLOW RATE(CFS) =       7.93

****************************************************************************
 FLOW PROCESS FROM NODE      7.04 TO NODE      7.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1051.70  DOWNSTREAM(FEET) =  1051.20
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.77
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.93
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   9.03
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.05 =   670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.05 TO NODE      7.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.03
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.204
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.72      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     2.67
 EFFECTIVE AREA(ACRES) =     2.80    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     2.80        PEAK FLOW RATE(CFS) =      10.39

****************************************************************************
 FLOW PROCESS FROM NODE      7.05 TO NODE      7.06 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1051.20  DOWNSTREAM(FEET) =  1050.70
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.39
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   9.40
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.06 =   780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.06 TO NODE      7.06 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.40
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.104
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.72      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     2.61
 EFFECTIVE AREA(ACRES) =     3.52    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     3.52        PEAK FLOW RATE(CFS) =      12.75
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      7.06 TO NODE      7.07 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1050.70  DOWNSTREAM(FEET) =  1050.10
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.75
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   9.72
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.07 =   890.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.07 TO NODE      7.07 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.72
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.023
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.72      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.56
 EFFECTIVE AREA(ACRES) =     4.24   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     4.24       PEAK FLOW RATE(CFS) =      15.05

****************************************************************************
 FLOW PROCESS FROM NODE      7.07 TO NODE      7.08 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1050.15  DOWNSTREAM(FEET) =  1050.10
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.05
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   9.75
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.08 =   900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.08 TO NODE      7.08 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.015
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        2.32      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.32      SUBAREA RUNOFF(CFS) =    8.22
 EFFECTIVE AREA(ACRES) =     6.56   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     6.56       PEAK FLOW RATE(CFS) =      23.24

****************************************************************************
 FLOW PROCESS FROM NODE      7.08 TO NODE      7.09 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1050.10  DOWNSTREAM(FEET) =  1049.60
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.43
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     23.24
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  10.01
  LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.09 =  1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.09 TO NODE      7.09 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  10.01
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.953
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.72      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     2.51
  EFFECTIVE AREA(ACRES) =     7.28    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     7.28       PEAK FLOW RATE(CFS) =      25.38

****************************************************************************
  FLOW PROCESS FROM NODE      7.09 TO NODE      7.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1049.60  DOWNSTREAM(FEET) =  1049.10
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.24
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     25.38
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =  10.31
  LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.10 =  1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  10.31
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.885
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.72      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     2.47
  EFFECTIVE AREA(ACRES) =     8.00    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     8.00       PEAK FLOW RATE(CFS) =      27.40

****************************************************************************
  FLOW PROCESS FROM NODE      7.10 TO NODE      7.11 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1049.10  DOWNSTREAM(FEET) =  1048.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.3 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     27.40
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =  10.59
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.11 =  1225.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.11 TO NODE      7.11 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.821
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.02      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.43
 EFFECTIVE AREA(ACRES) =     9.02   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     9.02       PEAK FLOW RATE(CFS) =      30.37

****************************************************************************
 FLOW PROCESS FROM NODE      7.11 TO NODE      7.12 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1048.50  DOWNSTREAM(FEET) =  1048.00
 FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.73
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     30.37
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  10.85
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.12 =  1330.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.12 TO NODE      7.12 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.85
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.766
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        3.21      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    3.21      SUBAREA RUNOFF(CFS) =   10.65
 EFFECTIVE AREA(ACRES) =    12.23   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    12.23       PEAK FLOW RATE(CFS) =      40.58

****************************************************************************
 FLOW PROCESS FROM NODE      7.12 TO NODE      7.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1048.00  DOWNSTREAM(FEET) =  1044.55
 FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.59
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     40.58
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =  11.26
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.13 =  1590.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE       7.13 TO NODE       7.13 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.26
  100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.683
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        1.98      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     1.98      SUBAREA RUNOFF(CFS) =     6.42
  EFFECTIVE AREA(ACRES) =    14.21    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     14.21       PEAK FLOW RATE(CFS) =      46.09

****************************************************************************
  FLOW PROCESS FROM NODE       7.13 TO NODE       7.14 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1044.55  DOWNSTREAM(FEET) =  1043.26
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     46.09
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  11.42
  LONGEST FLOWPATH FROM NODE       7.01 TO NODE       7.14 =  1690.00 FEET.

+--------------------------------------------------------------------------+
| The "8.X" series of nodes accounts for the graded industrial pads on the |
| previous "TRUCK STOP" area.  This area is tributary and will discharge   |
| into the on-site detention basin at the southeast corner of the site.    |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE       8.01 TO NODE       8.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   600.00
  ELEVATION DATA: UPSTREAM(FEET) =   1051.60  DOWNSTREAM(FEET) =   1048.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.333
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.670
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        3.52      0.80       0.10    52   11.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =     11.37
  TOTAL AREA(ACRES) =      3.52   PEAK FLOW RATE(CFS) =     11.37

****************************************************************************
  FLOW PROCESS FROM NODE       8.02 TO NODE       8.03 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1048.60
  DOWNSTREAM NODE ELEVATION(FEET) =   1045.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
```

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 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.916
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        7.07      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     20.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.20
 AVERAGE FLOW DEPTH(FEET) =   0.46   FLOOD WIDTH(FEET) =   59.21
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   5.29   Tc(MIN.) =  16.63
 SUBAREA AREA(ACRES) =    7.07       SUBAREA RUNOFF(CFS) =   18.05
 EFFECTIVE AREA(ACRES) =   10.59     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   10.59         PEAK FLOW RATE(CFS) =      27.03

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.50   FLOOD WIDTH(FEET) =   66.48
 FLOW VELOCITY(FEET/SEC.) =   2.35   DEPTH*VELOCITY(FT*FT/SEC) =   1.17
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.03 =  1300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.03 TO NODE      8.04 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1045.10
 DOWNSTREAM NODE ELEVATION(FEET) =   1040.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.401
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        9.25      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     36.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.50
 AVERAGE FLOW DEPTH(FEET) =   0.54   FLOOD WIDTH(FEET) =   75.33
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   6.36   Tc(MIN.) =  22.98
 SUBAREA AREA(ACRES) =    9.25       SUBAREA RUNOFF(CFS) =   19.33
 EFFECTIVE AREA(ACRES) =   19.84     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   19.84         PEAK FLOW RATE(CFS) =      41.45

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.56   FLOOD WIDTH(FEET) =   79.12
 FLOW VELOCITY(FEET/SEC.) =   2.57   DEPTH*VELOCITY(FT*FT/SEC) =   1.44
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.04 =  2255.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.04 TO NODE      8.05 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1040.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1039.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   165.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.336
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

```
     LAND USE              GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  COMMERCIAL                 A        1.03       0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     42.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.56
  AVERAGE FLOW DEPTH(FEET) =   0.57   FLOOD WIDTH(FEET) =   80.39
    GUTTER FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =  24.06
  SUBAREA AREA(ACRES) =    1.03       SUBAREA RUNOFF(CFS) =    2.09
  EFFECTIVE AREA(ACRES) =   20.87     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =   20.87         PEAK FLOW RATE(CFS) =      42.38

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.57   FLOOD WIDTH(FEET) =   80.39
  FLOW VELOCITY(FEET/SEC.) =   2.55   DEPTH*VELOCITY(FT*FT/SEC) =   1.45
  LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.05 =  2420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.05 TO NODE      8.06 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1036.50  DOWNSTREAM(FEET) =  1034.40
  FLOW LENGTH(FEET) =   465.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     42.38
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =  25.16
  LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.06 =  2885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.06 TO NODE      8.06 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  25.16
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.274
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        1.12       0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    1.12       SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =   21.99     AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    21.99        PEAK FLOW RATE(CFS) =      43.43

****************************************************************************
  FLOW PROCESS FROM NODE      8.06 TO NODE      8.06 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  25.16
  RAINFALL INTENSITY(INCH/HR) =   2.27
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =   21.99
  TOTAL STREAM AREA(ACRES) =   21.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.43

****************************************************************************
  FLOW PROCESS FROM NODE      8.01 TO NODE      8.07 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  ELEVATION DATA: UPSTREAM(FEET) =   1051.60  DOWNSTREAM(FEET) =   1049.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.251
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.686
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        1.17      0.80       0.10     52   11.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      3.80
  TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      3.80

****************************************************************************
  FLOW PROCESS FROM NODE      8.07 TO NODE      8.07 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.686
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        1.01      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     1.01      SUBAREA RUNOFF(CFS) =     3.28
  EFFECTIVE AREA(ACRES) =     2.18    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     2.18        PEAK FLOW RATE(CFS) =       7.07

****************************************************************************
  FLOW PROCESS FROM NODE      8.07 TO NODE      8.08 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1049.80
  DOWNSTREAM NODE ELEVATION(FEET) =   1049.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   165.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
  MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.438
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        3.68      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.99
  AVERAGE FLOW DEPTH(FEET) =   0.41   FLOOD WIDTH(FEET) =   48.46
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =  12.63
  SUBAREA AREA(ACRES) =     3.68      SUBAREA RUNOFF(CFS) =   11.12
  EFFECTIVE AREA(ACRES) =     5.86    AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =     5.86        PEAK FLOW RATE(CFS) =      17.71

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOOD WIDTH(FEET) =   56.05
  FLOW VELOCITY(FEET/SEC.) =   2.13   DEPTH*VELOCITY(FT*FT/SEC) =   0.95
  LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.08 =   665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.08 TO NODE      8.09 IS CODE =  91
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1049.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1047.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.047
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        8.54      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     29.06
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.37
 AVERAGE FLOW DEPTH(FEET) =   0.51   FLOOD WIDTH(FEET) =   68.69
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   2.81   Tc(MIN.) =  15.45
 SUBAREA AREA(ACRES) =    8.54       SUBAREA RUNOFF(CFS) =   22.81
 EFFECTIVE AREA(ACRES) =   14.40     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   14.40         PEAK FLOW RATE(CFS) =      38.46

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOOD WIDTH(FEET) =   76.91
 FLOW VELOCITY(FEET/SEC.) =   2.52   DEPTH*VELOCITY(FT*FT/SEC) =   1.39
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.09 =  1065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.09 TO NODE      8.10 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1047.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1044.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.731
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A       10.66      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     51.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.69
 AVERAGE FLOW DEPTH(FEET) =   0.60   FLOOD WIDTH(FEET) =   86.08
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.09   Tc(MIN.) =  18.54
 SUBAREA AREA(ACRES) =   10.66       SUBAREA RUNOFF(CFS) =   25.44
 EFFECTIVE AREA(ACRES) =   25.06     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   25.06         PEAK FLOW RATE(CFS) =      59.81

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.62   FLOOD WIDTH(FEET) =   91.77
 FLOW VELOCITY(FEET/SEC.) =   2.78   DEPTH*VELOCITY(FT*FT/SEC) =   1.74
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.10 =  1565.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.10 TO NODE      8.06 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
==============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1044.50
 DOWNSTREAM NODE ELEVATION(FEET) =   1040.40
 CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00
```

"V" GUTTER WIDTH(FEET) = 5.00 GUTTER HIKE(FEET) = 0.170
PAVEMENT LIP(FEET) = 0.021 MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
MAXIMUM DEPTH(FEET) = 1.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.384
SUBAREA LOSS RATE DATA(AMC III):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	A	15.70	0.80	0.10	52

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.10
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 76.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.93
AVERAGE FLOW DEPTH(FEET) = 0.67 FLOOD WIDTH(FEET) = 100.93
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 4.72 Tc(MIN.) = 23.26
SUBAREA AREA(ACRES) = 15.70 SUBAREA RUNOFF(CFS) = 32.56
EFFECTIVE AREA(ACRES) = 40.76 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.80 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 40.76 PEAK FLOW RATE(CFS) = 84.53

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) = 0.69 FLOOD WIDTH(FEET) = 105.36
FLOW VELOCITY(FEET/SEC.) = 3.00 DEPTH*VELOCITY(FT*FT/SEC) = 2.07
LONGEST FLOWPATH FROM NODE 8.01 TO NODE 8.06 = 2395.00 FEET.

****
FLOW PROCESS FROM NODE 8.06 TO NODE 8.06 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 23.26
RAINFALL INTENSITY(INCH/HR) = 2.38
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.80
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 40.76
TOTAL STREAM AREA(ACRES) = 40.76
PEAK FLOW RATE(CFS) AT CONFLUENCE = 84.53

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	43.43	25.16	2.274	0.80(0.08)	0.10	22.0	8.01
2	84.53	23.26	2.384	0.80(0.08)	0.10	40.8	8.01

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	126.69	23.26	2.384	0.80(0.08)	0.10	61.1	8.01
2	123.93	25.16	2.274	0.80(0.08)	0.10	62.8	8.01

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 126.69 Tc(MIN.) = 23.26
EFFECTIVE AREA(ACRES) = 61.09 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.80 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 62.75
LONGEST FLOWPATH FROM NODE 8.01 TO NODE 8.06 = 2885.00 FEET.

****
FLOW PROCESS FROM NODE 8.06 TO NODE 8.11 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 1034.40 DOWNSTREAM(FEET) = 1032.30

```
 FLOW LENGTH(FEET) =   465.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.23
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    126.69
 PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =  24.10
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.11 =  3350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.11 TO NODE      8.11 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  24.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.334
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        4.01      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    4.01      SUBAREA RUNOFF(CFS) =    8.14
 EFFECTIVE AREA(ACRES) =    65.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    66.76       PEAK FLOW RATE(CFS) =     132.07

****************************************************************************
 FLOW PROCESS FROM NODE      8.11 TO NODE      8.12 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1032.30  DOWNSTREAM(FEET) =  1031.00
 FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.67
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    132.07
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  24.57
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.12 =  3625.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.12 TO NODE      8.12 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  24.57
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.307
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    A        8.28      0.14       1.00    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
 SUBAREA AREA(ACRES) =    8.28      SUBAREA RUNOFF(CFS) =   16.15
 EFFECTIVE AREA(ACRES) =    73.38   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =    75.04       PEAK FLOW RATE(CFS) =     146.62

+--------------------------------------------------------------------------+
| This final group of nodes represents the flows we are allowing to freely |
| discharge into the San Sevaine Channel without detention.  "6.X" nodes   |
| in Commerce Drive; "9.0" nodes in Valley Boulevard.                       |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      6.03 TO NODE      6.04 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1045.00  DOWNSTREAM(FEET) =   1043.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.399
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.35      0.80       0.10     52    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.36

**************************************************************************
  FLOW PROCESS FROM NODE      6.04 TO NODE      6.05 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) = 1043.30  DOWNSTREAM ELEVATION(FEET) = 1039.80
  STREET LENGTH(FEET) =   555.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.47
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   4.93   Tc(MIN.) =  13.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.333
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        0.75      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    2.20
  EFFECTIVE AREA(ACRES) =    1.10    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    1.10        PEAK FLOW RATE(CFS) =      3.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  12.30
  FLOW VELOCITY(FEET/SEC.) =  1.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE      6.03 TO NODE      6.05 =   855.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.30
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
```

```
 EFFECTIVE STREAM AREA(ACRES) =    1.10
 TOTAL STREAM AREA(ACRES) =    1.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.22

****************************************************************************
 FLOW PROCESS FROM NODE      6.03 TO NODE      6.04 IS CODE =  21
----------------------------------------------------------------------------
  >>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
 ELEVATION DATA: UPSTREAM(FEET) =   1045.10  DOWNSTREAM(FEET) =   1043.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.608
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.328
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        0.38      0.80       0.10     52    8.61
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.45
 TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
 FLOW PROCESS FROM NODE      6.04 TO NODE      6.05 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1043.30  DOWNSTREAM ELEVATION(FEET) = 1040.20
 STREET LENGTH(FEET) =   550.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 40.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   11.15
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.79
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
 STREET FLOW TRAVEL TIME(MIN.) =   5.12   Tc(MIN.) =  13.73
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.270
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.66      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.66      SUBAREA RUNOFF(CFS) =    1.90
 EFFECTIVE AREA(ACRES) =    1.04    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.04        PEAK FLOW RATE(CFS) =       2.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  12.23
 FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
 LONGEST FLOWPATH FROM NODE      6.03 TO NODE      6.05 =   870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =  81
----------------------------------------------------------------------------
```

```
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
MAINLINE Tc(MIN) =  13.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.270
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        0.46      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA AREA(ACRES) =     0.46      SUBAREA RUNOFF(CFS) =     1.32
EFFECTIVE AREA(ACRES) =     1.50    AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =     1.50        PEAK FLOW RATE(CFS) =       4.31

**************************************************************************
FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =   1
--------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  13.73
RAINFALL INTENSITY(INCH/HR) =   3.27
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =    1.50
TOTAL STREAM AREA(ACRES) =    1.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.31

** CONFLUENCE DATA **
 STREAM     Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
 NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1      3.22  13.30     3.333  0.80( 0.08) 0.10      1.1        6.03
    2      4.31  13.73     3.270  0.80( 0.08) 0.10      1.5        6.03

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM     Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
 NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1      7.48  13.30     3.333  0.80( 0.08) 0.10      2.6        6.03
    2      7.47  13.73     3.270  0.80( 0.08) 0.10      2.6        6.03

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      7.48    Tc(MIN.) =    13.30
EFFECTIVE AREA(ACRES) =     2.55   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =      2.60
LONGEST FLOWPATH FROM NODE      6.03 TO NODE      6.05 =   870.00 FEET.

**************************************************************************
FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =  10
--------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
==========================================================================

**************************************************************************
FLOW PROCESS FROM NODE      9.01 TO NODE      9.02 IS CODE =  21
--------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
ELEVATION DATA: UPSTREAM(FEET) =   1041.00  DOWNSTREAM(FEET) =   1038.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.201
```

```
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.455
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        0.47      0.80       0.10     52    8.20
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.85
 TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.85

****************************************************************************
 FLOW PROCESS FROM NODE      9.02 TO NODE      9.03 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1038.00  DOWNSTREAM ELEVATION(FEET) = 1034.60
 STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 52.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  26.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.20
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   12.08
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
 STREET FLOW TRAVEL TIME(MIN.) =   4.07   Tc(MIN.) =  12.27
 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.499
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.87      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.87      SUBAREA RUNOFF(CFS) =    2.68
 EFFECTIVE AREA(ACRES) =    1.34    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.34        PEAK FLOW RATE(CFS) =       4.12

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) =  0.38   HALFSTREET FLOOD WIDTH(FEET) =  13.42
 FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
 LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.03 =   850.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.03 TO NODE      9.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.27
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.499
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        1.03      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    3.17
 EFFECTIVE AREA(ACRES) =    2.37    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    2.37        PEAK FLOW RATE(CFS) =       7.29
```

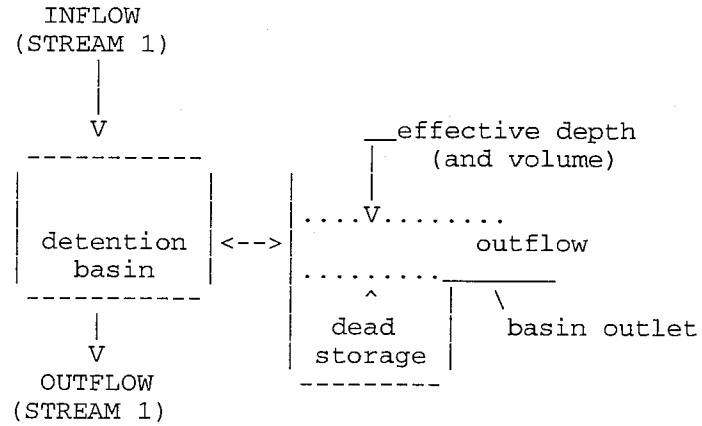
```
 ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  FLOW PROCESS FROM NODE       9.03 TO NODE       9.03 IS CODE =   1
 ----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 ============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.27
  RAINFALL INTENSITY(INCH/HR) =   3.50
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =    2.37
  TOTAL STREAM AREA(ACRES) =    2.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.29

 ****************************************************************************
  FLOW PROCESS FROM NODE       9.01 TO NODE       9.02 IS CODE =  21
 ----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 ============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  ELEVATION DATA: UPSTREAM(FEET) =   1041.00  DOWNSTREAM(FEET) =   1038.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.201
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.455
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.46      0.80       0.10    52    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.81
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.81

 ****************************************************************************
  FLOW PROCESS FROM NODE       9.02 TO NODE       9.03 IS CODE =  62
 ----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
 ============================================================================
  UPSTREAM ELEVATION(FEET) = 1038.00  DOWNSTREAM ELEVATION(FEET) = 1034.30
  STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 52.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  26.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   4.15   Tc(MIN.) =  12.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.486
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        0.75      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    2.30
```

16.000	95.9467	246.98	. . Q . V . .
16.083	98.3015	341.92	. . Q . V . .
16.167	102.0336	541.89	. . . V Q . .
16.250	106.8769	703.25	. . . V . Q .
16.333	111.4902	669.84	. . . V . Q .
16.417	114.8566	488.81	. . . Q V . .
16.500	117.2583	348.72	. . Q . V . .
16.583	119.0448	259.40	. . Q . V . .
16.667	120.5349	216.37	. Q . V. .
16.750	121.8446	190.17	. Q. . V. .
16.833	123.0114	169.42	. Q . . V. .
16.917	124.0672	153.30	. Q . . V .
17.000	125.0549	143.41	. Q . . V .
17.083	125.9911	135.94	. Q . . V .
17.167	126.8832	129.53	. Q . . V .
17.250	127.7295	122.89	. Q . . V .
17.333	128.5461	118.57	. Q . . .V .
17.417	129.3362	114.71	. Q . . .V .
17.500	130.1018	111.18	. Q . . .V .
17.583	130.8448	107.88	. Q . . .V .
17.667	131.5670	104.86	. Q . . .V .
17.750	132.2700	102.09	. Q . . . V .
17.833	132.9555	99.54	. Q . . . V .
17.917	133.6248	97.18	. Q . . . V .
18.000	134.2790	94.99	. Q . . . V .
18.083	134.9186	92.87	. Q . . . V .
18.167	135.5418	90.48	. Q . . . V .
18.250	136.1464	87.79	. Q . . . V .
18.333	136.7332	85.20	. Q . . . V .
18.417	137.3052	83.06	. Q . . . V .
18.500	137.8649	81.27	. Q . . . V .
18.583	138.4141	79.73	. Q . . . V .
18.667	138.9535	78.33	. Q . . . V .
18.750	139.4840	77.02	. Q . . . V .
18.833	140.0060	75.80	. Q . . . V .
18.917	140.5202	74.65	. Q . . . V .
19.000	141.0268	73.56	. Q . . . V .
19.083	141.5262	72.51	. Q . . . V .
19.167	142.0186	71.51	. Q . . . V .
19.250	142.5046	70.56	. Q . . . V .
19.333	142.9842	69.64	. Q . . . V .
19.417	143.4578	68.76	. Q . . . V .
19.500	143.9256	67.92	. Q . . . V .
19.583	144.3877	67.11	. Q . . . V .
19.667	144.8445	66.33	. Q . . . V .
19.750	145.2961	65.57	. Q . . . V .
19.833	145.7427	64.85	. Q . . . V .
19.917	146.1845	64.14	. Q . . . V .
20.000	146.6216	63.46	. Q . . . V .
20.083	147.0541	62.81	. Q . . . V .
20.167	147.4823	62.17	. Q . . . V .
20.250	147.9062	61.56	. Q . . . V .
20.333	148.3261	60.96	. Q . . . V .
20.417	148.7419	60.38	. Q . . . V .
20.500	149.1539	59.82	. Q . . . V .
20.583	149.5621	59.27	. Q . . . V .
20.667	149.9667	58.74	. Q . . . V .
20.750	150.3677	58.23	. Q . . . V .
20.833	150.7653	57.73	. Q . . . V .
20.917	151.1595	57.24	. Q . . . V .
21.000	151.5504	56.76	. Q . . . V .
21.083	151.9381	56.30	. Q . . . V .
21.167	152.3228	55.85	. Q . . . V .
21.250	152.7044	55.41	. Q . . . V .
21.333	153.0830	54.98	. Q . . . V .
21.417	153.4588	54.56	. Q . . . V .
21.500	153.8317	54.15	. Q . . . V .
21.583	154.2019	53.75	. Q . . . V .
21.667	154.5694	53.36	. Q . . . V .
21.750	154.9343	52.98	. Q . . . V .
21.833	155.2966	52.61	. Q . . . V .

21.917	155.6564	52.24	. Q	.	.	.	V .
22.000	156.0137	51.89	. Q	.	.	.	V .
22.083	156.3687	51.54	. Q	.	.	.	V .
22.167	156.7213	51.20	. Q	.	.	.	V .
22.250	157.0715	50.86	. Q	.	.	.	V .
22.333	157.4196	50.53	. Q	.	.	.	V .
22.417	157.7654	50.21	. Q	.	.	.	V .
22.500	158.1090	49.90	. Q	.	.	.	V .
22.583	158.4505	49.59	. Q	.	.	.	V .
22.667	158.7900	49.28	. Q	.	.	.	V .
22.750	159.1273	48.99	. Q	.	.	.	V .
22.833	159.4627	48.70	. Q	.	.	.	V .
22.917	159.7961	48.41	. Q	.	.	.	V .
23.000	160.1276	48.13	. Q	.	.	.	V .
23.083	160.4571	47.85	. Q	.	.	.	V .
23.167	160.7848	47.58	. Q	.	.	.	V .
23.250	161.1107	47.32	. Q	.	.	.	V.
23.333	161.4348	47.05	. Q	.	.	.	V.
23.417	161.7571	46.80	. Q	.	.	.	V.
23.500	162.0776	46.55	. Q	.	.	.	V.
23.583	162.3965	46.30	. Q	.	.	.	V.
23.667	162.7136	46.05	. Q	.	.	.	V.
23.750	163.0292	45.81	. Q	.	.	.	V.
23.833	163.3431	45.58	. Q	.	.	.	V.
23.917	163.6554	45.35	. Q	.	.	.	V.
24.000	163.9661	45.12	. Q	.	.	.	V.
24.083	164.2675	43.76	. Q	.	.	.	V.
24.167	164.5252	37.42	.Q	.	.	.	V.
24.250	164.7038	25.94	.Q	.	.	.	V.
24.333	164.8034	14.46	Q	.	.	.	V.
24.417	164.8548	7.46	Q	.	.	.	V.
24.500	164.8801	3.68	Q	.	.	.	V.
24.583	164.8935	1.94	Q	.	.	.	V.
24.667	164.9007	1.04	Q	.	.	.	V.
24.750	164.9043	0.52	Q	.	.	.	V.
24.833	164.9060	0.25	Q	.	.	.	V.
24.917	164.9071	0.16	Q	.	.	.	V.
25.000	164.9079	0.11	Q	.	.	.	V.

****
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 3.1

>>>>>FLOW-THROUGH DETENTION BASIN ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========



ROUTE RUNOFF HYDROGRAPH FROM STREAM NUMBER 1
THROUGH A FLOW-THROUGH DETENTION BASIN
SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
DEAD STORAGE(AF) = 0.000
SPECIFIED DEAD STORAGE(AF) FILLED = 0.000
SPECIFIED EFFECTIVE VOLUME(AF) FILLED ABOVE OUTLET = 0.000
DETENTION BASIN CONSTANT LOSS RATE(CFS) = 0.00

BASIN DEPTH VERSUS OUTFLOW AND STORAGE INFORMATION:

INTERVAL NUMBER	DEPTH (FT)	OUTFLOW (CFS)	STORAGE (AF)
1	0.00	0.00	0.000
2	1.00	5.20	0.163
3	2.00	19.40	1.290
4	3.00	40.40	3.940
5	4.00	65.70	8.177
6	5.00	93.00	13.711
7	6.00	115.70	19.773
8	7.00	131.80	26.046
9	8.00	146.10	32.526
10	9.00	159.10	39.218
11	10.00	171.10	46.124
12	11.00	182.30	53.247
13	12.00	192.90	60.590

==========

MODIFIED-PULS BASIN ROUTING MODEL RESULTS(5-MINUTE COMPUTATION INTERVALS):
(Note: Computed EFFECTIVE DEPTH and VOLUME are estimated at the clock time;
MEAN OUTFLOW is the average value during the unit interval.)

CLOCK TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	LOSS (CFS)	EFFECTIVE DEPTH(FT)	MEAN OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.083	0.000	1.13	0.00	0.04	0.1	0.007
0.167	0.000	7.27	0.00	0.31	0.9	0.051
0.250	0.000	18.60	0.00	0.96	3.3	0.156
0.333	0.000	30.01	0.00	1.14	6.1	0.321
0.417	0.000	37.02	0.00	1.31	8.4	0.518
0.500	0.000	40.86	0.00	1.50	11.0	0.724
0.583	0.000	42.68	0.00	1.68	13.5	0.924
0.667	0.000	43.67	0.00	1.84	16.0	1.115
0.750	0.000	44.30	0.00	2.00	18.3	1.294
0.833	0.000	44.68	0.00	2.07	20.1	1.463
0.917	0.000	44.87	0.00	2.13	21.4	1.625
1.000	0.000	45.04	0.00	2.18	22.7	1.779
1.083	0.000	45.21	0.00	2.24	23.9	1.926
1.167	0.000	45.38	0.00	2.29	25.0	2.066
1.250	0.000	45.49	0.00	2.34	26.1	2.200
1.333	0.000	45.61	0.00	2.39	27.1	2.327
1.417	0.000	45.73	0.00	2.44	28.1	2.449
1.500	0.000	45.85	0.00	2.48	29.0	2.565
1.583	0.000	45.97	0.00	2.52	29.9	2.675
1.667	0.000	46.09	0.00	2.56	30.8	2.780
1.750	0.000	46.21	0.00	2.60	31.6	2.881
1.833	0.000	46.34	0.00	2.64	32.4	2.977
1.917	0.000	46.46	0.00	2.67	33.1	3.069
2.000	0.000	46.58	0.00	2.70	33.8	3.157
2.083	0.000	46.71	0.00	2.74	34.5	3.240
2.167	0.000	46.84	0.00	2.77	35.2	3.321
2.250	0.000	46.96	0.00	2.80	35.8	3.398
2.333	0.000	47.09	0.00	2.82	36.4	3.471
2.417	0.000	47.22	0.00	2.85	37.0	3.542
2.500	0.000	47.36	0.00	2.88	37.5	3.610
2.583	0.000	47.49	0.00	2.90	38.0	3.675
2.667	0.000	47.62	0.00	2.92	38.5	3.737
2.750	0.000	47.76	0.00	2.95	39.0	3.797
2.833	0.000	47.89	0.00	2.97	39.5	3.855
2.917	0.000	48.03	0.00	2.99	39.9	3.911
3.000	0.000	48.17	0.00	3.01	40.4	3.965
3.083	0.000	48.31	0.00	3.02	40.7	4.017
3.167	0.000	48.45	0.00	3.03	41.0	4.068
3.250	0.000	48.59	0.00	3.04	41.3	4.118
3.333	0.000	48.74	0.00	3.05	41.6	4.168
3.417	0.000	48.88	0.00	3.07	41.9	4.216

3.500	0.000	49.03	0.00	3.08	42.2	4.263
3.583	0.000	49.18	0.00	3.09	42.5	4.309
3.667	0.000	49.33	0.00	3.10	42.7	4.354
3.750	0.000	49.48	0.00	3.11	43.0	4.399
3.833	0.000	49.63	0.00	3.12	43.3	4.443
3.917	0.000	49.79	0.00	3.13	43.5	4.486
4.000	0.000	49.94	0.00	3.14	43.8	4.528
4.083	0.000	50.10	0.00	3.15	44.0	4.570
4.167	0.000	50.26	0.00	3.16	44.3	4.611
4.250	0.000	50.42	0.00	3.17	44.5	4.652
4.333	0.000	50.58	0.00	3.18	44.8	4.692
4.417	0.000	50.74	0.00	3.19	45.0	4.731
4.500	0.000	50.91	0.00	3.20	45.2	4.770
4.583	0.000	51.08	0.00	3.21	45.5	4.809
4.667	0.000	51.24	0.00	3.21	45.7	4.847
4.750	0.000	51.41	0.00	3.22	45.9	4.885
4.833	0.000	51.59	0.00	3.23	46.2	4.922
4.917	0.000	51.76	0.00	3.24	46.4	4.959
5.000	0.000	51.94	0.00	3.25	46.6	4.996
5.083	0.000	52.11	0.00	3.26	46.8	5.033
5.167	0.000	52.30	0.00	3.27	47.0	5.069
5.250	0.000	52.48	0.00	3.27	47.2	5.105
5.333	0.000	52.66	0.00	3.28	47.5	5.141
5.417	0.000	52.85	0.00	3.29	47.7	5.176
5.500	0.000	53.04	0.00	3.30	47.9	5.212
5.583	0.000	53.22	0.00	3.31	48.1	5.247
5.667	0.000	53.42	0.00	3.32	48.3	5.282
5.750	0.000	53.61	0.00	3.33	48.5	5.317
5.833	0.000	53.81	0.00	3.33	48.7	5.352
5.917	0.000	54.01	0.00	3.34	48.9	5.387
6.000	0.000	54.21	0.00	3.35	49.1	5.422
6.083	0.000	54.41	0.00	3.36	49.4	5.457
6.167	0.000	54.62	0.00	3.37	49.6	5.492
6.250	0.000	54.83	0.00	3.37	49.8	5.527
6.333	0.000	55.04	0.00	3.38	50.0	5.561
6.417	0.000	55.25	0.00	3.39	50.2	5.596
6.500	0.000	55.47	0.00	3.40	50.4	5.631
6.583	0.000	55.69	0.00	3.41	50.6	5.666
6.667	0.000	55.91	0.00	3.42	50.8	5.701
6.750	0.000	56.13	0.00	3.42	51.0	5.737
6.833	0.000	56.36	0.00	3.43	51.2	5.772
6.917	0.000	56.59	0.00	3.44	51.4	5.807
7.000	0.000	56.83	0.00	3.45	51.7	5.843
7.083	0.000	57.06	0.00	3.46	51.9	5.879
7.167	0.000	57.30	0.00	3.47	52.1	5.915
7.250	0.000	57.54	0.00	3.47	52.3	5.951
7.333	0.000	57.79	0.00	3.48	52.5	5.987
7.417	0.000	58.04	0.00	3.49	52.7	6.024
7.500	0.000	58.30	0.00	3.50	53.0	6.060
7.583	0.000	58.55	0.00	3.51	53.2	6.098
7.667	0.000	58.81	0.00	3.52	53.4	6.135
7.750	0.000	59.07	0.00	3.53	53.6	6.172
7.833	0.000	59.34	0.00	3.54	53.8	6.210
7.917	0.000	59.61	0.00	3.54	54.1	6.248
8.000	0.000	59.89	0.00	3.55	54.3	6.287
8.083	0.000	60.17	0.00	3.56	54.5	6.326
8.167	0.000	60.46	0.00	3.57	54.8	6.365
8.250	0.000	60.74	0.00	3.58	55.0	6.405
8.333	0.000	61.04	0.00	3.59	55.2	6.445
8.417	0.000	61.33	0.00	3.60	55.5	6.485
8.500	0.000	61.63	0.00	3.61	55.7	6.526
8.583	0.000	61.94	0.00	3.62	56.0	6.567
8.667	0.000	62.25	0.00	3.63	56.2	6.608
8.750	0.000	62.57	0.00	3.64	56.5	6.650
8.833	0.000	62.89	0.00	3.65	56.7	6.693
8.917	0.000	63.21	0.00	3.66	57.0	6.736
9.000	0.000	63.55	0.00	3.67	57.2	6.780
9.083	0.000	63.88	0.00	3.68	57.5	6.824
9.167	0.000	64.23	0.00	3.69	57.8	6.868
9.250	0.000	64.58	0.00	3.70	58.0	6.913
9.333	0.000	64.93	0.00	3.71	58.3	6.959

9.417	0.000	65.29	0.00	3.72	58.6	7.006
9.500	0.000	65.66	0.00	3.73	58.8	7.052
9.583	0.000	66.04	0.00	3.75	59.1	7.100
9.667	0.000	66.42	0.00	3.76	59.4	7.148
9.750	0.000	66.81	0.00	3.77	59.7	7.197
9.833	0.000	67.21	0.00	3.78	60.0	7.247
9.917	0.000	67.61	0.00	3.79	60.3	7.297
10.000	0.000	68.02	0.00	3.80	60.6	7.348
10.083	0.000	68.44	0.00	3.82	60.9	7.400
10.167	0.000	68.87	0.00	3.83	61.2	7.453
10.250	0.000	69.30	0.00	3.84	61.5	7.506
10.333	0.000	69.75	0.00	3.85	61.9	7.561
10.417	0.000	70.20	0.00	3.87	62.2	7.616
10.500	0.000	70.67	0.00	3.88	62.5	7.672
10.583	0.000	71.14	0.00	3.89	62.9	7.729
10.667	0.000	71.62	0.00	3.91	63.2	7.787
10.750	0.000	72.11	0.00	3.92	63.5	7.846
10.833	0.000	72.62	0.00	3.94	63.9	7.906
10.917	0.000	73.14	0.00	3.95	64.3	7.967
11.000	0.000	73.67	0.00	3.97	64.6	8.029
11.083	0.000	74.20	0.00	3.98	65.0	8.093
11.167	0.000	74.76	0.00	4.00	65.4	8.157
11.250	0.000	75.32	0.00	4.01	65.8	8.223
11.333	0.000	75.91	0.00	4.02	66.1	8.291
11.417	0.000	76.50	0.00	4.03	66.4	8.360
11.500	0.000	77.11	0.00	4.05	66.8	8.431
11.583	0.000	77.73	0.00	4.06	67.1	8.504
11.667	0.000	78.38	0.00	4.07	67.5	8.579
11.750	0.000	79.03	0.00	4.09	67.9	8.656
11.833	0.000	79.71	0.00	4.10	68.3	8.735
11.917	0.000	80.40	0.00	4.12	68.7	8.816
12.000	0.000	81.12	0.00	4.13	69.1	8.899
12.083	0.000	81.95	0.00	4.15	69.5	8.985
12.167	0.000	83.20	0.00	4.16	69.9	9.076
12.250	0.000	84.90	0.00	4.18	70.4	9.176
12.333	0.000	86.62	0.00	4.20	70.9	9.285
12.417	0.000	88.00	0.00	4.22	71.4	9.399
12.500	0.000	89.15	0.00	4.24	72.0	9.517
12.583	0.000	90.16	0.00	4.26	72.6	9.638
12.667	0.000	91.14	0.00	4.29	73.2	9.761
12.750	0.000	92.11	0.00	4.31	73.8	9.887
12.833	0.000	93.10	0.00	4.33	74.5	10.015
12.917	0.000	94.09	0.00	4.36	75.1	10.146
13.000	0.000	95.14	0.00	4.38	75.7	10.280
13.083	0.000	96.21	0.00	4.40	76.4	10.416
13.167	0.000	97.33	0.00	4.43	77.1	10.556
13.250	0.000	98.48	0.00	4.46	77.8	10.698
13.333	0.000	99.69	0.00	4.48	78.5	10.844
13.417	0.000	100.93	0.00	4.51	79.2	10.994
13.500	0.000	102.24	0.00	4.54	80.0	11.147
13.583	0.000	103.60	0.00	4.57	80.7	11.304
13.667	0.000	105.03	0.00	4.59	81.5	11.466
13.750	0.000	106.51	0.00	4.62	82.3	11.633
13.833	0.000	108.08	0.00	4.66	83.2	11.804
13.917	0.000	109.71	0.00	4.69	84.0	11.981
14.000	0.000	111.44	0.00	4.72	84.9	12.164
14.083	0.000	113.19	0.00	4.75	85.8	12.352
14.167	0.000	114.79	0.00	4.79	86.8	12.545
14.250	0.000	116.22	0.00	4.82	87.7	12.741
14.333	0.000	117.77	0.00	4.86	88.7	12.941
14.417	0.000	119.66	0.00	4.90	89.7	13.148
14.500	0.000	121.90	0.00	4.94	90.8	13.362
14.583	0.000	124.39	0.00	4.98	91.8	13.586
14.667	0.000	127.16	0.00	5.02	92.9	13.822
14.750	0.000	130.14	0.00	5.06	93.9	14.072
14.833	0.000	133.41	0.00	5.10	94.8	14.338
14.917	0.000	136.95	0.00	5.15	95.9	14.620
15.000	0.000	140.85	0.00	5.20	97.0	14.923
15.083	0.000	145.09	0.00	5.25	98.1	15.246
15.167	0.000	149.83	0.00	5.31	99.4	15.593
15.250	0.000	155.06	0.00	5.37	100.7	15.967

15.333	0.000	161.01	0.00	5.44	102.2	16.372
15.417	0.000	166.53	0.00	5.51	103.8	16.805
15.500	0.000	168.01	0.00	5.58	105.4	17.236
15.583	0.000	165.40	0.00	5.65	107.0	17.638
15.667	0.000	164.69	0.00	5.71	108.4	18.026
15.750	0.000	170.92	0.00	5.78	109.9	18.446
15.833	0.000	184.23	0.00	5.86	111.7	18.946
15.917	0.000	206.56	0.00	5.97	113.8	19.584
16.000	0.000	246.98	0.00	6.11	116.3	20.485
16.083	0.000	341.92	0.00	6.36	119.5	22.017
16.167	0.000	541.89	0.00	6.82	125.1	24.887
16.250	0.000	703.25	0.00	7.43	133.4	28.812
16.333	0.000	669.84	0.00	7.99	141.9	32.447
16.417	0.000	488.81	0.00	8.34	148.2	34.793
16.500	0.000	348.72	0.00	8.54	151.8	36.149
16.583	0.000	259.40	0.00	8.65	153.8	36.876
16.667	0.000	216.37	0.00	8.71	155.0	37.299
16.750	0.000	190.17	0.00	8.75	155.6	37.537
16.833	0.000	169.42	0.00	8.76	155.9	37.630
16.917	0.000	153.30	0.00	8.76	156.0	37.611
17.000	0.000	143.41	0.00	8.75	155.9	37.525
17.083	0.000	135.94	0.00	8.73	155.7	37.390
17.167	0.000	129.53	0.00	8.70	155.4	37.212
17.250	0.000	122.89	0.00	8.67	155.0	36.990
17.333	0.000	118.57	0.00	8.63	154.5	36.743
17.417	0.000	114.71	0.00	8.59	154.0	36.472
17.500	0.000	111.18	0.00	8.55	153.5	36.181
17.583	0.000	107.88	0.00	8.50	152.9	35.871
17.667	0.000	104.86	0.00	8.45	152.3	35.544
17.750	0.000	102.09	0.00	8.40	151.6	35.203
17.833	0.000	99.54	0.00	8.35	151.0	34.849
17.917	0.000	97.18	0.00	8.29	150.3	34.483
18.000	0.000	94.99	0.00	8.24	149.5	34.107
18.083	0.000	92.87	0.00	8.18	148.8	33.722
18.167	0.000	90.48	0.00	8.12	148.0	33.326
18.250	0.000	87.79	0.00	8.06	147.3	32.916
18.333	0.000	85.20	0.00	8.00	146.4	32.495
18.417	0.000	83.06	0.00	7.93	145.6	32.064
18.500	0.000	81.27	0.00	7.86	144.6	31.628
18.583	0.000	79.73	0.00	7.79	143.6	31.188
18.667	0.000	78.33	0.00	7.73	142.7	30.745
18.750	0.000	77.02	0.00	7.66	141.7	30.300
18.833	0.000	75.80	0.00	7.59	140.7	29.853
18.917	0.000	74.65	0.00	7.52	139.7	29.405
19.000	0.000	73.56	0.00	7.45	138.7	28.956
19.083	0.000	72.51	0.00	7.38	137.7	28.507
19.167	0.000	71.51	0.00	7.31	136.7	28.058
19.250	0.000	70.56	0.00	7.24	135.7	27.609
19.333	0.000	69.64	0.00	7.17	134.8	27.160
19.417	0.000	68.76	0.00	7.10	133.8	26.713
19.500	0.000	67.92	0.00	7.03	132.8	26.266
19.583	0.000	67.11	0.00	6.96	131.8	25.821
19.667	0.000	66.33	0.00	6.89	130.7	25.378
19.750	0.000	65.57	0.00	6.82	129.5	24.937
19.833	0.000	64.85	0.00	6.75	128.4	24.500
19.917	0.000	64.14	0.00	6.68	127.3	24.065
20.000	0.000	63.46	0.00	6.62	126.2	23.633
20.083	0.000	62.81	0.00	6.55	125.1	23.204
20.167	0.000	62.17	0.00	6.48	124.0	22.779
20.250	0.000	61.56	0.00	6.41	122.9	22.356
20.333	0.000	60.96	0.00	6.35	121.8	21.937
20.417	0.000	60.38	0.00	6.28	120.7	21.522
20.500	0.000	59.82	0.00	6.21	119.7	21.110
20.583	0.000	59.27	0.00	6.15	118.6	20.701
20.667	0.000	58.74	0.00	6.08	117.6	20.296
20.750	0.000	58.23	0.00	6.02	116.5	19.895
20.833	0.000	57.73	0.00	5.95	115.3	19.498
20.917	0.000	57.24	0.00	5.89	113.9	19.107
21.000	0.000	56.76	0.00	5.83	112.5	18.723
21.083	0.000	56.30	0.00	5.76	111.1	18.346
21.167	0.000	55.85	0.00	5.70	109.7	17.976

21.250	0.000	55.41	0.00	5.64	108.3	17.611
21.333	0.000	54.98	0.00	5.58	106.9	17.254
21.417	0.000	54.56	0.00	5.53	105.6	16.902
21.500	0.000	54.15	0.00	5.47	104.3	16.557
21.583	0.000	53.75	0.00	5.41	103.0	16.217
21.667	0.000	53.36	0.00	5.36	101.8	15.884
21.750	0.000	52.98	0.00	5.30	100.5	15.557
21.833	0.000	52.61	0.00	5.25	99.3	15.235
21.917	0.000	52.24	0.00	5.20	98.1	14.919
22.000	0.000	51.89	0.00	5.15	96.9	14.609
22.083	0.000	51.54	0.00	5.10	95.8	14.304
22.167	0.000	51.20	0.00	5.05	94.7	14.005
22.250	0.000	50.86	0.00	5.00	93.5	13.711
22.333	0.000	50.53	0.00	4.95	92.3	13.423
22.417	0.000	50.21	0.00	4.90	90.9	13.143
22.500	0.000	49.90	0.00	4.85	89.5	12.870
22.583	0.000	49.59	0.00	4.80	88.2	12.604
22.667	0.000	49.28	0.00	4.75	86.9	12.345
22.750	0.000	48.99	0.00	4.71	85.6	12.093
22.833	0.000	48.70	0.00	4.66	84.4	11.847
22.917	0.000	48.41	0.00	4.62	83.2	11.607
23.000	0.000	48.13	0.00	4.58	82.0	11.373
23.083	0.000	47.85	0.00	4.54	80.9	11.146
23.167	0.000	47.58	0.00	4.50	79.8	10.924
23.250	0.000	47.32	0.00	4.46	78.7	10.708
23.333	0.000	47.05	0.00	4.42	77.7	10.497
23.417	0.000	46.80	0.00	4.38	76.6	10.291
23.500	0.000	46.55	0.00	4.35	75.6	10.091
23.583	0.000	46.30	0.00	4.31	74.7	9.896
23.667	0.000	46.05	0.00	4.28	73.7	9.705
23.750	0.000	45.81	0.00	4.24	72.8	9.519
23.833	0.000	45.58	0.00	4.21	71.9	9.338
23.917	0.000	45.35	0.00	4.18	71.0	9.162
24.000	0.000	45.12	0.00	4.15	70.1	8.989
24.083	0.000	43.76	0.00	4.12	69.3	8.814
24.167	0.000	37.42	0.00	4.08	68.3	8.601
24.250	0.000	25.94	0.00	4.03	67.1	8.317
24.333	0.000	14.46	0.00	3.95	65.4	7.967
24.417	0.000	7.46	0.00	3.86	63.3	7.582
24.500	0.000	3.68	0.00	3.77	61.0	7.187
24.583	0.000	1.94	0.00	3.67	58.6	6.797
24.667	0.000	1.04	0.00	3.58	56.3	6.416
24.750	0.000	0.52	0.00	3.50	54.1	6.047
24.833	0.000	0.25	0.00	3.41	51.9	5.692
24.917	0.000	0.16	0.00	3.33	49.8	5.349
25.000	0.000	0.11	0.00	3.26	47.8	5.021
25.083	0.000	0.05	0.00	3.18	45.9	4.705
25.167	0.000	0.00	0.00	3.11	44.1	4.401
25.250	0.000	0.00	0.00	3.04	42.3	4.110
25.333	0.000	0.00	0.00	2.96	40.5	3.831
25.417	0.000	0.00	0.00	2.86	38.5	3.566
25.500	0.000	0.00	0.00	2.76	36.4	3.315
25.583	0.000	0.00	0.00	2.67	34.5	3.078
25.667	0.000	0.00	0.00	2.59	32.7	2.853
25.750	0.000	0.00	0.00	2.51	30.9	2.640
25.833	0.000	0.00	0.00	2.43	29.3	2.438
25.917	0.000	0.00	0.00	2.36	27.7	2.247
26.000	0.000	0.00	0.00	2.29	26.3	2.066
26.083	0.000	0.00	0.00	2.23	24.9	1.895
26.167	0.000	0.00	0.00	2.17	23.5	1.732
26.250	0.000	0.00	0.00	2.11	22.3	1.579
26.333	0.000	0.00	0.00	2.05	21.1	1.433
26.417	0.000	0.00	0.00	2.00	20.0	1.296
26.500	0.000	0.00	0.00	1.89	18.7	1.167
26.583	0.000	0.00	0.00	1.79	17.1	1.050
26.667	0.000	0.00	0.00	1.69	15.7	0.941
26.750	0.000	0.00	0.00	1.60	14.4	0.842
26.833	0.000	0.00	0.00	1.52	13.2	0.752
26.917	0.000	0.00	0.00	1.45	12.1	0.668
27.000	0.000	0.00	0.00	1.38	11.1	0.592
27.083	0.000	0.00	0.00	1.32	10.2	0.522

27.167	0.000	0.00	0.00	1.26	9.3	0.458
27.250	0.000	0.00	0.00	1.21	8.5	0.399
27.333	0.000	0.00	0.00	1.16	7.8	0.345
27.417	0.000	0.00	0.00	1.12	7.2	0.296
27.500	0.000	0.00	0.00	1.08	6.6	0.250
27.583	0.000	0.00	0.00	1.04	6.0	0.209
27.667	0.000	0.00	0.00	1.01	5.5	0.170
27.750	0.000	0.00	0.00	0.84	4.8	0.137
27.833	0.000	0.00	0.00	0.68	3.9	0.110
27.917	0.000	0.00	0.00	0.54	3.2	0.088
28.000	0.000	0.00	0.00	0.43	2.5	0.071
28.083	0.000	0.00	0.00	0.35	2.0	0.057
28.167	0.000	0.00	0.00	0.28	1.6	0.046
28.250	0.000	0.00	0.00	0.22	1.3	0.037
28.333	0.000	0.00	0.00	0.18	1.0	0.029
28.417	0.000	0.00	0.00	0.14	0.8	0.023
28.500	0.000	0.00	0.00	0.12	0.7	0.019
28.583	0.000	0.00	0.00	0.09	0.5	0.015
28.667	0.000	0.00	0.00	0.07	0.4	0.012
28.750	0.000	0.00	0.00	0.06	0.3	0.010
28.833	0.000	0.00	0.00	0.05	0.3	0.008
28.917	0.000	0.00	0.00	0.04	0.2	0.006
29.000	0.000	0.00	0.00	0.03	0.2	0.005
29.083	0.000	0.00	0.00	0.02	0.1	0.004
29.167	0.000	0.00	0.00	0.02	0.1	0.003
29.250	0.000	0.00	0.00	0.02	0.1	0.003
29.333	0.000	0.00	0.00	0.01	0.1	0.002
29.417	0.000	0.00	0.00	0.01	0.1	0.002
29.500	0.000	0.00	0.00	0.01	0.0	0.001
29.583	0.000	0.00	0.00	0.01	0.0	0.001
29.667	0.000	0.00	0.00	0.01	0.0	0.001
29.750	0.000	0.00	0.00	0.00	0.0	0.001
29.833	0.000	0.00	0.00	0.00	0.0	0.001
29.917	0.000	0.00	0.00	0.00	0.0	0.000

PROCESS SUMMARY OF STORAGE:
INFLOW VOLUME = 164.908 AF
BASIN STORAGE = 0.000 AF (WITH 0.000 AF INITIALLY FILLED)
OUTFLOW VOLUME = 164.908 AF
LOSS VOLUME = 0.000 AF

==========

END OF FLOODSCx ROUTING ANALYSIS

ANALYSIS OF PEAK INFLOW INTO DETENTION BASIN USING SUPER-POSITIONED HYDROGRAPHS BASED ON RATIONAL METHOD PEAK Q's (to obtain Q_{1000} for Spillway Design)

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**************************************************************************

          F L O O D    R O U T I N G    A N A L Y S I S
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                        Analysis prepared by:

                          ASSOCIATED ENGINEERS
                        Consulting Civil Engineers
                   3311 E. Shelby Street  Ontario, California  91764
                        (909) 980-1982    Fax: (909) 941-0891

 ************************** DESCRIPTION OF STUDY **************************
* KAISER COMMERCE CENTER                                                  *
* DETENSION BASIN ROUTING                                                 *
* SUPERPOSITIONING OF INFLOW HYDROGRAPHS TO DETERMINE "TRUE" PEAK INFLOW  *
 *************************************************************************

  FILE NAME: 96082FE\ULTIMATE.DAT
  TIME/DATE OF STUDY: 14:44 08/15/2001


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      211.580 ACRES
         BASEFLOW =    0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =     0.208 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.074
         LOW LOSS FRACTION = 0.099
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.49
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.01
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.35
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.45
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.61
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  7.60

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.991
          30-MINUTE FACTOR = 0.991
           1-HOUR FACTOR = 0.991
           3-HOUR FACTOR = 0.999
           6-HOUR FACTOR = 0.999
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =    5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  40.064


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
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INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	2.921	74.734
2	19.516	424.653
3	49.239	760.528
4	77.506	723.318
5	91.191	350.148
6	96.779	142.984
7	98.477	43.450
8	99.221	19.050
9	99.688	11.959
10	99.922	5.979
11	100.000	1.993

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 12.1588
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 121.7220

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

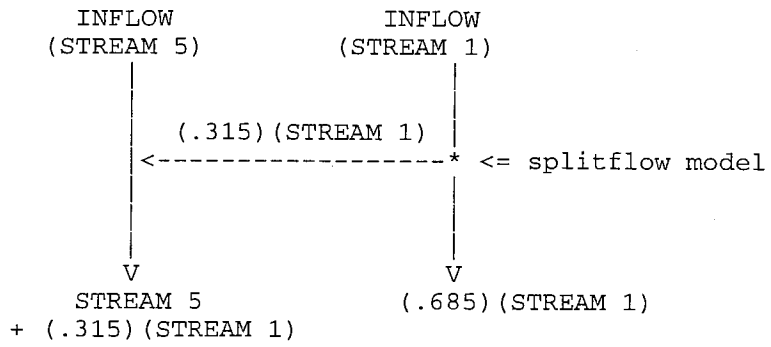
HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 150.0 300.0 450.0 600.0
14.000	52.8469	82.77	. Q . V . . .
14.083	53.4259	84.07	. Q . V . . .
14.167	54.0131	85.26	. Q . V . . .
14.250	54.6073	86.29	. Q . V . . .
14.333	55.2097	87.46	. Q . V . . .
14.417	55.8223	88.96	. Q . V . . .
14.500	56.4472	90.73	. Q . V . . .
14.583	57.0854	92.66	. Q . V . . .
14.667	57.7382	94.80	. Q . V . . .
14.750	58.4067	97.06	. Q . V. . . .
14.833	59.0924	99.56	. Q . V. . . .
14.917	59.7965	102.23	. Q . V. . . .
15.000	60.5211	105.21	. Q . V. . . .
15.083	61.2679	108.43	. Q . V . . .
15.167	62.0397	112.07	. Q . V . . .
15.250	62.8389	116.05	. Q . V . . .
15.333	63.6697	120.62	. Q . V . . .
15.417	64.5288	124.75	. Q . .V . . .
15.500	65.3909	125.18	. Q . .V . . .
15.583	66.2318	122.10	. Q . .V . . .
15.667	67.0660	121.12	. Q . . V . . .
15.750	67.9398	126.89	. Q . . V . . .
15.833	68.8939	138.53	. Q. . V . . .
15.917	69.9759	157.10	. Q . V . . .
16.000	71.2895	190.73	. . Q . V . . .
16.083	73.1489	269.99	. . Q . V . . .
16.167	76.1936	442.10	. . . V Q. . .
16.250	80.1059	568.07	. . . V . Q .
16.333	83.6576	515.70	. . . V . Q . .
16.417	85.9304	330.01	. . . Q V . . .
16.500	87.4181	216.01	. . Q . V . . .
16.583	88.5166	159.51	. Q . V. . . .
16.667	89.4815	140.11	. Q. . V. . . .
16.750	90.3642	128.17	. Q . . V. . . .
16.833	91.1729	117.43	. Q . . V. . . .
16.917	91.9197	108.43	. Q . . V . . .
17.000	92.6189	101.52	. Q . . V . . .
17.083	93.2832	96.46	. Q . . V . . .

17.167	93.9194	92.38	.	Q	.	.	V	.
17.250	94.5329	89.09	.	Q	.	.	.V	.
17.333	95.1267	86.22	.	Q	.	.	.V	.
17.417	95.7018	83.50	.	Q	.	.	.V	.
17.500	96.2594	80.96	.	Q	.	.	.V	.
17.583	96.8008	78.61	.	Q	.	.	.V	.
17.667	97.3274	76.46	.	Q	.	.	.V	.
17.750	97.8405	74.50	.	Q	.	.	. V	.
17.833	98.3411	72.69	.	Q	.	.	. V	.
17.917	98.8301	71.01	.	Q	.	.	. V	.
18.000	99.3084	69.45	.	Q	.	.	. V	.

****
FLOW PROCESS FROM NODE 1.00 TO NODE 1.00 IS CODE = 8

>>>>>MODEL STREAM SPLITFLOW WHERE A CONSTANT PROPORTION
OF STREAM 1 IS ADDED TO STREAM 5<<<<<
==========



STREAM NUMBER 1 IS SPLIT TOWARDS STREAM 5
WHERE 0.68(DECIMAL PERCENT) REMAINS IN STREAM 1
AND 0.32(DECIMAL PERCENT) IS ADDED TO STREAM 5

STREAM SPLITFLOW MODELING RESULTS:

MODEL TIME (HRS)	INFLOW STREAM 5 (CFS)	INFLOW STREAM 1 (CFS)	OUTFLOW STREAM 5 (CFS)	OUTFLOW STREAM 1 (CFS)
14.000	0.00	82.77	26.10	56.67
14.083	0.00	84.07	26.51	57.56
14.167	0.00	85.26	26.88	58.38
14.250	0.00	86.29	27.21	59.08
14.333	0.00	87.46	27.58	59.89
14.417	0.00	88.96	28.05	60.91
14.500	0.00	90.73	28.61	62.12
14.583	0.00	92.66	29.22	63.45
14.667	0.00	94.80	29.89	64.91
14.750	0.00	97.06	30.60	66.46
14.833	0.00	99.56	31.39	68.17
14.917	0.00	102.23	32.23	70.00
15.000	0.00	105.21	33.17	72.04
15.083	0.00	108.43	34.19	74.24
15.167	0.00	112.07	35.33	76.73
15.250	0.00	116.05	36.59	79.46
15.333	0.00	120.62	38.03	82.59
15.417	0.00	124.75	39.33	85.42
15.500	0.00	125.18	39.47	85.71
15.583	0.00	122.10	38.50	83.60
15.667	0.00	121.12	38.19	82.93
15.750	0.00	126.89	40.01	86.88
15.833	0.00	138.53	43.68	94.85
15.917	0.00	157.10	49.53	107.57

16.000	0.00	190.73	60.14	130.59
16.083	0.00	269.99	85.13	184.86
16.167	0.00	442.10	139.39	302.70
16.250	0.00	568.07	179.11	388.96
16.333	0.00	515.70	162.60	353.10
16.417	0.00	330.01	104.05	225.96
16.500	0.00	216.01	68.11	147.90
16.583	0.00	159.51	50.29	109.21
16.667	0.00	140.11	44.18	95.93
16.750	0.00	128.17	40.41	87.76
16.833	0.00	117.43	37.03	80.40
16.917	0.00	108.43	34.19	74.24
17.000	0.00	101.52	32.01	69.51
17.083	0.00	96.46	30.41	66.04
17.167	0.00	92.38	29.13	63.25
17.250	0.00	89.09	28.09	61.00
17.333	0.00	86.22	27.19	59.04
17.417	0.00	83.50	26.33	57.17
17.500	0.00	80.96	25.53	55.43
17.583	0.00	78.61	24.79	53.83
17.667	0.00	76.46	24.11	52.36
17.750	0.00	74.50	23.49	51.01
17.833	0.00	72.69	22.92	49.77
17.917	0.00	71.01	22.39	48.62
18.000	0.00	69.45	21.90	47.56

```
**************************************************************************
 FLOW PROCESS FROM NODE     2.00 TO NODE     2.00 IS CODE =   1
--------------------------------------------------------------------------
 >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

    (UNIT-HYDROGRAPH ADDED TO STREAM #2)

      WATERSHED AREA =      75.040 ACRES
      BASEFLOW =    0.000 CFS/SQUARE-MILE
      *USER ENTERED "LAG" TIME =    0.328 HOURS
       CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
       THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
       MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
      VALLEY(DEVELOPED) S-GRAPH SELECTED
      MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.074
      LOW LOSS FRACTION = 0.099
      *HYDROGRAPH MODEL #1 SPECIFIED*

      SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.49
      SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.01
      SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.35
      SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.45
      SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.61
      SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  7.60

      PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
        5-MINUTE FACTOR = 0.997
       30-MINUTE FACTOR = 0.997
        1-HOUR FACTOR = 0.997
        3-HOUR FACTOR = 0.999
        6-HOUR FACTOR = 1.000
       24-HOUR FACTOR = 1.000

      UNIT HYDROGRAPH TIME UNIT =    5.000 MINUTES
      UNIT INTERVAL PERCENTAGE OF LAG-TIME =  25.407


      RUNOFF HYDROGRAPH LISTING LIMITS:
      MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
      MODEL TIME(HOURS) FOR END OF RESULTS =  18.00

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UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	1.525	13.841
2	7.660	55.671
3	21.435	125.017
4	39.763	166.325
5	61.043	193.119
6	77.647	150.690
7	87.674	90.996
8	93.266	50.744
9	96.469	29.069
10	98.072	14.547
11	98.596	4.752
12	99.072	4.323
13	99.548	4.323
14	100.000	4.098

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 4.3095
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 43.1863

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	18.4391	28.67	. Q . V . . .
14.083	18.6396	29.11	. Q . V . . .
14.167	18.8430	29.54	. Q . V . . .
14.250	19.0492	29.93	. Q . V . . .
14.333	19.2579	30.31	. Q . V . . .
14.417	19.4693	30.70	. Q . V . . .
14.500	19.6840	31.17	. Q . V . . .
14.583	19.9025	31.73	. Q . V . . .
14.667	20.1254	32.36	. Q . V . . .
14.750	20.3532	33.08	. Q . V . . .
14.833	20.5864	33.85	. Q . V. . . .
14.917	20.8254	34.71	. Q . V. . . .
15.000	21.0708	35.63	. Q . V. . . .
15.083	21.3233	36.66	. Q . V. . . .
15.167	21.5834	37.77	. Q . V. . . .
15.250	21.8521	39.01	. Q . V . . .
15.333	22.1302	40.39	. Q . V . . .
15.417	22.4180	41.78	. Q . V . . .
15.500	22.7130	42.83	. Q . .V . . .
15.583	23.0112	43.30	. Q . .V . . .
15.667	23.3113	43.57	. Q . .V . . .
15.750	23.6145	44.04	. Q . .V . . .
15.833	23.9293	45.70	. Q. . V . . .
15.917	24.2699	49.46	. Q. . V . . .
16.000	24.6573	56.25	. .Q . V . . .
16.083	25.1527	71.93	. . Q . V . . .
16.167	25.8400	99.80	. . Q. V . . .
16.250	26.7710	135.19	. . . V Q . . .
16.333	27.8326	154.14	. . . V Q . . .
16.417	28.9262	158.79	. . . V .Q . . .
16.500	29.8403	132.72	. . . QV . . .
16.583	30.5282	99.89	. . Q. V . . .
16.667	31.0534	76.26	. . Q . V . . .

```
 16.750      31.4804      62.00  .          . Q        .          V.          .
 16.833      31.8385      51.99  .          Q          .          V.          .
 16.917      32.1475      44.87  .        Q .          .          V.          .
 17.000      32.4360      41.90  .        Q .          .           V          .
 17.083      32.7079      39.48  .       Q  .          .           V          .
 17.167      32.9638      37.15  .       Q  .          .           V          .
 17.250      33.1966      33.81  .      Q   .          .           V          .
 17.333      33.4194      32.35  .      Q   .          .           V          .
 17.417      33.6343      31.21  .      Q   .          .           .V         .
 17.500      33.8425      30.22  .      Q   .          .           .V         .
 17.583      34.0440      29.27  .     Q    .          .           .V         .
 17.667      34.2396      28.39  .     Q    .          .           .V         .
 17.750      34.4296      27.59  .     Q    .          .           .V         .
 17.833      34.6145      26.85  .     Q    .          .           . V        .
 17.917      34.7947      26.17  .     Q    .          .           . V        .
 18.000      34.9706      25.54  .     Q    .          .           . V        .
```

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****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =    8
----------------------------------------------------------------------------
  >>>>>MODEL STREAM SPLITFLOW WHERE A CONSTANT PROPORTION
       OF STREAM 2 IS ADDED TO STREAM 3<<<<<
============================================================================
```

```
                   INFLOW               INFLOW
                 (STREAM 3)           (STREAM 2)
                     |                    |
                     |                    |
                     |   (.923)(STREAM 2) |
                     |<-------------------* <= splitflow model
                     |                    |
                     |                    |
                     |                    |
                     V                    V
                  STREAM 3          (.077)(STREAM 2)
              + (.923)(STREAM 2)
```

STREAM NUMBER 2 IS SPLIT TOWARDS STREAM 3
WHERE 0.08(DECIMAL PERCENT) REMAINS IN STREAM 2
AND 0.92(DECIMAL PERCENT) IS ADDED TO STREAM 3

STREAM SPLITFLOW MODELING RESULTS:

MODEL TIME (HRS)	INFLOW STREAM 3 (CFS)	INFLOW STREAM 2 (CFS)	OUTFLOW STREAM 3 (CFS)	OUTFLOW STREAM 2 (CFS)
14.000	0.00	28.67	26.48	2.20
14.083	0.00	29.11	26.88	2.23
14.167	0.00	29.54	27.27	2.26
14.250	0.00	29.93	27.64	2.29
14.333	0.00	30.31	27.99	2.32
14.417	0.00	30.70	28.35	2.35
14.500	0.00	31.17	28.78	2.39
14.583	0.00	31.73	29.30	2.43
14.667	0.00	32.36	29.89	2.48
14.750	0.00	33.08	30.54	2.53
14.833	0.00	33.85	31.26	2.59
14.917	0.00	34.71	32.05	2.66
15.000	0.00	35.63	32.91	2.73
15.083	0.00	36.66	33.85	2.81
15.167	0.00	37.77	34.87	2.89
15.250	0.00	39.01	36.03	2.99
15.333	0.00	40.39	37.29	3.09
15.417	0.00	41.78	38.58	3.20
15.500	0.00	42.83	39.55	3.28

15.583	0.00	43.30	39.98	3.32
15.667	0.00	43.57	40.23	3.34
15.750	0.00	44.04	40.66	3.37
15.833	0.00	45.70	42.20	3.50
15.917	0.00	49.46	45.67	3.79
16.000	0.00	56.25	51.94	4.31
16.083	0.00	71.93	66.42	5.51
16.167	0.00	99.80	92.15	7.64
16.250	0.00	135.19	124.83	10.36
16.333	0.00	154.14	142.34	11.81
16.417	0.00	158.79	146.63	12.16
16.500	0.00	132.72	122.55	10.17
16.583	0.00	99.89	92.24	7.65
16.667	0.00	76.26	70.42	5.84
16.750	0.00	62.00	57.25	4.75
16.833	0.00	51.99	48.01	3.98
16.917	0.00	44.87	41.43	3.44
17.000	0.00	41.90	38.69	3.21
17.083	0.00	39.48	36.46	3.02
17.167	0.00	37.15	34.30	2.85
17.250	0.00	33.81	31.22	2.59
17.333	0.00	32.35	29.87	2.48
17.417	0.00	31.21	28.82	2.39
17.500	0.00	30.22	27.90	2.31
17.583	0.00	29.27	27.03	2.24
17.667	0.00	28.39	26.22	2.17
17.750	0.00	27.59	25.48	2.11
17.833	0.00	26.85	24.79	2.06
17.917	0.00	26.17	24.16	2.00
18.000	0.00	25.54	23.58	1.96

****
FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 7

>>>>>STREAM NUMBER 3 ADDED TO STREAM NUMBER 1<<<<<
==========

****
FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 11

>>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
==========

STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	150.0	300.0	450.0	600.0
14.000	53.2109	83.15	Q		V		
14.083	53.7925	84.45	Q		V		
14.167	54.3824	85.65	Q		V		
14.250	54.9796	86.72	Q		V		
14.333	55.5848	87.87	Q		V		
14.417	56.1996	89.26	Q		V		
14.500	56.8256	90.90	Q		V		
14.583	57.4643	92.74	Q		V		
14.667	58.1172	94.79	Q		V		
14.750	58.7852	97.00	Q		V		
14.833	59.4700	99.43	Q		V		
14.917	60.1728	102.05	Q		V		
15.000	60.8956	104.95	Q		V		
15.083	61.6400	108.09	Q		V		
15.167	62.4087	111.61	Q		V		
15.250	63.2040	115.48	Q		V		
15.333	64.0297	119.89	Q		V		
15.417	64.8837	124.00	Q		.V		
15.500	65.7463	125.26	Q		.V		
15.583	66.5975	123.58	Q		.V		
15.667	67.4457	123.16	Q		.V		

15.750	68.3241	127.54	. Q . . V . .
15.833	69.2680	137.05	. Q. . V . .
15.917	70.3233	153.24	. Q . V . .
16.000	71.5804	182.53	. . Q . V . .
16.083	73.3111	251.29	. . Q . V . .
16.167	76.0304	394.85	. . . V Q . .
250	79.5689	513.79	. . . V . Q .
.333	82.9810	495.44	. . . V . Q .
16.417	85.5471	372.59	. . . Q V . .
16.500	87.4097	270.45	. . Q . V . .
16.583	88.7971	201.45	. Q . V . .
16.667	89.9428	166.35	.Q . V. .
16.750	90.9414	145.01	Q. . V. .
16.833	91.8258	128.41	Q . . V. .
16.917	92.6225	115.67	Q . . V .
17.000	93.3676	108.19	Q . . V .
17.083	94.0735	102.50	Q . . V .
17.167	94.7454	97.56	Q . . V .
17.250	95.3805	92.21	Q . . V .
17.333	95.9928	88.91	Q . . .V .
17.417	96.5850	85.99	Q . . .V .
17.500	97.1590	83.34	Q . . .V .
17.583	97.7158	80.85	Q . . .V .
17.667	98.2569	78.57	Q . . .V .
17.750	98.7837	76.48	Q . . . V .
17.833	99.2972	74.56	Q . . . V .
17.917	99.7984	72.78	Q . . . V .
18.000	100.2884	71.14	Q . . . V .

END OF FLOODSCx ROUTING ANALYSIS

EMERGENCY SPILLWAY DESIGN

ASSOCIATED ENGINEERS, INC.
3311 East Shelby Street
ONTARIO, CALIFORNIA 91764
(909) 980-1982
FAX (909) 941-0891

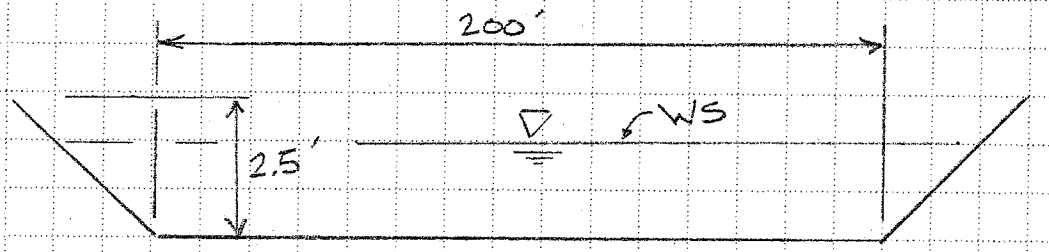
JOB KAISER COMMERCE CENTER
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

EMERGENCY SPILLWAY DESIGN

$Q_{100} = 513.79$ CFS
(BASED UPON SUPER-POSITIONED HYDROGRAPHS)

$$\begin{bmatrix} Q_{PIPE} = 389.0 \text{ CFS} \\ Q_{SITE} = 146.6 \text{ CFS} \end{bmatrix}$$

$Q_{1000} = Q_{100} \times 1.35 = 693.6$ CFS



$L = 200$
$H = 1.5$ (1.0' FREEBOARD)
$C = 3.08$ (KING'S TABLE 5-9)
MOST CONSERVATIVE VALUE

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

$$Q = 3.08(200)(1.5)^{3/2}$$

$$= 1131.7 > 693.6 \ (Q_{1000})$$

$\therefore$ OK

HYDRAULIC ANALYSIS

- Storm Drain Line "A"
- Storm Drain Line "A-1"
- Storm Drain Line "A-1A"
- Storm Drain Line "A-1B"
- Storm Drain Line "A-2"
- Storm Drain Line "A-2A"
- Storm Drain Line "B"
- Storm Drain Line "B-1"
- Storm Drain Line "B-2"
- Storm Drain Line "B-3"
- Storm Drain Line "E"

STORM DRAIN LINE "A"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 8:29:34

Storm Drain Line "A"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT or "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
100.00	1012.67	2.239	1014.909	176.3	19.40	5.845	1020.755	.00	3.714	5.40	5.50	.00	.00	0 .0
.27	.00493					.022769	.01	2.24	2.637	3.545	.013		.00	PIPE
100.27	1012.67	2.238	1014.910	176.3	19.41	5.851	1020.761	.00	3.714	5.40	5.50	.00	.00	0 .0
26.07	.00493					.024373	.64	2.24	2.639	3.545	.013		.00	PIPE
126.33	1012.80	2.160	1014.960	176.3	20.36	6.437	1021.396	.00	3.714	5.37	5.50	.00	.00	0 .0
24.88	.00493					.027776	.69	2.16	2.826	3.545	.013		.00	PIPE
151.22	1012.92	2.085	1015.007	176.3	21.35	7.080	1022.088	.00	3.714	5.34	5.50	.00	.00	0 .0
23.78	.00493					.031666	.75	2.08	3.025	3.545	.013		.00	PIPE
175.00	1013.04	2.012	1015.052	176.3	22.40	7.788	1022.841	.00	3.714	5.30	5.50	.00	.00	0 .0
83.03	.03687					.032581	2.71	2.01	3.238	1.965	.013		.00	PIPE
258.03	1016.10	2.051	1018.153	176.3	21.82	7.396	1025.548	.00	3.714	5.32	5.50	.00	.00	0 .0
81.03	.03687					.029490	2.39	2.05	3.121	1.965	.013		.00	PIPE
339.06	1019.09	2.125	1021.215	176.3	20.81	6.723	1027.938	.00	3.714	5.36	5.50	.00	.00	0 .0
48.55	.03687					.025872	1.26	2.13	2.916	1.965	.013		.00	PIPE
387.61	1020.88	2.202	1023.082	176.3	19.84	6.112	1029.194	.73	3.714	5.39	5.50	.00	.00	0 .0
21.05	.03678					.023303	.49	2.93	2.723	1.967	.013		.00	PIPE
408.66	1021.65	2.248	1023.902	176.3	19.30	5.783	1029.686	.69	3.714	5.41	5.50	.00	.00	0 .0
28.20	.03678					.021054	.59	2.94	2.617	1.967	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
436.86	1022.69	2.330	1025.022	176.3	18.40	5.257	1030.279	.64	3.714	5.44	5.50	.00	.00	0 .0
21.44	.03678					.018492	.40	2.97	2.442	1.967	.013		.00	PIPE
458.30	1023.48	2.416	1025.896	176.3	17.54	4.779	1030.676	.00	3.714	5.46	5.50	.00	.00	0 .0
JUNCT STR	.03641					.022201	.10	2.42	2.279		.013		.00	PIPE
462.97	1023.65	1.999	1025.649	156.0	20.00	6.213	1031.861	.00	3.487	5.29	5.50	.00	.00	0 .0
21.31	.03696					.026337	.56	2.00	2.903	1.841	.013		.00	PIPE
484.28	1024.44	2.030	1026.468	156.0	19.58	5.955	1032.423	.00	3.487	5.31	5.50	.00	.00	0 .0
36	.03696					.023996	.87	2.03	2.817	1.841	.013		.00	PIPE
520.42	1025.77	2.103	1027.876	156.0	18.67	5.414	1033.290	.00	3.487	5.35	5.50	.00	.00	0 .0
26.16	.03696					.021051	.55	2.10	2.632	1.841	.013		.00	PIPE
546.58	1026.74	2.179	1028.919	156.0	17.80	4.922	1033.841	.00	3.487	5.38	5.50	.00	.00	0 .0
TRANS STR	.03601					.018246	.09	2.18	2.458		.013		.00	PIPE
551.58	1026.92	2.801	1029.721	156.0	16.60	4.279	1033.999	.70	3.640	3.67	4.00	.00	.00	1 .0
1.94	.03691					.016687	.03	3.50	1.827	2.153	.013		.00	PIPE
553.52	1026.99	2.817	1029.809	156.0	16.49	4.224	1034.033	.69	3.640	3.65	4.00	.00	.00	1 .0
12.03	.03691					.015683	.19	3.50	1.806	2.153	.013		.00	PIPE
565.55	1027.44	2.946	1030.382	156.0	15.72	3.840	1034.221	.60	3.640	3.52	4.00	.00	.00	1 .0
9.12	.03691					.014056	.13	3.55	1.652	2.153	.013		.00	PIPE

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 8:2

Storm Drain Line "A"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"		ZR	Type Ch
574.67	1027.77	3.086	1030.859	156.0	14.99	3.491	1034.349	.52	3.640	3.36	4.00	.00	.00	1 .0
6.65	.03691					.012669	.08	3.61	1.501	2.153	.013		.00	PIPE
581.32	1028.02	3.243	1031.260	156.0	14.30	3.173	1034.434	.44	3.640	3.13	4.00	.00	.00	1 .0
4.32	.03691					.011520	.05	3.68	1.350	2.153	.013		.00	PIPE
585.64	1028.18	3.421	1031.599	156.0	13.63	2.885	1034.483	.36	3.640	2.81	4.00	.00	.00	1 .0
1.70	.03691					.010653	.02	3.78	1.191	2.153	.013		.00	PIPE
587.34	1028.24	3.640	1031.880	156.0	12.99	2.622	1034.501	.27	3.640	2.29	4.00	.00	.00	1 .0

STORM DRAIN LINE "A-1"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 8:40:46

Storm Drain Line "A-1"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
102.75	1025.32	.943	1026.263	12.9	8.87	1.221	1027.484	.00	1.293	2.00	2.00	.00	.00	1 .0
45.86	.01595					.015963	.73	.94	1.830	.943	.013		.00	PIPE
148.61	1026.05	.943	1026.995	12.9	8.87	1.221	1028.216	.00	1.293	2.00	2.00	.00	.00	1 .0
86.74	.01595					.015829	1.37	.94	1.830	.943	.013		.00	PIPE
235.35	1027.44	.948	1028.383	12.9	8.81	1.206	1029.589	.00	1.293	2.00	2.00	.00	.00	1 .0
61.62	.01595					.014754	.91	.95	1.813	.943	.013		.00	PIPE
296.98	1028.42	.983	1029.402	12.9	8.40	1.096	1030.498	.00	1.293	2.00	2.00	.00	.00	1 .0
20.95	.01595					.012989	.27	.98	1.689	.943	.013		.00	PIPE
317.93	1028.75	1.021	1029.773	12.9	8.01	.997	1030.770	.00	1.293	2.00	2.00	.00	.00	1 .0
11.38	.01595					.011444	.13	1.02	1.572	.943	.013		.00	PIPE
329.31	1028.93	1.060	1029.994	12.9	7.64	.906	1030.900	.00	1.293	2.00	2.00	.00	.00	1 .0
6.97	.01595					.010091	.07	1.06	1.463	.943	.013		.00	PIPE
336.28	1029.05	1.102	1030.147	12.9	7.28	.824	1030.971	.00	1.293	1.99	2.00	.00	.00	1 .0
4.44	.01595					.008907	.04	1.10	1.359	.943	.013		.00	PIPE
340.73	1029.12	1.145	1030.261	12.9	6.94	.749	1031.010	.00	1.293	1.98	2.00	.00	.00	1 .0
2.72	.01595					.007871	.02	1.15	1.262	.943	.013		.00	PIPE
343.45	1029.16	1.191	1030.351	12.9	6.62	.681	1031.032	.00	1.293	1.96	2.00	.00	.00	1 .0
1.47	.01595					.006964	.01	1.19	1.170	.943	.013		.00	PIPE

Storm Drain Line "A-1"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"		ZR	Type Ch
344.91	1029.18	1.240	1030.423	12.9	6.31	.619	1031.042	.00	1.293	1.94	2.00	.00	.00	1 .0
.45	.01595					.006165	.00	1.24	1.084	.943	.013		.00	PIPE
345.36	1029.19	1.293	1030.483	12.9	6.01	.562	1031.045	.00	1.293	1.91	2.00	.00	.00	1 .0

STORM DRAIN LINE "A-1A"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 8-22-2001 Time: 9: 1: 5

Storm Drain Line "A-1A"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
102.04	1029.22	1.260	1030.480	5.6	2.71	.114	1030.594	.00	.839	1.93	2.00	.00	.00	1 .0
4.46	.00993					.001266	.01	1.26	.459	.682	.013		.00	PIPE
106.50	1029.26	1.210	1030.474	5.6	2.84	.125	1030.599	.00	.839	1.96	2.00	.00	.00	1 .0
4.06	.00993					.001430	.01	1.21	.496	.682	.013		.00	PIPE
110.56	1029.30	1.163	1030.468	5.6	2.98	.137	1030.605	.00	.839	1.97	2.00	.00	.00	1 .0
3.71	.00993					.001617	.01	1.16	.535	.682	.013		.00	PIPE
114.27	1029.34	1.118	1030.460	5.6	3.12	.151	1030.611	.00	.839	1.99	2.00	.00	.00	1 .0
3.34	.00993					.001831	.01	1.12	.577	.682	.013		.00	PIPE
117.61	1029.37	1.076	1030.451	5.6	3.27	.166	1030.617	.00	.839	1.99	2.00	.00	.00	1 .0
3.00	.00993					.002076	.01	1.08	.621	.682	.013		.00	PIPE
120.61	1029.40	1.036	1030.440	5.6	3.43	.183	1030.623	.00	.839	2.00	2.00	.00	.00	1 .0
1.52	.00993					.002356	.00	1.04	.667	.682	.013		.00	PIPE
122.14	1029.42	.998	1030.417	5.6	3.60	.201	1030.619	.00	.839	2.00	2.00	.00	.00	1 .0
HYDRAULIC JUMP														
122.14	1029.42	.682	1030.102	5.6	5.96	.552	1030.654	.00	.839	1.90	2.00	.00	.00	1 .0
32.56	.00993					.009409	.31	.68	1.488	.682	.013		.00	PIPE
154.70	1029.74	.702	1030.445	5.6	5.73	.511	1030.956	.00	.839	1.91	2.00	.00	.00	1 .0
13.55	.00993					.008349	.11	.70	1.408	.682	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT or "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
168.26	1029.88	.727	1030.604	5.6	5.47	.464	1031.069	.00	.839	1.92	2.00	.00	.00	1 .0
6.17	.00993					.007320	.05	.73	1.316	.682	.013		.00	PIPE
174.43	1029.94	.753	1030.692	5.6	5.21	.422	1031.114	.00	.839	1.94	2.00	.00	.00	1 .0
3.21	.00993					.006420	.02	.75	1.230	.682	.013		.00	PIPE
177.64	1029.97	.780	1030.751	5.6	4.97	.384	1031.134	.00	.839	1.95	2.00	.00	.00	1 .0
1.53	.00993					.005633	.01	.78	1.149	.682	.013		.00	PIPE
179.17	1029.99	.808	1030.794	5.6	4.74	.349	1031.143	.00	.839	1.96	2.00	.00	.00	1 .0
.42	.00993					.004935	.00	.81	1.073	.682	.013		.00	PIPE
179.59	1029.99	.839	1030.829	5.6	4.51	.316	1031.145	.00	.839	1.97	2.00	.00	.00	1 .0

STORM DRAIN LINE "A-1B"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 9: 1:28

Storm Drain Line "A-1B"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
102.47	1029.22	.711	1029.932	7.3	7.28	.822	1030.754	.00	.959	1.91	2.00	.00	.00	1 .0
17.68	.01472					.013870	.25	.71	1.773	.704	.013		.00	PIPE
120.15	1029.48	.719	1030.199	7.3	7.18	.800	1030.999	.00	.959	1.92	2.00	.00	.00	1 .0
24.13	.01472					.012771	.31	.72	1.739	.704	.013		.00	PIPE
144.28	1029.84	.744	1030.580	7.3	6.84	.727	1031.307	.00	.959	1.93	2.00	.00	.00	1 .0
11.17	.01472					.011200	.13	.74	1.625	.704	.013		.00	PIPE
155.45	1030.00	.771	1030.771	7.3	6.53	.661	1031.432	.00	.959	1.95	2.00	.00	.00	1 .0
6.58	.01472					.009826	.06	.77	1.518	.704	.013		.00	PIPE
162.03	1030.10	.799	1030.896	7.3	6.22	.601	1031.497	.00	.959	1.96	2.00	.00	.00	1 .0
4.19	.01472					.008623	.04	.80	1.418	.704	.013		.00	PIPE
166.22	1030.16	.828	1030.987	7.3	5.93	.547	1031.533	.00	.959	1.97	2.00	.00	.00	1 .0
2.70	.01472					.007572	.02	.83	1.324	.704	.013		.00	PIPE
168.92	1030.20	.859	1031.057	7.3	5.66	.497	1031.554	.00	.959	1.98	2.00	.00	.00	1 .0
1.67	.01472					.006651	.01	.86	1.236	.704	.013		.00	PIPE
170.59	1030.22	.890	1031.113	7.3	5.39	.452	1031.565	.00	.959	1.99	2.00	.00	.00	1 .0
.90	.01472					.005846	.01	.89	1.153	.704	.013		.00	PIPE
171.48	1030.24	.923	1031.159	7.3	5.14	.411	1031.570	.00	.959	1.99	2.00	.00	.00	1 .0
.28	.01472					.005132	.00	.92	1.075	.704	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
171.76	1030.24	.959	1031.199	7.3	4.90	.372	1031.571	.00	.959	2.00	2.00	.00	.00	1 .0

STORM DRAIN LINE "A-2"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 9:34: 0

Storm Drain Line "A-2"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
104.11	1025.32	.515	1025.836	7.5	11.67	2.115	1027.951	.00	.972	1.75	2.00	.00	.00	0 .0
4.66	.05292					.051617	.24	.52	3.398	.512	.013		.00	PIPE
108.77	1025.57	.516	1026.083	7.5	11.66	2.111	1028.193	.00	.972	1.75	2.00	.00	.00	0 .0
37.81	.05292					.048312	1.83	.52	3.393	.512	.013		.00	PIPE
146.58	1027.57	.534	1028.101	7.5	11.12	1.919	1030.020	.00	.972	1.77	2.00	.00	.00	0 .0
14.65	.05292					.042265	.62	.53	3.176	.512	.013		.00	PIPE
161.23	1028.34	.552	1028.895	7.5	10.60	1.744	1030.639	.00	.972	1.79	2.00	.00	.00	0 .0
8.75	.05292					.036982	.32	.55	2.973	.512	.013		.00	PIPE
169.98	1028.81	.571	1029.377	7.5	10.11	1.586	1030.962	.00	.972	1.81	2.00	.00	.00	0 .0
6.05	.05292					.032368	.20	.57	2.782	.512	.013		.00	PIPE
176.02	1029.13	.591	1029.717	7.5	9.64	1.442	1031.158	.00	.972	1.83	2.00	.00	.00	0 .0
4.49	.05292					.028335	.13	.59	2.604	.512	.013		.00	PIPE
180.51	1029.36	.612	1029.975	7.5	9.19	1.311	1031.285	.00	.972	1.84	2.00	.00	.00	0 .0
3.48	.05292					.024810	.09	.61	2.436	.512	.013		.00	PIPE
183.99	1029.55	.633	1030.180	7.5	8.76	1.191	1031.372	.00	.972	1.86	2.00	.00	.00	0 .0
2.76	.05292					.021727	.06	.63	2.279	.512	.013		.00	PIPE
186.75	1029.69	.655	1030.348	7.5	8.35	1.083	1031.431	.00	.972	1.88	2.00	.00	.00	0 .0
2.22	.05292					.019034	.04	.66	2.131	.512	.013		.00	PIPE

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 9:3

Storm Drain Line "A-2"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
188.97	1029.81	.679	1030.489	7.5	7.96	.985	1031.474	.00	.972	1.89	2.00	.00	.00	0 .0
1.81	.05292					.016679	.03	.68	1.993	.512	.013		.00	PIPE
190.78	1029.91	.703	1030.609	7.5	7.59	.895	1031.504	.00	.972	1.91	2.00	.00	.00	0 .0
1.47	.05292					.014619	.02	.70	1.863	.512	.013		.00	PIPE
192.25	1029.98	.728	1030.711	7.5	7.24	.814	1031.525	.00	.972	1.92	2.00	.00	.00	0 .0
1.19	.05292					.012818	.02	.73	1.741	.512	.013		.00	PIPE
193.44	1030.05	.754	1030.801	7.5	6.90	.740	1031.541	.00	.972	1.94	2.00	.00	.00	0 .0
.96	.05292					.011243	.01	.75	1.627	.512	.013		.00	PIPE
194.40	1030.10	.781	1030.879	7.5	6.58	.673	1031.551	.00	.972	1.95	2.00	.00	.00	0 .0
.76	.05292					.009864	.01	.78	1.520	.512	.013		.00	PIPE
195.16	1030.14	.809	1030.948	7.5	6.27	.611	1031.559	.00	.972	1.96	2.00	.00	.00	0 .0
.59	.05292					.008659	.01	.81	1.419	.512	.013		.00	PIPE
195.75	1030.17	.839	1031.008	7.5	5.98	.556	1031.564	.00	.972	1.97	2.00	.00	.00	0 .0
.44	.05292					.007604	.00	.84	1.325	.512	.013		.00	PIPE
196.19	1030.19	.870	1031.062	7.5	5.70	.505	1031.567	.00	.972	1.98	2.00	.00	.00	0 .0
.30	.05292					.006681	.00	.87	1.236	.512	.013		.00	PIPE
196.48	1030.21	.902	1031.110	7.5	5.44	.459	1031.569	.00	.972	1.99	2.00	.00	.00	0 .0
.17	.05292					.005873	.00	.90	1.153	.512	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT or "N"	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
196.65	1030.22	.936	1031.153	7.5	5.19	.418	1031.570	.00	.972	2.00	2.00	.00	.00	0 .0
.06	.05292					.005157	.00	.94	1.075	.512	.013		.00	PIPE
196.71	1030.22	.972	1031.192	7.5	4.94	.379	1031.571	.00	.972	2.00	2.00	.00	.00	0 .0
JUNCT STR	.05320							.97	1.000		.013		.00	PIPE
202.35	1030.52	.389	1030.909	4.3	10.03	1.562	1032.471	.00	.729	1.58	2.00	.00	.00	0 .0
5.13	.05285					.052998	.27	.39	3.392	.389	.013		.00	PIPE
207.48	1030.79	.389	1031.180	4.3	10.03	1.562	1032.742	.00	.729	1.58	2.00	.00	.00	0 .0
42.41	.05285					.051556	2.19	.39	3.392	.389	.013		.00	PIPE
249	1033.03	.394	1033.427	4.3	9.83	1.501	1034.928	.00	.729	1.59	2.00	.00	.00	0 .0
20.86	.05285					.046954	.98	.39	3.302	.389	.013		.00	PIPE
270.74	1034.14	.408	1034.543	4.3	9.37	1.365	1035.907	.00	.729	1.61	2.00	.00	.00	0 .0
9.33	.05285					.041032	.38	.41	3.093	.389	.013		.00	PIPE
280.07	1034.63	.422	1035.049	4.3	8.94	1.241	1036.290	.00	.729	1.63	2.00	.00	.00	0 .0
5.79	.05285					.035860	.21	.42	2.897	.389	.013		.00	PIPE
285.86	1034.93	.436	1035.370	4.3	8.52	1.128	1036.498	.00	.729	1.65	2.00	.00	.00	0 .0
4.08	.05285					.031345	.13	.44	2.714	.389	.013		.00	PIPE
289.94	1035.15	.451	1035.600	4.3	8.13	1.025	1036.626	.00	.729	1.67	2.00	.00	.00	0 .0
3.06	.05285					.027400	.08	.45	2.542	.389	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
293.00	1035.31	.466	1035.777	4.3	7.75	.932	1036.709	.00	.729	1.69	2.00	.00	.00	0 .0
2.38	.05285					.023957	.06	.47	2.381	.389	.013		.00	PIPE
295.38	1035.44	.482	1035.919	4.3	7.39	.847	1036.766	.00	.729	1.71	2.00	.00	.00	0 .0
1.90	.05285					.020949	.04	.48	2.229	.389	.013		.00	PIPE
297.27	1035.54	.499	1036.036	4.3	7.04	.770	1036.806	.00	.729	1.73	2.00	.00	.00	0 .0
1.53	.05285					.018321	.03	.50	2.087	.389	.013		.00	PIPE
298.80	1035.62	.516	1036.134	4.3	6.72	.700	1036.834	.00	.729	1.75	2.00	.00	.00	0 .0
1.25	.05285					.016026	.02	.52	1.954	.389	.013		.00	PIPE
300.05	1035.68	.534	1036.217	4.3	6.40	.637	1036.854	.00	.729	1.77	2.00	.00	.00	0
1.01	.05285					.014021	.01	.53	1.829	.389	.013		.00	PIPE
301.06	1035.74	.552	1036.290	4.3	6.11	.579	1036.868	.00	.729	1.79	2.00	.00	.00	0 .0
.83	.05285					.012269	.01	.55	1.712	.389	.013		.00	PIPE
301.89	1035.78	.571	1036.352	4.3	5.82	.526	1036.879	.00	.729	1.81	2.00	.00	.00	0 .0
.66	.05285					.010737	.01	.57	1.603	.389	.013		.00	PIPE
302.55	1035.82	.591	1036.407	4.3	5.55	.478	1036.886	.00	.729	1.83	2.00	.00	.00	0 .0
.52	.05285					.009399	.00	.59	1.500	.389	.013		.00	PIPE
303.08	1035.84	.612	1036.456	4.3	5.29	.435	1036.891	.00	.729	1.84	2.00	.00	.00	0 .0
.40	.05285					.008230	.00	.61	1.403	.389	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
303.48	1035.87	.633	1036.499	4.3	5.05	.395	1036.894	.00	.729	1.86	2.00	.00	.00	0 .0
.30	.05285					.007208	.00	.63	1.312	.389	.013		.00	PIPE
303.78	1035.88	.656	1036.537	4.3	4.81	.359	1036.896	.00	.729	1.88	2.00	.00	.00	0 .0
.21	.05285					.006314	.00	.66	1.227	.389	.013		.00	PIPE
303.98	1035.89	.679	1036.571	4.3	4.59	.327	1036.897	.00	.729	1.89	2.00	.00	.00	0 .0
.12	.05285					.005533	.00	.68	1.148	.389	.013		.00	PIPE
304.10	1035.90	.703	1036.601	4.3	4.37	.297	1036.898	.00	.729	1.91	2.00	.00	.00	0 .0
.04	.05285					.004838	.00	.70	1.073	.389	.013		.00	PIPE
304.14	1035.90	.729	1036.629	4.3	4.16	.269	1036.898	.00	.729	1.93	2.00	.00	.00	0 .0

STORM DRAIN LINE "A-2A"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 8-22-2001 Time: 9:36:17

Storm Drain Line "A-2A"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
103.15	1030.52	.334	1030.854	3.2	9.33	1.351	1032.205	.00	.627	1.49	2.00	.00	.00	1 .0
.60	.05506					.055114	.03	.33	3.418	.334	.013	.00		PIPE
103.75	1030.55	.334	1030.887	3.2	9.33	1.351	1032.238	.00	.627	1.49	2.00	.00	.00	1 .0
32.51	.05506					.052691	1.71	.33	3.418	.334	.013	.00		PIPE
136.25	1032.34	.342	1032.684	3.2	9.03	1.267	1033.951	.00	.627	1.51	2.00	.00	.00	1 .0
13.00	.05506					.047087	.61	.34	3.271	.334	.013	.00		PIPE
149.25	1033.06	.353	1033.411	3.2	8.61	1.152	1034.563	.00	.627	1.52	2.00	.00	.00	1 .0
6.66	.05506					.041130	.27	.35	3.065	.334	.013	.00		PIPE
155.91	1033.42	.365	1033.790	3.2	8.21	1.047	1034.837	.00	.627	1.54	2.00	.00	.00	1 .0
4.33	.05506					.035929	.16	.36	2.872	.334	.013	.00		PIPE
160.24	1033.66	.377	1034.041	3.2	7.83	.952	1034.992	.00	.627	1.56	2.00	.00	.00	1 .0
3.11	.05506					.031390	.10	.38	2.691	.334	.013	.00		PIPE
163.35	1033.83	.390	1034.225	3.2	7.46	.865	1035.090	.00	.627	1.58	2.00	.00	.00	1 .0
2.37	.05506					.027428	.06	.39	2.521	.334	.013	.00		PIPE
165.72	1033.97	.403	1034.369	3.2	7.12	.787	1035.155	.00	.627	1.60	2.00	.00	.00	1 .0
1.86	.05506					.023965	.04	.40	2.362	.334	.013	.00		PIPE
167.58	1034.07	.417	1034.485	3.2	6.79	.715	1035.200	.00	.627	1.62	2.00	.00	.00	1 .0
1.49	.05506					.020943	.03	.42	2.213	.334	.013	.00		PIPE

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 8-22-2001 Time: 9:3

Storm Drain Line "A-2A"

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"		ZR	Type Ch
169.07	1034.15	.431	1034.581	3.2	6.47	.650	1035.231	.00	.627	1.64	2.00	.00	.00	1 .0
1.21	.05506					.018306	.02	.43	2.073	.334	.013		.00	PIPE
170.28	1034.22	.446	1034.662	3.2	6.17	.591	1035.253	.00	.627	1.66	2.00	.00	.00	1 .0
.99	.05506					.016002	.02	.45	1.941	.334	.013		.00	PIPE
171.27	1034.27	.461	1034.732	3.2	5.88	.537	1035.269	.00	.627	1.68	2.00	.00	.00	1 .0
.80	.05506					.013990	.01	.46	1.818	.334	.013		.00	PIPE
172.07	1034.32	.477	1034.792	3.2	5.61	.488	1035.280	.00	.627	1.70	2.00	.00	.00	1 .0
.66	.05506					.012233	.01	.48	1.703	.334	.013		.00	PIPE
172.73	1034.35	.493	1034.844	3.2	5.35	.444	1035.288	.00	.627	1.72	2.00	.00	.00	1
.53	.05506					.010698	.01	.49	1.594	.334	.013		.00	PIPE
173.25	1034.38	.510	1034.890	3.2	5.10	.404	1035.294	.00	.627	1.74	2.00	.00	.00	1 .0
.42	.05506					.009357	.00	.51	1.493	.334	.013		.00	PIPE
173.67	1034.40	.528	1034.931	3.2	4.86	.367	1035.298	.00	.627	1.76	2.00	.00	.00	1 .0
.32	.05506					.008185	.00	.53	1.397	.334	.013		.00	PIPE
173.99	1034.42	.546	1034.967	3.2	4.63	.334	1035.300	.00	.627	1.78	2.00	.00	.00	1 .0
.24	.05506					.007162	.00	.55	1.308	.334	.013		.00	PIPE
174.23	1034.43	.565	1034.999	3.2	4.42	.303	1035.302	.00	.627	1.80	2.00	.00	.00	1 .0
.16	.05506					.006268	.00	.56	1.224	.334	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip / Type Ch
174.39	1034.44	.584	1035.027	3.2	4.21	.276	1035.303	.00	.627	1.82	2.00	.00	.00	1 .0
.09	.05506					.005487	.00	.58	1.146	.334	.013		.00	PIPE
174.49	1034.45	.605	1035.053	3.2	4.02	.251	1035.304	.00	.627	1.84	2.00	.00	.00	1 .0
.03	.05506					.004790	.00	.60	1.072	.334	.013		.00	PIPE
174.52	1034.45	.627	1035.077	3.2	3.82	.227	1035.304	.00	.627	1.86	2.00	.00	.00	1 .0

STORM DRAIN LINE "B"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 8-22-2001 Time: 1:28:19

Storm Drain Line "B"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT or I.D. / "N"	Base Wt / ZL / ZR	No Wth Prs/Pip / Type Ch
1000.00	1032.07	5.013	1037.083	389.0	13.19	2.701	1039.784	.00	5.197	6.31	7.00	.00	.00 1 .0
61.93	.00501					.004970	.31	5.01	1.075	5.006	.013		.00 PIPE
1061.93	1032.38	5.028	1037.408	389.0	13.15	2.684	1040.092	.38	5.197	6.30	7.00	.00	.00 1 .0
9.41	.00495					.004950	.05	5.40	1.069	5.028	.013		.00 PIPE
1071.34	1032.43	5.028	1037.455	389.0	13.15	2.684	1040.138	.38	5.197	6.30	7.00	.00	.00 1 .0
61.28	.00495					.004758	.29	5.40	1.069	5.028	.013		.00 PIPE
1132.62	1032.73	5.197	1037.927	389.0	12.70	2.503	1040.430	.00	5.197	6.12	7.00	.00	.00 1 .0
JUNCT STR	.00325					.003549	.02	5.20	1.000		.013		.00 PIPE
1138.79	1032.75	6.586	1039.336	345.8	9.21	1.316	1040.652	.00	4.899	3.30	7.00	.00	.00 1 .0
306.[illegible]	.00359					.002587	.79	6.59	.481	5.210	.013		.00 PIPE
1445.48	1033.85	6.148	1039.998	345.8	9.65	1.447	1041.445	.00	4.899	4.58	7.00	.00	.00 1 .0
232.03	.00359					.002754	.64	6.15	.608	5.210	.013		.00 PIPE
1677.51	1034.68	5.810	1040.492	345.8	10.13	1.592	1042.084	.00	4.899	5.26	7.00	.00	.00 1 .0
30.16	.00359					.002884	.09	5.81	.700	5.210	.013		.00 PIPE
1707.67	1034.79	5.768	1040.558	345.8	10.19	1.613	1042.171	.00	4.899	5.33	7.00	.00	.00 1 .0
TRANS STR	.00430					.003675	.02	5.77	.712		.013		.00 PIPE
1712.33	1034.81	5.263	1040.073	345.8	12.01	2.241	1042.314	.00	4.987	5.10	6.50	.00	.00 1 .0
123.59	.00356					.004258	.53	5.26	.891	6.500	.013		.00 PIPE

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 1:28

Storm Drain Line "B"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
1835.92	1035.25	5.552	1040.803	345.8	11.45	2.037	1042.840	.00	4.987	4.59	6.50	.00	.00	1 .0
448.63	.00356					.003935	1.77	5.55	.787	6.500	.013		.00	PIPE
2284.55	1036.85	5.904	1042.754	345.8	10.92	1.852	1044.606	.15	4.987	3.75	6.50	.00	.00	1 .0
143.38	.00363					.003795	.54	6.06	.662	6.500	.013		.00	PIPE
2427.93	1037.37	5.946	1043.316	345.8	10.87	1.834	1045.150	.00	4.987	3.63	6.50	.00	.00	1 .0
272.07	.00356					.003775	1.03	5.95	.647	6.500	.013		.00	PIPE
2700.00	1038.34	6.041	1044.381	345.8	10.76	1.796	1046.177	.00	4.987	3.33	6.50	.00	.00	1 .0
427.39	.00358					.003764	1.61	6.04	.610	6.500	.013		.00	PIPE
3127.39	1039.87	6.161	1046.031	345.8	10.63	1.755	1047.786	.00	4.987	2.89	6.50	.00	.00	1 .0
TRANS STR	.00429					.004764	.02	6.16	.559		.013		.00	PIPE
3132.06	1039.89	5.597	1045.487	345.8	12.59	2.463	1047.950	.16	5.042	3.00	6.00	.00	.00	1 .0
103.69	.00357					.006099	.63	5.76	.734	6.000	.013		.00	PIPE
3235.75	1040.26	6.000	1046.260	345.8	12.23	2.322	1048.582	6.00	5.042	.00	6.00	.00	.00	1 .0
8.43	.00357					.006551	.06	6.00	.000	6.000	.013		.00	PIPE
3244.18	1040.29	6.139	1046.429	345.8	12.23	2.322	1048.752	.00	5.042	.00	6.00	.00	.00	1 .0
JUNCT STR	.00453					.006465	.01	.00	.000		.013		.00	PIPE
3246.39	1040.30	6.404	1046.704	335.2	11.85	2.182	1048.886	.00	4.975	.00	6.00	.00	.00	1 .0
28.67	.00349					.006264	.18	.00	.000	6.000	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT or "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
3275.06	1040.40	6.689	1047.089	335.2	11.85	2.182	1049.272	.00	4.975	.00	6.00	.00	.00	1 .0
24.94	.00361					.006264	.16	6.69	.000	6.000	.013		.00	PIPE
3300.00	1040.49	6.865	1047.355	335.2	11.85	2.182	1049.537	.00	4.975	.00	6.00	.00	.00	1 .0

STORM DRAIN LINE "B-1"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 8-22-2001 Time: 2: 2:50

Storm Drain Line "B-1"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
104.75	1034.99	1.117	1036.107	42.3	19.92	6.162	1042.269	.00	2.175	2.49	2.50	.00	.00	1 .0
3.38	.20245					.059292	.20	1.12	3.800	.814	.013		.00	PIPE
108.13	1035.67	1.155	1036.830	42.3	19.06	5.640	1042.469	.00	2.175	2.49	2.50	.00	.00	1 .0
3.13	.20245					.052396	.16	1.16	3.561	.814	.013		.00	PIPE
111.26	1036.31	1.199	1037.506	42.3	18.17	5.127	1042.633	.00	2.175	2.50	2.50	.00	.00	1 .0
2.69	.20245					.046106	.12	1.20	3.319	.814	.013		.00	PIPE
113.95	1036.85	1.244	1038.096	42.3	17.33	4.661	1042.757	.00	2.175	2.50	2.50	.00	.00	1 .0
2.32	.20245					.040599	.09	1.24	3.091	.814	.013		.00	PIPE
116.27	1037.32	1.292	1038.614	42.3	16.52	4.237	1042.852	.00	2.175	2.50	2.50	.00	.00	1 .0
2.01	.20245					.035778	.07	1.29	2.877	.814	.013		.00	PIPE
118.28	1037.73	1.342	1039.072	42.3	15.75	3.852	1042.924	.00	2.175	2.49	2.50	.00	.00	1 .0
1.74	.20245					.031558	.05	1.34	2.676	.814	.013		.00	PIPE
120.03	1038.08	1.394	1039.477	42.3	15.02	3.502	1042.979	.00	2.175	2.48	2.50	.00	.00	1 .0
1.51	.20245					.027864	.04	1.39	2.486	.814	.013		.00	PIPE
121.53	1038.39	1.450	1039.837	42.3	14.32	3.184	1043.021	.00	2.175	2.47	2.50	.00	.00	1 .0
1.30	.20245					.024633	.03	1.45	2.307	.814	.013		.00	PIPE
122.83	1038.65	1.508	1040.158	42.3	13.65	2.894	1043.053	.00	2.175	2.45	2.50	.00	.00	1 .0
1.11	.20245					.021806	.02	1.51	2.139	.814	.013		.00	PIPE

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 8-22-2001 Time: 2:

Storm Drain Line "B-1"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL	No Wth Prs/Pip / Type Ch
123.94	1038.88	1.570	1040.446	42.3	13.02	2.631	1043.077	.00	2.175	2.42	2.50	.00	.00	1 .0
.95	.20245					.019336	.02	1.57	1.979	.814	.013		.00	PIPE
124.89	1039.07	1.637	1040.703	42.3	12.41	2.392	1043.095	.00	2.175	2.38	2.50	.00	.00	1 .0
.79	.20245					.017180	.01	1.64	1.828	.814	.013		.00	PIPE
125.68	1039.23	1.707	1040.934	42.3	11.83	2.174	1043.109	.00	2.175	2.33	2.50	.00	.00	1 .0
.65	.20245					.015302	.01	1.71	1.683	.814	.013		.00	PIPE
126.33	1039.36	1.783	1041.142	42.3	11.28	1.977	1043.119	.00	2.175	2.26	2.50	.00	.00	1 .0
.52	.20245					.013674	.01	1.78	1.545	.814	.013		.00	PIPE
126.85	1039.46	1.865	1041.329	42.3	10.76	1.797	1043.126	.00	2.175	2.18	2.50	.00	.00	1 .0
.38	.20245					.012273	.00	1.87	1.411	.814	.013		.00	PIPE
127.23	1039.54	1.956	1041.497	42.3	10.26	1.634	1043.130	.00	2.175	2.06	2.50	.00	.00	1 .0
.25	.20245					.011085	.00	1.96	1.279	.814	.013		.00	PIPE
127.48	1039.59	2.057	1041.648	42.3	9.78	1.485	1043.133	.00	2.175	1.91	2.50	.00	.00	1 .0
.09	.20245					.010113	.00	2.06	1.146	.814	.013		.00	PIPE
127.57	1039.61	2.175	1041.785	42.3	9.32	1.349	1043.134	.00	2.175	1.68	2.50	.00	.00	1 .0

STORM DRAIN LINE "B-2"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 8-22-2001 Time: 2: 3:11

Storm Drain Line "B-2"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT) / SF Ave	Water Elev / HF	Q (CFS) / SE Dpth	Vel (FPS) / Froude N	Vel Head / Norm Dp	Energy Grd.El. / "N"	Super Elev / ZR	Critical Depth / Type Ch	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
104.25	1035.24	4.100	1039.340	3.4	1.09	.019	1039.359	.00	.648	.00	2.00	.00	.00	1 .0
26.42	.07972					.000228	.01	4.10	.000	.315	.013		.00	PIPE
130.67	1037.35	2.000	1039.346	3.4	1.09	.019	1039.365	.00	.648	.00	2.00	.00	.00	1 .0
2.30	.07972					.000213	.00	2.00	.000	.315	.013		.00	PIPE
132.96	1037.53	1.815	1039.344	3.4	1.15	.020	1039.364	.00	.648	1.16	2.00	.00	.00	1 .0
1.33	.07972					.000208	.00	1.81	.126	.315	.013		.00	PIPE
134.29	1037.64	1.707	1039.342	3.4	1.20	.022	1039.364	.00	.648	1.41	2.00	.00	.00	1 .0
1.09	.07972					.000225	.00	1.71	.149	.315	.013		.00	PIPE
135.38	1037.72	1.618	1039.340	3.4	1.26	.025	1039.365	.00	.648	1.57	2.00	.00	.00	1 .0
.95	.07972					.000248	.00	1.62	.169	.315	.013		.00	PIPE
136.33	1037.80	1.540	1039.338	3.4	1.32	.027	1039.365	.00	.648	1.68	2.00	.00	.00	1 .0
.85	.07972					.000275	.00	1.54	.187	.315	.013		.00	PIPE
137.18	1037.86	1.470	1039.335	3.4	1.39	.030	1039.365	.00	.648	1.77	2.00	.00	.00	1 .0
.77	.07972					.000307	.00	1.47	.206	.315	.013		.00	PIPE
137.95	1037.93	1.406	1039.333	3.4	1.45	.033	1039.365	.00	.648	1.83	2.00	.00	.00	1 .0
.71	.07972					.000344	.00	1.41	.225	.315	.013		.00	PIPE
138.65	1037.98	1.347	1039.329	3.4	1.52	.036	1039.365	.00	.648	1.88	2.00	.00	.00	1 .0
.65	.07972					.000387	.00	1.35	.245	.315	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
139.30	1038.03	1.292	1039.326	3.4	1.60	.040	1039.366	.00	.648	1.91	2.00	.00	.00	1 .0
.60	.07972					.000435	.00	1.29	.266	.315	.013		.00	PIPE
139.91	1038.08	1.240	1039.323	3.4	1.68	.044	1039.366	.00	.648	1.94	2.00	.00	.00	1 .0
.56	.07972					.000491	.00	1.24	.288	.315	.013		.00	PIPE
140.47	1038.13	1.191	1039.318	3.4	1.76	.048	1039.366	.00	.648	1.96	2.00	.00	.00	1 .0
.36	.07972					.000555	.00	1.19	.311	.315	.013		.00	PIPE
140.83	1038.16	1.145	1039.301	3.4	1.84	.053	1039.354	.00	.648	1.98	2.00	.00	.00	1 .0
HYDRAULIC JUMP														
140.83	1038.16	.319	1038.475	3.4	10.61	1.748	1040.223	.00	.648	1.46	2.00	.00	.00	1 .0
4.36	.07972					.070520	.31	.32	3.980	.315	.013		.00	PIPE
145.19	1038.50	.330	1038.834	3.4	10.11	1.588	1040.422	.00	.648	1.48	2.00	.00	.00	1 .0
7.33	.07972					.061551	.45	.33	3.728	.315	.013		.00	PIPE
152.52	1039.09	.341	1039.430	3.4	9.64	1.444	1040.873	.00	.648	1.50	2.00	.00	.00	1 .0
4.61	.07972					.053761	.25	.34	3.494	.315	.013		.00	PIPE
157.14	1039.46	.353	1039.809	3.4	9.19	1.312	1041.121	.00	.648	1.52	2.00	.00	.00	1 .0
3.28	.07972					.046956	.15	.35	3.275	.315	.013		.00	PIPE
160.42	1039.72	.364	1040.082	3.4	8.77	1.193	1041.275	.00	.648	1.54	2.00	.00	.00	1 .0
2.48	.07972					.041016	.10	.36	3.068	.315	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
162.90	1039.92	.377	1040.292	3.4	8.36	1.085	1041.377	.00	.648	1.56	2.00	.00	.00	1 .0
1.96	.07972					.035835	.07	.38	2.875	.315	.013		.00	PIPE
164.86	1040.07	.389	1040.461	3.4	7.97	.986	1041.447	.00	.648	1.58	2.00	.00	.00	1 .0
1.58	.07972					.031310	.05	.39	2.694	.315	.013		.00	PIPE
166.44	1040.20	.403	1040.600	3.4	7.60	.896	1041.497	.00	.648	1.60	2.00	.00	.00	1 .0
1.29	.07972					.027358	.04	.40	2.524	.315	.013		.00	PIPE
167.73	1040.30	.416	1040.717	3.4	7.24	.815	1041.532	.00	.648	1.62	2.00	.00	.00	1 .0
1.07	.07972					.023909	.03	.42	2.364	.315	.013		.00	PIPE
168.81	1040.39	.430	1040.817	3.4	6.91	.741	1041.558	.00	.648	1.64	2.00	.00	.00	1 .0
.89	.07972					.020897	.02	.43	2.215	.315	.013		.00	PIPE
169.70	1040.46	.445	1040.903	3.4	6.59	.673	1041.576	.00	.648	1.66	2.00	.00	.00	1 .0
.75	.07972					.018268	.01	.45	2.074	.315	.013		.00	PIPE
170.45	1040.52	.460	1040.978	3.4	6.28	.612	1041.590	.00	.648	1.68	2.00	.00	.00	1 .0
.63	.07972					.015971	.01	.46	1.943	.315	.013		.00	PIPE
171.08	1040.57	.476	1041.043	3.4	5.99	.557	1041.600	.00	.648	1.70	2.00	.00	.00	1 .0
.52	.07972					.013964	.01	.48	1.819	.315	.013		.00	PIPE
171.60	1040.61	.492	1041.101	3.4	5.71	.506	1041.607	.00	.648	1.72	2.00	.00	.00	1 .0
.43	.07972					.012212	.01	.49	1.703	.315	.013		.00	PIPE

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
172.03	1040.64	.509	1041.153	3.4	5.44	.460	1041.613	.00	.648	1.74	2.00	.00	.00	1 .0
.35	.07972					.010682	.00	.51	1.595	.315	.013		.00	PIPE
172.38	1040.67	.527	1041.198	3.4	5.19	.418	1041.616	.00	.648	1.76	2.00	.00	.00	1 .0
.28	.07972					.009344	.00	.53	1.493	.315	.013		.00	PIPE
172.66	1040.69	.545	1041.239	3.4	4.95	.380	1041.619	.00	.648	1.78	2.00	.00	.00	1 .0
.22	.07972					.008176	.00	.54	1.398	.315	.013		.00	PIPE
172.88	1040.71	.564	1041.275	3.4	4.72	.346	1041.621	.00	.648	1.80	2.00	.00	.00	1 .0
.16	.07972					.007155	.00	.56	1.308	.315	.013		.00	PIPE
173.04	1040.72	.584	1041.308	3.4	4.50	.314	1041.622	.00	.648	1.82	2.00	.00	.00	1 .0
.11	.07972					.006263	.00	.58	1.224	.315	.013		.00	PIPE
173.15	1040.73	.604	1041.337	3.4	4.29	.286	1041.623	.00	.648	1.84	2.00	.00	.00	1 .0
.06	.07972					.005483	.00	.60	1.145	.315	.013		.00	PIPE
173.22	1040.74	.625	1041.363	3.4	4.09	.260	1041.623	.00	.648	1.85	2.00	.00	.00	1 .0
.02	.07972					.004789	.00	.63	1.071	.315	.013		.00	PIPE
173.24	1040.74	.648	1041.388	3.4	3.89	.235	1041.623	.00	.648	1.87	2.00	.00	.00	1 .0

STORM DRAIN LINE "B-3"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 8-22-2001 Time: 3: 3:30

Storm Drain Line "B-3"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/ Dia.-FT / ZR	Base Wt or I.D. / ZL	No Wth Prs/Pip / Type Ch
103.45	1042.35	4.350	1046.700	12.3	3.92	.239	1046.939	.00	1.262	.00	2.00	.00	.00 0 .0
130.41	.01710					.002966	.39	4.35	.000	.900	.013		.00 PIPE
233.86	1044.58	2.507	1047.087	12.3	3.92	.239	1047.326	.00	1.262	.00	2.00	.00	.00 0 .0
WALL	ENTRANCE												
233.86	1044.58	2.870	1047.450	12.3	1.07	.018	1047.468	.00	.665	4.00	6.00	4.00	.00 0 .0
JUNCT STR	.08287					.000053	.00	2.87	.112		.015		.00 BOX
237.36	1044.87	2.613	1047.483	4.0	.38	.002	1047.486	.00	.314	4.00	6.00	4.00	.00 0 .0
WALL	EXIT												
237.36	1044.87	2.614	1047.484	4.0	1.27	.025	1047.509	.00	.701	.00	2.00	.00	.00 0 .0
63.15	.01003					.000308	.02	2.61	.000	.568	.013		.00 PIPE
300.51	1045.50	2.000	1047.504	4.0	1.27	.025	1047.529	.00	.701	.00	2.00	.00	.00 0 .0
18.66	.01003					.000289	.01	2.00	.000	.568	.013		.00 PIPE
319.17	1045.69	1.815	1047.505	4.0	1.33	.028	1047.533	.00	.701	1.16	2.00	.00	.00 0 .0
10.76	.01003					.000282	.00	1.81	.146	.568	.013		.00 PIPE
329.93	1045.80	1.707	1047.506	4.0	1.40	.030	1047.536	.00	.701	1.41	2.00	.00	.00 0 .0
2.10	.01003					.000294	.00	1.71	.173	.568	.013		.00 PIPE
332.03	1045.82	1.686	1047.506	4.0	1.41	.031	1047.537	.00	.701	1.46	2.00	.00	.00 0 .0

STORM DRAIN LINE "E"

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING Date: 4-20-2001 Time: 9: 2:29

Storm Drain Line "E"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
100.00	1012.50	1.724	1014.225	68.4	16.27	4.112	1018.336	.00	2.636	2.97	3.00	.00	.00	1 .0
115.30	.02749					.025453	2.93	1.72	2.408	1.707	.013		.00	PIPE
215.30	1015.67	1.777	1017.447	68.4	15.69	3.824	1021.271	.50	2.636	2.95	3.00	.00	.00	1 .0
34.22	.02747					.023593	.81	2.28	2.274	1.708	.013		.00	PIPE
249.52	1016.61	1.810	1018.420	68.4	15.35	3.659	1022.079	.00	2.636	2.94	3.00	.00	.00	1 .0
9.33	.02749					.022695	.21	1.81	2.195	1.707	.013		.00	PIPE
258.85	1016.87	1.822	1018.689	68.4	15.23	3.602	1022.290	.00	2.636	2.93	3.00	.00	.00	1 .0
39.98	.02749					.021190	.85	1.82	2.167	1.707	.013		.00	PIPE
298.83	1017.97	1.897	1019.863	68.4	14.52	3.274	1023.138	.00	2.636	2.89	3.00	.00	.00	1 .0
25.01	.02749					.018796	.47	1.90	2.005	1.707	.013		.00	PIPE
323.84	1018.65	1.978	1020.631	68.4	13.85	2.977	1023.608	.00	2.636	2.84	3.00	.00	.00	1 .0
17.13	.02749					.016706	.29	1.98	1.851	1.707	.013		.00	PIPE
340.98	1019.12	2.063	1021.188	68.4	13.20	2.706	1023.894	.00	2.636	2.78	3.00	.00	.00	1 .0
12.19	.02749					.014888	.18	2.06	1.704	1.707	.013		.00	PIPE
353.17	1019.46	2.156	1021.615	68.4	12.59	2.460	1024.075	.00	2.636	2.70	3.00	.00	.00	1 .0
8.70	.02749					.013312	.12	2.16	1.563	1.707	.013		.00	PIPE
361.87	1019.70	2.256	1021.955	68.4	12.00	2.236	1024.191	.00	2.636	2.59	3.00	.00	.00	1 .0
5.99	.02749					.011958	.07	2.26	1.426	1.707	.013		.00	PIPE

For: Associated Engineers, Inc., Ontario, CA - S/N 595

WATER SURFACE PROFILE LISTING

Date: 4-20-2001 Time: 9:

Storm Drain Line "E"

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D.	ZL / ZR	No Wth Prs/Pip / Type Ch
367.85	1019.86	2.366	1022.230	68.4	11.44	2.033	1024.263	.00	2.636	2.45	3.00	.00	.00	1 .0
3.65	.02749					.010815	.04	2.37	1.290	1.707	.013		.00	PIPE
371.51	1019.96	2.490	1022.454	68.4	10.91	1.848	1024.302	.00	2.636	2.25	3.00	.00	.00	1 .0
1.31	.02749					.009892	.01	2.49	1.152	1.707	.013		.00	PIPE
372.82	1020.00	2.636	1022.636	68.4	10.40	1.679	1024.315	.00	2.636	1.96	3.00	.00	.00	1 .0

CATCH BASIN DESIGN

****

HYDRAULIC ELEMENTS - I PROGRAM PACKAGE

Ver. 8.0 Release Date: 01/01/2001 License ID 1404

Analysis prepared by:

ASSOCIATED ENGINEERS
Consulting Civil Engineers
3311 E. Shelby Street Ontario, California 91764
(909) 980-1982 Fax: (909) 941-0891

TIME/DATE OF STUDY: 16:13 08/16/2001

==========

********** DESCRIPTION OF STUDY **********

* KAISER COMMERCE CENTER *
* CATCH BASIN ALONG NORTH CURB OF VALLEY BOULEVARD *
* VALLEY BOULEVARD Sta 32+00.00 *

****

****

>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 5.64
BASIN OPENING(FEET) = 0.67
DEPTH OF WATER(FEET) = 1.00

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 2.14

==========

USE 7'

****
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Consulting Civil Engineers
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TIME/DATE OF STUDY: 16:12 08/16/2001

==========

********** DESCRIPTION OF STUDY **********
* KAISER COMMERCE CENTER *
* CATCH BASIN ALONG SOUTH CURB OF VALLEY BOULEVARD *
* VALLEY BOULEVARD Sta 32+10.00 *
****

****
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 7.29
BASIN OPENING(FEET) = 0.67
DEPTH OF WATER(FEET) = 1.00

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 2.77

==========

USE 7'

```
**************************************************************************
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                        Consulting Civil Engineers
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                     (909) 980-1982    Fax: (909) 941-0891

--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 16:18 08/16/2001
==========================================================================

 ************************** DESCRIPTION OF STUDY **************************
* KAISER COMMERCE CENTER                                                  *
* CATCH BASIN ON WEST SIDE OF COMMERCE JUST NORTH OF VALLEY BOULEVARD     *
* COMMERCE DRIVE Sta 101+50.00                                            *
 **************************************************************************

**************************************************************************
>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<
--------------------------------------------------------------------------

    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    STREETFLOW(CFS) =     3.22
    GUTTER FLOWDEPTH(FEET) =  0.36
    BASIN LOCAL DEPRESSION(FEET) =  0.33
    FLOWBY BASIN WIDTH(FEET) =   9.40

    >>>>CALCULATED BASIN WIDTH FOR TOTAL INTERCEPTION =     9.4

    >>>>CALCULATED ESTIMATED INTERCEPTION(CFS) =     3.2

==========================================================================
```

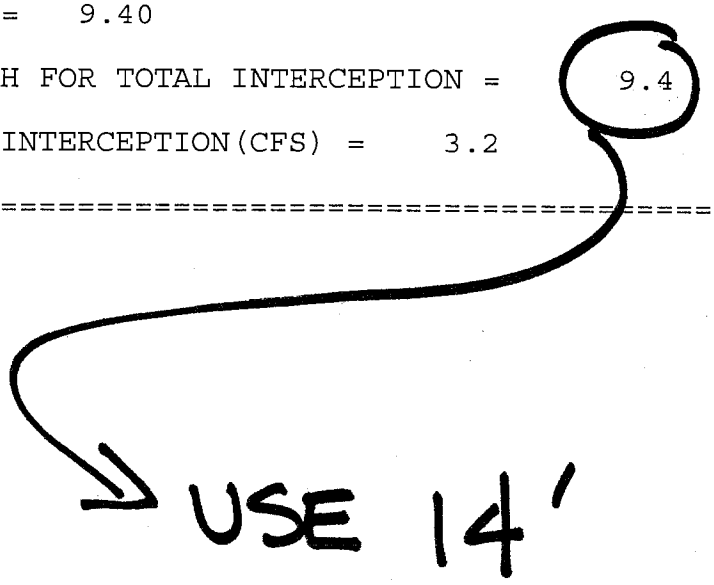

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(909) 980-1982 Fax: (909) 941-0891

TIME/DATE OF STUDY: 16:20 08/16/2001

==========

********** DESCRIPTION OF STUDY **********
* KAISER COMMERCE CENTER *
* CATCH BASIN ALONG EAST SIDE OF COMMERCE JUST NORTH OF VALLEY BOULEVARD *
* COMMERCE DRIVE Sta 101+50.00 *
****

****
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of Public Roads nomograph plots for flowby basins and sump basins.

BASIN INFLOW(CFS) = 4.31
BASIN OPENING(FEET) = 0.67
DEPTH OF WATER(FEET) = 1.00

>>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) = 1.64

==========

USE 7'

****

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Consulting Civil Engineers
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(909) 980-1982 Fax: (909) 941-0891

TIME/DATE OF STUDY: 16:26 08/16/2001

==========

********** DESCRIPTION OF STUDY **********
* KAISER COMMERCE CENTER *
* CATCH BASIN ON WEST SIDE OF COMMERCE JUST NORTH OF DETENTION BASIN *
* COMMERCE DRIVE Sta 109+98.62 *
****

****
>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<

Curb Inlet Capacities are approximated based on the Bureau of
Public Roads nomograph plots for flowby basins and sump basins.

STREETFLOW(CFS) = 3.50
GUTTER FLOWDEPTH(FEET) = 0.38
BASIN LOCAL DEPRESSION(FEET) = 0.33
FLOWBY BASIN WIDTH(FEET) = 9.65

>>>>CALCULATED BASIN WIDTH FOR TOTAL INTERCEPTION = 9.7

>>>>CALCULATED ESTIMATED INTERCEPTION(CFS) = 3.5

==========

USE 14'

```
**************************************************************************
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                      Consulting Civil Engineers
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                   (909) 980-1982    Fax: (909) 941-0891

--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 16:28 08/16/2001
==========================================================================

 ************************** DESCRIPTION OF STUDY **************************
* KAISER COMMERCE CENTER                                                  *
* CATCH BASIN ON EAST SIDE OF COMMERCE JUST NORTH OF DENTENTION BASIN     *
* COMMERCE DRIVE Sta 110+22.22                                            *
 *************************************************************************

**************************************************************************
>>>>FLOWBY CATCH BASIN INLET CAPACITY INPUT INFORMATION<<<<
--------------------------------------------------------------------------

  Curb Inlet Capacities are approximated based on the Bureau of
  Public Roads nomograph plots for flowby basins and sump basins.


   STREETFLOW(CFS) =     3.43
   GUTTER FLOWDEPTH(FEET) =  0.37
   BASIN LOCAL DEPRESSION(FEET) =  0.33
   FLOWBY BASIN WIDTH(FEET) =    9.73

   >>>>CALCULATED BASIN WIDTH FOR TOTAL INTERCEPTION =     9.7

   >>>>CALCULATED ESTIMATED INTERCEPTION(CFS) =     3.4

==========================================================================
```

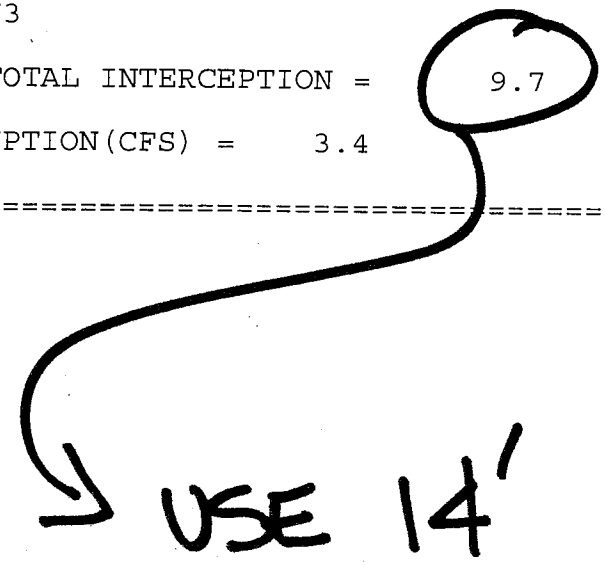

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                        Consulting Civil Engineers
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                     (909) 980-1982    Fax: (909) 941-0891

--------------------------------------------------------------------------
  TIME/DATE OF STUDY: 17:28 08/16/2001
==========================================================================

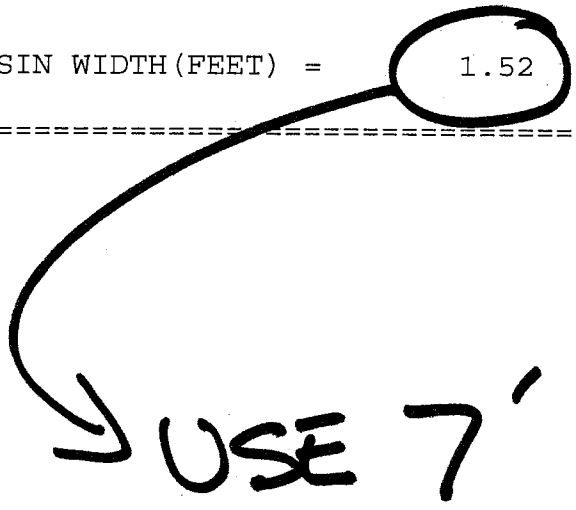
 ************************** DESCRIPTION OF STUDY **************************
* KAISER COMMERCE CENTER                                                  *
* CATCH BASIN ALONG SOUTH SIDE OF SAN BERNARDINO WEST OF PRIVATE DRIVE    *
* SAN BERNARDINO AVENUE Sta 21+00.00                                      *
 **************************************************************************

**************************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
--------------------------------------------------------------------------

    Curb Inlet Capacities are approximated based on the Bureau of
    Public Roads nomograph plots for flowby basins and sump basins.


    BASIN INFLOW(CFS) =    3.99
    BASIN OPENING(FEET) =  0.67
    DEPTH OF WATER(FEET) =  1.00

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =      1.52
==========================================================================
```



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                          ASSOCIATED ENGINEERS
                        Consulting Civil Engineers
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                    (909) 980-1982    Fax: (909) 941-0891

----------------------------------------------------------------------
  TIME/DATE OF STUDY: 17:29 08/16/2001
======================================================================

 ************************** DESCRIPTION OF STUDY **********************
* KAISER COMMERCE CENTER                                              *
* CATCH BASIN ALONG NORTH SIDE OF SAN BERNARDINO WEST OF PRIVATE DRIVE *
* SAN BERNARDINO AVENUE Sta 21+00.00                                  *
 **********************************************************************

**********************************************************************
>>>>SUMP TYPE BASIN INPUT INFORMATION<<<<
----------------------------------------------------------------------

  Curb Inlet Capacities are approximated based on the Bureau of
  Public Roads nomograph plots for flowby basins and sump basins.

    BASIN INFLOW(CFS) =     8.47
    BASIN OPENING(FEET) =   0.67
    DEPTH OF WATER(FEET) =  1.00

    >>>>CALCULATED ESTIMATED SUMP BASIN WIDTH(FEET) =      3.22
======================================================================
```

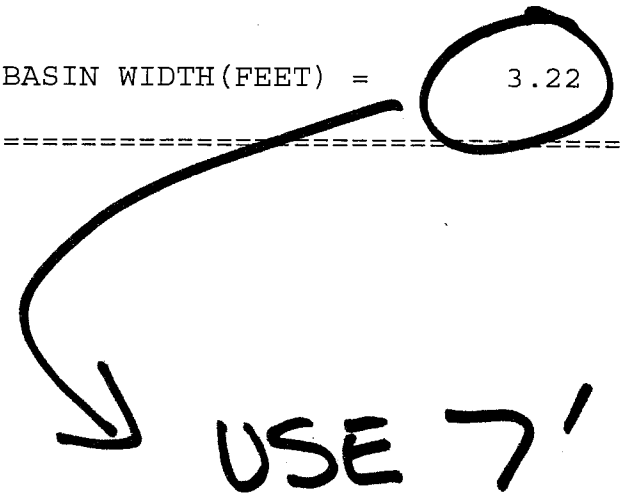

DRAINAGE NODE MAP

```
 EFFECTIVE AREA(ACRES) =    1.21    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.21        PEAK FLOW RATE(CFS) =       3.71

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.65
 FLOW VELOCITY(FEET/SEC.) =  2.18   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
 LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.03 =   860.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.03 TO NODE      9.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.35
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.486
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.63      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.93
 EFFECTIVE AREA(ACRES) =     1.84   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     1.84       PEAK FLOW RATE(CFS) =       5.64

****************************************************************************
 FLOW PROCESS FROM NODE      9.03 TO NODE      9.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.35
 RAINFALL INTENSITY(INCH/HR) =   3.49
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.84
 TOTAL STREAM AREA(ACRES) =    1.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.64

 ** CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      7.29  12.27     3.499   0.80( 0.08) 0.10      2.4        9.01
     2      5.64  12.35     3.486   0.80( 0.08) 0.10      1.8        9.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1     12.92  12.27     3.499   0.80( 0.08) 0.10      4.2        9.01
     2     12.91  12.35     3.486   0.80( 0.08) 0.10      4.2        9.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     12.92    Tc(MIN.) =    12.27
 EFFECTIVE AREA(ACRES) =     4.20   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      4.21
 LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.03 =   860.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.03 TO NODE      9.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1029.20  DOWNSTREAM(FEET) =  1024.50
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     12.92
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =  12.79
  LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.04 =  1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.05 TO NODE      9.04 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
   NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
      1     12.92   12.79     3.413   0.80( 0.08) 0.10      4.2        9.01
      2     12.91   12.86     3.401   0.80( 0.08) 0.10      4.2        9.01
  LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.04 =  1130.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
   STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
   NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
      1      7.48   13.30     3.333   0.80( 0.08) 0.10      2.6        6.03
      2      7.47   13.73     3.270   0.80( 0.08) 0.10      2.6        6.03
  LONGEST FLOWPATH FROM NODE      6.03 TO NODE      9.04 =   870.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
   NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
      1     20.28   12.79     3.413   0.80( 0.08) 0.10      6.7        9.01
      2     20.29   12.86     3.401   0.80( 0.08) 0.10      6.7        9.01
      3     20.12   13.30     3.333   0.80( 0.08) 0.10      6.8        6.03
      4     19.86   13.73     3.270   0.80( 0.08) 0.10      6.8        6.03
    TOTAL AREA(ACRES) =      6.81

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.29  Tc(MIN.) =   12.864
  EFFECTIVE AREA(ACRES) =     6.68  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =      6.81
  LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.04 =  1130.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      6.81  TC(MIN.) =     12.86
  EFFECTIVE AREA(ACRES) =      6.68  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  PEAK FLOW RATE(CFS)    =     20.29

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
   NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
      1     20.28   12.79     3.413   0.80( 0.08) 0.10      6.7        9.01
      2     20.29   12.86     3.401   0.80( 0.08) 0.10      6.7        9.01
      3     20.12   13.30     3.333   0.80( 0.08) 0.10      6.8        6.03
      4     19.86   13.73     3.270   0.80( 0.08) 0.10      6.8        6.03
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

2-YEAR STUDY

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* KAISER COMMERCE CENTER                                                  *
* 2 YEAR ANALYSIS                                                         *
* REVISED SITE DRAINAGE STUDY                                             *
 **************************************************************************

  FILE NAME: 96082FE\CCG002YR.DAT
  TIME/DATE OF STUDY: 14:01 08/15/2001
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.6000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.6200

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)     SIDE / SIDE/ WAY    (FT)    (FT)   (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   52.0     26.0    0.020/0.020/0.020   0.67    1.50  0.0208  0.125  0.0150
  2   40.0     20.0    0.020/0.020/0.020   0.67    1.50  0.0208  0.125  0.0150
  3   38.0     19.0    0.020/0.020/0.020   0.67    1.50  0.0208  0.125  0.0150
  4   22.0     11.0    0.020/0.020/0.020   0.67    1.50  0.0208  0.125  0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

  UNIT-HYDROGRAPH MODEL SELECTIONS/PARAMETERS:
    WATERSHED LAG = 0.80 * Tc
    VALLEY(DEVELOPED) S-GRAPH USED.
    SIERRA MADRE DEPTH-AREA FACTORS USED.
                    AREA-AVERAGED
        DURATION    RAINFALL(INCH)
         5-MINUTES         0.23
        30-MINUTES         0.47
         1-HOUR            0.62
         3-HOUR            1.10
         6-HOUR            1.64
        24-HOUR            3.06
*ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR UNIT HYDROGRAPH METHOD*


+--------------------------------------------------------------------------+
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| This is the major stream thread within the Kaiser Commerce Center      |
| Development.  It primarily consists of the backbone storm drain system |
| commencing at the EXEL building and discharging into the on-site basin. |
+-------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
 ELEVATION DATA: UPSTREAM(FEET) =   1107.30  DOWNSTREAM(FEET) =   1104.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.586
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.991
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        1.05      0.80       0.10     52    8.59
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.81
 TOTAL AREA(ACRES) =      1.05   PEAK FLOW RATE(CFS) =      1.81

****************************************************************************
 FLOW PROCESS FROM NODE      1.02 TO NODE      1.03 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1098.90  DOWNSTREAM(FEET) =  1097.90
 FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.34
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.81
 PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   9.63
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.03 =   600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.03 TO NODE      1.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.63
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.858
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        2.42      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.42     SUBAREA RUNOFF(CFS) =     3.87
 EFFECTIVE AREA(ACRES) =     3.47   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     3.47       PEAK FLOW RATE(CFS) =       5.55

****************************************************************************
 FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1097.90  DOWNSTREAM(FEET) =  1096.80
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.52
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

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 PIPE-FLOW(CFS) =      5.55
 PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =  10.45
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.04 =   820.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.04 TO NODE      1.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.45
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.770
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.58      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.58      SUBAREA RUNOFF(CFS) =     3.92
 EFFECTIVE AREA(ACRES) =     6.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     6.05        PEAK FLOW RATE(CFS) =       9.20

****************************************************************************
 FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1096.80  DOWNSTREAM(FEET) =  1095.70
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.09
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.20
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =  11.17
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =  1040.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.17
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.700
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.58      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.58      SUBAREA RUNOFF(CFS) =     3.76
 EFFECTIVE AREA(ACRES) =     8.63    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     8.63        PEAK FLOW RATE(CFS) =      12.59

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.06 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1095.70  DOWNSTREAM(FEET) =  1094.60
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.52
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.59
 PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =  11.83
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.06 =  1260.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      1.06 TO NODE      1.06 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.83
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.642
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.61      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.61      SUBAREA RUNOFF(CFS) =    3.67
 EFFECTIVE AREA(ACRES) =   11.24    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    11.24       PEAK FLOW RATE(CFS) =      15.81

****************************************************************************
 FLOW PROCESS FROM NODE      1.06 TO NODE      1.07 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1094.60  DOWNSTREAM(FEET) =  1093.50
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.81
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =  12.45
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.07 =  1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.07 TO NODE      1.07 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.45
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.593
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.58      0.80        0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.58      SUBAREA RUNOFF(CFS) =    3.51
 EFFECTIVE AREA(ACRES) =   13.82    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    13.82       PEAK FLOW RATE(CFS) =      18.82

****************************************************************************
 FLOW PROCESS FROM NODE      1.07 TO NODE      1.08 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1093.50  DOWNSTREAM(FEET) =  1092.30
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     18.82
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =  13.08
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.08 =  1710.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.08 TO NODE      1.08 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.08
```

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.547
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        2.97      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA AREA(ACRES) =     2.97      SUBAREA RUNOFF(CFS) =     3.92
EFFECTIVE AREA(ACRES) =    16.79    AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =     16.79       PEAK FLOW RATE(CFS) =      22.17

****************************************************************************
 FLOW PROCESS FROM NODE      1.08 TO NODE      1.09 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1092.30  DOWNSTREAM(FEET) =  1091.50
 FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.17
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =  13.40
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.09 =  1840.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.09 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1090.50  DOWNSTREAM(FEET) =  1090.00
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.17
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =  13.70
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.10 =  1950.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.70
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.504
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        1.14      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     1.14      SUBAREA RUNOFF(CFS) =     1.46
 EFFECTIVE AREA(ACRES) =    17.93    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     17.93       PEAK FLOW RATE(CFS) =      22.99

****************************************************************************
 FLOW PROCESS FROM NODE      1.10 TO NODE      1.11 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1090.00  DOWNSTREAM(FEET) =  1089.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     22.99
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =  14.18
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.11 =  2140.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.11 TO NODE      1.11 IS CODE =  81
----------------------------------------------------------------------------
 >>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  14.18
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.473
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.57      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    0.71
 EFFECTIVE AREA(ACRES) =    18.50   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    18.50       PEAK FLOW RATE(CFS) =      23.21

****************************************************************************
 FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1089.00  DOWNSTREAM(FEET) =  1088.00
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     23.21
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =  14.66
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =  2330.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  14.66
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.444
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.57      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    0.70
 EFFECTIVE AREA(ACRES) =    19.07   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    19.07       PEAK FLOW RATE(CFS) =      23.42

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1088.00  DOWNSTREAM(FEET) =  1087.10
 FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.29
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     23.42
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =  15.16
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.13 =  2520.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE       1.13 TO NODE       1.13 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  15.16
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.415
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.30      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.36
 EFFECTIVE AREA(ACRES) =    19.37    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     19.37       PEAK FLOW RATE(CFS) =      23.42
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE       1.13 TO NODE       1.14 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1087.10  DOWNSTREAM(FEET) =  1086.70
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.44
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     23.42
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =  15.37
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.14 =  2600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE       1.14 TO NODE       1.14 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  15.37
 RAINFALL INTENSITY(INCH/HR) =   1.40
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =   19.37
 TOTAL STREAM AREA(ACRES) =   19.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.42

+--------------------------------------------------------------------------+
| The following stream thread runs along the west edge of the EXEL         |
| building and ties into the on-site storm drain.                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE       1.01 TO NODE       2.01 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   520.00
 ELEVATION DATA: UPSTREAM(FEET) =   1107.30  DOWNSTREAM(FEET) =   1103.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.028
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.814
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        2.64      0.80       0.10    52   10.03
```

```
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      4.12
 TOTAL AREA(ACRES) =      2.64   PEAK FLOW RATE(CFS) =      4.12

****************************************************************************
 FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1098.40  DOWNSTREAM(FEET) =  1097.20
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.30
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.12
 PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =  10.92
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.02 =   750.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.02 TO NODE      2.02 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.92
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.723
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.43      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.43      SUBAREA RUNOFF(CFS) =     3.59
 EFFECTIVE AREA(ACRES) =     5.07   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     5.07      PEAK FLOW RATE(CFS) =      7.50

****************************************************************************
 FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1097.20  DOWNSTREAM(FEET) =  1096.10
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.50
 PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =  11.67
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.03 =   970.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.03 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.67
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.656
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.45      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.45      SUBAREA RUNOFF(CFS) =     3.48
 EFFECTIVE AREA(ACRES) =     7.52   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     7.52      PEAK FLOW RATE(CFS) =      10.67
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1096.10  DOWNSTREAM(FEET) =  1095.00
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.17
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.67
 PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =  12.38
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.04 =  1190.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.04 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.38
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.598
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.45      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.45      SUBAREA RUNOFF(CFS) =     3.35
 EFFECTIVE AREA(ACRES) =     9.97    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     9.97        PEAK FLOW RATE(CFS) =      13.63

****************************************************************************
 FLOW PROCESS FROM NODE      2.04 TO NODE      2.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1095.00  DOWNSTREAM(FEET) =  1093.90
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.59
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.63
 PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =  13.03
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.05 =  1410.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.05 TO NODE      2.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.03
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.550
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.49      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     2.49      SUBAREA RUNOFF(CFS) =     3.29
 EFFECTIVE AREA(ACRES) =    12.46    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    12.46        PEAK FLOW RATE(CFS) =      16.49

****************************************************************************
 FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1093.90  DOWNSTREAM(FEET) =  1092.80
 FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 E-FLOW(CFS) =     16.49
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =  13.65
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.06 =  1630.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.06 TO NODE      2.06 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.65
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.507
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.46      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.46      SUBAREA RUNOFF(CFS) =    3.16
 EFFECTIVE AREA(ACRES) =    14.92   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    14.92       PEAK FLOW RATE(CFS) =      19.17

****************************************************************************
 FLOW PROCESS FROM NODE      2.06 TO NODE      2.07 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1092.80  DOWNSTREAM(FEET) =  1091.40
 FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     19.17
 PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =  14.42
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.07 =  1910.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.07 TO NODE      2.07 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  14.42
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.458
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        3.01      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    3.01      SUBAREA RUNOFF(CFS) =    3.74
 EFFECTIVE AREA(ACRES) =    17.93   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    17.93       PEAK FLOW RATE(CFS) =      22.25

****************************************************************************
 FLOW PROCESS FROM NODE      2.07 TO NODE      1.14 IS CODE =  31
----------------------------------------------------------------------------
 >>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1091.40  DOWNSTREAM(FEET) =  1086.70
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.82
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.25
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =  14.49
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.14 =  1980.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.14 TO NODE      1.14 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  14.49
 RAINFALL INTENSITY(INCH/HR) =   1.45
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =   17.93
 TOTAL STREAM AREA(ACRES) =   17.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.25

 ** CONFLUENCE DATA **
  STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1     23.42  15.37    1.404  0.80( 0.08) 0.10    19.4        1.01
     2     22.25  14.49    1.454  0.80( 0.08) 0.10    17.9        1.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
     1     45.17  14.49    1.454  0.80( 0.08) 0.10    36.2        1.01
     2     44.85  15.37    1.404  0.80( 0.08) 0.10    37.3        1.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     45.17    Tc(MIN.) =    14.49
 EFFECTIVE AREA(ACRES) =    36.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     37.30
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.14 =  2600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.14 TO NODE      1.15 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1086.70  DOWNSTREAM(FEET) =  1067.80
 FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.71
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     45.17
 PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =  15.40
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.15 =  3350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.15 TO NODE      1.15 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| Nodes in the "3.X" series represent surface flows within Private Drive   |
| intercepted at catch basins and entering into the backbone storm drain.  |
| These flows are computed to size respective catch basins and laterals.   |
+--------------------------------------------------------------------------+
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  ITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
 ELEVATION DATA: UPSTREAM(FEET) =   1094.00  DOWNSTREAM(FEET) =   1089.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.400
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.375
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        0.29      0.80       0.10     52    6.40
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      0.60
 TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
 FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1089.50  DOWNSTREAM ELEVATION(FEET) = 1075.30
 STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  ECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.88
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.73
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
 STREET FLOW TRAVEL TIME(MIN.) =   3.15   Tc(MIN.) =   9.55
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.868
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.35      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    0.56
 EFFECTIVE AREA(ACRES) =    0.64    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    0.64        PEAK FLOW RATE(CFS) =       1.03

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.17
 FLOW VELOCITY(FEET/SEC.) =  2.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.03 =   775.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
```

```
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.55
 RAINFALL INTENSITY(INCH/HR) =   1.87
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    0.64
 TOTAL STREAM AREA(ACRES) =    0.64
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.03

****************************************************************************
 FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
 ELEVATION DATA: UPSTREAM(FEET) =   1094.00  DOWNSTREAM(FEET) =   1089.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.686
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.313
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        0.43      0.80       0.10    52    6.69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      0.86
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
 FLOW PROCESS FROM NODE      3.02 TO NODE      3.03 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1089.50  DOWNSTREAM ELEVATION(FEET) = 1075.30
 STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.14
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.47
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
 STREET FLOW TRAVEL TIME(MIN.) =   2.99   Tc(MIN.) =   9.67
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.854
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.35      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    0.56
 EFFECTIVE AREA(ACRES) =    0.78    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    0.78        PEAK FLOW RATE(CFS) =      1.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.77
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 FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.66
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.03 =   795.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
   >>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   9.67
 RAINFALL INTENSITY(INCH/HR) =   1.85
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    0.78
 TOTAL STREAM AREA(ACRES) =    0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.25

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity    Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1       1.03   9.55     1.868   0.80( 0.08) 0.10      0.6        3.01
     2       1.25   9.67     1.854   0.80( 0.08) 0.10      0.8        3.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity    Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1       2.27   9.55     1.868   0.80( 0.08) 0.10      1.4        3.01
     2       2.27   9.67     1.854   0.80( 0.08) 0.10      1.4        3.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   AK FLOW RATE(CFS) =      2.27    Tc(MIN.) =     9.55
 EFFECTIVE AREA(ACRES) =     1.41   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      1.42
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.03 =   795.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      1.15 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity    Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1       2.27   9.55     1.868   0.80( 0.08) 0.10      1.4        3.01
     2       2.27   9.67     1.854   0.80( 0.08) 0.10      1.4        3.01
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      1.15 =   795.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity    Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      45.17  15.40     1.402   0.80( 0.08) 0.10     36.2        1.01
     2      44.85  16.28     1.356   0.80( 0.08) 0.10     37.3        1.01
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.15 =  3350.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity    Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      40.13   9.55     1.868   0.80( 0.08) 0.10     23.8        3.01
     2      40.32   9.67     1.854   0.80( 0.08) 0.10     24.1        3.01
     3      46.86  15.40     1.402   0.80( 0.08) 0.10     37.6        1.01
     4      46.48  16.28     1.356   0.80( 0.08) 0.10     38.7        1.01
   TOTAL AREA(ACRES) =     38.72
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       46.86  Tc(MIN.) =   15.402
 EFFECTIVE AREA(ACRES) =     37.61  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     38.72
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.15 =  3350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.15 TO NODE      1.16 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1067.80  DOWNSTREAM(FEET) =  1053.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.18
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     46.86
 PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =  16.29
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.16 =  4050.00 FEET.

+--------------------------------------------------------------------------+
| The following area represents the ungraded pad between the EXCEL and SMC |
| buildings that will ultimately generate flows into the storm drain       |
| system.                                                                  |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      1.16 TO NODE      1.16 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  16.29
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.356
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A       31.88      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =   31.88      SUBAREA RUNOFF(CFS) =   36.61
 EFFECTIVE AREA(ACRES) =    69.49   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    70.60       PEAK FLOW RATE(CFS) =      79.81

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)        (ACRES)    NODE
     1     84.59  10.48     1.766  0.80( 0.08) 0.10    55.7       3.01
     2     84.43  10.60     1.754  0.80( 0.08) 0.10    56.0       3.01
     3     79.81  16.29     1.356  0.80( 0.08) 0.10    69.5       1.01
     4     78.40  17.17     1.313  0.80( 0.08) 0.10    70.6       1.01
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =     84.59  Tc(MIN.) =  10.48
 AREA-AVERAGED Fm(INCH/HR) =  0.08  AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10  EFFECTIVE AREA(ACRES) =     55.72

****************************************************************************
 FLOW PROCESS FROM NODE      1.16 TO NODE      1.17 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1053.00  DOWNSTREAM(FEET) =  1051.00
 FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.83
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     84.59
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =  10.99
```

```
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.17 =  4350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.17 TO NODE      1.17 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.04 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
 ELEVATION DATA: UPSTREAM(FEET) =   1075.30  DOWNSTREAM(FEET) =   1063.80

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.792
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.291
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        0.28      0.80       0.10     52    6.79
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE      3.04 TO NODE      3.05 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1063.80  DOWNSTREAM ELEVATION(FEET) = 1058.40
 STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.84
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    6.29
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.68
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
 STREET FLOW TRAVEL TIME(MIN.) =   5.96   Tc(MIN.) =  12.75
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.570
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.41      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.41      SUBAREA RUNOFF(CFS) =     0.55
 EFFECTIVE AREA(ACRES) =    0.69     AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     0.69        PEAK FLOW RATE(CFS) =      0.93

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.58
 FLOW VELOCITY(FEET/SEC.) =  1.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =  1000.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.05 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.75
 RAINFALL INTENSITY(INCH/HR) =   1.57
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    0.69
 TOTAL STREAM AREA(ACRES) =    0.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.93

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.04 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
 ELEVATION DATA: UPSTREAM(FEET) =   1075.30  DOWNSTREAM(FEET) =   1063.80

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.792
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.291
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                A        0.28      0.80       0.10    52    6.79
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      0.56
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.56

****************************************************************************
 FLOW PROCESS FROM NODE      3.04 TO NODE      3.05 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1063.80  DOWNSTREAM ELEVATION(FEET) = 1058.40
 STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.84
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    6.29
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.68
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
 STREET FLOW TRAVEL TIME(MIN.) =   5.96   Tc(MIN.) =  12.75
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.570
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                A        0.41      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
```

```
 SUBAREA AREA(ACRES) =     0.41      SUBAREA RUNOFF(CFS) =     0.55
 EFFECTIVE AREA(ACRES) =    0.69     AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    0.69         PEAK FLOW RATE(CFS) =       0.93

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.58
 FLOW VELOCITY(FEET/SEC.) =  1.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =  1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.05 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.75
 RAINFALL INTENSITY(INCH/HR) =   1.57
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    0.69
 TOTAL STREAM AREA(ACRES) =    0.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.93

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       0.93  12.75     1.570  0.80( 0.08) 0.10      0.7        3.03
     2       0.93  12.75     1.570  0.80( 0.08) 0.10      0.7        3.03

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       1.85  12.75     1.570  0.80( 0.08) 0.10      1.4        3.03
     2       1.85  12.75     1.570  0.80( 0.08) 0.10      1.4        3.03

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       1.85    Tc(MIN.) =    12.75
 EFFECTIVE AREA(ACRES) =     1.38    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      1.38
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =  1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      1.17 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       1.85  12.75     1.570  0.80( 0.08) 0.10      1.4        3.03
     2       1.85  12.75     1.570  0.80( 0.08) 0.10      1.4        3.03
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      1.17 =  1000.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
  NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1      84.59  10.99     1.717  0.80( 0.08) 0.10     55.7        3.01
     2      84.43  11.11     1.705  0.80( 0.08) 0.10     56.0        3.01
     3      79.81  16.81     1.330  0.80( 0.08) 0.10     69.5        1.01
     4      78.40  17.70     1.290  0.80( 0.08) 0.10     70.6        1.01
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.17 =  4350.00 FEET.
```

```
** PEAK FLOW RATE TABLE **
 STREAM     Q      Tc    Intensity   Fp(Fm)      Ap    Ae      HEADWATER
 NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1     86.35  10.99     1.717   0.80( 0.08) 0.10     56.9        3.01
    2     86.19  11.11     1.705   0.80( 0.08) 0.10     57.2        3.01
    3     84.95  12.75     1.570   0.80( 0.08) 0.10     61.3        3.03
    4     84.95  12.75     1.570   0.80( 0.08) 0.10     61.3        3.03
    5     81.36  16.81     1.330   0.80( 0.08) 0.10     70.9        1.01
    6     79.90  17.70     1.290   0.80( 0.08) 0.10     72.0        1.01
  TOTAL AREA(ACRES) =      71.98

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       86.35  Tc(MIN.) =   10.987
 EFFECTIVE AREA(ACRES) =     56.91  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     71.98
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.17 =  4350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.17 TO NODE      1.18 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1051.00  DOWNSTREAM(FEET) =  1050.40
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.99
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     86.35
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =  11.19
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.18 =  4460.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.18 TO NODE      1.18 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.19
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.698
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        2.98      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    2.98      SUBAREA RUNOFF(CFS) =    4.34
 EFFECTIVE AREA(ACRES) =    59.89   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    74.96       PEAK FLOW RATE(CFS) =    87.24

****************************************************************************
 FLOW PROCESS FROM NODE      1.18 TO NODE      1.19 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1050.40  DOWNSTREAM(FEET) =  1048.90
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.76
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     87.24
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =  11.78
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.19 =  4770.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.19 TO NODE      1.19 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 MAINLINE Tc(MIN) =  11.78
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.647
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        3.22      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     3.22      SUBAREA RUNOFF(CFS) =     4.54
 EFFECTIVE AREA(ACRES) =    63.11    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    78.18        PEAK FLOW RATE(CFS) =      89.00

****************************************************************************
 FLOW PROCESS FROM NODE      1.19 TO NODE      1.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1048.90  DOWNSTREAM(FEET) =  1046.90
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     89.00
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =  12.31
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.20 =  5080.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.20 TO NODE      1.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.31
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.604
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        3.97      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     3.97      SUBAREA RUNOFF(CFS) =     5.45
 EFFECTIVE AREA(ACRES) =    67.08    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    82.15        PEAK FLOW RATE(CFS) =      92.01

****************************************************************************
 FLOW PROCESS FROM NODE      1.20 TO NODE      1.21 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1046.90  DOWNSTREAM(FEET) =  1042.50
 FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.16
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     92.01
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  12.70
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.21 =  5390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.21 TO NODE      1.21 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

+-------------------------------------------------------------------------+
| The following subarea accounts for the proposed "BNSF" site.  This pad  |
| will sheet flow into the southeast corner and be picked up the backbone |
| storm drain system and conveyed into the on-site detention basin.       |
```

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+----------------------------------------------------------------------+

**********************************************************************
 FLOW PROCESS FROM NODE      4.01 TO NODE      4.02 IS CODE =  21
----------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
======================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  1140.00
 ELEVATION DATA: UPSTREAM(FEET) =   1082.30  DOWNSTREAM(FEET) =   1074.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.690
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.505
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        9.40      0.80       0.10     52   13.69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =     12.06
 TOTAL AREA(ACRES) =      9.40   PEAK FLOW RATE(CFS) =     12.06

**********************************************************************
 FLOW PROCESS FROM NODE      4.02 TO NODE      4.03 IS CODE =  91
----------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
======================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1074.30
 DOWNSTREAM NODE ELEVATION(FEET) =   1069.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1030.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
 MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.107
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A       20.14      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     21.29
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.88
 AVERAGE FLOW DEPTH(FEET) =   0.41   FLOOD WIDTH(FEET) =   93.19
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   9.15   Tc(MIN.) =  22.84
 SUBAREA AREA(ACRES) =   20.14       SUBAREA RUNOFF(CFS) =   18.62
 EFFECTIVE AREA(ACRES) =   29.54     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   29.54         PEAK FLOW RATE(CFS) =      27.31

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.44   FLOOD WIDTH(FEET) =  103.31
 FLOW VELOCITY(FEET/SEC.) =   1.97   DEPTH*VELOCITY(FT*FT/SEC) =   0.86
 LONGEST FLOWPATH FROM NODE      4.01 TO NODE      4.03 =  2170.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE      4.03 TO NODE      4.04 IS CODE =  91
----------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
======================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1069.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1064.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   890.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
 MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.946
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

```
     LAND USE              GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  COMMERCIAL                 A       22.62       0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     36.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.18
  AVERAGE FLOW DEPTH(FEET) =   0.46   FLOOD WIDTH(FEET) =  113.42
   " GUTTER FLOW TRAVEL TIME(MIN.) =   6.81   Tc(MIN.) =  29.65
  SUBAREA AREA(ACRES) =   22.62       SUBAREA RUNOFF(CFS) =   17.65
  EFFECTIVE AREA(ACRES) =   52.16     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =   52.16         PEAK FLOW RATE(CFS) =      40.69

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.48   FLOOD WIDTH(FEET) =  119.11
  FLOW VELOCITY(FEET/SEC.) =   2.23   DEPTH*VELOCITY(FT*FT/SEC) =   1.06
  LONGEST FLOWPATH FROM NODE      4.01 TO NODE      4.04 =  3060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.04 TO NODE      4.05 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1064.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1058.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1190.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
  MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.809
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A       27.70      0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     49.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
  AVERAGE FLOW DEPTH(FEET) =   0.51   FLOOD WIDTH(FEET) =  131.75
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   8.84   Tc(MIN.) =  38.49
  SUBAREA AREA(ACRES) =   27.70       SUBAREA RUNOFF(CFS) =   18.19
  EFFECTIVE AREA(ACRES) =   79.86     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =   79.86         PEAK FLOW RATE(CFS) =      52.44

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOOD WIDTH(FEET) =  134.91
  FLOW VELOCITY(FEET/SEC.) =   2.26   DEPTH*VELOCITY(FT*FT/SEC) =   1.16
  LONGEST FLOWPATH FROM NODE      4.01 TO NODE      4.05 =  4250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.05 TO NODE      4.06 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1058.00
  DOWNSTREAM NODE ELEVATION(FEET) =   1055.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.00500
  MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.763
  SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A       25.52      0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
```

```
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     60.33
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.31
 AVERAGE FLOW DEPTH(FEET) =   0.54   FLOOD WIDTH(FEET) =  143.13
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =  42.46
 SUBAREA AREA(ACRES) =   25.52       SUBAREA RUNOFF(CFS) =   15.77
 EFFECTIVE AREA(ACRES) =  105.38     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 * RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
 * IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
 TOTAL AREA(ACRES) =  105.38         PEAK FLOW RATE(CFS) =      65.12

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOOD WIDTH(FEET) =  147.56
 FLOW VELOCITY(FEET/SEC.) =   2.35   DEPTH*VELOCITY(FT*FT/SEC) =   1.29
 LONGEST FLOWPATH FROM NODE      4.01 TO NODE      4.06 =  4800.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.06 TO NODE      4.06 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  42.46
 RAINFALL INTENSITY(INCH/HR) =   0.76
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =  105.38
 TOTAL STREAM AREA(ACRES) =  105.38
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     65.12

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.06 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
 ELEVATION DATA: UPSTREAM(FEET) =   1058.40  DOWNSTREAM(FEET) =   1056.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.636
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.858
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        0.28      0.80       0.10     52    9.64
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE      3.06 TO NODE      3.07 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1056.40  DOWNSTREAM ELEVATION(FEET) = 1051.20
 STREET LENGTH(FEET) =   635.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   6.70   Tc(MIN.) =  16.33
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.354
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        0.44      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.44      SUBAREA RUNOFF(CFS) =     0.50
  EFFECTIVE AREA(ACRES) =    0.72     AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     0.72       PEAK FLOW RATE(CFS) =       0.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.36
  FLOW VELOCITY(FEET/SEC.) =  1.63   DEPTH*VELOCITY(FT*FT/SEC.) =   0.40
  LONGEST FLOWPATH FROM NODE      3.05 TO NODE      3.07 =  1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.06 TO NODE      3.07 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  16.33
  RAINFALL INTENSITY(INCH/HR) =   1.35
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =    0.72
  TOTAL STREAM AREA(ACRES) =    0.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE      3.05 TO NODE      3.06 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
  ELEVATION DATA: UPSTREAM(FEET) =   1058.40  DOWNSTREAM(FEET) =   1056.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.636
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.858
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.28      0.80       0.10    52    9.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE      3.06 TO NODE      3.07 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1056.40  DOWNSTREAM ELEVATION(FEET) = 1051.30
  STREET LENGTH(FEET) =   635.00   CURB HEIGHT(INCHES) =  8.0
```

```
 STREET HALFWIDTH(FEET) = 22.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  11.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.92
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.55
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
 STREET FLOW TRAVEL TIME(MIN.) =   6.83   Tc(MIN.) =  16.46
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.347
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.44      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    0.50
 EFFECTIVE AREA(ACRES) =    0.72    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    0.72        PEAK FLOW RATE(CFS) =       0.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.44
 FLOW VELOCITY(FEET/SEC.) =  1.59   DEPTH*VELOCITY(FT*FT/SEC.) =   0.39
 LONGEST FLOWPATH FROM NODE      3.05 TO NODE      3.07 =  1035.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.07 TO NODE      3.07 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  16.46
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.347
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.52      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.52      SUBAREA RUNOFF(CFS) =    1.73
 EFFECTIVE AREA(ACRES) =    2.24    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    2.24        PEAK FLOW RATE(CFS) =       2.56

****************************************************************************
 FLOW PROCESS FROM NODE      3.07 TO NODE      3.07 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =  16.46
 RAINFALL INTENSITY(INCH/HR) =   1.35
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.24
 TOTAL STREAM AREA(ACRES) =    2.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.56

 ** CONFLUENCE DATA **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.12	42.46	0.763	0.80(0.08)	0.10	105.4	4.01
2	0.83	16.33	1.354	0.80(0.08)	0.10	0.7	3.05
3	2.56	16.46	1.347	0.80(0.08)	0.10	2.2	3.05

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	49.85	16.33	1.354	0.80(0.08)	0.10	43.5	3.05
2	49.99	16.46	1.347	0.80(0.08)	0.10	43.8	3.05
3	66.95	42.46	0.763	0.80(0.08)	0.10	108.3	4.01

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 66.95 Tc(MIN.) = 42.46
EFFECTIVE AREA(ACRES) = 108.34 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.80 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 108.34
LONGEST FLOWPATH FROM NODE 4.01 TO NODE 3.07 = 4800.00 FEET.

****
FLOW PROCESS FROM NODE 3.07 TO NODE 1.21 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
==========

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	49.85	16.33	1.354	0.80(0.08)	0.10	43.5	3.05
2	49.99	16.46	1.347	0.80(0.08)	0.10	43.8	3.05
3	66.95	42.46	0.763	0.80(0.08)	0.10	108.3	4.01

LONGEST FLOWPATH FROM NODE 4.01 TO NODE 1.21 = 4800.00 FEET.

** MEMORY BANK # 3 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	92.01	12.70	1.574	0.80(0.08)	0.10	67.1	3.01
2	91.86	12.83	1.565	0.80(0.08)	0.10	67.4	3.01
3	90.03	14.47	1.455	0.80(0.08)	0.10	71.4	3.03
4	90.03	14.47	1.455	0.80(0.08)	0.10	71.4	3.03
5	86.87	18.54	1.254	0.80(0.08)	0.10	81.0	1.01
6	85.36	19.44	1.219	0.80(0.08)	0.10	82.1	1.01

LONGEST FLOWPATH FROM NODE 1.01 TO NODE 1.21 = 5390.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	137.49	12.70	1.574	0.80(0.08)	0.10	100.9	3.01
2	137.50	12.83	1.565	0.80(0.08)	0.10	101.5	3.01
3	137.73	14.47	1.455	0.80(0.08)	0.10	110.0	3.03
4	137.73	14.47	1.455	0.80(0.08)	0.10	110.0	3.03
5	138.43	16.33	1.354	0.80(0.08)	0.10	119.3	3.05
6	138.46	16.46	1.347	0.80(0.08)	0.10	120.0	3.05
7	138.21	18.54	1.254	0.80(0.08)	0.10	130.0	1.01
8	137.29	19.44	1.219	0.80(0.08)	0.10	133.4	1.01
9	118.40	42.46	0.763	0.80(0.08)	0.10	190.5	4.01

TOTAL AREA(ACRES) = 190.49

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 138.46 Tc(MIN.) = 16.463
EFFECTIVE AREA(ACRES) = 119.96 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.80 AREA-AVERAGED Ap = 0.10
TOTAL AREA(ACRES) = 190.49
LONGEST FLOWPATH FROM NODE 1.01 TO NODE 1.21 = 5390.00 FEET.

****
FLOW PROCESS FROM NODE 1.21 TO NODE 1.22 IS CODE = 31

```
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1040.50  DOWNSTREAM(FEET) =  1040.30
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  46.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    138.46
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  16.58
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.22 =  5450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      1.22 TO NODE      1.22 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| The following confluence accumulates the flows within San Bernardino     |
| Avenue and a portion of the SMC parking lot and adds them into the       |
| primary storm drain system.                                              |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      5.01 TO NODE      5.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =   1052.90  DOWNSTREAM(FEET) =   1051.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.135
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.056
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.43      0.80       0.10     52    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE      5.02 TO NODE      5.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1051.30  DOWNSTREAM ELEVATION(FEET) = 1050.20
```

```
 STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  ECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.17
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.31
  HALFSTREET FLOOD WIDTH(FEET) =    9.60
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.14
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.35
 STREET FLOW TRAVEL TIME(MIN.) =   5.85   Tc(MIN.) =  13.99
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.485
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.63      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    0.80
 EFFECTIVE AREA(ACRES) =    1.06    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.06        PEAK FLOW RATE(CFS) =       1.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.15
 FLOW VELOCITY(FEET/SEC.) =  1.18   DEPTH*VELOCITY(FT*FT/SEC.) =   0.38
 LONGEST FLOWPATH FROM NODE      5.01 TO NODE     5.03 =   680.00 FEET.

 ****************************************************************************
 LOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  13.99
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.485
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.28      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.35
 EFFECTIVE AREA(ACRES) =    1.34    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.34        PEAK FLOW RATE(CFS) =       1.70

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  13.99
 RAINFALL INTENSITY(INCH/HR) =   1.49
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
  EA-AVERAGED Ap =  0.10
 FFECTIVE STREAM AREA(ACRES) =    1.34
 TOTAL STREAM AREA(ACRES) =    1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.70

****************************************************************************
```

```
 FLOW PROCESS FROM NODE       5.01 TO NODE       5.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =   1053.20  DOWNSTREAM(FEET) =   1051.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.135
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.056
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        0.31      0.80       0.10     52    8.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE       5.02 TO NODE       5.02 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   8.13
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.056
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        1.66      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    2.95
 EFFECTIVE AREA(ACRES) =     1.97   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     1.97       PEAK FLOW RATE(CFS) =       3.50

****************************************************************************
 FLOW PROCESS FROM NODE       5.02 TO NODE       5.03 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1051.60  DOWNSTREAM ELEVATION(FEET) = 1050.50
 STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.84
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   15.62
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.51
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
 STREET FLOW TRAVEL TIME(MIN.) =   4.41   Tc(MIN.) =  12.54
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.586
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.50      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
```

```
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     0.68
 EFFECTIVE AREA(ACRES) =    2.47     AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    2.47        PEAK FLOW RATE(CFS) =       3.50
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) =  1.49   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
 LONGEST FLOWPATH FROM NODE      5.01 TO NODE      5.03 =   680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.54
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.586
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.21      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.21      SUBAREA RUNOFF(CFS) =     0.28
 EFFECTIVE AREA(ACRES) =     2.68    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     2.68        PEAK FLOW RATE(CFS) =       3.63

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      5.03 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  12.54
 RAINFALL INTENSITY(INCH/HR) =   1.59
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    2.68
 TOTAL STREAM AREA(ACRES) =    2.68
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.63

 ** CONFLUENCE DATA **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      1.70  13.99     1.485   0.80( 0.08) 0.10      1.3        5.01
     2      3.63  12.54     1.586   0.80( 0.08) 0.10      2.7        5.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
     1      5.26  12.54     1.586   0.80( 0.08) 0.10      3.9        5.01
     2      5.09  13.99     1.485   0.80( 0.08) 0.10      4.0        5.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      5.26    Tc(MIN.) =    12.54
 EFFECTIVE AREA(ACRES) =     3.88   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      4.02
 LONGEST FLOWPATH FROM NODE      5.01 TO NODE      5.03 =   680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.03 TO NODE      1.22 IS CODE =  11
----------------------------------------------------------------------------
```

```
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

** MAIN STREAM CONFLUENCE DATA **
 STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
    1       5.26  12.54    1.586  0.80( 0.08) 0.10     3.9        5.01
    2       5.09  13.99    1.485  0.80( 0.08) 0.10     4.0        5.01
LONGEST FLOWPATH FROM NODE      5.01 TO NODE      1.22 =   680.00 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
    1     137.49  12.82    1.565  0.80( 0.08) 0.10   100.9        3.01
    2     137.50  12.95    1.556  0.80( 0.08) 0.10   101.5        3.01
    3     137.73  14.59    1.448  0.80( 0.08) 0.10   110.0        3.03
    4     137.73  14.59    1.448  0.80( 0.08) 0.10   110.0        3.03
    5     138.43  16.45    1.348  0.80( 0.08) 0.10   119.3        3.05
    6     138.46  16.58    1.341  0.80( 0.08) 0.10   120.0        3.05
    7     138.21  18.66    1.250  0.80( 0.08) 0.10   130.0        1.01
    8     137.29  19.56    1.215  0.80( 0.08) 0.10   133.4        1.01
    9     118.40  42.58    0.762  0.80( 0.08) 0.10   190.5        4.01
LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.22 =  5450.00 FEET.

** PEAK FLOW RATE TABLE **
 STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
    1     141.64  12.54    1.586  0.80( 0.08) 0.10   102.6        5.01
    2     142.71  12.82    1.565  0.80( 0.08) 0.10   104.8        3.01
    3     142.71  12.95    1.556  0.80( 0.08) 0.10   105.5        3.01
    4     142.73  13.99    1.485  0.80( 0.08) 0.10   110.9        5.01
    5     142.68  14.59    1.448  0.80( 0.08) 0.10   114.0        3.03
    6     142.68  14.59    1.448  0.80( 0.08) 0.10   114.0        3.03
    7     143.02  16.45    1.348  0.80( 0.08) 0.10   123.3        3.05
    8     143.03  16.58    1.341  0.80( 0.08) 0.10   124.0        3.05
    9     142.44  18.66    1.250  0.80( 0.08) 0.10   134.0        1.01
   10     141.40  19.56    1.215  0.80( 0.08) 0.10   137.4        1.01
   11     120.88  42.58    0.762  0.80( 0.08) 0.10   194.5        4.01
  TOTAL AREA(ACRES) =    194.51

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      143.03  Tc(MIN.) =   16.581
EFFECTIVE AREA(ACRES) =    123.98  AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =    194.51
LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.22 =  5450.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.22 TO NODE      1.23 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1040.30  DOWNSTREAM(FEET) =  1032.80
FLOW LENGTH(FEET) =  2100.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  60.0 INCH PIPE IS  46.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.79
ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =    143.03
PIPE TRAVEL TIME(MIN.) =   3.98    Tc(MIN.) =  20.56
LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.23 =  7550.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      1.23 TO NODE      1.23 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| The nodes numbered "6.X" represent street flows within Commerce Drive    |
| to be intercepted into the master storm drain system.                    |
```

```
 FLOW PROCESS FROM NODE       6.01 TO NODE       6.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>>>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
 ELEVATION DATA: UPSTREAM(FEET) =   1051.70  DOWNSTREAM(FEET) =   1048.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.907
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.827
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 A        0.58      0.80       0.10     52    9.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      0.91
 TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
 FLOW PROCESS FROM NODE       6.02 TO NODE       6.03 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1048.30  DOWNSTREAM ELEVATION(FEET) = 1045.00
 STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 40.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL) =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.33
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.76
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.53
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   6.66   Tc(MIN.) =  16.56
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.342
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.73      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    0.83
 EFFECTIVE AREA(ACRES) =    1.31    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    1.31        PEAK FLOW RATE(CFS) =      1.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.20
 FLOW VELOCITY(FEET/SEC.) =  1.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.47
 LONGEST FLOWPATH FROM NODE      6.01 TO NODE      6.03 =  1110.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE       6.03 TO NODE       6.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
  MAINLINE Tc(MIN) =  16.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.342
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A       14.49      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =   14.49      SUBAREA RUNOFF(CFS) =   16.47
  EFFECTIVE AREA(ACRES) =    15.80   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    15.80       PEAK FLOW RATE(CFS) =      17.95

**************************************************************************
  FLOW PROCESS FROM NODE      6.03 TO NODE      6.03 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  16.56
  RAINFALL INTENSITY(INCH/HR) =   1.34
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =   15.80
  TOTAL STREAM AREA(ACRES) =   15.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.95

**************************************************************************
  FLOW PROCESS FROM NODE      6.01 TO NODE      6.02 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  ELEVATION DATA: UPSTREAM(FEET) =   1051.70  DOWNSTREAM(FEET) =   1048.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.907
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.827
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  A        0.57      0.80       0.10    52    9.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      0.90
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      0.90

**************************************************************************
  FLOW PROCESS FROM NODE      6.02 TO NODE      6.03 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) = 1048.30  DOWNSTREAM ELEVATION(FEET) = 1045.10
  STREET LENGTH(FEET) =   585.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
  STREET FLOW TRAVEL TIME(MIN.) =   6.43   Tc(MIN.) =  16.34
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.353
   AREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.70      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =    1.27    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    1.27        PEAK FLOW RATE(CFS) =       1.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.12
  FLOW VELOCITY(FEET/SEC.) =  1.56   DEPTH*VELOCITY(FT*FT/SEC.) =   0.46
  LONGEST FLOWPATH FROM NODE      6.01 TO NODE      6.03 =  1085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.03 TO NODE      6.03 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  16.34
  RAINFALL INTENSITY(INCH/HR) =   1.35
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
   EFFECTIVE STREAM AREA(ACRES) =    1.27
  TOTAL STREAM AREA(ACRES) =    1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.46

  ** CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     17.95  16.56     1.342  0.80( 0.08) 0.10     15.8        6.01
      2      1.46  16.34     1.353  0.80( 0.08) 0.10      1.3        6.01

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     19.32  16.34     1.353  0.80( 0.08) 0.10     16.9        6.01
      2     19.40  16.56     1.342  0.80( 0.08) 0.10     17.1        6.01

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     19.40    Tc(MIN.) =    16.56
  EFFECTIVE AREA(ACRES) =    17.07   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     17.07
  LONGEST FLOWPATH FROM NODE      6.01 TO NODE      6.03 =  1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.03 TO NODE      1.23 IS CODE =  11
----------------------------------------------------------------------------
   >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
```

```
     1     19.32  16.34    1.353  0.80( 0.08) 0.10     16.9        6.01
     2     19.40  16.56    1.342  0.80( 0.08) 0.10     17.1        6.01
  LONGEST FLOWPATH FROM NODE      6.01 TO NODE      1.23 =  1110.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1    141.64  16.53    1.344  0.80( 0.08) 0.10    102.6        5.01
      2    142.71  16.81    1.330  0.80( 0.08) 0.10    104.8        3.01
      3    142.71  16.93    1.325  0.80( 0.08) 0.10    105.5        3.01
      4    142.73  17.97    1.278  0.80( 0.08) 0.10    110.9        5.01
      5    142.68  18.57    1.253  0.80( 0.08) 0.10    114.0        3.03
      6    142.68  18.57    1.253  0.80( 0.08) 0.10    114.0        3.03
      7    143.02  20.43    1.183  0.80( 0.08) 0.10    123.3        3.05
      8    143.03  20.56    1.179  0.80( 0.08) 0.10    124.0        3.05
      9    142.44  22.64    1.113  0.80( 0.08) 0.10    134.0        1.01
     10    141.40  23.55    1.087  0.80( 0.08) 0.10    137.4        1.01
     11    120.88  46.72    0.720  0.80( 0.08) 0.10    194.5        4.01
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.23 =  7550.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1    160.35  16.34    1.353  0.80( 0.08) 0.10    118.2        6.01
      2    161.02  16.53    1.344  0.80( 0.08) 0.10    119.6        5.01
      3    161.16  16.56    1.342  0.80( 0.08) 0.10    119.9        6.01
      4    161.93  16.81    1.330  0.80( 0.08) 0.10    121.9        3.01
      5    161.84  16.93    1.325  0.80( 0.08) 0.10    122.5        3.01
      6    161.14  17.97    1.278  0.80( 0.08) 0.10    128.0        5.01
      7    160.71  18.57    1.253  0.80( 0.08) 0.10    131.1        3.03
      8    160.71  18.57    1.253  0.80( 0.08) 0.10    131.1        3.03
      9    159.97  20.43    1.183  0.80( 0.08) 0.10    140.4        3.05
     10    159.91  20.56    1.179  0.80( 0.08) 0.10    141.1        3.05
     11    158.31  22.64    1.113  0.80( 0.08) 0.10    151.1        1.01
     12    156.87  23.55    1.087  0.80( 0.08) 0.10    154.5        1.01
     13    130.84  46.72    0.720  0.80( 0.08) 0.10    211.6        4.01
    TOTAL AREA(ACRES) =    211.58

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      161.93  Tc(MIN.) =   16.805
  EFFECTIVE AREA(ACRES) =    121.88  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    211.58
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.23 =  7550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.23 TO NODE      1.24 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1032.80  DOWNSTREAM(FEET) =  1032.10
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    161.93
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =  17.04
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.24 =  7695.00 FEET.

+--------------------------------------------------------------------------+
| The following flows are generated from the east edge of the SMC building |
| and will freely discharge into the San Sevaine Channel through an        |
| existing outlet connection.                                              |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      7.01 TO NODE      7.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   370.00
  ELEVATION DATA: UPSTREAM(FEET) =   1062.00  DOWNSTREAM(FEET) =   1057.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.890
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.094
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A        0.59      0.80       0.10     52    7.89
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      1.07

**************************************************************************
  FLOW PROCESS FROM NODE      7.02 TO NODE      7.03 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1052.70  DOWNSTREAM(FEET) =  1052.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.07
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   8.35
  LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.03 =   450.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE      7.03 TO NODE      7.03 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN) =   8.35
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.025
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.77      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    1.35
  EFFECTIVE AREA(ACRES) =     1.36   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    1.36       PEAK FLOW RATE(CFS) =       2.38

**************************************************************************
  FLOW PROCESS FROM NODE      7.03 TO NODE      7.04 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1052.30  DOWNSTREAM(FEET) =  1051.70
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.38
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   8.83
  LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.04 =   560.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE      7.04 TO NODE      7.04 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
```

```
 MAINLINE Tc(MIN) =   8.83
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.958
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.72      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     1.22
 EFFECTIVE AREA(ACRES) =     2.08    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     2.08       PEAK FLOW RATE(CFS) =       3.52

****************************************************************************
 FLOW PROCESS FROM NODE       7.04 TO NODE       7.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1051.70  DOWNSTREAM(FEET) =  1051.20
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.93
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.52
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   9.30
 LONGEST FLOWPATH FROM NODE       7.01 TO NODE       7.05 =   670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE       7.05 TO NODE       7.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.30
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.898
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.72      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     1.18
 EFFECTIVE AREA(ACRES) =     2.80    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     2.80       PEAK FLOW RATE(CFS) =       4.58

****************************************************************************
 FLOW PROCESS FROM NODE       7.05 TO NODE       7.06 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1051.20  DOWNSTREAM(FEET) =  1050.70
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.18
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.58
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   9.74
 LONGEST FLOWPATH FROM NODE       7.01 TO NODE       7.06 =   780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE       7.06 TO NODE       7.06 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =   9.74
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.846
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

```
     LAND USE              GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  COMMERCIAL                 A        0.72       0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     1.14
  EFFECTIVE AREA(ACRES) =     3.52    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     3.52        PEAK FLOW RATE(CFS) =        5.60

****************************************************************************
  FLOW PROCESS FROM NODE      7.06 TO NODE      7.07 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1050.70  DOWNSTREAM(FEET) =  1050.10
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.60
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  10.13
  LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.07 =   890.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.07 TO NODE      7.07 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  10.13
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.803
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.72      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     1.12
  EFFECTIVE AREA(ACRES) =     4.24    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     4.24        PEAK FLOW RATE(CFS) =        6.58

****************************************************************************
  FLOW PROCESS FROM NODE      7.07 TO NODE      7.08 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1050.15  DOWNSTREAM(FEET) =  1050.10
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      6.58
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  10.16
  LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.08 =   900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.08 TO NODE      7.08 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  10.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.799
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        2.32      0.80       0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     2.32      SUBAREA RUNOFF(CFS) =     3.59
```

```
 EFFECTIVE AREA(ACRES) =     6.56   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     6.56       PEAK FLOW RATE(CFS) =      10.15

****************************************************************************
 FLOW PROCESS FROM NODE      7.08 TO NODE      7.09 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1050.10  DOWNSTREAM(FEET) =  1049.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.15
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.15
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =  10.49
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.09 =  1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.09 TO NODE      7.09 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.49
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.766
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.72      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     1.09
 EFFECTIVE AREA(ACRES) =     7.28   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     7.28       PEAK FLOW RATE(CFS) =      11.05

****************************************************************************
 FLOW PROCESS FROM NODE      7.09 TO NODE      7.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1049.60  DOWNSTREAM(FEET) =  1049.10
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.05
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =  10.84
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.10 =  1110.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.10 TO NODE      7.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  10.84
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.731
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        0.72      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.72      SUBAREA RUNOFF(CFS) =     1.07
 EFFECTIVE AREA(ACRES) =     8.00   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     8.00       PEAK FLOW RATE(CFS) =      11.89

****************************************************************************
```

```
 FLOW PROCESS FROM NODE       7.10 TO NODE       7.11 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1049.10  DOWNSTREAM(FEET) =  1048.50
 FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.89
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =  11.18
 LONGEST FLOWPATH FROM NODE       7.01 TO NODE       7.11 =  1225.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE       7.11 TO NODE       7.11 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.18
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.02      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     1.02      SUBAREA RUNOFF(CFS) =     1.49
 EFFECTIVE AREA(ACRES) =     9.02    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     9.02        PEAK FLOW RATE(CFS) =      13.14

****************************************************************************
 FLOW PROCESS FROM NODE       7.11 TO NODE       7.12 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1048.50  DOWNSTREAM(FEET) =  1048.00
 FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.14
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =  11.51
 LONGEST FLOWPATH FROM NODE       7.01 TO NODE       7.12 =  1330.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE       7.12 TO NODE       7.12 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.51
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.670
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        3.21      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     3.21      SUBAREA RUNOFF(CFS) =     4.59
 EFFECTIVE AREA(ACRES) =    12.23    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    12.23        PEAK FLOW RATE(CFS) =      17.51

****************************************************************************
 FLOW PROCESS FROM NODE       7.12 TO NODE       7.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1048.00  DOWNSTREAM(FEET) =  1044.55
 FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.43
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     17.51
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =  12.02
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.13 =  1590.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.13 TO NODE      7.13 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  12.02
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.627
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.98      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =    1.98      SUBAREA RUNOFF(CFS) =    2.76
 EFFECTIVE AREA(ACRES) =    14.21   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    14.21       PEAK FLOW RATE(CFS) =      19.79

****************************************************************************
 FLOW PROCESS FROM NODE      7.13 TO NODE      7.14 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1044.55  DOWNSTREAM(FEET) =  1043.26
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.84
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     19.79
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =  12.21
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.14 =  1690.00 FEET.

+--------------------------------------------------------------------------+
| The "8.X" series of nodes accounts for the graded industrial pads on the |
| previous "TRUCK STOP" area.  This area is tributary and will discharge   |
| into the on-site detention basin at the southeast corner of the site.    |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE      8.01 TO NODE      8.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   600.00
 ELEVATION DATA: UPSTREAM(FEET) =   1051.60  DOWNSTREAM(FEET) =   1048.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.333
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.685
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        3.52      0.80       0.10    52   11.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      5.09
 TOTAL AREA(ACRES) =      3.52   PEAK FLOW RATE(CFS) =      5.09

****************************************************************************
 FLOW PROCESS FROM NODE      8.02 TO NODE      8.03 IS CODE =  91
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1048.60
  DOWNSTREAM NODE ELEVATION(FEET) =   1045.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
  MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.300
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        7.07      0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.90
  AVERAGE FLOW DEPTH(FEET) =   0.37   FLOOD WIDTH(FEET) =   41.19
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   6.13   Tc(MIN.) =  17.47
  SUBAREA AREA(ACRES) =    7.07       SUBAREA RUNOFF(CFS) =    7.77
  EFFECTIVE AREA(ACRES) =   10.59     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =   10.59         PEAK FLOW RATE(CFS) =      11.63

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOOD WIDTH(FEET) =   46.25
  FLOW VELOCITY(FEET/SEC.) =   2.00   DEPTH*VELOCITY(FT*FT/SEC) =   0.79
  LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.03 =  1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.03 TO NODE      8.04 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1045.10
  DOWNSTREAM NODE ELEVATION(FEET) =   1040.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00
  "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
  PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
  MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.047
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  A        9.25      0.80        0.10    52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     15.66
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.10
  AVERAGE FLOW DEPTH(FEET) =   0.43   FLOOD WIDTH(FEET) =   52.89
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   7.58   Tc(MIN.) =  25.05
  SUBAREA AREA(ACRES) =    9.25       SUBAREA RUNOFF(CFS) =    8.05
  EFFECTIVE AREA(ACRES) =   19.84     AREA-AVERAGED Fm(INCH/HR) =   0.08
  AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
  TOTAL AREA(ACRES) =   19.84         PEAK FLOW RATE(CFS) =      17.28

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOOD WIDTH(FEET) =   55.10
  FLOW VELOCITY(FEET/SEC.) =   2.14   DEPTH*VELOCITY(FT*FT/SEC) =   0.95
  LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.04 =  2255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.04 TO NODE      8.05 IS CODE =  91
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =   1040.30
  DOWNSTREAM NODE ELEVATION(FEET) =   1039.50
```

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CHANNEL LENGTH THRU SUBAREA(FEET) =   165.00
"V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
MAXIMUM DEPTH(FEET) =   1.00
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.016
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        1.03      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.13
AVERAGE FLOW DEPTH(FEET) =   0.45   FLOOD WIDTH(FEET) =   56.05
"V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =  26.34
SUBAREA AREA(ACRES) =    1.03       SUBAREA RUNOFF(CFS) =    0.87
EFFECTIVE AREA(ACRES) =   20.87     AREA-AVERAGED Fm(INCH/HR) =   0.08
AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
TOTAL AREA(ACRES) =   20.87         PEAK FLOW RATE(CFS) =      17.59

END OF SUBAREA "V" GUTTER HYDRAULICS:
DEPTH(FEET) =  0.45   FLOOD WIDTH(FEET) =   56.05
FLOW VELOCITY(FEET/SEC.) =   2.11   DEPTH*VELOCITY(FT*FT/SEC) =   0.94
LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.05 =  2420.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      8.05 TO NODE      8.06 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =  1036.50  DOWNSTREAM(FEET) =  1034.40
FLOW LENGTH(FEET) =   465.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     17.59
PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =  27.69
LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.06 =  2885.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      8.06 TO NODE      8.06 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  27.69
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.986
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        1.12      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA AREA(ACRES) =    1.12       SUBAREA RUNOFF(CFS) =    0.91
EFFECTIVE AREA(ACRES) =   21.99     AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =   21.99         PEAK FLOW RATE(CFS) =      17.94

****************************************************************************
FLOW PROCESS FROM NODE      8.06 TO NODE      8.06 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =  27.69
RAINFALL INTENSITY(INCH/HR) =   0.99
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80
AREA-AVERAGED Ap =  0.10
```

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 EFFECTIVE STREAM AREA(ACRES) =   21.99
 TOTAL STREAM AREA(ACRES) =   21.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.94

****************************************************************************
 FLOW PROCESS FROM NODE      8.01 TO NODE      8.07 IS CODE =  21
----------------------------------------------------------------------------
 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
 ELEVATION DATA: UPSTREAM(FEET) =   1051.60  DOWNSTREAM(FEET) =   1049.80

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.251
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.693
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  A        1.17      0.80       0.10     52   11.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA RUNOFF(CFS) =      1.70
 TOTAL AREA(ACRES) =      1.17   PEAK FLOW RATE(CFS) =      1.70

****************************************************************************
 FLOW PROCESS FROM NODE      8.07 TO NODE      8.07 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  11.25
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.693
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        1.01      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     1.01      SUBAREA RUNOFF(CFS) =     1.47
 EFFECTIVE AREA(ACRES) =     2.18    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     2.18       PEAK FLOW RATE(CFS) =       3.16

****************************************************************************
 FLOW PROCESS FROM NODE      8.07 TO NODE      8.08 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1049.80
 DOWNSTREAM NODE ELEVATION(FEET) =   1049.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   165.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.566
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        3.68      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.62
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.76
 AVERAGE FLOW DEPTH(FEET) =   0.33   FLOOD WIDTH(FEET) =   32.97
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =  12.81
 SUBAREA AREA(ACRES) =     3.68      SUBAREA RUNOFF(CFS) =     4.92
 EFFECTIVE AREA(ACRES) =     5.86    AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =     5.86       PEAK FLOW RATE(CFS) =       7.84
```

```
 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.36   FLOOD WIDTH(FEET) =   38.98
 FLOW VELOCITY(FEET/SEC.) =   1.84   DEPTH*VELOCITY(FT*FT/SEC) =   0.66
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.08 =   665.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.08 TO NODE      8.09 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1049.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1047.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.364
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A        8.54      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.01
 AVERAGE FLOW DEPTH(FEET) =   0.41   FLOOD WIDTH(FEET) =   48.46
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.31   Tc(MIN.) =  16.13
 SUBAREA AREA(ACRES) =    8.54       SUBAREA RUNOFF(CFS) =    9.87
 EFFECTIVE AREA(ACRES) =   14.40     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   14.40         PEAK FLOW RATE(CFS) =      16.64

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.44   FLOOD WIDTH(FEET) =   54.15
 FLOW VELOCITY(FEET/SEC.) =   2.13   DEPTH*VELOCITY(FT*FT/SEC) =   0.93
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.09 =  1065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.09 TO NODE      8.10 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1047.00
 DOWNSTREAM NODE ELEVATION(FEET) =   1044.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.205
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 A       10.66      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     22.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.25
 AVERAGE FLOW DEPTH(FEET) =   0.47   FLOOD WIDTH(FEET) =   61.11
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   3.71   Tc(MIN.) =  19.83
 SUBAREA AREA(ACRES) =   10.66       SUBAREA RUNOFF(CFS) =   10.79
 EFFECTIVE AREA(ACRES) =   25.06     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   25.06         PEAK FLOW RATE(CFS) =      25.38

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.49   FLOOD WIDTH(FEET) =   64.90
 FLOW VELOCITY(FEET/SEC.) =   2.31   DEPTH*VELOCITY(FT*FT/SEC) =   1.13
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.10 =  1565.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      8.10 TO NODE      8.06 IS CODE =  91
----------------------------------------------------------------------------
 >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
 UPSTREAM NODE ELEVATION(FEET) =   1044.50
 DOWNSTREAM NODE ELEVATION(FEET) =   1040.40
 CHANNEL LENGTH THRU SUBAREA(FEET) =   830.00
 "V" GUTTER WIDTH(FEET) =   5.00   GUTTER HIKE(FEET) =  0.170
 PAVEMENT LIP(FEET) =  0.021   MANNING'S N = .0150
 PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01000
 MAXIMUM DEPTH(FEET) =   1.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.035
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A       15.70      0.80       0.10     52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     32.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.42
 AVERAGE FLOW DEPTH(FEET) =   0.52   FLOOD WIDTH(FEET) =   71.54
 "V" GUTTER FLOW TRAVEL TIME(MIN.) =   5.71   Tc(MIN.) =  25.54
 SUBAREA AREA(ACRES) =   15.70       SUBAREA RUNOFF(CFS) =   13.50
 EFFECTIVE AREA(ACRES) =   40.76     AREA-AVERAGED Fm(INCH/HR) =   0.08
 AREA-AVERAGED Fp(INCH/HR) =   0.80  AREA-AVERAGED Ap =   0.10
 TOTAL AREA(ACRES) =   40.76         PEAK FLOW RATE(CFS) =      35.05

 END OF SUBAREA "V" GUTTER HYDRAULICS:
 DEPTH(FEET) =  0.54   FLOOD WIDTH(FEET) =   74.07
 FLOW VELOCITY(FEET/SEC.) =   2.47   DEPTH*VELOCITY(FT*FT/SEC) =   1.32
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.06 =  2395.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.06 TO NODE      8.06 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  25.54
 RAINFALL INTENSITY(INCH/HR) =   1.03
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =   40.76
 TOTAL STREAM AREA(ACRES) =   40.76
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.05

 ** CONFLUENCE DATA **
  STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
     1     17.94  27.69     0.986  0.80( 0.08) 0.10     22.0        8.01
     2     35.05  25.54     1.035  0.80( 0.08) 0.10     40.8        8.01

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
     1     52.49  25.54     1.035  0.80( 0.08) 0.10     61.0        8.01
     2     51.19  27.69     0.986  0.80( 0.08) 0.10     62.8        8.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     52.49    Tc(MIN.) =    25.54
 EFFECTIVE AREA(ACRES) =    61.04   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     62.75
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.06 =  2885.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      8.06 TO NODE      8.11 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1034.40  DOWNSTREAM(FEET) =  1032.30
 FLOW LENGTH(FEET) =   465.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.43
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     52.49
 PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =  26.59
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.11 =  3350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.11 TO NODE      8.11 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  26.59
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.010
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        4.01      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     4.01      SUBAREA RUNOFF(CFS) =     3.36
 EFFECTIVE AREA(ACRES) =    65.05   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =    66.76       PEAK FLOW RATE(CFS) =      54.50

****************************************************************************
 FLOW PROCESS FROM NODE      8.11 TO NODE      8.12 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1032.30  DOWNSTREAM(FEET) =  1031.00
 FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.60
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     54.50
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =  27.19
 LONGEST FLOWPATH FROM NODE      8.01 TO NODE      8.12 =  3625.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.12 TO NODE      8.12 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  27.19
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.997
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    A        8.28      0.14       1.00    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
 SUBAREA AREA(ACRES) =     8.28      SUBAREA RUNOFF(CFS) =     6.39
 EFFECTIVE AREA(ACRES) =    73.33   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =    75.04       PEAK FLOW RATE(CFS) =      60.09

+--------------------------------------------------------------------------+
| This final group of nodes represents the flows we are allowing to freely |
| discharge into the San Sevaine Channel without detention.  "6.X" nodes   |
```

```
| in Commerce Drive; "9.0" nodes in Valley Boulevard.                    |
+------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE      6.03 TO NODE      6.04 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  (   SE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =   1045.00  DOWNSTREAM(FEET) =   1043.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.020
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A        0.35      0.80       0.10     52    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE      6.04 TO NODE      6.05 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1043.30  DOWNSTREAM ELEVATION(FEET) = 1039.80
  STREET LENGTH(FEET) =   555.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  (   IDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   6.01   Tc(MIN.) =  14.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.460
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.75      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    0.93
  EFFECTIVE AREA(ACRES) =    1.10    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    1.10        PEAK FLOW RATE(CFS) =      1.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.55
  FLOW VELOCITY(FEET/SEC.) =  1.64   DEPTH*VELOCITY(FT*FT/SEC.) =   0.47
  L(   EST FLOWPATH FROM NODE      6.03 TO NODE      6.05 =   855.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =  1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  14.39
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =    1.10
  TOTAL STREAM AREA(ACRES) =    1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.37

****************************************************************************
  FLOW PROCESS FROM NODE      6.03 TO NODE      6.04 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   320.00
  ELEVATION DATA: UPSTREAM(FEET) =   1045.10  DOWNSTREAM(FEET) =   1043.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.608
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.988
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A        0.38      0.80       0.10     52    8.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE      6.04 TO NODE      6.05 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1043.30  DOWNSTREAM ELEVATION(FEET) = 1040.20
  STREET LENGTH(FEET) =   550.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.48
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.40
  STREET FLOW TRAVEL TIME(MIN.) =   6.18   Tc(MIN.) =  14.79
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.436
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 A        0.66      0.80       0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    0.66      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =    1.04    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =    1.04        PEAK FLOW RATE(CFS) =      1.27
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 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.55
 FLOW VELOCITY(FEET/SEC.) =  1.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.44
 LONGEST FLOWPATH FROM NODE      6.03 TO NODE      6.05 =   870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN) =  14.79
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.436
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  A        0.46      0.80       0.10    52
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
 SUBAREA AREA(ACRES) =     0.46      SUBAREA RUNOFF(CFS) =     0.56
 EFFECTIVE AREA(ACRES) =     1.50    AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =     1.50        PEAK FLOW RATE(CFS) =       1.83

****************************************************************************
 FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  14.79
 RAINFALL INTENSITY(INCH/HR) =   1.44
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =    1.50
 TOTAL STREAM AREA(ACRES) =    1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.83

 ** CONFLUENCE DATA **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)    NODE
     1       1.37  14.39     1.460   0.80( 0.08) 0.10      1.1        6.03
     2       1.83  14.79     1.436   0.80( 0.08) 0.10      1.5        6.03

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER    (CFS)  (MIN.)  (INCH/HR)  (INCH/HR)         (ACRES)    NODE
     1       3.18  14.39     1.460   0.80( 0.08) 0.10      2.6        6.03
     2       3.17  14.79     1.436   0.80( 0.08) 0.10      2.6        6.03

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      3.18    Tc(MIN.) =    14.39
 EFFECTIVE AREA(ACRES) =     2.56   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      2.60
 LONGEST FLOWPATH FROM NODE      6.03 TO NODE      6.05 =   870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.05 TO NODE      6.05 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      9.01 TO NODE      9.02 IS CODE =  21
----------------------------------------------------------------------------
```

```
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
ELEVATION DATA: UPSTREAM(FEET) =   1041.00  DOWNSTREAM(FEET) =   1038.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.201
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.046
SUBAREA Tc AND LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                 A        0.47      0.80       0.10     52    8.20
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA RUNOFF(CFS) =      0.83
TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      0.83

********************************************************************************
FLOW PROCESS FROM NODE      9.02 TO NODE      9.03 IS CODE =  62
--------------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
UPSTREAM ELEVATION(FEET) = 1038.00  DOWNSTREAM ELEVATION(FEET) = 1034.60
STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 52.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  26.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.020
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.41
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.29
  HALFSTREET FLOOD WIDTH(FEET) =    8.53
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.49
STREET FLOW TRAVEL TIME(MIN.) =   4.91   Tc(MIN.) =  13.11
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.544
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        0.87      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA AREA(ACRES) =    0.87      SUBAREA RUNOFF(CFS) =    1.15
EFFECTIVE AREA(ACRES) =    1.34    AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =    1.34        PEAK FLOW RATE(CFS) =       1.77

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.40
FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.03 =   850.00 FEET.

********************************************************************************
FLOW PROCESS FROM NODE      9.03 TO NODE      9.03 IS CODE =  81
--------------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
MAINLINE Tc(MIN) =  13.11
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.544
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  COMMERCIAL                  A        1.03      0.80      0.10     52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =     1.03     SUBAREA RUNOFF(CFS) =     1.36
  EFFECTIVE AREA(ACRES) =     2.37   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =     2.37       PEAK FLOW RATE(CFS) =       3.12

****************************************************************************
  FLOW PROCESS FROM NODE       9.03 TO NODE       9.03 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  13.11
  RAINFALL INTENSITY(INCH/HR) =   1.54
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.80
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =    2.37
  TOTAL STREAM AREA(ACRES) =    2.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE       9.01 TO NODE       9.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   350.00
  ELEVATION DATA: UPSTREAM(FEET) =   1041.00  DOWNSTREAM(FEET) =   1038.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.201
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.046
   AREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 A        0.46      0.80       0.10     52    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA RUNOFF(CFS) =      0.81
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      0.81

****************************************************************************
  FLOW PROCESS FROM NODE       9.02 TO NODE       9.03 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1038.00  DOWNSTREAM ELEVATION(FEET) = 1034.30
  STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 52.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  26.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0199

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.31
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    8.15
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   4.98   Tc(MIN.) =  13.18
```

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.539
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        0.75      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA AREA(ACRES) =     0.75      SUBAREA RUNOFF(CFS) =     0.99
EFFECTIVE AREA(ACRES) =    1.21     AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =     1.21        PEAK FLOW RATE(CFS) =       1.59

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.92
FLOW VELOCITY(FEET/SEC.) =  1.77   DEPTH*VELOCITY(FT*FT/SEC.) =   0.52
LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.03 =   860.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      9.03 TO NODE      9.03 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  13.18
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.539
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 A        0.63      0.80       0.10     52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.80
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
SUBAREA AREA(ACRES) =     0.63      SUBAREA RUNOFF(CFS) =     0.83
EFFECTIVE AREA(ACRES) =    1.84     AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80   AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =     1.84        PEAK FLOW RATE(CFS) =       2.42

****************************************************************************
FLOW PROCESS FROM NODE      9.03 TO NODE      9.03 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  13.18
RAINFALL INTENSITY(INCH/HR) =   1.54
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =    1.84
TOTAL STREAM AREA(ACRES) =    1.84
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.42

** CONFLUENCE DATA **
 STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      3.12  13.11    1.544  0.80( 0.08) 0.10      2.4        9.01
    2      2.42  13.18    1.539  0.80( 0.08) 0.10      1.8        9.01

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR  2 STREAMS.

** PEAK FLOW RATE TABLE **
 STREAM     Q      Tc    Intensity   Fp(Fm)      Ap   Ae      HEADWATER
 NUMBER   (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      5.54  13.11    1.544  0.80( 0.08) 0.10      4.2        9.01
    2      5.53  13.18    1.539  0.80( 0.08) 0.10      4.2        9.01

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      5.54    Tc(MIN.) =    13.11
EFFECTIVE AREA(ACRES) =     4.20   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
```

```
 TOTAL AREA(ACRES) =      4.21
 LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.03 =   860.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.03 TO NODE      9.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
   >>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1029.20  DOWNSTREAM(FEET) =  1024.50
 FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.54
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =  13.73
 LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.04 =  1130.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.05 TO NODE      9.04 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
     1      5.54  13.73     1.502  0.80( 0.08) 0.10      4.2        9.01
     2      5.53  13.80     1.497  0.80( 0.08) 0.10      4.2        9.01
 LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.04 =  1130.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
     1      3.18  14.39     1.460  0.80( 0.08) 0.10      2.6        6.03
     2      3.17  14.79     1.436  0.80( 0.08) 0.10      2.6        6.03
 LONGEST FLOWPATH FROM NODE      6.03 TO NODE      9.04 =   870.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
     1      8.66  13.73     1.502  0.80( 0.08) 0.10      6.6        9.01
     2      8.66  13.80     1.497  0.80( 0.08) 0.10      6.7        9.01
     3      8.57  14.39     1.460  0.80( 0.08) 0.10      6.8        6.03
     4      8.47  14.79     1.436  0.80( 0.08) 0.10      6.8        6.03
   TOTAL AREA(ACRES) =      6.81

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      8.66  Tc(MIN.) =   13.799
 EFFECTIVE AREA(ACRES) =    6.66  AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =      6.81
 LONGEST FLOWPATH FROM NODE      9.01 TO NODE      9.04 =  1130.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      6.81  TC(MIN.) =     13.80
 EFFECTIVE AREA(ACRES) =       6.66  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.80  AREA-AVERAGED Ap =  0.10
 PEAK FLOW RATE(CFS)    =      8.66

 ** PEAK FLOW RATE TABLE **
  STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
  NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
     1      8.66  13.73     1.502  0.80( 0.08) 0.10      6.6        9.01
     2      8.66  13.80     1.497  0.80( 0.08) 0.10      6.7        9.01
     3      8.57  14.39     1.460  0.80( 0.08) 0.10      6.8        6.03
     4      8.47  14.79     1.436  0.80( 0.08) 0.10      6.8        6.03
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

BASIN ROUTING ANALYSIS

- Flood/Basin Routing Analysis
- Determination of Peak Rational Flow

FLOOD/BASIN ROUTING ANALYSIS

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**************************************************************************

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                          Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* KAISER COMMERCE CENTER                                                  *
* DETENSION BASIN ROUTING                                                 *
* REVISED DRAINAGE ANALYSIS                                               *
 **************************************************************************

  FILE NAME: 96082FE\DETBASIN.DAT
  TIME/DATE OF STUDY: 14:53 08/15/2001


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      211.580 ACRES
         BASEFLOW =    0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =     0.208 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.074
         LOW LOSS FRACTION = 0.099
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.49
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.01
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.35
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.45
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.61
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  7.60

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.991
          30-MINUTE FACTOR = 0.991
           1-HOUR FACTOR = 0.991
           3-HOUR FACTOR = 0.999
           6-HOUR FACTOR = 0.999
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =    5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  40.064


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                     UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	2.921	74.734
2	19.516	424.653
3	49.239	760.528
4	77.506	723.318
5	91.191	350.148
6	96.779	142.984
7	98.477	43.450
8	99.221	19.050
9	99.688	11.959
10	99.922	5.979
11	100.000	1.993

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 12.1588
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 121.7220

24-HOUR STORM RUNOFF HYDROGRAPH

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 150.0 300.0 450.0 600.0
14.000	52.8469	82.77	. Q . V . . .
14.083	53.4259	84.07	. Q . V . . .
14.167	54.0131	85.26	. Q . V . . .
250	54.6073	86.29	. Q . V . . .
14.333	55.2097	87.46	. Q . V . . .
14.417	55.8223	88.96	. Q . V . . .
14.500	56.4472	90.73	. Q . V . . .
14.583	57.0854	92.66	. Q . V . . .
14.667	57.7382	94.80	. Q . V . . .
14.750	58.4067	97.06	. Q . V. . . .
14.833	59.0924	99.56	. Q . V. . . .
14.917	59.7965	102.23	. Q . V. . . .
15.000	60.5211	105.21	. Q . V. . . .
15.083	61.2679	108.43	. Q . V . . .
15.167	62.0397	112.07	. Q . V . . .
15.250	62.8389	116.05	. Q . V . . .
15.333	63.6697	120.62	. Q . V . . .
15.417	64.5288	124.75	. Q . .V . . .
15.500	65.3909	125.18	. Q . .V . . .
15.583	66.2318	122.10	. Q . .V . . .
15.667	67.0660	121.12	. Q . . V . . .
15.750	67.9398	126.89	. Q . . V . . .
15.833	68.8939	138.53	. Q. . V . . .
15.917	69.9759	157.10	. Q . V . . .
16.000	71.2895	190.73	. Q . V . . .
16.083	73.1489	269.99	. Q . V . . .
16.167	76.1936	442.10	. . V Q. . .
16.250	80.1059	568.07	. . V . Q .
16.333	83.6576	515.70	. . V . Q .
16.417	85.9304	330.01	. . Q V . . .
16.500	87.4181	216.01	. Q . V . . .
16.583	88.5166	159.51	. Q . V. . .
567	89.4815	140.11	. Q. . V. . .
16.750	90.3642	128.17	. Q . . V. . .
16.833	91.1729	117.43	. Q . . V. . .
16.917	91.9197	108.43	. Q . . V . .
17.000	92.6189	101.52	. Q . . V . .
17.083	93.2832	96.46	. Q . . V . .

17.167	93.9194	92.38	.	Q	.	.	V	.
17.250	94.5329	89.09	.	Q	.	.	.V	.
17.333	95.1267	86.22	.	Q	.	.	.V	.
17.417	95.7018	83.50	.	Q	.	.	.V	.
17.500	96.2594	80.96	.	Q	.	.	.V	.
17.583	96.8008	78.61	.	Q	.	.	.V	.
17.667	97.3274	76.46	.	Q	.	.	.V	.
17.750	97.8405	74.50	.	Q	.	.	. V	.
17.833	98.3411	72.69	.	Q	.	.	. V	.
17.917	98.8301	71.01	.	Q	.	.	. V	.
18.000	99.3084	69.45	.	Q	.	.	. V	.

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FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 1

>>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
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(UNIT-HYDROGRAPH ADDED TO STREAM #2)

WATERSHED AREA = 75.040 ACRES
BASEFLOW = 0.000 CFS/SQUARE-MILE
*USER ENTERED "LAG" TIME = 0.328 HOURS
CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
VALLEY(DEVELOPED) S-GRAPH SELECTED
MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) = 0.074
LOW LOSS FRACTION = 0.099
HYDROGRAPH MODEL #1 SPECIFIED

SPECIFIED PEAK 5-MINUTES RAINFALL(INCH)= 0.49
SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)= 1.01
SPECIFIED PEAK 1-HOUR RAINFALL(INCH) = 1.35
SPECIFIED PEAK 3-HOUR RAINFALL(INCH) = 2.45
SPECIFIED PEAK 6-HOUR RAINFALL(INCH) = 3.61
SPECIFIED PEAK 24-HOUR RAINFALL(INCH) = 7.60

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE FACTOR = 0.997
30-MINUTE FACTOR = 0.997
1-HOUR FACTOR = 0.997
3-HOUR FACTOR = 0.999
6-HOUR FACTOR = 1.000
24-HOUR FACTOR = 1.000

UNIT HYDROGRAPH TIME UNIT = 5.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 25.407

RUNOFF HYDROGRAPH LISTING LIMITS:
MODEL TIME(HOURS) FOR BEGINNING OF RESULTS = 14.00
MODEL TIME(HOURS) FOR END OF RESULTS = 18.00

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UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	1.525	13.841
2	7.660	55.671
3	21.435	125.017
4	39.763	166.325
5	61.043	193.119
6	77.647	150.690
7	87.674	90.996
8	93.266	50.744

9	96.469	29.069
10	98.072	14.547
11	98.596	4.752
12	99.072	4.323
13	99.548	4.323
14	100.000	4.098

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 4.3095
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 43.1863

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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	18.4391	28.67	. Q . V . . .
14.083	18.6396	29.11	. Q . V . . .
14.167	18.8430	29.54	. Q . V . . .
14.250	19.0492	29.93	. Q . V . . .
14.333	19.2579	30.31	. Q . V . . .
14.417	19.4693	30.70	. Q . V . . .
14.500	19.6840	31.17	. Q . V . . .
14.583	19.9025	31.73	. Q . V . . .
14.667	20.1254	32.36	. Q . V . . .
14.750	20.3532	33.08	. Q . V . . .
14.833	20.5864	33.85	. Q . V. . . .
14.917	20.8254	34.71	. Q . V. . . .
15.000	21.0708	35.63	. Q . V. . . .
15.083	21.3233	36.66	. Q . V. . . .
15.167	21.5834	37.77	. Q . V. . . .
15.250	21.8521	39.01	. Q . V . . .
15.333	22.1302	40.39	. Q . V . . .
15.417	22.4180	41.78	. Q . V . . .
15.500	22.7130	42.83	. Q . .V . . .
15.583	23.0112	43.30	. Q . .V . . .
15.667	23.3113	43.57	. Q . .V . . .
15.750	23.6145	44.04	. Q . .V . . .
15.833	23.9293	45.70	. Q. . V . . .
15.917	24.2699	49.46	. Q. . V . . .
16.000	24.6573	56.25	. .Q . V . . .
16.083	25.1527	71.93	. . Q . V . . .
16.167	25.8400	99.80	. . Q. V . . .
16.250	26.7710	135.19	. . . V Q . . .
16.333	27.8326	154.14	. . . V Q . . .
16.417	28.9262	158.79	. . . V .Q . . .
16.500	29.8403	132.72	. . . QV . . .
16.583	30.5282	99.89	. . Q. V . . .
16.667	31.0534	76.26	. . Q . V . . .
16.750	31.4804	62.00	. . Q . V. . . .
16.833	31.8385	51.99	. Q . V. . . .
16.917	32.1475	44.87	. Q . V. . . .
17.000	32.4360	41.90	. Q . V . . .
17.083	32.7079	39.48	. Q . V . . .
17.167	32.9638	37.15	. Q . V . . .
17.250	33.1966	33.81	. Q . V . . .
17.333	33.4194	32.35	. Q . V . . .
17.417	33.6343	31.21	. Q . .V . . .
17.500	33.8425	30.22	. Q . .V . . .
17.583	34.0440	29.27	. Q . .V . . .
17.667	34.2396	28.39	. Q . .V . . .
17.750	34.4296	27.59	. Q . .V . . .
17.833	34.6145	26.85	. Q . . V . .

17.917	34.7947	26.17	.	Q	.	.	.	V	.	
18.000	34.9706	25.54	.	Q	.	.	.	V	.	

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FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 7

>>>>>STREAM NUMBER 2 ADDED TO STREAM NUMBER 1<<<<<
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FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 11

>>>>>VIEW STREAM NUMBER 1 HYDROGRAPH<<<<<
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STREAM HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	200.0	400.0	600.0	800.0
0.083	0.0078	1.13	Q	.	.	.	.
0.167	0.0579	7.27	Q	.	.	.	.
0.250	0.1860	18.60	Q	.	.	.	.
0.333	0.3926	30.01	VQ	.	.	.	.
0.417	0.6476	37.02	VQ	.	.	.	.
0.500	0.9290	40.86	V Q	.	.	.	.
0.583	1.2229	42.68	V Q	.	.	.	.
0.667	1.5237	43.67	V Q	.	.	.	.
0.750	1.8288	44.30	V Q	.	.	.	.
0.833	2.1365	44.68	V Q	.	.	.	.
0.917	2.4455	44.87	V Q	.	.	.	.
1.000	2.7558	45.04	V Q	.	.	.	.
1.083	3.0671	45.21	V Q	.	.	.	.
1.167	3.3797	45.38	V Q	.	.	.	.
1.250	3.6930	45.49	V Q	.	.	.	.
1.333	4.0071	45.61	V Q	.	.	.	.
1.417	4.3221	45.73	.VQ	.	.	.	.
1.500	4.6378	45.85	.VQ	.	.	.	.
1.583	4.9544	45.97	.VQ	.	.	.	.
1.667	5.2718	46.09	.VQ	.	.	.	.
1.750	5.5901	46.21	.VQ	.	.	.	.
1.833	5.9092	46.34	.VQ	.	.	.	.
1.917	6.2292	46.46	.VQ	.	.	.	.
2.000	6.5500	46.58	.VQ	.	.	.	.
2.083	6.8717	46.71	.VQ	.	.	.	.
2.167	7.1943	46.84	.VQ	.	.	.	.
2.250	7.5177	46.96	.VQ	.	.	.	.
2.333	7.8420	47.09	.VQ	.	.	.	.
2.417	8.1673	47.22	.VQ	.	.	.	.
2.500	8.4934	47.36	. Q	.	.	.	.
2.583	8.8205	47.49	. Q	.	.	.	.
2.667	9.1485	47.62	. Q	.	.	.	.
2.750	9.4774	47.76	. Q	.	.	.	.
2.833	9.8072	47.89	. Q	.	.	.	.
2.917	10.1380	48.03	. Q	.	.	.	.
3.000	10.4698	48.17	. Q	.	.	.	.
3.083	10.8025	48.31	. Q	.	.	.	.
3.167	11.1362	48.45	. Q	.	.	.	.
3.250	11.4708	48.59	. Q	.	.	.	.
3.333	11.8065	48.74	. Q	.	.	.	.
3.417	12.1432	48.88	. Q	.	.	.	.
3.500	12.4809	49.03	. QV	.	.	.	.
3.583	12.8196	49.18	. QV	.	.	.	.
3.667	13.1593	49.33	. QV	.	.	.	.
3.750	13.5001	49.48	. QV	.	.	.	.
3.833	13.8419	49.63	. QV	.	.	.	.
3.917	14.1848	49.79	. QV	.	.	.	.
4.000	14.5287	49.94	. QV	.	.	.	.
4.083	14.8737	50.10	. QV	.	.	.	.

4.167	15.2199	50.26	.	QV	.	.	.	.
4.250	15.5671	50.42	.	QV	.	.	.	.
4.333	15.9155	50.58	.	QV	.	.	.	.
4.417	16.2649	50.74	.	QV	.	.	.	.
4.500	16.6155	50.91	.	Q V	.	.	.	.
4.583	16.9673	51.08	.	Q V	.	.	.	.
4.667	17.3202	51.24	.	Q V	.	.	.	.
.750	17.6743	51.41	.	Q V	.	.	.	.
4.833	18.0296	51.59	.	Q V	.	.	.	.
4.917	18.3861	51.76	.	Q V	.	.	.	.
5.000	18.7438	51.94	.	Q V	.	.	.	.
5.083	19.1027	52.11	.	Q V	.	.	.	.
5.167	19.4629	52.30	.	Q V	.	.	.	.
5.250	19.8243	52.48	.	Q V	.	.	.	.
5.333	20.1870	52.66	.	Q V	.	.	.	.
5.417	20.5509	52.85	.	Q V	.	.	.	.
5.500	20.9162	53.04	.	Q V	.	.	.	.
5.583	21.2827	53.22	.	Q V	.	.	.	.
5.667	21.6506	53.42	.	Q V	.	.	.	.
5.750	22.0198	53.61	.	Q V	.	.	.	.
5.833	22.3904	53.81	.	Q V	.	.	.	.
5.917	22.7624	54.01	.	Q V	.	.	.	.
6.000	23.1357	54.21	.	Q V	.	.	.	.
6.083	23.5104	54.41	.	Q V	.	.	.	.
6.167	23.8866	54.62	.	Q V	.	.	.	.
6.250	24.2642	54.83	.	Q V	.	.	.	.
6.333	24.6432	55.04	.	Q V	.	.	.	.
6.417	25.0238	55.25	.	Q V	.	.	.	.
6.500	25.4058	55.47	.	Q V	.	.	.	.
6.583	25.7893	55.69	.	Q V	.	.	.	.
6.667	26.1744	55.91	.	Q V	.	.	.	.
6.750	26.5610	56.13	.	Q V	.	.	.	.
6.833	26.9491	56.36	.	Q V	.	.	.	.
6.917	27.3389	56.59	.	Q V	.	.	.	.
7.000	27.7303	56.83	.	Q V	.	.	.	.
7.083	28.1233	57.06	.	Q V	.	.	.	.
167	28.5179	57.30	.	Q V	.	.	.	.
.250	28.9142	57.54	.	Q V	.	.	.	.
7.333	29.3122	57.79	.	Q V	.	.	.	.
7.417	29.7120	58.04	.	Q V	.	.	.	.
7.500	30.1135	58.30	.	Q V	.	.	.	.
7.583	30.5167	58.55	.	Q V	.	.	.	.
7.667	30.9217	58.81	.	Q V	.	.	.	.
7.750	31.3286	59.07	.	Q V	.	.	.	.
7.833	31.7373	59.34	.	Q V	.	.	.	.
7.917	32.1479	59.61	.	Q V	.	.	.	.
8.000	32.5603	59.89	.	Q V	.	.	.	.
8.083	32.9747	60.17	.	Q V	.	.	.	.
8.167	33.3911	60.46	.	Q V	.	.	.	.
8.250	33.8094	60.74	.	Q V	.	.	.	.
8.333	34.2298	61.04	.	Q V	.	.	.	.
8.417	34.6522	61.33	.	Q V	.	.	.	.
8.500	35.0767	61.63	.	Q V	.	.	.	.
8.583	35.5032	61.94	.	Q V	.	.	.	.
8.667	35.9320	62.25	.	Q V	.	.	.	.
8.750	36.3629	62.57	.	Q V	.	.	.	.
8.833	36.7960	62.89	.	Q V	.	.	.	.
8.917	37.2314	63.21	.	Q V	.	.	.	.
9.000	37.6690	63.55	.	Q V	.	.	.	.
9.083	38.1090	63.88	.	Q V	.	.	.	.
9.167	38.5514	64.23	.	Q V	.	.	.	.
9.250	38.9961	64.58	.	Q V	.	.	.	.
9.333	39.4433	64.93	.	Q V	.	.	.	.
9.417	39.8930	65.29	.	Q V	.	.	.	.
9.500	40.3452	65.66	.	Q V	.	.	.	.
583	40.8000	66.04	.	Q V	.	.	.	.
.667	41.2575	66.42	.	Q V	.	.	.	.
9.750	41.7176	66.81	.	Q V	.	.	.	.
9.833	42.1804	67.21	.	Q V	.	.	.	.
9.917	42.6460	67.61	.	Q V	.	.	.	.
10.000	43.1145	68.02	.	Q V	.	.	.	.

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10.083     43.5858     68.44  .  Q      V          .          .          .
10.167     44.0601     68.87  .  Q      V          .          .          .
10.250     44.5374     69.30  .  Q      V          .          .          .
10.333     45.0177     69.75  .  Q      V          .          .          .
10.417     45.5012     70.20  .  Q      .V         .          .          .
10.500     45.9879     70.67  .  Q      .V         .          .          .
10.583     46.4778     71.14  .  Q      .V         .          .          .
10.667     46.9711     71.62  .  Q      .V         .          .          .
10.750     47.4677     72.11  .  Q      .V         .          .          .
10.833     47.9679     72.62  .  Q      .V         .          .          .
10.917     48.4716     73.14  .  Q      .V         .          .          .
11.000     48.9789     73.67  .  Q      .V         .          .          .
11.083     49.4899     74.20  .  Q      . V        .          .          .
11.167     50.0048     74.76  .  Q      . V        .          .          .
11.250     50.5236     75.32  .  Q      . V        .          .          .
11.333     51.0463     75.91  .  Q      . V        .          .          .
11.417     51.5732     76.50  .  Q      . V        .          .          .
11.500     52.1043     77.11  .  Q      . V        .          .          .
11.583     52.6396     77.73  .  Q      . V        .          .          .
11.667     53.1794     78.38  .  Q      . V        .          .          .
11.750     53.7237     79.03  .  Q      .  V       .          .          .
11.833     54.2727     79.71  .  Q      .  V       .          .          .
11.917     54.8264     80.40  .   Q     .  V       .          .          .
12.000     55.3851     81.12  .   Q     .  V       .          .          .
12.083     55.9495     81.95  .   Q     .  V       .          .          .
12.167     56.5225     83.20  .   Q     .  V       .          .          .
12.250     57.1072     84.90  .   Q     .  V       .          .          .
12.333     57.7038     86.62  .   Q     .  V       .          .          .
12.417     58.3098     88.00  .   Q     .   V      .          .          .
12.500     58.9238     89.15  .   Q     .   V      .          .          .
12.583     59.5448     90.16  .   Q     .   V      .          .          .
12.667     60.1724     91.14  .   Q     .   V      .          .          .
12.750     60.8068     92.11  .   Q     .   V      .          .          .
12.833     61.4479     93.10  .   Q     .   V      .          .          .
12.917     62.0959     94.09  .   Q     .    V     .          .          .
13.000     62.7512     95.14  .   Q     .    V     .          .          .
13.083     63.4138     96.21  .   Q     .    V     .          .          .
13.167     64.0841     97.33  .   Q     .    V     .          .          .
13.250     64.7623     98.48  .   Q     .    V     .          .          .
13.333     65.4489     99.69  .   Q     .    V     .          .          .
13.417     66.1440    100.93  .    Q    .     V    .          .          .
13.500     66.8482    102.24  .    Q    .     V    .          .          .
13.583     67.5617    103.60  .    Q    .     V    .          .          .
13.667     68.2850    105.03  .    Q    .     V    .          .          .
13.750     69.0186    106.51  .    Q    .     V    .          .          .
13.833     69.7629    108.08  .    Q    .     V    .          .          .
13.917     70.5185    109.71  .    Q    .      V   .          .          .
14.000     71.2860    111.44  .    Q    .      V   .          .          .
14.083     72.0655    113.19  .    Q    .      V   .          .          .
14.167     72.8561    114.79  .    Q    .      V   .          .          .
14.250     73.6565    116.22  .    Q    .      V   .          .          .
14.333     74.4676    117.77  .    Q    .       V  .          .          .
14.417     75.2917    119.66  .    Q    .       V  .          .          .
14.500     76.1312    121.90  .     Q   .       V  .          .          .
14.583     76.9879    124.39  .     Q   .       V  .          .          .
14.667     77.8636    127.16  .     Q   .       V  .          .          .
14.750     78.7599    130.14  .     Q   .        V.          .          .
14.833     79.6787    133.41  .     Q   .        V.          .          .
14.917     80.6219    136.95  .     Q   .        V.          .          .
15.000     81.5919    140.85  .      Q  .        V.          .          .
15.083     82.5911    145.09  .      Q  .         V          .          .
15.167     83.6230    149.83  .      Q  .         V          .          .
15.250     84.6910    155.06  .      Q  .         V          .          .
15.333     85.7999    161.01  .       Q .         V          .          .
15.417     86.9468    166.53  .       Q .          .V        .          .
15.500     88.1039    168.01  .       Q .          .V        .          .
15.583     89.2430    165.40  .       Q .          .V        .          .
15.667     90.3772    164.69  .       Q .          .V        .          .
15.750     91.5544    170.92  .       Q .          . V       .          .
15.833     92.8232    184.23  .        Q.          . V       .          .
15.917     94.2457    206.56  .         Q         . V       .          .
```

DRAINAGE NODE MAP

SCALE: 1"=200'

0 100 200 400

SCALE FEET

4.01 1092.3 FS
1.01 1107.3 FS
2.01 1103.7 FS 1098.4 Inv 2.64 Ac
1.05 Ac 1104.0 TG 1098.9 Inv 1.02
9.40 Ac
2.43 Ac 2.42 Ac
2.02 1097.2 Inv 1097.9 Inv 1.03
2.45 Ac 2.58 Ac
2.03 1096.1 Inv 1096.8 Inv 1.04
4.02 1074.3 FS
2.45 Ac 2.58 Ac
2.04 1095.0 Inv 1095.7 Inv 1.05
20.14 Ac
2.49 Ac 2.61 Ac
2.05 1093.9 Inv 1094.6 Inv 1.06
2.46 Ac 2.58 Ac
2.06 1092.8 Inv 1093.5 Inv 1.07
3.01 Ac 1.13 1087.1 Inv 2.97 Ac
2.07 1091.4 Inv 1092.3 Inv 1.08
0.30 Ac 0.57 Ac 0.57 Ac 1.14 Ac
22.62 Ac
0.29 Ac 1086.7 Inv 1.14 1088.0 Inv 1.12 1089.0 Inv 1.11 1090.0 Inv 1.10 1090.5 Inv 1091.5 Inv 1.09
4.03 1069.0 FS
1094.0 FL 3.01
0.43 Ac
1089.5 FL 3.02
0.35 Ac 0.35 Ac
31.88 Ac
0.28 Ac 1075.3 FL 1067.8 Inv 1.15 3.03
0.28 Ac
27.70 Ac
1063.8 FL 3.04
0.41 Ac
1.16 1053.0 Inv
7.01 1062.0 FS
0.59 Ac 1057.7 TG 1052.7 Inv 1052.3 Inv 7.02 7.03
0.41 Ac
2.98 Ac 0.77 Ac
3.05 1.17 1058.4 FL 1051.0 Inv 0.72 Ac 1051.7 Inv 7.04
1.18 1050.4 Inv 0.72 Ac 2.32 Ac 1051.2 Inv 7.05
3.06 1056.4 FL 0.28 Ac 3.22 Ac 0.72 Ac 1050.7 Inv 7.06
0.28 Ac 0.72 Ac 1050.15 Inv 7.07
1.19 1048.9 Inv 0.72 Ac 1050.1 Inv 7.08
25.52 Ac
4.05 1058.0 FS 3.97 Ac 0.72 Ac 1049.6 Inv 7.09
0.44 Ac 0.72 Ac 1049.1 Inv 7.10
0.44 Ac 1.02 Ac 3.21 Ac 1048.5 Inv 7.11
1.20 1046.9 Inv 1048.0 Inv 7.12
3.07 1.21 1051.2/3 FL 1042.5 Inv 1040.5 Inv 1.52 Ac
4.06 1055.3 FL 1040.3 Inv 1.22 5.01 1053.2 FS 1044.6 Inv 7.13
5.03 1050.5 FL 1050.2 FL 1.66 Ac 1052.9 FS 1.98 Ac 1043.3 Inv 7.14
0.21 Ac 0.50 Ac 0.31 Ac
0.28 Ac 0.63 Ac 0.43 Ac
Q_{100} = 46.1
Q_2 = 19.8
8.02 1048.6 FS 3.52 Ac 1051.6 FS 8.01 1.17 Ac 1.01 Ac 1051.6 FL 1051.3 FL 5.02 1051.7 FS 6.01
1049.8 FS 8.07
3.68 Ac
1049.0 FS
8.54 Ac 8.08
14.49 Ac
0.59 Ac 0.57 Ac
1048.3 FL 6.02
7.07 Ac
8.03 1045.1 FS
1047.0 FS 8.09
10.66 Ac
0.73 Ac 0.79 Ac
1045.0 FL (W) 1045.1 FL (E) 6.03
1032.8 Inv 1.23
1044.5 FS 8.10
1032.1 Inv 1.24
Q_{100} = 389.0
Q_2 = 161.9
0.35 Ac 0.38 Ac
1043.3 FL 6.04
9.25 Ac
15.70 Ac
4.01 Ac
8.28 Ac
0.75 Ac 0.66 Ac
8.04 1040.3 FS
8.05 1039.5 TG 1036.5 Inv
8.06 1040.4 TG 1034.4 Inv
8.11 1032.3 Inv
Q_{100} = 146.6
Q_2 = 60.1
8.12 1031.0 Inv
1039.8 FL (W) 1040.2 FL (E) 6.05
1.03 Ac 1.12 Ac
0.47 Ac 0.87 Ac 1.03 Ac 0.46 Ac
0.46 Ac 0.75 Ac 0.63 Ac
1041.0 FS 9.02 1038.0 FL 9.03 1034.6 FL(N) 1034.3 FL(S) 1029.2 Inv 9.04 1024.5 Inv
Q_{100} = 80.3
Q_2 = 30.7
9.01

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