CEQA HYDROLOGY & HYDRAULIC REPORT

DATED: 2/11/26

For

The Cambridge School

PRJ-1109086

Prepared for:
The Cambridge School, Attn: Scott Kim
Mailing Adress: 12855 Black Mountain Road, San Diego, CA 92129
Phone: 858-484-3488
scottckim@gmail.com

Project Location:
Corner of Coyote Bush Dr & Camino del Sur, San Diego, CA 92127

APN: 678-690-70-00, 678-690-71-00, 678-690-72-00

Prepared By:
SPEAR & ASSOCIATES, INC.
CIVIL ENGINEERING AND LAND SURVEYING
457 Production Street
San Marcos, CA 92078
Phone: (760) 736-2040

Danny Abada, PE



DECLARATION OF RESPONSIBLE CHARGE

I, HEREBY DECLARE THAT I AM THE CIVIL ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THIS PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONAL CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT DESIGN STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.



2/11/26

Danny Abada
REGISTERED CIVIL ENGINEER
Spear & Associates Inc.

DATE



TABLE OF CONTENTS

I. INTRODUCTION	1
II. DISCUSSION/CONCLUSION	1
SUMMARY OF FLOW RATES	2
ATTACHMENTS	
A. LOCATION MAP	3
B. HYDROLOGY	5
C. UNDERGROUND DETENTION CALCULATIONS	30
D. REFERENCE RICK ENGINEERING HYDROLOGY STUDY JOB NO 15009-H & Q100, Q25 EXCERPTS	41
E. DRAINAGE AREA MAP	421

I. INTRODUCTION

This hydrology report was prepared for The Cambridge School located at the corner of Coyote Bush Dr & Camino del Sur, San Diego, CA 92127. The total site encompasses approximately 6.53 acres.

The site is currently undeveloped, and it was previously graded and is mostly bare. The existing topography slopes in a northeasterly direction with elevations ranging from approximately 528 to 497.

The project consists of developing a vacant lot with a private school parking structure landscaping, proprietary modular wetlands for stormwater treatment and underground detention to address hydromodification.

The site drains northeasterly towards and existing detention basin located at the northeast corner of the site. Additionally, 0.30 acres of offsite runoff from Coyote Bush Drive drain into the northeast corner of the site. The entire runoff then drains to a headwall connecting to an existing 24" RCP. The runoff is then directed approximately 1.69 miles through public stormdrains to the San Dieguito River, then 7.9 miles to the Pacific Ocean

A "Drainage Study for Camino Del Sur South Half Phase II Northerly Drainage Areas, Addendum 5 Dated 4/24/2013, Job Number 15009-H" Has calculations for assumed developed conditions showing Q100= 22.52 cfs and Q25 = 8.5 cfs exiting the site.

The development will maintain existing drainage patterns. Post development runoff will be directed to proprietary modular wetlands for stormwater treatment and underground detention to address hydromodification located at the northeast corner of the site. They will mitigate onsite and offsite runoff. The outlet flows will be directed to the same drainage system as in pre-development. The proposed peak runoff exiting the site will not be increased from the peak Q100 and Q25 runoffs from the above-mentioned Rick Engineering Hydrology Report. (Refer to Node 7123.40 to Node 7123.0 Q100 = 22.52 cfs of that report). (See report excerpts for the Q100 and Q25 and also the full report in attachment D.

We have used the County of San Diego Hydrology Manual to determine the run-off from the site for the 100yr and 25yr flows. Based on the soil hydrologic group map of the County Hydrology Manual, the project soil uniformly consists of type C across all sub areas. Peak flow rates were calculated using the rational method. Times of concentrations were calculated using the Manning's equation to obtain velocities using average overland flow rates. Detention Basins were modeled with Rathydro and Hydrocad.

In order to comply with detention basin conjunctive use of flood control and HMP, section 6.2.7 of the County Hydraulic Manual, the basin was modeled with a ponded the water quality volume at the overflow riser's first surface outlet at time = 0; before initiating the 100-year simulation

Water quality will be addressed with biofiltration basins to treat the projects anticipated and expected pollutants. Refer to the Storm Water Quality Management Plan for more detailed information.

II. DISCUSSION/CONCLUSION

Calculated proposed total peak outlets from the site Q100 = 8.5 cfs and Q25 = 7.1 cfs. Post development peak flows, flow volumes and velocities for the 100yr and 25yr events will not exceed pre-development rates with reduced site imperviousness, an efficient site design,

maximizing onsite times of concentration and onsite underground detention. No increased negative impact to any adjacent properties is anticipated from this development.

No increased peak runoff flow into the existing stormdrain system is anticipated as a result of this development.

The project will not conduct activities that would trigger a Clean Water Act Section 401 or 404 Certification.

This project will not significantly alter existing drainage patterns along the site or divert runoff from existing conditions. Total post development peak runoff from the site will not exceed the pre-development rates. The proposed onsite biofiltration basins, proprietary modular wetland and underground detention are designed to address pollutant and hydromodification controls.

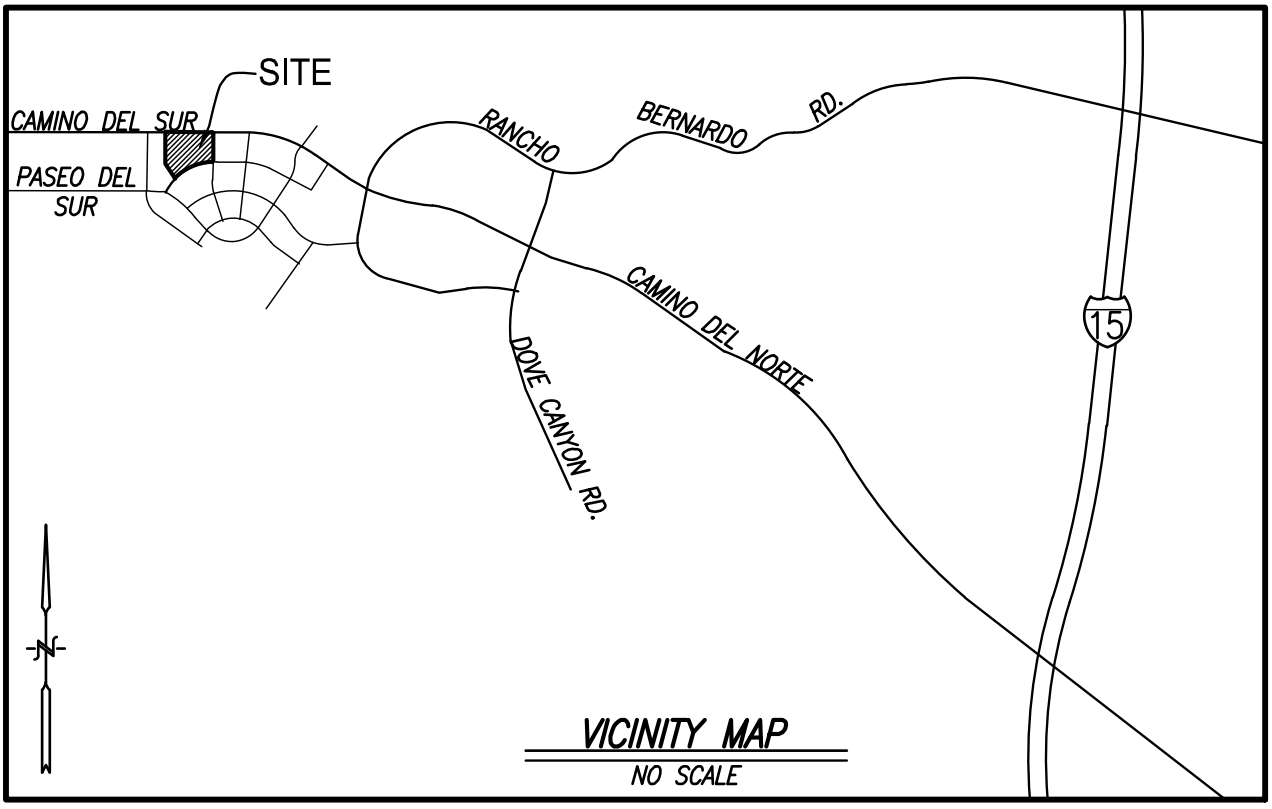
The proposed post development source control and treatment control BMPs, as shown in the stormwater quality management plan, will protect water quality and mitigate water quality objectives to the maximum extent practicable prior to discharging offsite.

Summary of flow rates

	Q100-yr cfs	***Outlet V100-yr ft/s***
Pre-Dev. Total	9.6	14.8
Post-Dev. Total w/Onsite Det. @ POC 1	8.5	14.1

Note: The Post Development outflow flow rate @ (POC 1 Q100 = 8.5 cfs, V100 = 14.1 ft/s) is lower than Rick Engineering Hydrology Study Job No 15009-H @ (POC 1 Q100= 22.52 cfs, V100= 18.9). Also the post development Q25 = 7.1 cfs is lower than "Rick's report showing Q25 = 8.5 cfs." See attachment D for excerpts from that study.

ATTACHMENT A


SITE
CAMINO DEL SUR
PASEO DEL SUR
RANCHO
BERNARDO
RD.
CAMINO DEL NORTE
DOVE CANYON RD.
15
N
VICINITY MAP
NO SCALE

ATTACHMENT B

Post-Development **Rational Method, 100yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	Q cfs	Q cfs w/Det Basin
Area A1	6.3	0.76	4.5	3.42	3.42	2.80	6.36	**21.7**	
Area A2	8.7	0.76	1.73	1.31	1.31	2.80	5.16	**6.8**	
Area B	6.9	0.44	0.19	0.08	0.08	2.80	5.99	**0.5**	
Area SM-1	5	0.3	0.11	0.03	0.03	2.80	7.38	**0.2**	
Offsite O	5	0.79	0.31	0.24	0.24	2.80	7.38	**1.8**	
Total Confluence	6.3					2.80	6.36	**28.8**	**8.5**

Confluence Junction Equation 3.4.2 (Total Site Area)

(Shortest Tc)

DMA	SM-1		O		A1		B		A2	
	T_1 =	5.00	T_2 =	5.00	T_3 =	6.30	T_4 =	6.9	T_5 =	8.70
	I_1 =	7.38	I_2 =	7.38	I_3 =	6.36	I_4 =	5.99	I_5 =	5.16
	Q_1 =	0.2	Q_2 =	1.80	Q_3 =	21.70	Q_4 =	0.5	Q_5 =	6.80
	Q_{t1} =	23.5	Q_{t2} =	23.5	**Q_{t3} =**	**28.8**	Q_{t4} =	28.0	Q_{t5} =	26.2

Pre-Development

REACH	TC	C	A	CA	∑CA	P_6	I	Q cfs
Area A	11.3	0.30	6.53	1.96	1.96	2.80	4.36	**8.5**
Offsite O	5	0.79	0.31	0.24	0.24	2.80	7.38	**1.8**
Total Confluence	11.3				2.20	2.80	4.36	**9.6**

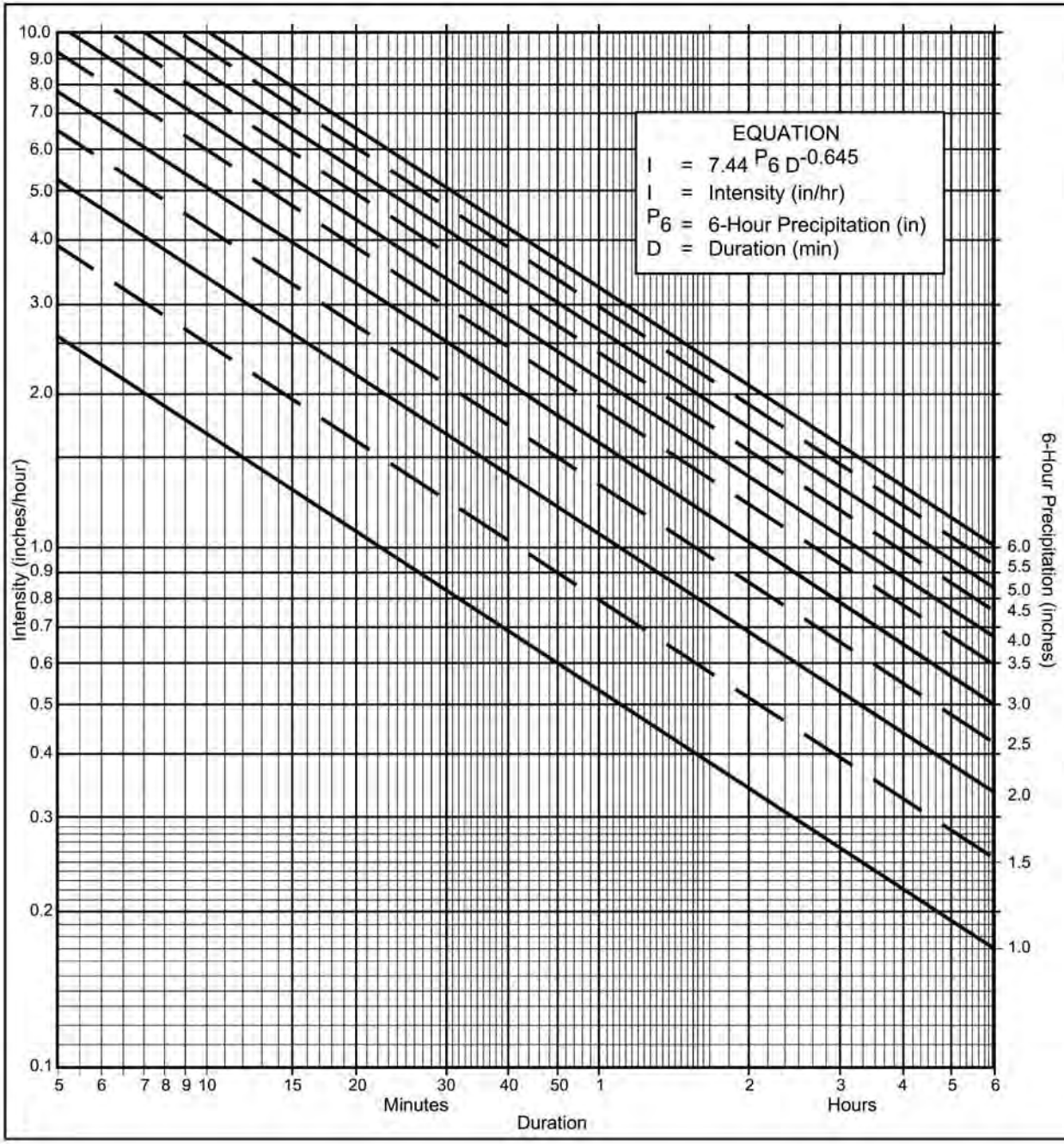
Post-Development **Rational Method, 25yr Event**

REACH	TC	C	A	CA	∑CA	P_6	I	**Q cfs**	**Q cfs w/Det Basin**
Area A1	6.3	0.76	4.5	3.42	3.42	2.21	5.02	**17.2**	
Area A2	8.7	0.76	1.73	1.31	1.31	2.21	4.07	**5.4**	
Area B	6.9	0.44	0.19	0.08	0.08	2.21	4.73	**0.4**	
Area SM-1	5	0.3	0.11	0.03	0.03	2.21	5.82	**0.2**	
Offsite O	5	0.79	0.31	0.24	0.24	2.21	5.82	**1.4**	
Total Confluence	6.3					2.21	5.02	**22.9**	**7.1**

Confluence Junction Equation 3.4.2 (Total Site Area)

(Shortest Tc)

DMA	SM-1		O		A1		B		A2	
	T_1 =	5.00	T_2 =	5.00	T_3 =	6.30	T_4 =	6.9	T_5 =	8.70
	I_1 =	5.82	I_2 =	5.82	I_3 =	5.02	I_4 =	4.73	I_5 =	4.07
	Q_1 =	0.2	Q_2 =	1.40	Q_3 =	17.20	Q_4 =	0.4	Q_5 =	5.40
	Q_{t1} =	18.6	Q_{t2} =	18.6	**Q_{t3} =**	**22.9**	Q_{t4} =	22.2	Q_{t5} =	20.8



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.80 in., P_{24} = 4.90, $\frac{P_6}{P_{24}}$ = 57 %(2)

(c) Adjusted $P_6^{(2)}$ = _____ in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

NOAA Atlas 14, Volume 6, Version 2
Location name: San Diego, California, USA*
Latitude: 33.0218°, Longitude: -117.1285°
Elevation: 499 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.116 (0.098-0.139)	0.147 (0.123-0.176)	0.187 (0.157-0.225)	0.221 (0.183-0.268)	0.268 (0.215-0.337)	0.304 (0.239-0.392)	0.343 (0.262-0.453)	0.383 (0.284-0.522)	0.439 (0.311-0.625)	0.483 (0.330-0.714)
10-min	0.167 (0.140-0.200)	0.210 (0.177-0.252)	0.268 (0.225-0.323)	0.317 (0.263-0.385)	0.384 (0.308-0.483)	0.436 (0.342-0.562)	0.491 (0.375-0.650)	0.549 (0.407-0.748)	0.629 (0.446-0.896)	0.693 (0.473-1.02)
15-min	0.201 (0.170-0.242)	0.254 (0.213-0.305)	0.324 (0.272-0.391)	0.383 (0.318-0.465)	0.464 (0.372-0.585)	0.528 (0.414-0.680)	0.594 (0.453-0.786)	0.664 (0.492-0.904)	0.760 (0.539-1.08)	0.838 (0.573-1.24)
30-min	0.281 (0.237-0.337)	0.354 (0.298-0.426)	0.453 (0.379-0.545)	0.534 (0.444-0.649)	0.647 (0.519-0.816)	0.736 (0.577-0.949)	0.829 (0.633-1.10)	0.926 (0.686-1.26)	1.06 (0.752-1.51)	1.17 (0.799-1.73)
60-min	0.417 (0.351-0.500)	0.525 (0.442-0.631)	0.671 (0.562-0.808)	0.792 (0.658-0.962)	0.959 (0.769-1.21)	1.09 (0.856-1.41)	1.23 (0.938-1.62)	1.37 (1.02-1.87)	1.57 (1.12-2.24)	1.73 (1.18-2.56)
2-hr	0.588 (0.495-0.705)	0.739 (0.621-0.888)	0.939 (0.787-1.13)	1.10 (0.919-1.34)	1.34 (1.07-1.68)	1.51 (1.19-1.95)	1.70 (1.30-2.25)	1.89 (1.40-2.58)	2.16 (1.53-3.08)	2.38 (1.62-3.51)
3-hr	0.712 (0.599-0.854)	0.894 (0.752-1.08)	1.14 (0.953-1.37)	1.34 (1.11-1.62)	1.61 (1.29-2.03)	1.83 (1.43-2.35)	2.05 (1.56-2.71)	2.28 (1.69-3.11)	2.60 (1.84-3.71)	2.86 (1.95-4.22)
6-hr	0.974 (0.820-1.17)	1.23 (1.03-1.47)	1.56 (1.31-1.88)	1.83 (1.52-2.23)	2.21 (1.77-2.78)	2.50 (1.96-3.22)	2.80 (2.14-3.71)	3.12 (2.31-4.25)	3.55 (2.52-5.06)	3.89 (2.66-5.76)
12-hr	1.32 (1.12-1.59)	1.67 (1.41-2.01)	2.13 (1.79-2.57)	2.51 (2.09-3.05)	3.03 (2.43-3.81)	3.43 (2.69-4.42)	3.84 (2.93-5.03)	4.26 (3.16-5.81)	4.85 (3.44-6.91)	5.31 (3.63-7.85)
24-hr	1.66 (1.47-1.93)	2.11 (1.86-2.45)	2.70 (2.38-3.14)	3.19 (2.78-3.74)	3.86 (3.26-4.66)	4.37 (3.62-5.38)	4.90 (3.97-6.18)	5.45 (4.30-7.05)	6.20 (4.71-8.34)	6.80 (4.99-9.44)
2-day	2.04 (1.79-2.36)	2.60 (2.29-3.01)	3.34 (2.94-3.88)	3.96 (3.45-4.63)	4.81 (4.06-5.81)	5.48 (4.54-6.74)	6.16 (4.99-7.77)	6.88 (5.43-8.90)	7.88 (5.98-10.6)	8.66 (6.36-12.0)
3-day	2.28 (2.01-2.64)	2.92 (2.58-3.39)	3.78 (3.32-4.40)	4.50 (3.92-5.27)	5.50 (4.65-6.64)	6.28 (5.21-7.74)	7.10 (5.75-8.94)	7.95 (6.28-10.3)	9.14 (6.94-12.3)	10.1 (7.41-14.0)
4-day	2.50 (2.20-2.89)	3.22 (2.83-3.73)	4.18 (3.67-4.85)	4.98 (4.34-5.83)	6.10 (5.16-7.37)	6.99 (5.79-8.60)	7.91 (6.40-9.96)	8.88 (7.01-11.5)	10.2 (7.77-13.8)	11.3 (8.31-15.7)
7-day	2.93 (2.59-3.40)	3.79 (3.34-4.40)	4.95 (4.35-5.75)	5.92 (5.16-6.92)	7.27 (6.15-8.78)	8.35 (6.92-10.3)	9.48 (7.68-11.9)	10.7 (8.42-13.8)	12.3 (9.36-16.6)	13.7 (10.1-19.0)
10-day	3.26 (2.87-3.77)	4.23 (3.73-4.90)	5.54 (4.87-6.44)	6.64 (5.79-7.77)	8.18 (6.91-9.88)	9.41 (7.80-11.6)	10.7 (8.66-13.5)	12.1 (9.51-15.6)	14.0 (10.6-18.8)	15.5 (11.4-21.6)
20-day	3.96 (3.50-4.59)	5.20 (4.58-6.03)	6.87 (6.03-7.98)	8.27 (7.21-9.68)	10.2 (8.65-12.4)	11.8 (9.79-14.5)	13.5 (10.9-17.0)	15.2 (12.0-19.7)	17.7 (13.4-23.8)	19.7 (14.5-27.4)
30-day	4.78 (4.22-5.54)	6.32 (5.57-7.32)	8.39 (7.37-9.75)	10.1 (8.83-11.9)	12.6 (10.6-15.2)	14.5 (12.0-17.9)	16.6 (13.4-20.9)	18.8 (14.8-24.3)	21.9 (16.6-29.4)	24.4 (17.9-33.9)
45-day	5.66 (4.99-6.55)	7.51 (6.62-8.70)	10.0 (8.79-11.6)	12.1 (10.6-14.2)	15.1 (12.7-18.2)	17.4 (14.4-21.4)	19.9 (16.1-25.1)	22.5 (17.8-29.1)	26.3 (19.9-35.3)	29.3 (21.5-40.7)
60-day	6.56 (5.78-7.59)	8.72 (7.68-10.1)	11.6 (10.2-13.5)	14.1 (12.3-16.5)	17.5 (14.8-21.2)	20.3 (16.8-25.0)	23.2 (18.8-29.2)	26.3 (20.7-34.0)	30.6 (23.2-41.2)	34.2 (25.1-47.5)

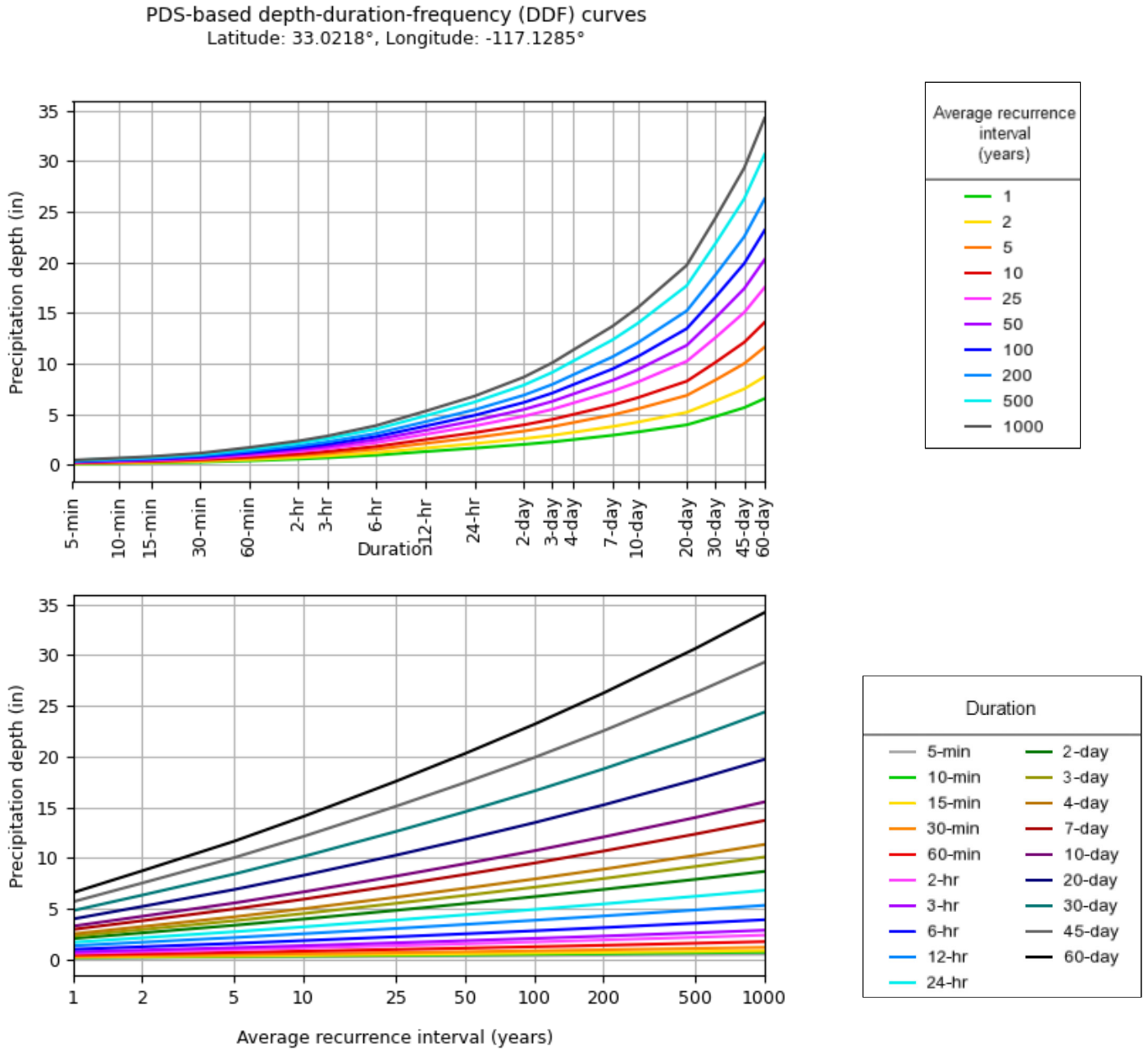
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



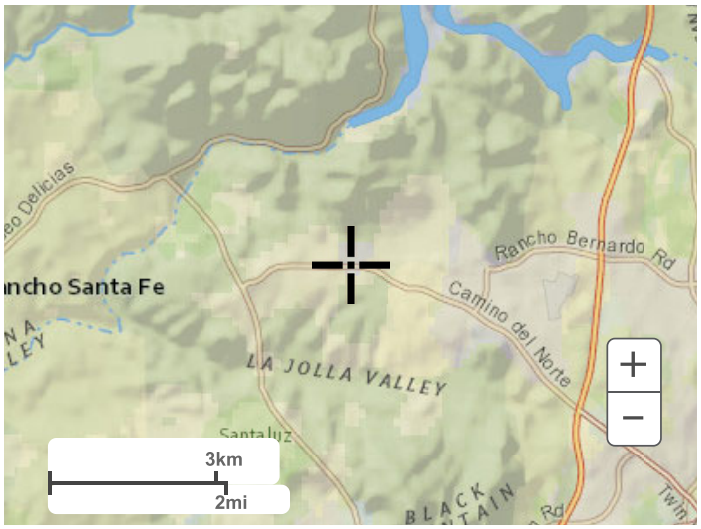
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Nov 22 21:08:49 2023

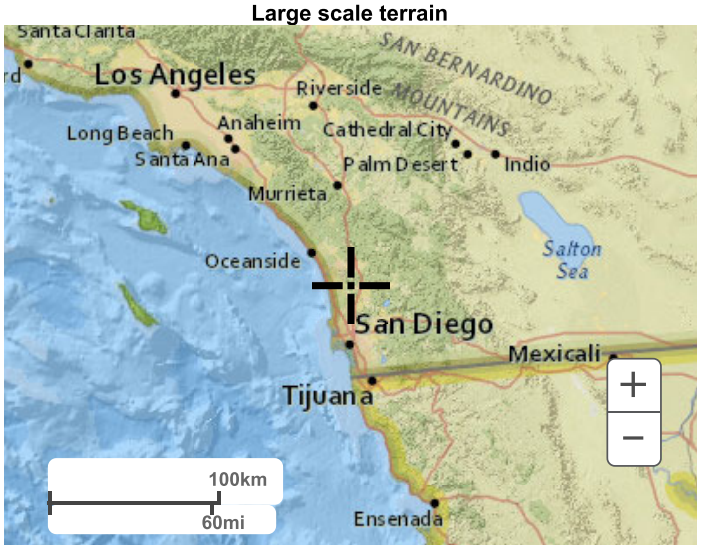
Back to Top

Maps & aerials

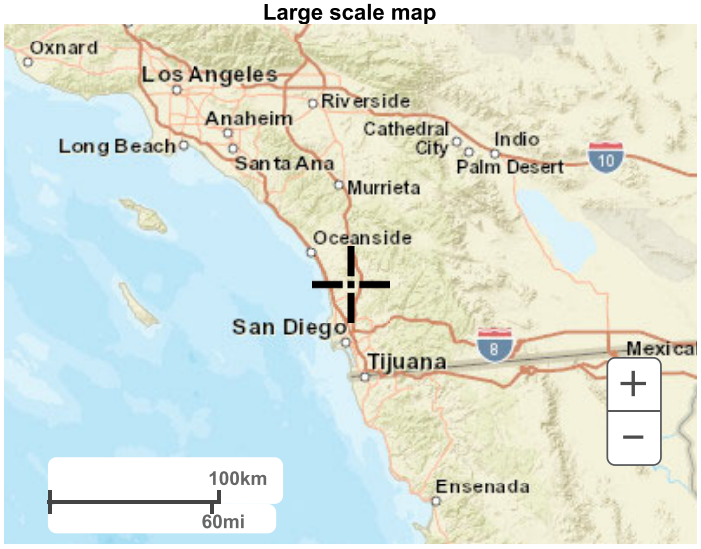
Small scale terrain



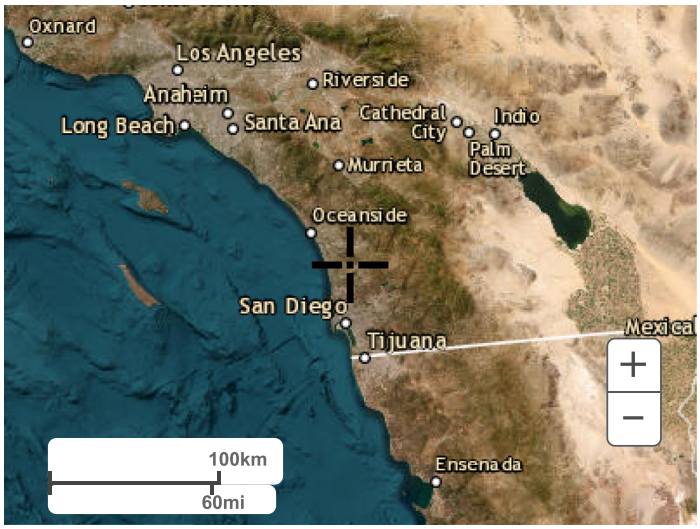
Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

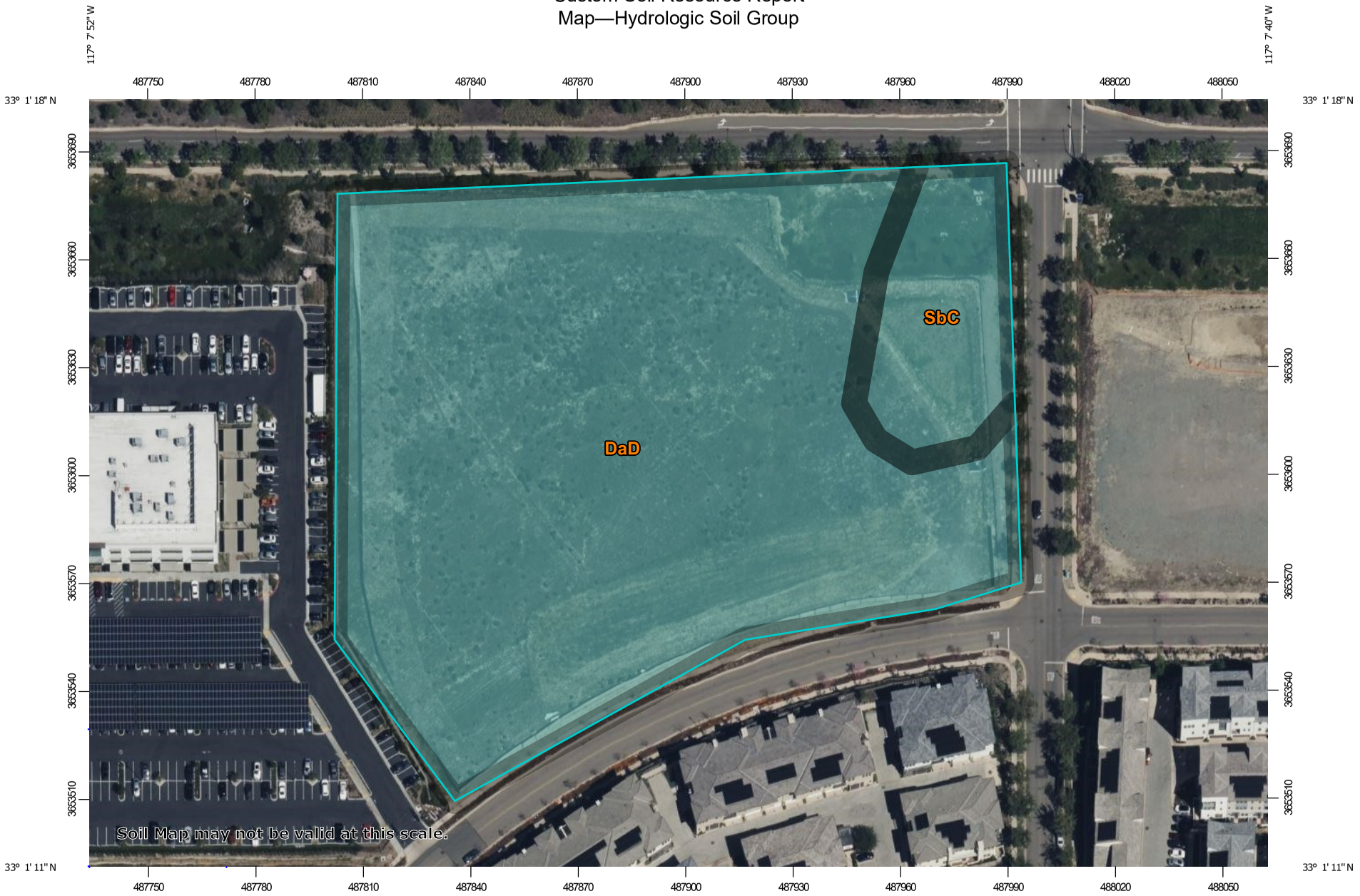
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for San Diego County Area, California



April 26, 2023

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:1,510 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 18, Sep 14, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 24, 2022—Apr 29, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DaD	Diablo clay, 9 to 15 percent slopes, warm MAAT	C	5.8	88.9%
SbC	Salinas clay loam, 2 to 9 percent slopes	C	0.7	11.1%
Totals for Area of Interest			**6.5**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).

DU/A = dwelling units per acre

NRCS = National Resources Conservation Service

Runoff Coefficient Adjustment

Post Development Area A

Total Area	271254	
Impervious	209517	77.24%

C = 0.90 × (% Impervious) + Cp × (1 - % Impervious)
% impervious = 77.24%
Cp = 0.3 (Table 3.1, soil type C, 0% impervious, County Hydrology Manual)
C = 0.76

Post Development Area B

Total Area	8121	
Impervious	1840	22.66%

C = 0.90 × (% Impervious) + Cp × (1 - % Impervious)
% impervious = 22.66%
Cp = 0.3 (Table 3.1, soil type C, 0% impervious, County Hydrology Manual)
C = 0.44

Post Development Area SM-1

Total Area	4917	
Impervious	0	0.00%

C = 0.90 × (% Impervious) + Cp × (1 - % Impervious)
% impervious = 0.00%
Cp = 0.3 (Table 3.1, soil type C, 0% impervious, County Hydrology Manual)
C = 0.30

Pre & Post Development Area Offsite O

Total Area	13068	
Impervious	10768	82.40%

C = 0.90 × (% Impervious) + Cp × (1 - % Impervious)
% impervious = 82.40%
Cp = 0.3 (Table 3.1, soil type C, 0% impervious, County Hydrology Manual)
C = 0.79

Time of Concentration

Location	Initial Average slope %	Initial L (ft)	**Initial Travel Time T (min)**	Add'l L (ft)	Average slope %	Notes	**Average Q Mannings Eq. V (ft/s)**	**Additional TC (travel time) T (min)**	**Total TC T (min)**
									(5 minutes min)
Pre Dev.									
Area A	5.5	100	8.16	435	3.5			3.1	11.3
Offsite O	7.5	100	2.85	275	4.2		2.83	1.6	5.0
Post Dev.									
Area A1	0.6	50	5.13	140	0.6		2.01	1.2	6.3
Area A2	0.6	50	5.13	275	0.6		1.3	3.5	8.7
Area B	8	100	5.94	90	5		1.56	1.0	6.9
Area SM-1	2.7	10	3.27						5.0

Initial Travel Time
(Figure 3-3)

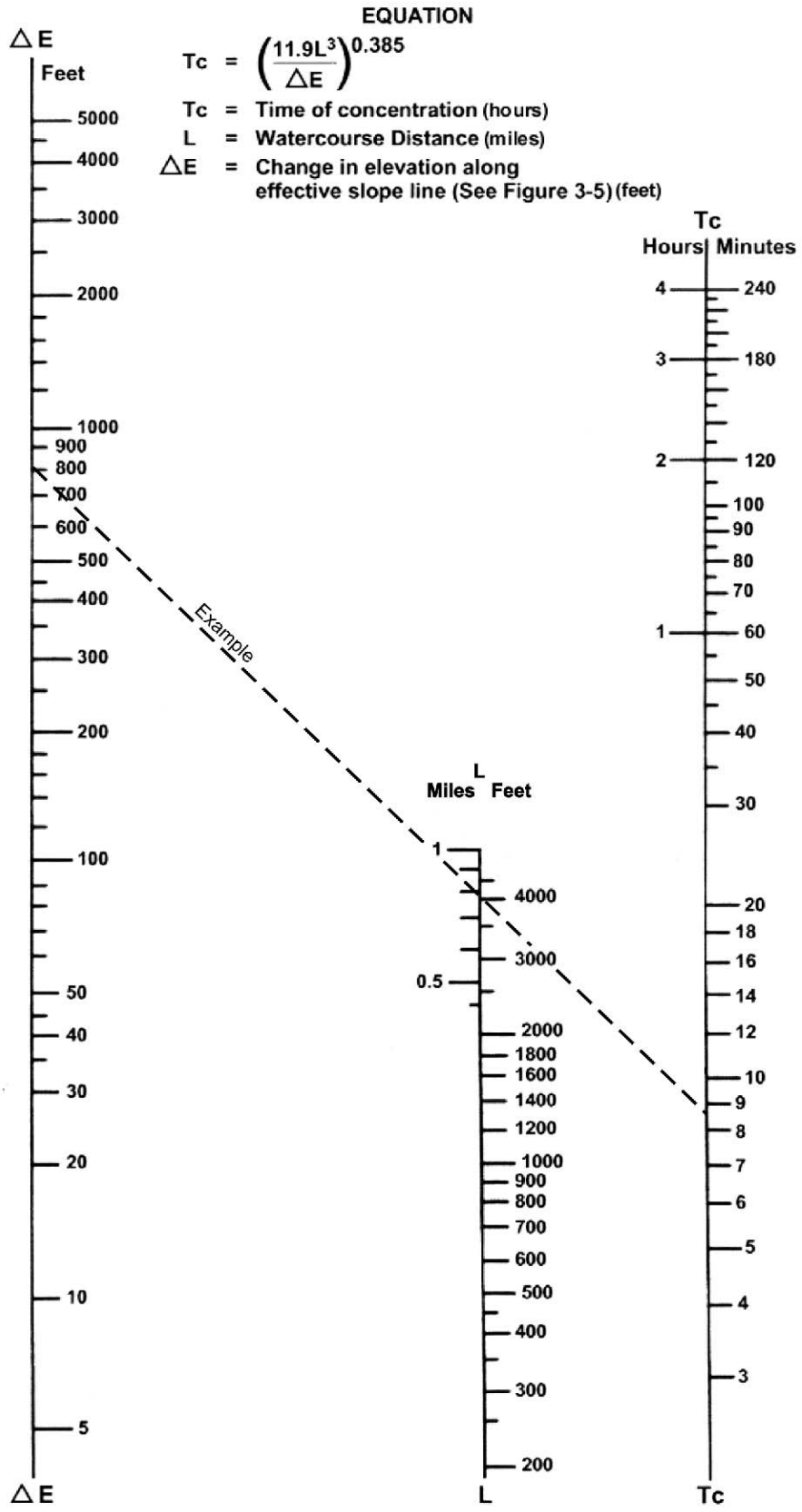
$$T\ min = \frac{1.8(1.1-C)D^{1/2}}{S^{1/3}}$$

	Initial TC	Pre-Dev Onsite A	Offsite O	Post-Dev Area A1 & A2	Area B	SM-1
C =		0.3	0.79	0.76	0.44	0.3
D ft =		100	100	50	100	10
S % =		5.5	7.5	0.6	8	2.7
T =		**8.16**	**2.85**	**5.13**	**5.94**	**3.27**

Overland Flow (Pre-Development)
Kirpich Formula

$$Tc\ min = (11.9L^3/\Delta E)^{0.385}$$

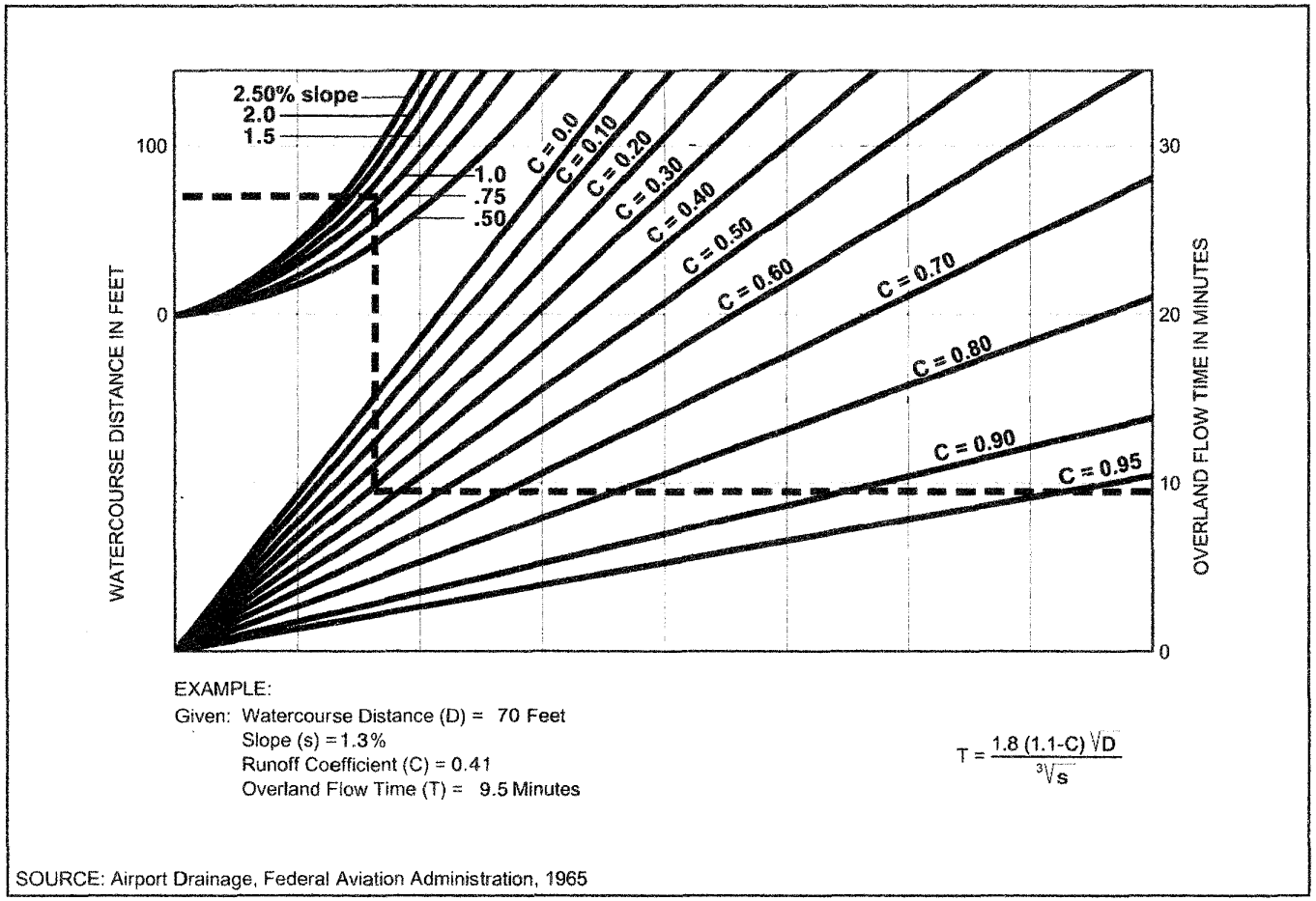
	Pre-Dev Area A
ΔE ft =	15
L Feet =	435
L miles =	0.082386
T hours =	0.05118
T min =	3.07



SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE 3-4

Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds



EXAMPLE:
Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE 3-3

Rational Formula - Overland Time of Flow Nomograph

Channel Report

Area A1 TC Flow Path V, Average Q

Gutter

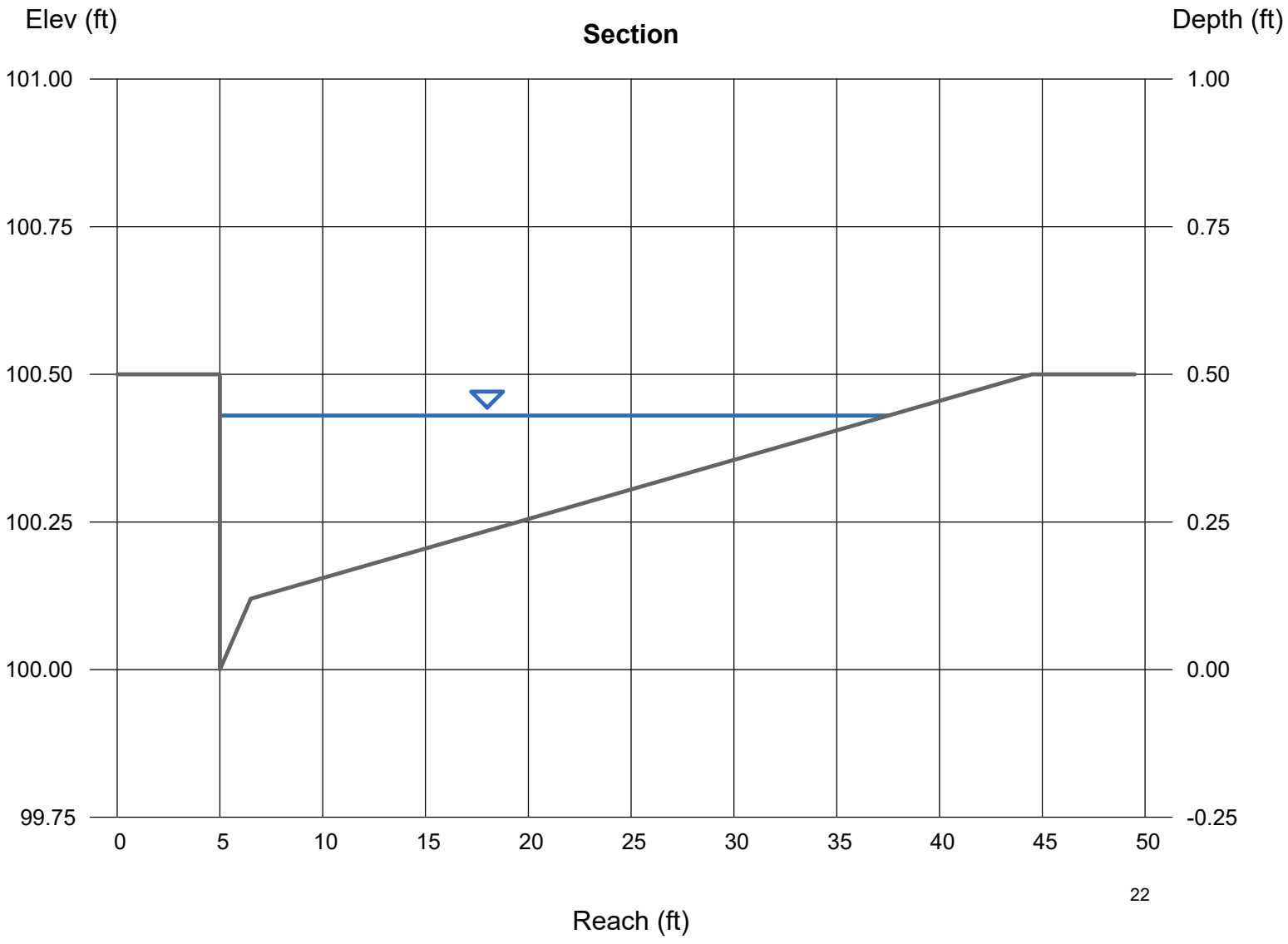
Cross Sl, Sx (ft/ft)	= 0.01
Cross Sl, Sw (ft/ft)	= 0.08
Gutter Width (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.60
N-Value	= 0.016

Calculations

Compute by:	Known Q
Known Q (cfs)	= 10.80

Highlighted

Depth (ft)	= 0.43
Q (cfs)	= 10.80
Area (sqft)	= 5.36
Velocity (ft/s)	= 2.01
Wetted Perim (ft)	= 32.94
Crit Depth, Yc (ft)	= 0.42
Spread Width (ft)	= 32.50
EGL (ft)	= 0.49



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, Nov 22 2023

Area A2 TC Flow Path V, Average Q

Triangular

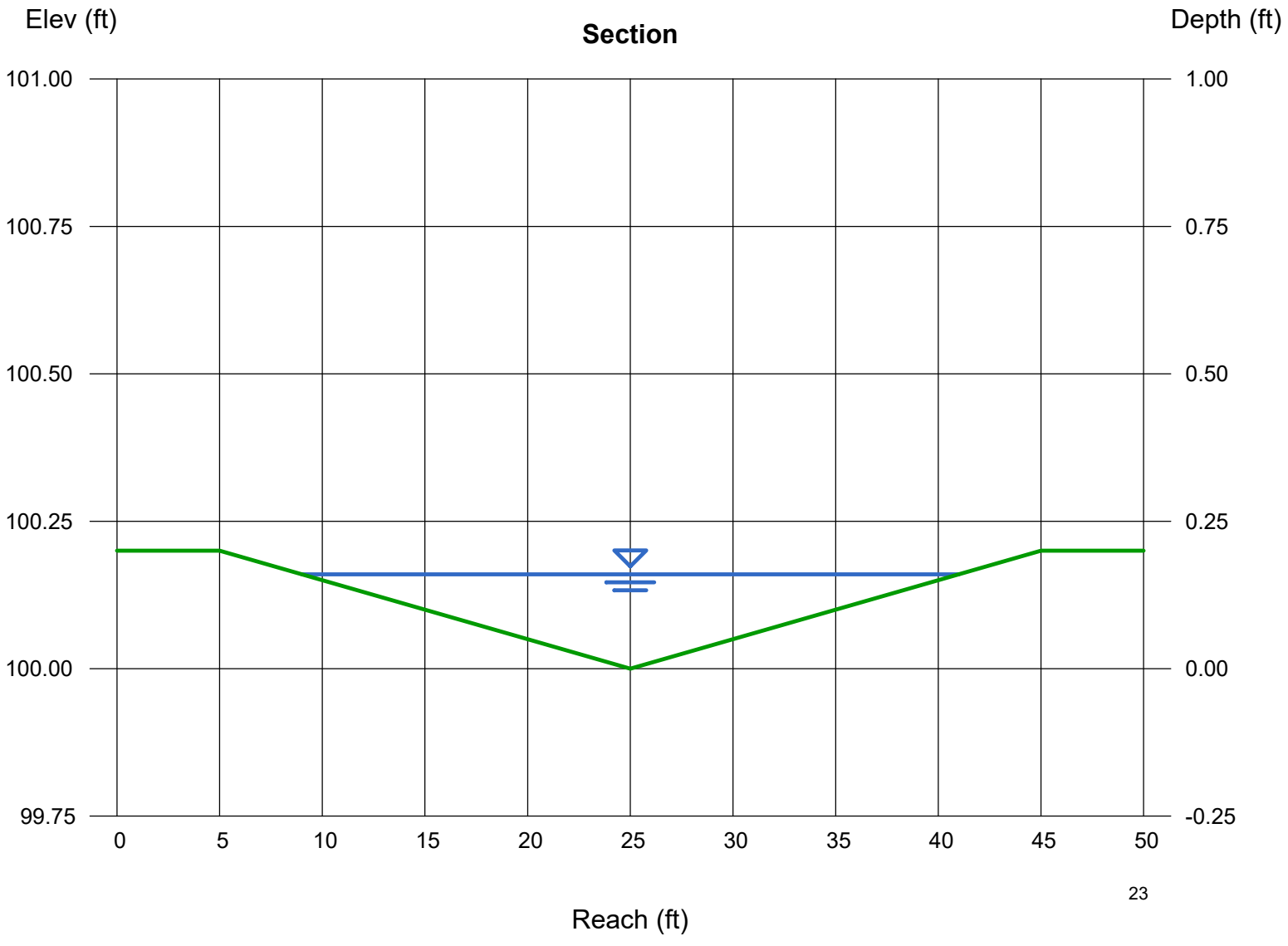
Side Slopes (z:1)	= 100.00, 100.00
Total Depth (ft)	= 0.20
Invert Elev (ft)	= 100.00
Slope (%)	= 0.60
N-Value	= 0.016

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.40

Highlighted

Depth (ft)	= 0.16
Q (cfs)	= 3.400
Area (sqft)	= 2.56
Velocity (ft/s)	= 1.33
Wetted Perim (ft)	= 32.00
Crit Depth, Yc (ft)	= 0.15
Top Width (ft)	= 32.00
EGL (ft)	= 0.19



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, Nov 22 2023

Area B TC Flow Path V, Average Q

Triangular

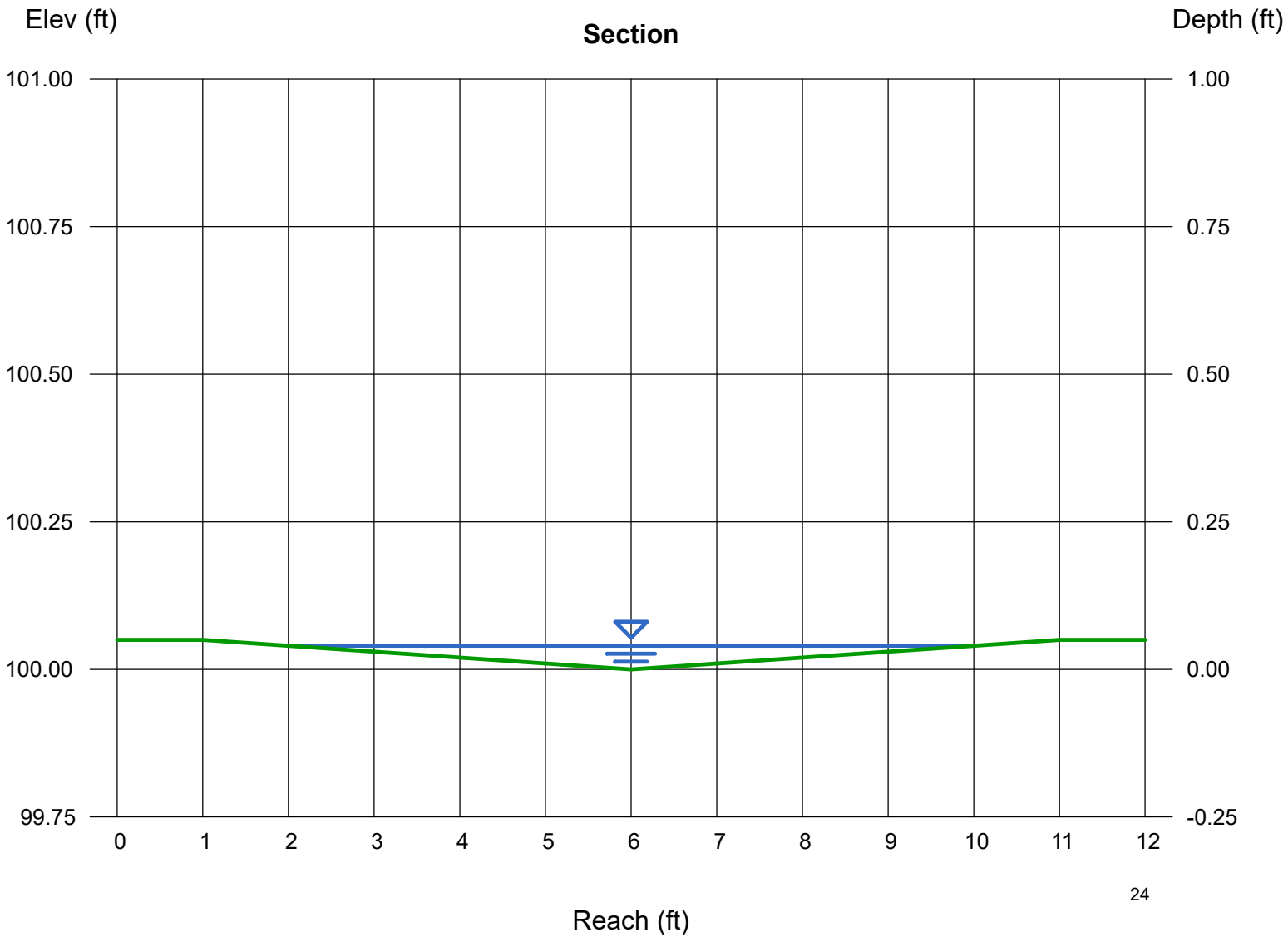
Side Slopes (z:1)	= 100.00, 100.00
Total Depth (ft)	= 0.05
Invert Elev (ft)	= 100.00
Slope (%)	= 8.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.25

Highlighted

Depth (ft)	= 0.04
Q (cfs)	= 0.250
Area (sqft)	= 0.16
Velocity (ft/s)	= 1.56
Wetted Perim (ft)	= 8.00
Crit Depth, Yc (ft)	= 0.05
Top Width (ft)	= 8.00
EGL (ft)	= 0.08



Channel Report

Area Offsite O TC Flow Path V, Average Q

Gutter

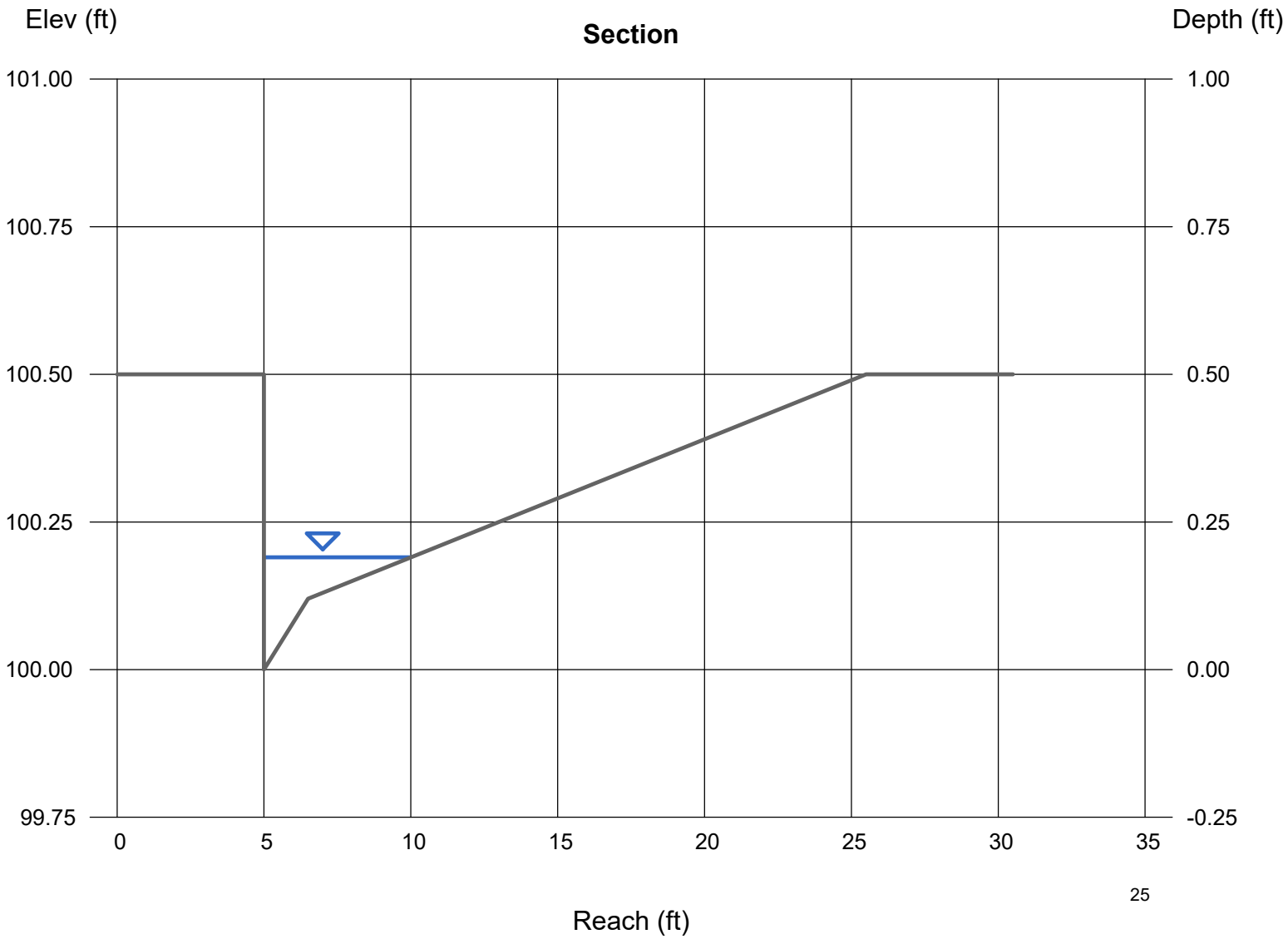
Cross Sl, Sx (ft/ft)	= 0.02
Cross Sl, Sw (ft/ft)	= 0.08
Gutter Width (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 4.20
N-Value	= 0.016

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.90

Highlighted

Depth (ft)	= 0.19
Q (cfs)	= 0.900
Area (sqft)	= 0.32
Velocity (ft/s)	= 2.83
Wetted Perim (ft)	= 5.20
Crit Depth, Yc (ft)	= 0.24
Spread Width (ft)	= 5.00
EGL (ft)	= 0.31



Channel Report

A2 Q100 Pipe flow

Circular

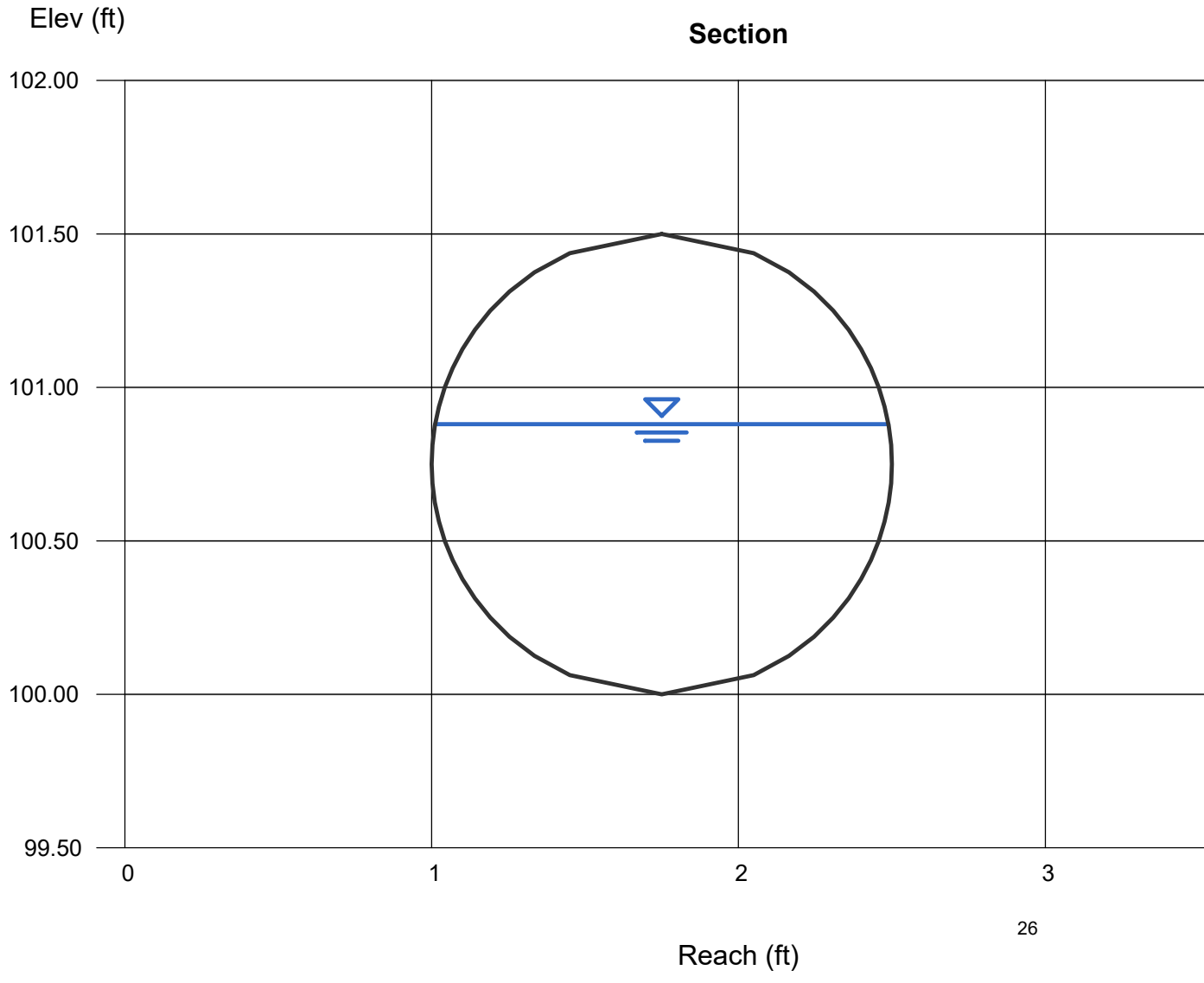
Diameter (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 6.80

Highlighted

Depth (ft)	= 0.88
Q (cfs)	= 6.800
Area (sqft)	= 1.08
Velocity (ft/s)	= 6.28
Wetted Perim (ft)	= 2.62
Crit Depth, Yc (ft)	= 1.01
Top Width (ft)	= 1.48
EGL (ft)	= 1.49



Channel Report

A1 & A2 Q100 into Underground Detention

Circular

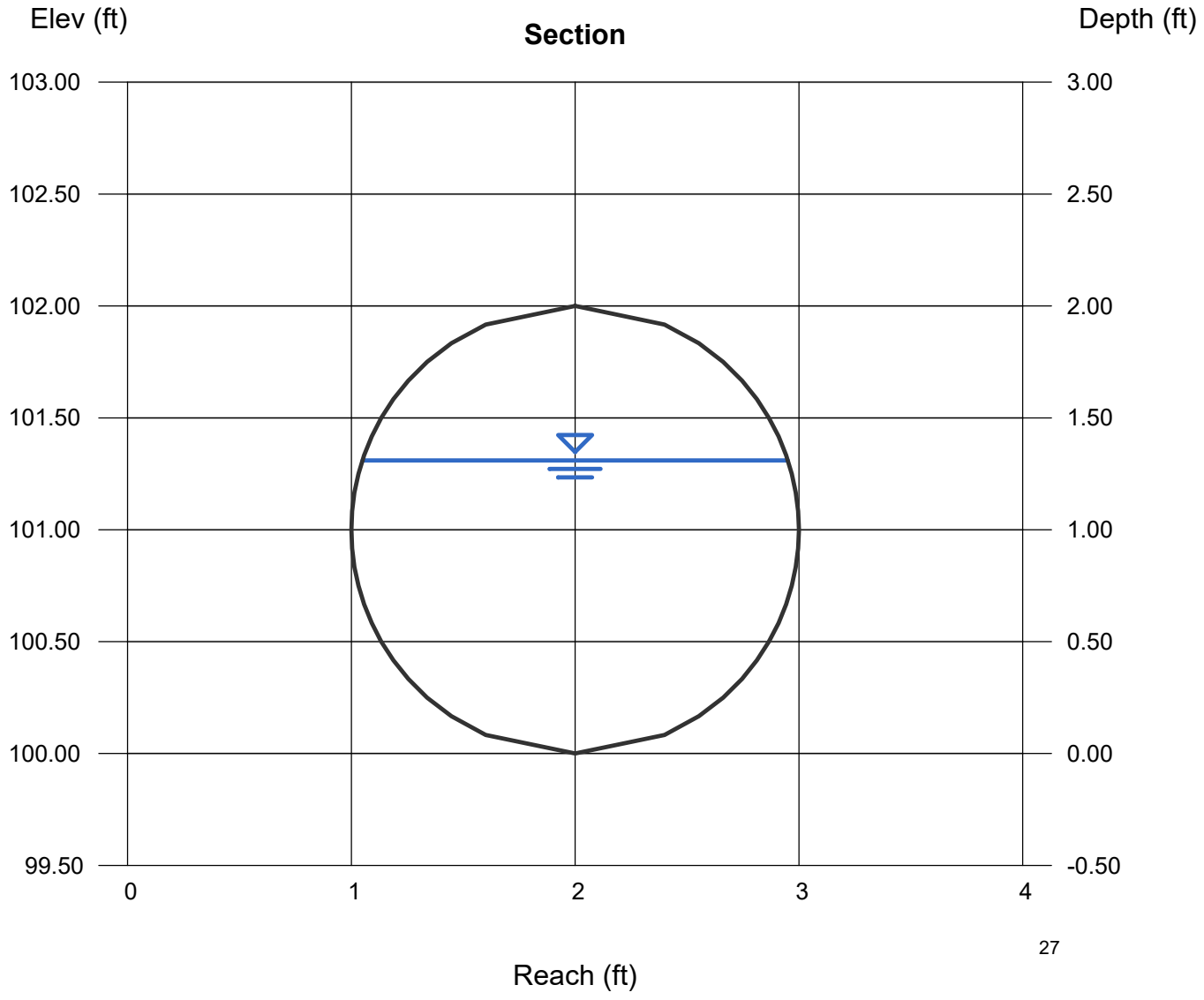
Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 2.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 24.40

Highlighted

Depth (ft)	= 1.31
Q (cfs)	= 24.40
Area (sqft)	= 2.19
Velocity (ft/s)	= 11.15
Wetted Perim (ft)	= 3.78
Crit Depth, Yc (ft)	= 1.75
Top Width (ft)	= 1.90
EGL (ft)	= 3.24



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Wednesday, Feb 5 2025

Total Onsite & Offsite Q100 UG Detention Outflow

Circular

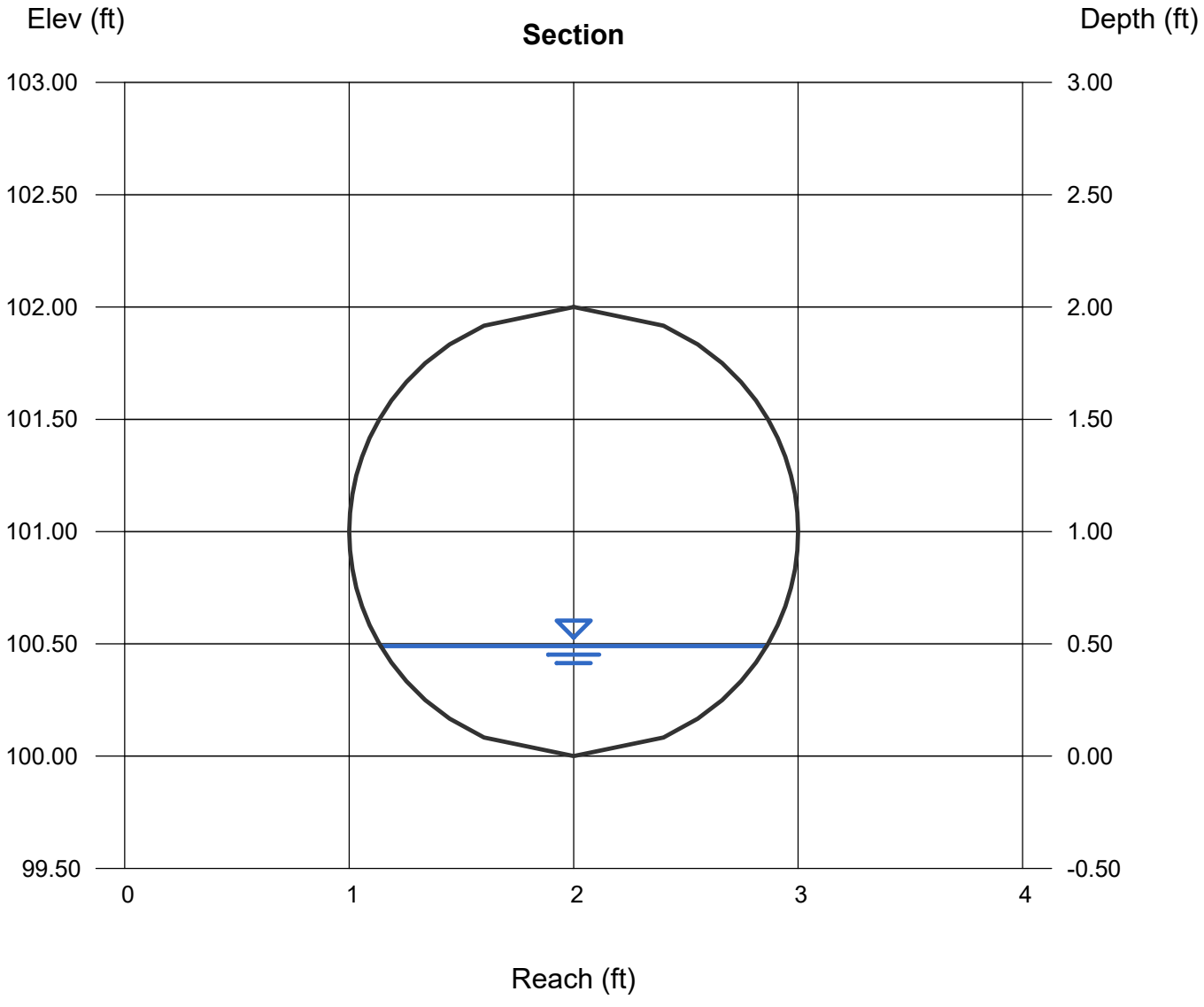
Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 8.70
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.50

Highlighted

Depth (ft)	= 0.49
Q (cfs)	= 8.500
Area (sqft)	= 0.60
Velocity (ft/s)	= 14.09
Wetted Perim (ft)	= 2.08
Crit Depth, Yc (ft)	= 1.04
Top Width (ft)	= 1.72
EGL (ft)	= 3.57



Channel Report

Total Q100 Onsite & Offsite Outflow Per Rick Eng. Study, Job # 15009

Circular

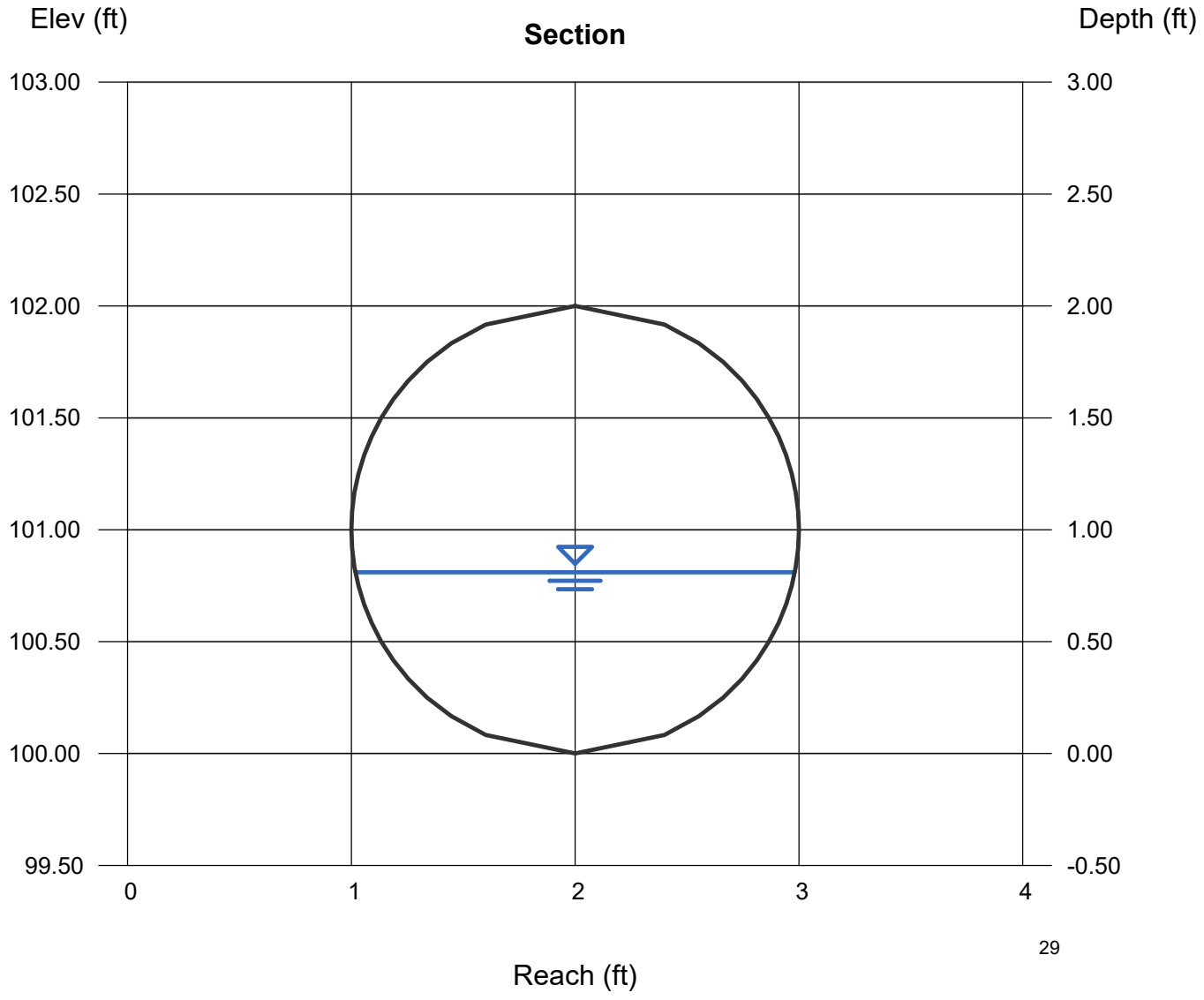
Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 8.70
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 22.52

Highlighted

Depth (ft)	= 0.81
Q (cfs)	= 22.52
Area (sqft)	= 1.19
Velocity (ft/s)	= 18.86
Wetted Perim (ft)	= 2.76
Crit Depth, Yc (ft)	= 1.69
Top Width (ft)	= 1.96
EGL (ft)	= 6.34



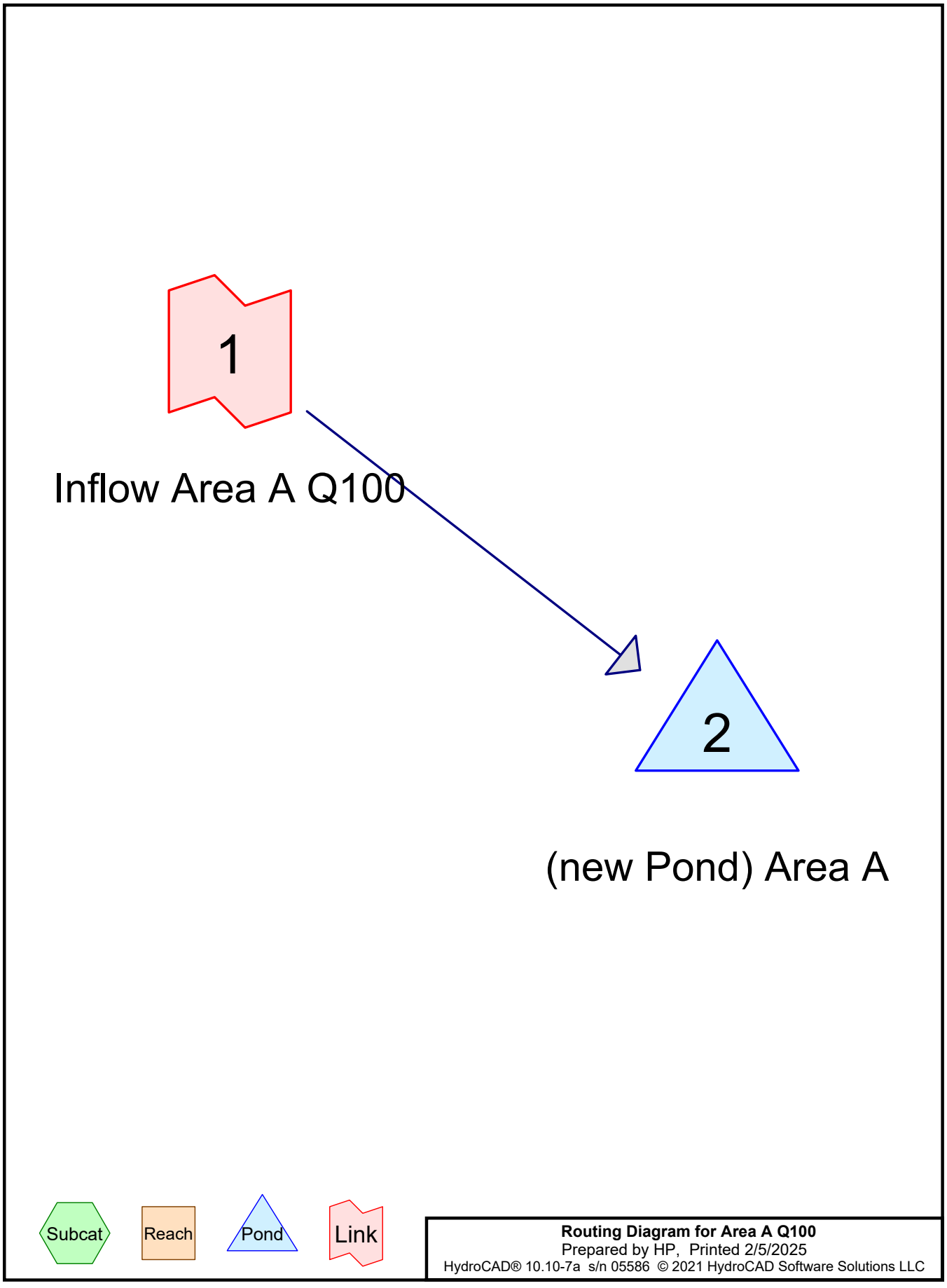
ATTACHMENT C

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 11/22/2023
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 6 MIN.
6 HOUR RAINFALL 2.8 INCHES
BASIN AREA 6.84 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 28.8 CFS

Onsite & Offsite Q100 Inflow

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 6	DISCHARGE (CFS) = 0.9
TIME (MIN) = 12	DISCHARGE (CFS) = 0.9
TIME (MIN) = 18	DISCHARGE (CFS) = 0.9
TIME (MIN) = 24	DISCHARGE (CFS) = 0.9
TIME (MIN) = 30	DISCHARGE (CFS) = 0.9
TIME (MIN) = 36	DISCHARGE (CFS) = 0.9
TIME (MIN) = 42	DISCHARGE (CFS) = 1
TIME (MIN) = 48	DISCHARGE (CFS) = 1
TIME (MIN) = 54	DISCHARGE (CFS) = 1
TIME (MIN) = 60	DISCHARGE (CFS) = 1
TIME (MIN) = 66	DISCHARGE (CFS) = 1
TIME (MIN) = 72	DISCHARGE (CFS) = 1.1
TIME (MIN) = 78	DISCHARGE (CFS) = 1.1
TIME (MIN) = 84	DISCHARGE (CFS) = 1.1
TIME (MIN) = 90	DISCHARGE (CFS) = 1.1
TIME (MIN) = 96	DISCHARGE (CFS) = 1.2
TIME (MIN) = 102	DISCHARGE (CFS) = 1.2
TIME (MIN) = 108	DISCHARGE (CFS) = 1.2
TIME (MIN) = 114	DISCHARGE (CFS) = 1.3
TIME (MIN) = 120	DISCHARGE (CFS) = 1.3
TIME (MIN) = 126	DISCHARGE (CFS) = 1.4
TIME (MIN) = 132	DISCHARGE (CFS) = 1.4
TIME (MIN) = 138	DISCHARGE (CFS) = 1.5
TIME (MIN) = 144	DISCHARGE (CFS) = 1.5
TIME (MIN) = 150	DISCHARGE (CFS) = 1.6
TIME (MIN) = 156	DISCHARGE (CFS) = 1.6
TIME (MIN) = 162	DISCHARGE (CFS) = 1.7
TIME (MIN) = 168	DISCHARGE (CFS) = 1.8
TIME (MIN) = 174	DISCHARGE (CFS) = 1.9
TIME (MIN) = 180	DISCHARGE (CFS) = 2
TIME (MIN) = 186	DISCHARGE (CFS) = 2.2
TIME (MIN) = 192	DISCHARGE (CFS) = 2.3
TIME (MIN) = 198	DISCHARGE (CFS) = 2.5
TIME (MIN) = 204	DISCHARGE (CFS) = 2.7
TIME (MIN) = 210	DISCHARGE (CFS) = 3
TIME (MIN) = 216	DISCHARGE (CFS) = 3.3
TIME (MIN) = 222	DISCHARGE (CFS) = 4
TIME (MIN) = 228	DISCHARGE (CFS) = 4.6
TIME (MIN) = 234	DISCHARGE (CFS) = 6.8
TIME (MIN) = 240	DISCHARGE (CFS) = 14.8
TIME (MIN) = 246	DISCHARGE (CFS) = 28.8
TIME (MIN) = 252	DISCHARGE (CFS) = 5.4
TIME (MIN) = 258	DISCHARGE (CFS) = 3.6
TIME (MIN) = 264	DISCHARGE (CFS) = 2.8
TIME (MIN) = 270	DISCHARGE (CFS) = 2.4
TIME (MIN) = 276	DISCHARGE (CFS) = 2.1
TIME (MIN) = 282	DISCHARGE (CFS) = 1.8
TIME (MIN) = 288	DISCHARGE (CFS) = 1.7
TIME (MIN) = 294	DISCHARGE (CFS) = 1.5
TIME (MIN) = 300	DISCHARGE (CFS) = 1.4
TIME (MIN) = 306	DISCHARGE (CFS) = 1.3
TIME (MIN) = 312	DISCHARGE (CFS) = 1.3
TIME (MIN) = 318	DISCHARGE (CFS) = 1.2
TIME (MIN) = 324	DISCHARGE (CFS) = 1.1
TIME (MIN) = 330	DISCHARGE (CFS) = 1.1
TIME (MIN) = 336	DISCHARGE (CFS) = 1
TIME (MIN) = 342	DISCHARGE (CFS) = 1
TIME (MIN) = 348	DISCHARGE (CFS) = 1
TIME (MIN) = 354	DISCHARGE (CFS) = 0.9
TIME (MIN) = 360	DISCHARGE (CFS) = 0.9
TIME (MIN) = 366	DISCHARGE (CFS) = 0



Routing Diagram for Area A Q100
Prepared by HP, Printed 2/5/2025
HydroCAD® 10.10-7a s/n 05586 © 2021 HydroCAD Software Solutions LLC

Summary for Pond 2: (new Pond) Area A

Inflow	=	28.83 cfs @	4.10 hrs, Volume=	1.206 af
Outflow	=	8.51 cfs @	4.19 hrs, Volume=	1.409 af, Atten= 70%, Lag= 5.3 min
Primary	=	8.51 cfs @	4.19 hrs, Volume=	1.409 af

Routing by Stor-Ind method, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs
Starting Elev= 3.38' Storage= 41,082 cf
Peak Elev= 3.97' @ 4.19 hrs Storage= 48,164 cf (7,083 cf above start)

Plug-Flow detention time= 165.8 min calculated for 0.466 af (39% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

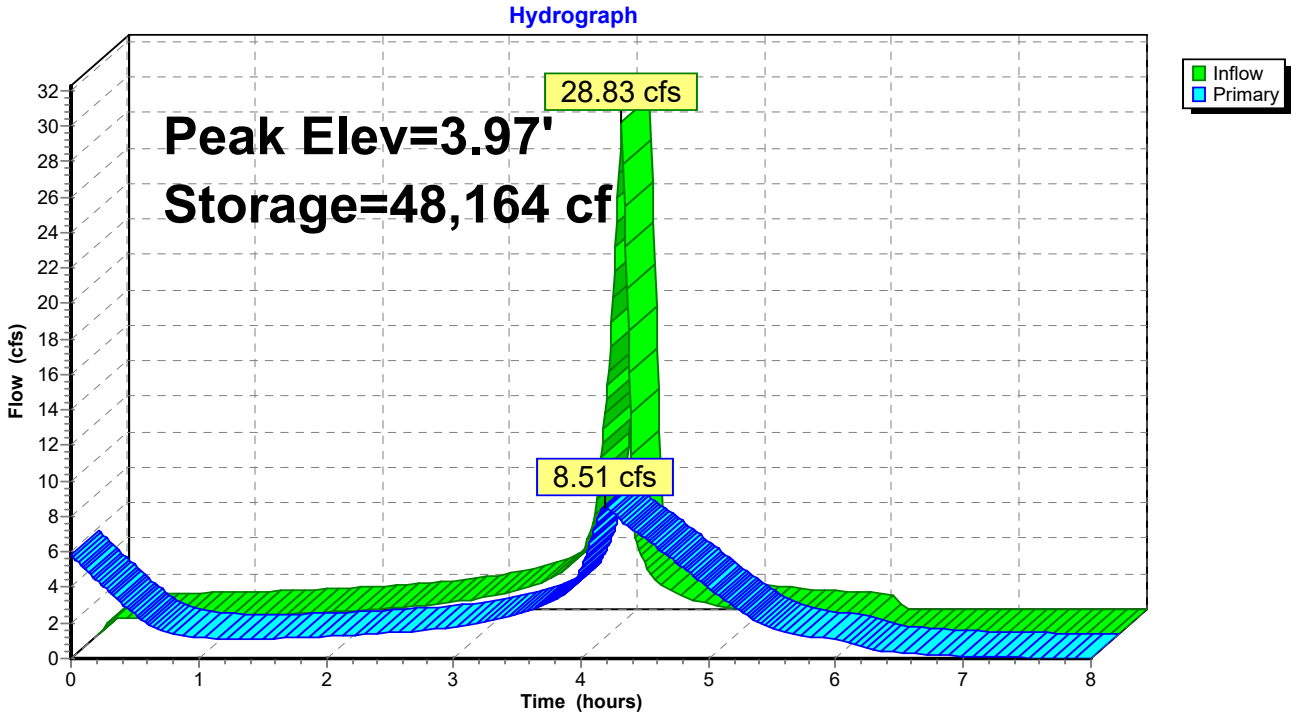
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	57,403 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
0.00	0
2.74	32,221
3.75	46,204
5.00	57,403

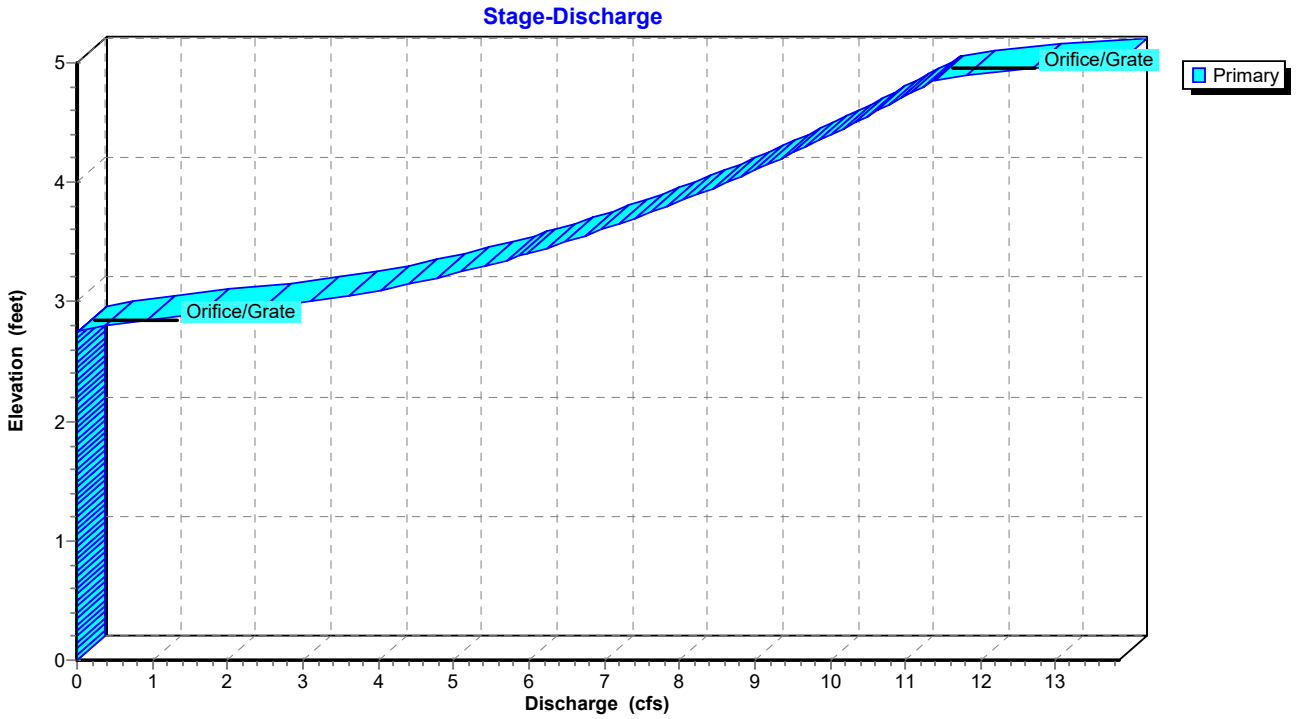
Device	Routing	Invert	Outlet Devices
#1	Primary	2.74'	**96.0" W x 2.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	4.86'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.50 cfs @ 4.19 hrs HW=3.97' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 8.50 cfs @ 5.10 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2: (new Pond) Area A



Pond 2: (new Pond) Area A



Summary for Link 1: Inflow Area A Q100

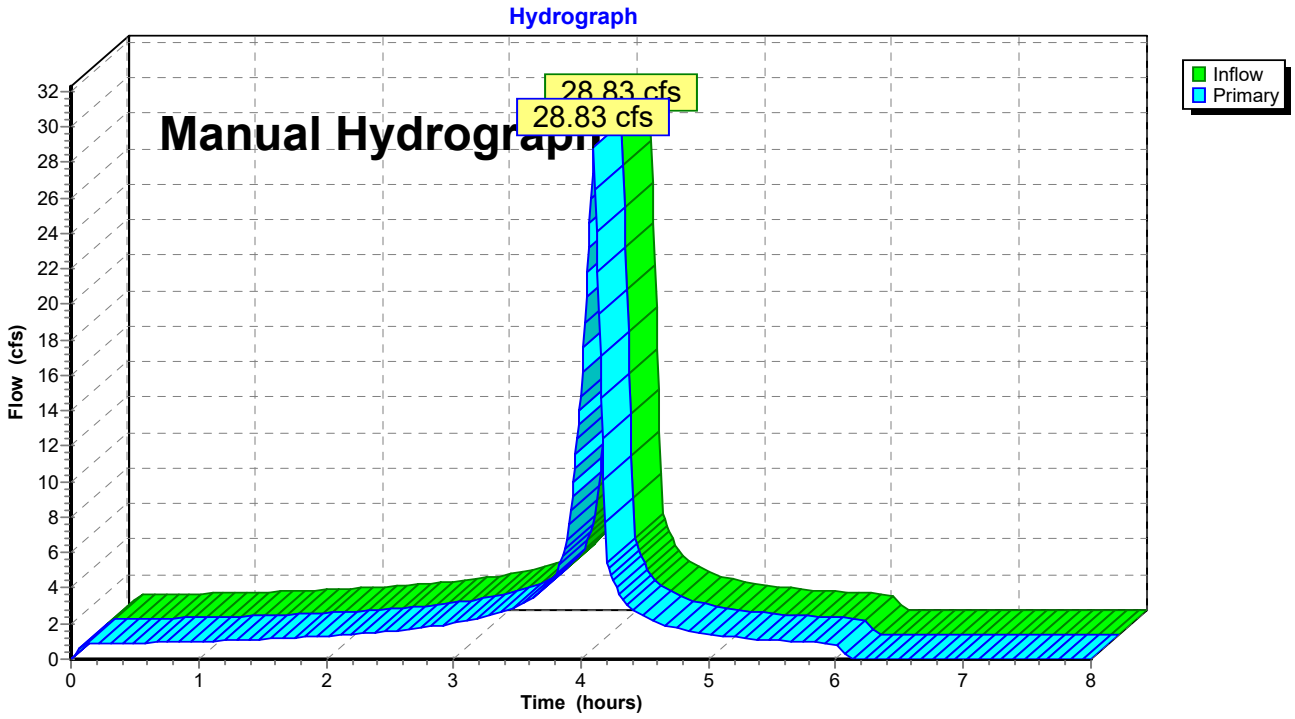
Inflow = 28.83 cfs @ 4.10 hrs, Volume= 1.206 af
Primary = 28.83 cfs @ 4.10 hrs, Volume= 1.206 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 2 : (new Pond) Area A

Primary outflow = Inflow, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs

62 Point manual hydrograph, To= 0.00 hrs, dt= 0.10 hrs, cfs =

0.00	0.90	0.90	0.90	0.90	0.90	0.90	1.00	1.00	1.00
1.00	1.00	1.10	1.10	1.10	1.10	1.20	1.20	1.20	1.30
1.30	1.40	1.40	1.50	1.50	1.60	1.60	1.70	1.80	1.90
2.00	2.20	2.30	2.50	2.70	3.00	3.30	4.00	4.60	6.80
14.80	28.80	5.40	3.60	2.80	2.40	2.10	1.80	1.70	1.50
1.40	1.30	1.30	1.20	1.10	1.10	1.00	1.00	1.00	0.90
0.90	0.00								

Link 1: Inflow Area A Q100

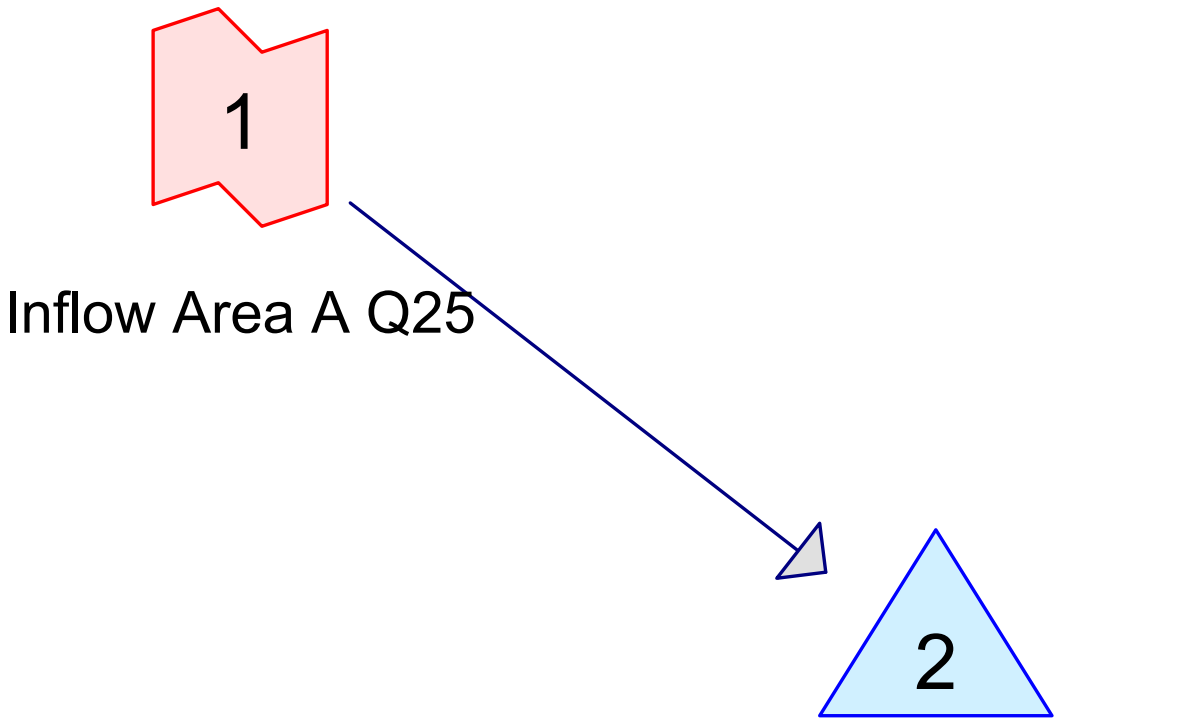


RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 2/17/2024
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 6 MIN.
6 HOUR RAINFALL 2.21 INCHES
BASIN AREA 6.84 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 22.9 CFS

Onsite & Offsite Q25 Inflow

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 6	DISCHARGE (CFS) = 0.7
TIME (MIN) = 12	DISCHARGE (CFS) = 0.7
TIME (MIN) = 18	DISCHARGE (CFS) = 0.7
TIME (MIN) = 24	DISCHARGE (CFS) = 0.7
TIME (MIN) = 30	DISCHARGE (CFS) = 0.7
TIME (MIN) = 36	DISCHARGE (CFS) = 0.7
TIME (MIN) = 42	DISCHARGE (CFS) = 0.8
TIME (MIN) = 48	DISCHARGE (CFS) = 0.8
TIME (MIN) = 54	DISCHARGE (CFS) = 0.8
TIME (MIN) = 60	DISCHARGE (CFS) = 0.8
TIME (MIN) = 66	DISCHARGE (CFS) = 0.8
TIME (MIN) = 72	DISCHARGE (CFS) = 0.8
TIME (MIN) = 78	DISCHARGE (CFS) = 0.9
TIME (MIN) = 84	DISCHARGE (CFS) = 0.9
TIME (MIN) = 90	DISCHARGE (CFS) = 0.9
TIME (MIN) = 96	DISCHARGE (CFS) = 0.9
TIME (MIN) = 102	DISCHARGE (CFS) = 1
TIME (MIN) = 108	DISCHARGE (CFS) = 1
TIME (MIN) = 114	DISCHARGE (CFS) = 1
TIME (MIN) = 120	DISCHARGE (CFS) = 1
TIME (MIN) = 126	DISCHARGE (CFS) = 1.1
TIME (MIN) = 132	DISCHARGE (CFS) = 1.1
TIME (MIN) = 138	DISCHARGE (CFS) = 1.2
TIME (MIN) = 144	DISCHARGE (CFS) = 1.2
TIME (MIN) = 150	DISCHARGE (CFS) = 1.2
TIME (MIN) = 156	DISCHARGE (CFS) = 1.3
TIME (MIN) = 162	DISCHARGE (CFS) = 1.4
TIME (MIN) = 168	DISCHARGE (CFS) = 1.4
TIME (MIN) = 174	DISCHARGE (CFS) = 1.5
TIME (MIN) = 180	DISCHARGE (CFS) = 1.6
TIME (MIN) = 186	DISCHARGE (CFS) = 1.7
TIME (MIN) = 192	DISCHARGE (CFS) = 1.8
TIME (MIN) = 198	DISCHARGE (CFS) = 2
TIME (MIN) = 204	DISCHARGE (CFS) = 2.1
TIME (MIN) = 210	DISCHARGE (CFS) = 2.4
TIME (MIN) = 216	DISCHARGE (CFS) = 2.6
TIME (MIN) = 222	DISCHARGE (CFS) = 3.2
TIME (MIN) = 228	DISCHARGE (CFS) = 3.6
TIME (MIN) = 234	DISCHARGE (CFS) = 5.3
TIME (MIN) = 240	DISCHARGE (CFS) = 11.5
TIME (MIN) = 246	DISCHARGE (CFS) = 22.9
TIME (MIN) = 252	DISCHARGE (CFS) = 4.3
TIME (MIN) = 258	DISCHARGE (CFS) = 2.9
TIME (MIN) = 264	DISCHARGE (CFS) = 2.2
TIME (MIN) = 270	DISCHARGE (CFS) = 1.9
TIME (MIN) = 276	DISCHARGE (CFS) = 1.6
TIME (MIN) = 282	DISCHARGE (CFS) = 1.5
TIME (MIN) = 288	DISCHARGE (CFS) = 1.3
TIME (MIN) = 294	DISCHARGE (CFS) = 1.2
TIME (MIN) = 300	DISCHARGE (CFS) = 1.1
TIME (MIN) = 306	DISCHARGE (CFS) = 1.1
TIME (MIN) = 312	DISCHARGE (CFS) = 1
TIME (MIN) = 318	DISCHARGE (CFS) = 0.9
TIME (MIN) = 324	DISCHARGE (CFS) = 0.9
TIME (MIN) = 330	DISCHARGE (CFS) = 0.9
TIME (MIN) = 336	DISCHARGE (CFS) = 0.8
TIME (MIN) = 342	DISCHARGE (CFS) = 0.8
TIME (MIN) = 348	DISCHARGE (CFS) = 0.8
TIME (MIN) = 354	DISCHARGE (CFS) = 0.7
TIME (MIN) = 360	DISCHARGE (CFS) = 0.7
TIME (MIN) = 366	DISCHARGE (CFS) = 0



Subcat Reach Pond Link

Routing Diagram for Area A Q25
Prepared by HP, Printed 2/5/2025
HydroCAD® 10.10-7a s/n 05586 © 2021 HydroCAD Software Solutions LLC

Summary for Pond 2: (new Pond) Area A

Inflow	=	22.92 cfs @	4.10 hrs, Volume=	0.953 af
Outflow	=	7.09 cfs @	4.19 hrs, Volume=	1.156 af, Atten= 69%, Lag= 5.2 min
Primary	=	7.09 cfs @	4.19 hrs, Volume=	1.156 af

Routing by Stor-Ind method, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs
Starting Elev= 3.38' Storage= 41,082 cf
Peak Elev= 3.63' @ 4.19 hrs Storage= 44,479 cf (3,398 cf above start)

Plug-Flow detention time= 228.5 min calculated for 0.213 af (22% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

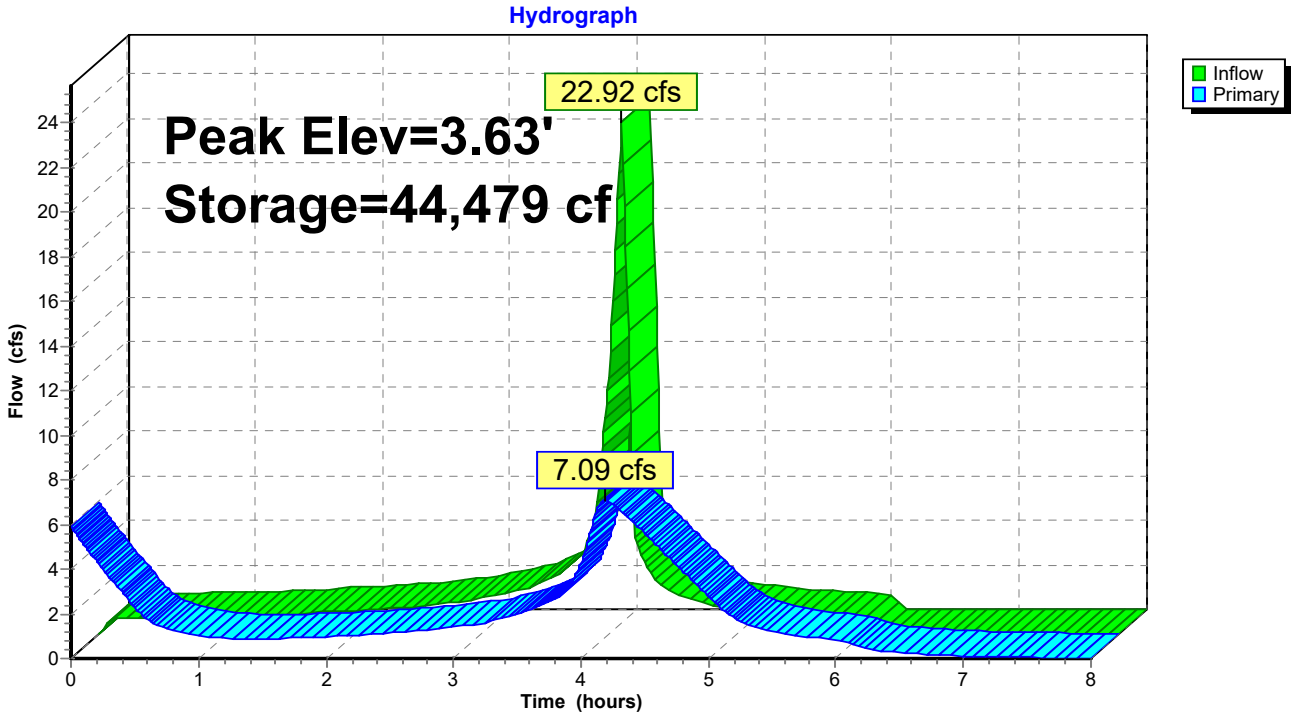
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	57,403 cf	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (cubic-feet)
0.00	0
2.74	32,221
3.75	46,204
5.00	57,403

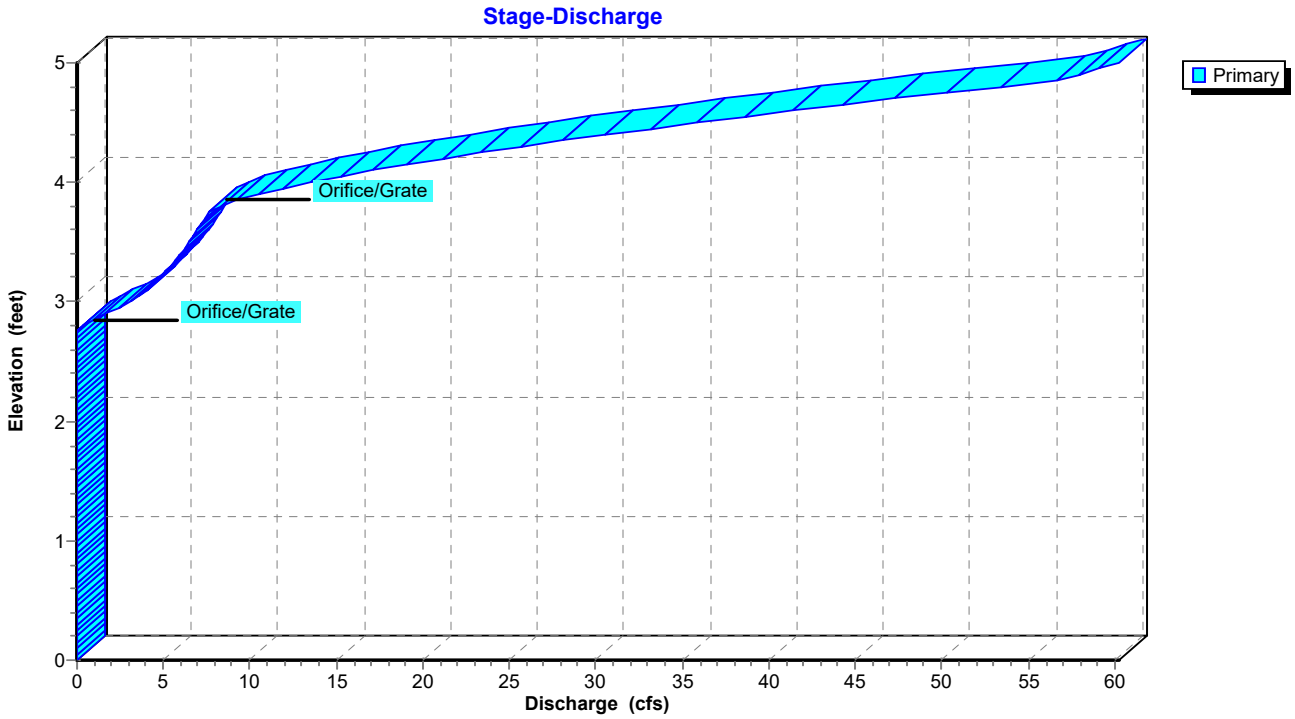
Device	Routing	Invert	Outlet Devices
#1	Primary	2.74'	**96.0" W x 2.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	3.75'	**36.0" x 36.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.09 cfs @ 4.19 hrs HW=3.62' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 7.09 cfs @ 4.25 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2: (new Pond) Area A



Pond 2: (new Pond) Area A



Summary for Link 1: Inflow Area A Q25

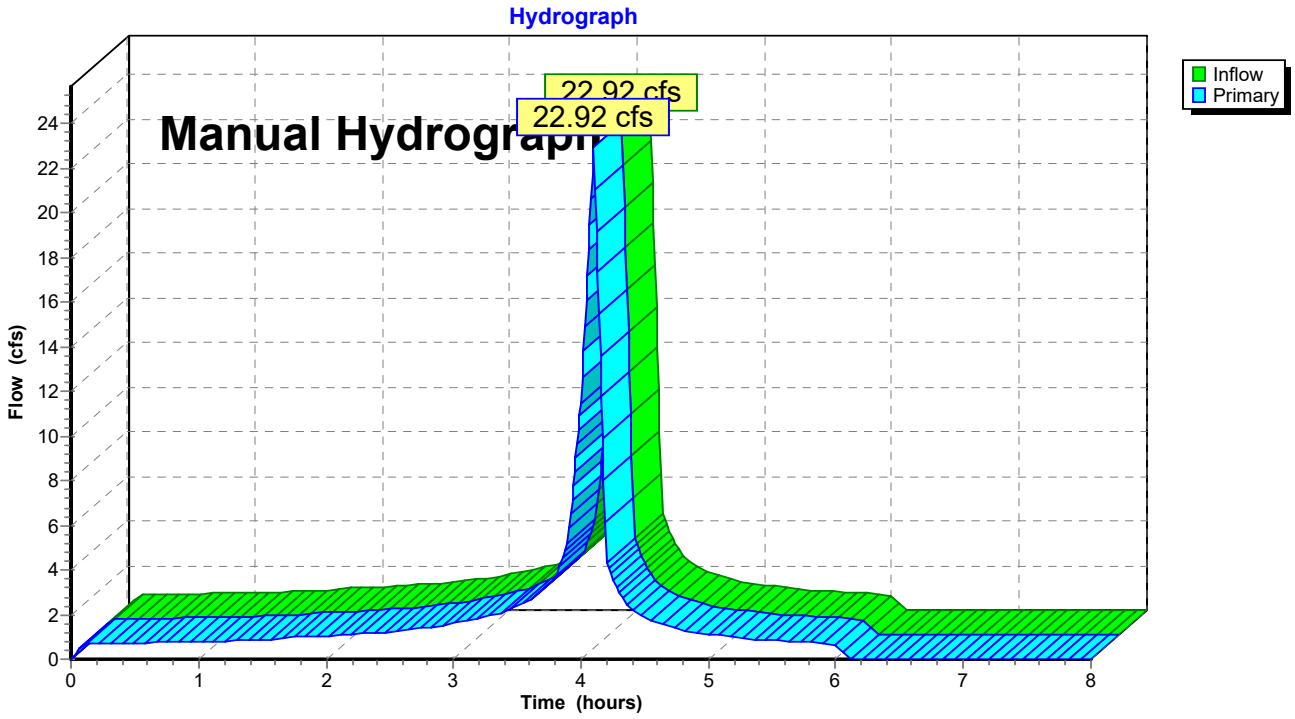
Inflow = 22.92 cfs @ 4.10 hrs, Volume= 0.953 af
Primary = 22.92 cfs @ 4.10 hrs, Volume= 0.953 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 2 : (new Pond) Area A

Primary outflow = Inflow, Time Span= 0.00-8.00 hrs, dt= 0.01 hrs

62 Point manual hydrograph, To= 0.00 hrs, dt= 0.10 hrs, cfs =

0.00	0.70	0.70	0.70	0.70	0.70	0.70	0.80	0.80	0.80
0.80	0.80	0.80	0.90	0.90	0.90	0.90	1.00	1.00	1.00
1.00	1.10	1.10	1.20	1.20	1.20	1.30	1.40	1.40	1.50
1.60	1.70	1.80	2.00	2.10	2.40	2.60	3.20	3.60	5.30
11.50	22.90	4.30	2.90	2.20	1.90	1.60	1.50	1.30	1.20
1.10	1.10	1.00	0.90	0.90	0.90	0.80	0.80	0.80	0.70
0.70	0.00								

Link 1: Inflow Area A Q25



ATTACHMENT D

```
 CHANNEL FLOW THRU SUBAREA(CFS) =      1.43
 FLOW VELOCITY(FEET/SEC.) =    0.74   FLOW DEPTH(FEET)      0.06
 TRAVEL TIME(MIN.) =    0.22   Tc(MIN.) =    8.02
 LONGEST FLOWPATH FROM NODE    731.20 TO NODE   7123.40 =   380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7123.40 TO NODE   7123.40 IS CODE =   2

 >>>>>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.) =    8.02
 RAINFALL INTENSITY(INCH/HR) =    3.83
 TOTAL STREAM AREA(ACRES) =      0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.43

 ** CONFLUENCE DATA
 STREAM      RUNOFF      Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        21.14      8.73       3.690         6.00
     2         1.43      8.02       3.827         0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc      INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        21.82      8.02       3.827
     2        22.52      8.73       3.690

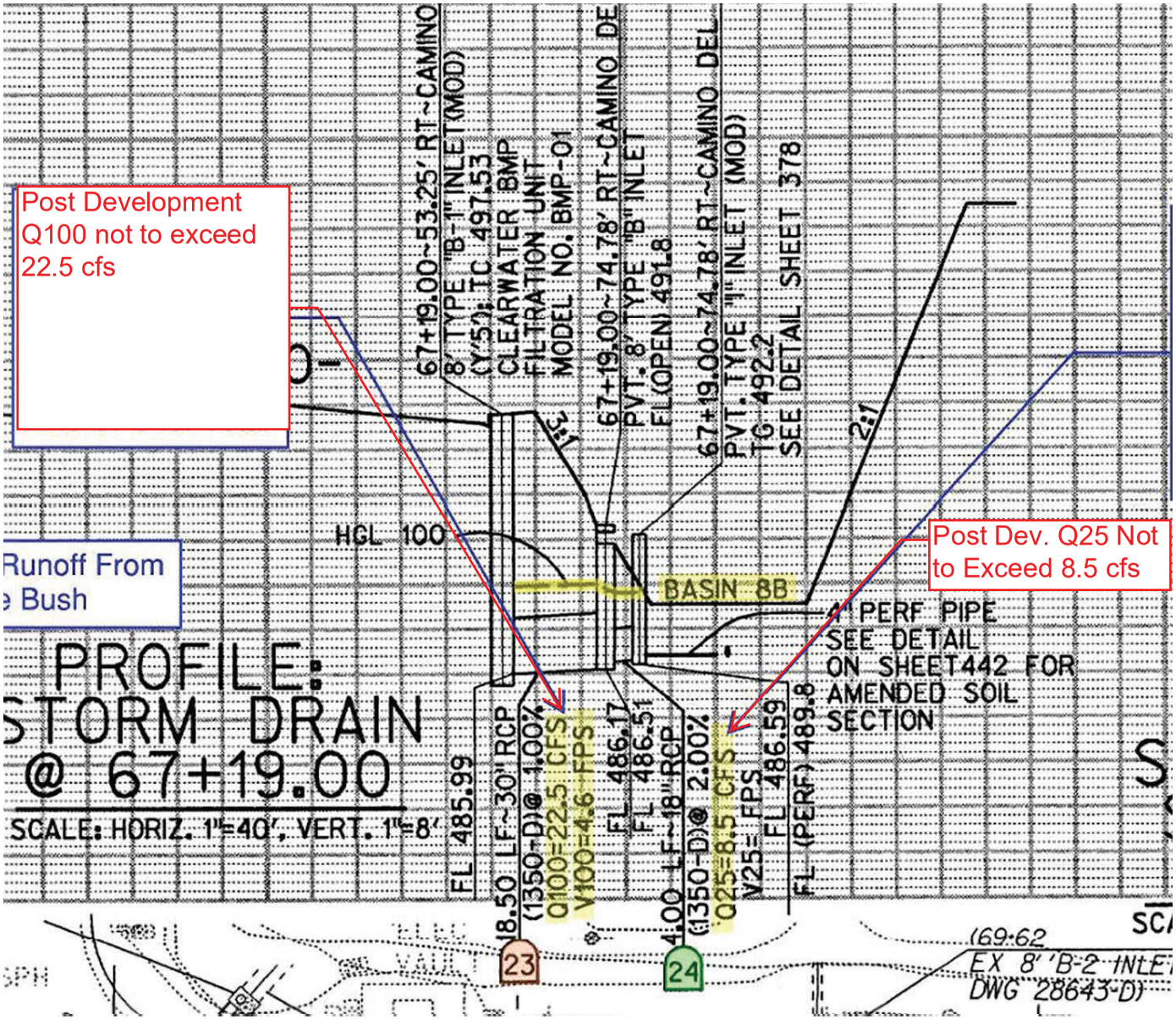
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      22.52   Tc(MIN.) =    8.73
 TOTAL AREA(ACRES) =      6.40
 LONGEST FLOWPATH FROM NODE   7123.10 TO NODE   7123.40     722.00 FEET.

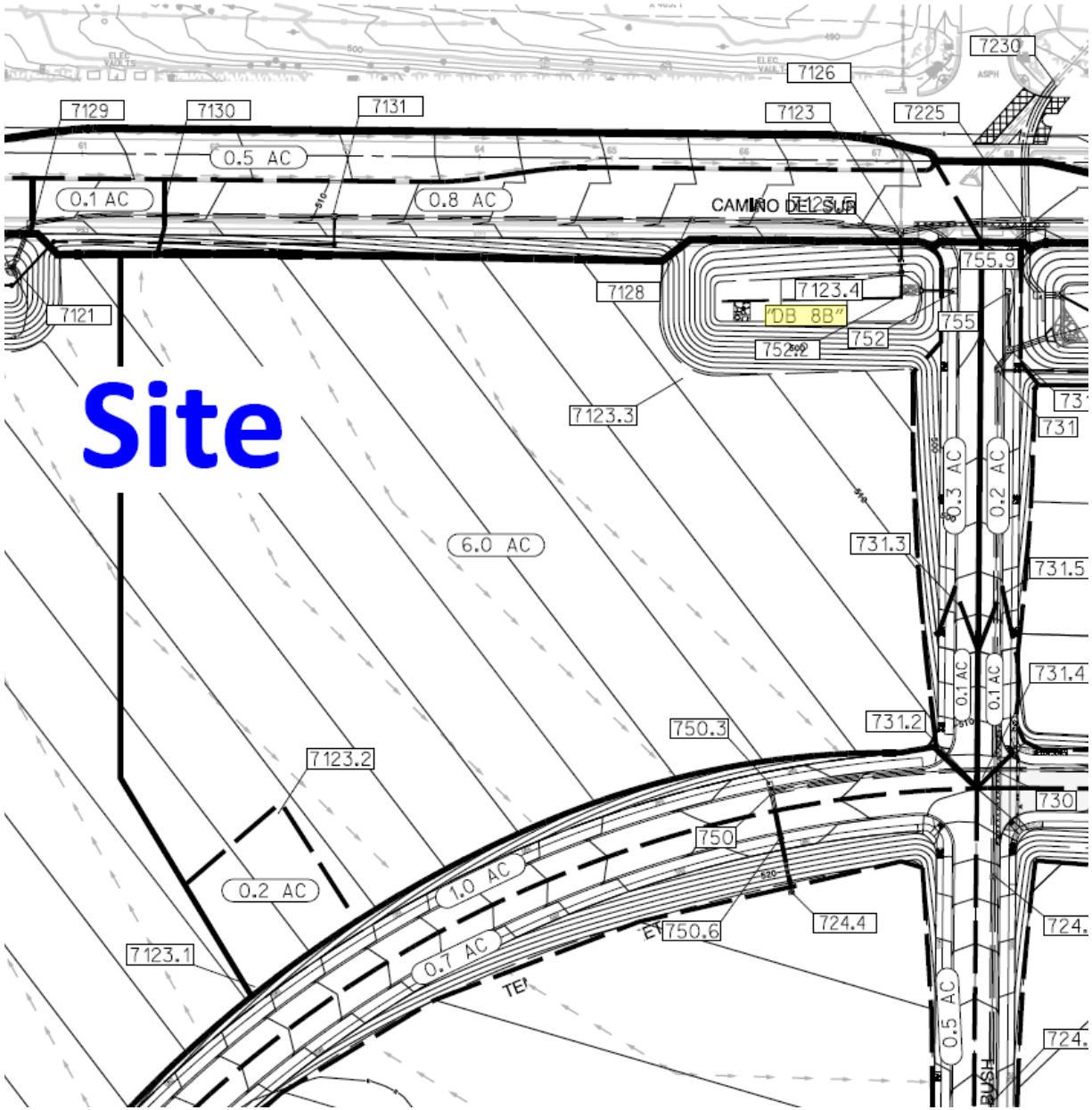
****************************************************************************
 FLOW PROCESS FROM NODE   7123.40 TO NOD     7123.00 IS CODE =  41

 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.00  DOWNSTREAM(FEET)      485.49
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIP  IS    9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.53
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =
 PIPE-FLOW(CFS) =      22.52
 PIPE TRAVEL TIME(MIN.) =    0.04    Tc(MIN.) =    8.77
 LONGEST FLOWPATH FROM NODE   7123.10 TO NODE   7123.00 =   762.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7123.00 TO NODE   7123.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc      INTENSITY      AREA
```


Post Development
Q100 not to exceed
22.5 cfs
Runoff From
e Bush
PROFILE:
STORM DRAIN
@ 67+19.00
SCALE: HORIZ. 1"=40', VERT. 1"=8'
67+19.00~53.25' RT~CAMINO
8' TYPE "B-1" INLET (MOD)
(Y'S): TC 497.53
CLEARWATER BMP
FILTRATION UNIT
MODEL NO. BMP-01
67+19.00~74.78' RT~CAMINO DE
PVT. 8' TYPE "B" INLET
FL(OPEN) 491.8
67+19.00~74.78' RT~CAMINO DEL
PVT. TYPE "1" INLET (MOD)
TG: 492.2
SEE DETAIL SHEET 378
2:1
HGL 100
BASIN 8B
4" PERF PIPE
SEE DETAIL
ON SHEET442 FOR
AMENDED SOIL
SECTION
Post Dev. Q25 Not
to Exceed 8.5 cfs
18.50 LF~30" RCP
(1350-D)@ 1.00%
Q100=22.5 CFS
V100=4.6 FPS
FL 485.99
FL 486.17
FL 486.51
4.00 LF~18" RCP
(1350-D)@ 2.00%
Q25=8.5 CFS
V25=FPS
FL 486.59
FL (PERF) 489.8
23
24
(69:62
EX 8' 'B-2 INLE
DWG 28643-D)


Site
7230
7126
7129
7130
7131
7123
7225
0.5 AC
0.1 AC
0.8 AC
CAMINO DE LA LUZ
7125.6
755.9
7128
7123.4
"DB 8B"
755
752
7121
7123.3
731
0.3 AC
0.2 AC
6.0 AC
731.3
731.5
0.1 AC
0.1 AC
731.4
731.2
750.3
7123.2
730
750
0.2 AC
1.0 AC
724.4
724.
750.6
7123.1
0.7 AC
0.5 AC
724.
BUSH

ADDENDUM 6
DRAINAGE STUDY
FOR
CAMINO DEL SUR SOUTH HALF PHASE II

NORTHERLY DRAINING AREAS

(In Support of BMR Unit 14 Grading - Construction Change 'F'
BMR North Village East Town Center Improvements – Construction Change 'B'
BMR North Village Paseo Del Sur Phase 5 Improvements– Construction Change 'A')

PTS # 303110, I.O # 24003381, DWG # 37225-D
(Previously: PTS # 83713, # 302622)

Job Number 16630

(Original Report Job Number 15032
Addendum 1 Job Number 15009C
Addendum 2 Job Number 15009E
Addendum 3 Job Number 15009F
Addendum 4 Job Numbers 16806 & 16807)

Original: March 9, 2011
Addendum 1: January 6, 2012
Addendum 2: March 8, 2012
Addendum 3: August 13, 2012
Addendum 4: January 14, 2013
Addendum 5: April 24, 2013
Revised Addendum 5: July 11, 2013
Addendum 6: July 3, 2014
Revised Addendum 6: October 2, 2014

RICK ENGINEERING COMPANY

ADDENDUM 6

TO

DRAINAGE STUDY

FOR

CAMINO DEL SUR SOUTH HALF PHASE II

NORTHERLY DRAINING AREAS

(In Support of BMR Unit 14 Grading - Construction Change 'F'
BMR North Village East Town Center Improvements – Construction Change 'B'
BMR North Village Paseo Del Sur Phase 5 Improvements – Construction Change 'A')

Job Number 16630

Dennis C. Bowling, M.S.
R.C.E. #32838
Exp. 06/16



Prepared for:
Black Mountain Ranch, LLC
12770 High Bluff Drive, Suite 260
San Diego, California 92103
(858) 792-7061

Prepared by:
Rick Engineering Company
Water Resources Department
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707

Original: March 9, 2011
Addendum 1: January 6, 2012
Addendum 2: March 8, 2012
Addendum 3: August 13, 2012
Addendum 4: January 14, 2013
Addendum 5: April 24, 2013
Revised Addendum 5: July 11, 2013
Addendum 6: July 3, 2014
Revised Addendum 6: October 2, 2014

TABLE OF CONTENTS

Northerly Draining Areas:

Revision Page, dated October 2, 2014 i
1.0 Introduction 1
2.0 Hydrology 5
3.0 Hydraulics 7
4.0 Detention 9
6.0 Conclusion 11

Appendices:

Appendix A: AES Modified Rational Method Analyses
Appendix G: AES Pipe Flow Hydraulic Analyses for Ultimate Condition
Appendix H: Inlet Design Calculations
Appendix L: Detention Basin Calculations

Map Pocket 5: Drainage Study map for Camino Del Sur South Half Phase II Basin 700 [Ultimate Condition]
Map Pocket 6: Drainage Study map for Camino Del Sur South Half Phase II Basin 900 [Ultimate Condition]

ADDENDUM 6 TO
DRAINAGE STUDY
FOR
CAMINO DEL SUR SOUTH HALF PHASE II
NORTHERLY DRAINING AREAS

(In Support of BMR Unit 14 Grading - Construction Change 'F'
BMR North Village East Town Center Improvements – Construction Change 'B'
BMR North Village Paseo Del Sur Phase 5 Improvements – Construction Change 'A')

Job Number 16630

REVISION PAGE(S)

October 2, 2014

This Drainage Study presents a revision to the July 3, 2014 report pursuant to first plan check comments of the ((Cycle 1 LDR – Drainage & Grades)). The comments have been included below for each plan set and the response-to-comments have been provided in italics.

BMR NVE Unit 14, East Town Center Improvements – Construction Change 'B'

32. Cover Sheet: Please reference the PTS # for this construction change. "Construction Change PTS 378809 to PTS 303110"

    Response: Noted. The cover has been updated

33. On Sheet 42: The Q & V on pipe #1 are provided to be Q = 4.4 & V = 2.5. I went to the provided Drainage Study (Basin 900) and was not able to find the analysis at node 904.5 (Templeton Street). Is there another drainage study that covers those nodes? Please

provide. Ensure that all Q & V provided on the plans match the drainage study analysis. (On my next review I will verify few other nodes to ensure consistency)

Response: Basin 900 rational method analysis omitted unintentionally. Please see appendix A, Basin 900 for analysis of node 904.5. Node 904.5 represents the street inlet on the north side of Templeton Street. Node 904.4 represents the cleanout where the confluence of the north and south street inlet occurs. The combined flow modeled in the pipe flow (pipe #1, node 904.4 to 906) analysis equals 4.4 cfs with a max velocity of 2.5 feet per second. Pipe flow analysis for node 904.5 can be found in Appendix G, Basin 900 in the AES pipeflow analyses file name: 9044.LAT. Pipeflow analyses of pipe #1 (node 904.4 to node 906) can be found in Appendix G, Basion 900 in the AES pipeflow analysis file name: 906.LAT. Note: Pipe #1 (node 904.4 to node 906) is under pressure due to the HGL at node 906, which confluences the flow from the parcel to south of Templeton Street. Pipe #1 is not undersized and meets capacity for waters received by the two street inlets.

Additional revisions included in this report: Revised AES Pipeflows for the storm drain inlet and outlet pipes of Underground Detention Basin 9A. Minor changes were made to the horizontal alignment of Detention Basin 9A's outlet works which required the pipeflows to be updated. See Appendix G.

BMR NVE Unit 14, Paseo Del Sur Phase 5 Improvements – Construction Change 'A'

Response: No comments to address.

BMR NVE Unit 14, Grading Plans – Construction Change 'F'

Response: No comments to address.

1.0 INTRODUCTION

This drainage study has been prepared to address changes to the northerly draining areas of Black Mountain Ranch North Village Unit 14, pursuant to the following projects:

- Black Mountain Ranch North Village East Unit 14 Grading Plans - Construction Change 'F'
- Black Mountain Ranch North Village East Town Center Improvement Plans – Construction Change 'B'
- Black Mountain Ranch North Village Paseo Del Sur Phase 5 Improvement Plans – Construction Change 'A'

This report is the sixth addendum to the report titled "Drainage Study for Camino Del Sur South Half Phase II, (In Support of BMR NVE Unit 14 Grading Plans – Construction Change 'F' – Northerly Draining Areas)," last revised on July 3, 2014 (herein referred to as the "original report"). The most recent addendums, Addendum 3 and 4, had specifically addressed Construction Change 'D' to the Unit 14 Grading Plans, and the original improvement plans for East Town Center and Paseo Del Sur Phase 5, respectively. Addendum 5 specifically addressed Construction Change 'E'.

Unit 14, as a whole, drains in two (2) directions. Because of this, Unit 14 was split between the northerly draining areas, referred to as the Town Center (covered in the report titled, "Drainage Study for Camino Del Sur South Half Phase II," and its subsequent addendums) and the southerly draining areas, referred to as Del Sur Ridge (covered in the report titled, "Drainage Study for Black Mountain Ranch North Village East Unit 14," and its subsequent addendums). The table below describes the history of revisions throughout BMR Unit 14, and the applicable addendum to the original studies for each change.

Table 1.1 – Black Mountain Ranch North Village East Unit 14 project history.

Project	**Northerly Draining Area (Town Center)**	**Southerly Draining Area (Del Sur Ridge)**
Construction Change 'B'	Addendum 1	Not Applicable
Construction Change 'C'	Addendum 2	Not Applicable
Construction Change 'D'	Addendum 3	Addendum 1
Improvement Plans to BMR North Village East Town Center and Paseo Del Sur Phase 5	Addendum 4	Not Applicable
Construction Change 'E'	Addendum 5	Addendum 2
Construction Change 'F'	Addendum 6	N/A

Detailed below are the changes to BMR North Village East Unit 14, pursuant to the Construction Change 'F' project, and the Construction Change 'A' & 'B' to the improvement plans listed above. The portions covered within the northerly draining report are italicized:

<u>BMRNV Unit 14 – Construction Change 'F':</u>

- *Replace Detention Basin 9A (above ground detention basin and bioretention swale) within Drainage Basin 900A, with an underground detention vault and an underground Jellyfish Filtration treatment unit.*
- *Revised sheet grading of the lots north of Del Sur Ridge Road, west of Paseo Del Sur, and east of Garretson Street within the commercial district of the Town Center, including the removal of the portion of Templeton Street between Garretson Street and Paseo Del Sur.*
- *Lower the street grades along portions of Del Sur Ridge Road, Garretson Street, Templeton Street, and Paseo Del Sur*

BMRNV East Town Center Improvements – Construction Change 'B':

- *Revisions to the storm drain layout for a portion of the system along Del Sur Ridge Road, Templeton Street, and Garretson Street*
- *Horizontal and vertical revisions to water, sewer and storm drain due to the lowering of streets listed above.*
- *Providing driveways, curb ramps and utility services to the Shea Commercial Site*

BMRNV Paseo Del Sur Phase 5 Improvements – Construction Change 'A':

- *Revisions to the storm drain layout for the system along Paseo Del Sur, north of Del Sur Ridge Road*
- *Horizontal and vertical revisions to water, sewer and storm drain due to the lowering of streets listed above.*
- *Providing driveways, curb ramps and utility services to the Shea Commercial Site*

Therefore, the following has been updated within this report to support the changes pursuant to the project:

- Updated rational method for the ultimate condition within Drainage Basin 700
- Updated rational method for the ultimate condition within Drainage Basin 900A
- Updated rational method for the ultimate condition within Drainage Basin 900
- Updated pipe flow analysis for the systems within Drainage Basin 700 (only including the pipe flow analysis for Garretson St.)
- Updated pipe flow analysis for the systems within Drainage Basin 900A
- Updated pipe flow analysis for the system within Drainage Basin 900 (only including the pipe flow analysis for Templeton St.)
- Sizing of curb inlets along Paseo Del Sur & Templeton St

- Ultimate sizing and final design of the underground detention vault and outlet structure for Detention Basin 9A

Refer to Appendix A for the revised Rational Method output files. Refer to Appendix B for the revised AES Pipe Flow output files. Refer to Appendix H for revised curb inlet calculations. Refer to Appendix L for revised Detention Basin calculations.

The revised Drainage Study Exhibits for Drainage Basin 700 and Drainage Basin 900 are located within Map Pocket 5 and 6, respectively.

2.0 HYDROLOGY

Based on the original report, the Town Center is divided between two (2) main drainage basins: Basin 700 and Basin 900 (drainage basin 900 is further sub-divided into Basin 900A and Basin 900). The storm drain within Basin 700 was designed to collect runoff from the lots and streets throughout the watershed and convey it to an existing 60-inch RCP that runs below Camino Del Sur and outlets to the north of that road. Basin 900 was primarily connected by two storm drain systems; one of these systems discharges runoff to the north of Camino Del Sur, just west of Four Gee Road (Basin 900A); and the other system discharges to an existing outfall approximately 450 feet east of Four Gee Road (Basin 900).

The AES Modified Rational Method models were revised to incorporate the revisions to the hydrology, per the changes listed above. For Drainage Basin 700, these changes include more detailed analysis of the revisions to street grades along Templeton Street, Garretson Street, and Del Sur Ridge Road, as well as revised slope grading of the pads adjacent to these roads, and sheet grading of the pads north of Del Sur Ridge Road and east of Garretson Street (including the removal of Templeton Street east of Garretson Street). For Drainage Basin 900A, these changes include the revisions to the street grades of Del Sur Ridge Road, Templeton Street, and Paseo Del Sur, as well as the sheet grading of the pads north of Del Sur Ridge Road, west of Paseo Del Sur, and east of Garretson Street, including the removal of Templeton Street west of Paseo Del Sur. Additionally, Construction Change 'F' includes the design of the underground detention basin 9A (DB 9A) within the lot west of Paseo Del Sur and north of Del Sur Ridge Road.

As stated above, the block north of Del Sur Ridge Road, west of Paseo Del Sur, and east of Garretson Street have revised sheet grading as part of the Construction Change 'F' project, which includes the location of proposed DB 9A. To design the size and layout for DB 9A, the ultimate condition for these lots was utilized. As shown on the Basin 900 Drainage Exhibit, the drainage boundaries in the vicinity of these lots do not follow the Construction Change 'F' grading. Rather, the boundaries correspond to the precise grading, which was completed by

Kimley Horn Engineering. A note has been placed on the exhibit to further clarify this condition.

The updated AES Modified Rational Method computer output for the project is provided in Appendix A of this report. For information regarding hydrologic criteria and methodology, refer to section 2.0, Hydrology, of the original Drainage Study.

3.0 HYDRAULICS

The changes to the hydraulic systems stemming from the Construction Change 'A', 'B' and Construction Change 'F' projects consist of the final design for storm drain, curb inlets, and detention basins throughout drainage basins 700 and 900A.

As stated in the introduction, the BMRNV East Town Center Improvements – Construction Change 'B' project designs the storm drain for portions of Del Sur Ridge Road, Garretson Street, and Templeton Street, and the BMRNV Paseo Del Sur Phase 5 Improvements – Construction Change 'A' project designs the storm drain along Paseo Del Sur. At this time, the horizontal & vertical alignment for the storm drain along these roads has been established, and is shown on the drainage exhibits located within Map Pockets 5 and 6. The pipe flows for these systems have been revised, and are included in appendix G.

As part of the Unit 14 – Construction Change 'F' project, changes to the hydraulics within Drainage Basins 700 and 900A stem from the revisions to the East Town Center grading revisions and the inclusion of underground DB 9A, respectively.

The redesign of Detention Basin 9A as an underground detention basin has revised the layout of the on-site storm drain for the lots west of Paseo Del Sur and north of Del Sur Ridge Road, within Drainage Basin 900A. The storm drain along Paseo Del Sur turns into the lot at Drainage Node 914.2, and discharges into DB 9A at Drainage Node 916. This storm drain consists of 30" RCP. DB 9A discharges at Drainage Node 919, and continues towards Camino Del Sur, where it ties into the mainline system along that road at the existing curb inlet at Drainage Node 990. The storm drain downstream of DB 9A is 36-inch RCP. AES Pipe Flow analyses for the storm drain from Paseo Del Sur to DB 9A, and from DB 9A to Camino Del Sur have been run, and are included within this report, and reflected on the Construction Change 'F' Grading Plans.

One additional Type-B curb inlet along Paseo Del Sur is proposed with this project. The inlet is located at Drainage Node 914, and has been sized and designed to collect 100% of surface runoff to it, as well as to ensure that a proper 'Dry Lane' is maintained (per the original report, this 'Dry Lane' must be a minimum of 9-feet in combined roadway width, though 12-feet is preferred).

The AES Pipe Flow computer output for the project is provided in Appendix G of this report. For inlet sizing refer to Appendix H of this report. For information regarding the methodology and criteria for hydraulic design, refer to section 3.0, Hydraulics, of the original drainage study.

4.0 DETENTION BASIN

As detailed within the original report (and subsequent addendums), detention requirements for the BMR North Village East Unit 14 Town Center area consists of detention for the 2-year, 10-year, and 25-year post-project peak flow rates. These detention requirements are met through six (6) regional detention basins, which are located along the southern edge of Camino Del Sur. As stated earlier, this project is redesigning Detention Basin 9A (DB 9A) as an underground detention vault, in conjunction with an underground filtration unit for treatment.

DB 9A was originally designed as part of the Addendum 3 report, and consisted of an above ground detention basin, with a bioretention swale along the bottom as a Treatment Control Best Management Practice (TC-BMP). Following the development of the site plan for the lots west of Paseo Del Sur, it was determined that DB 9A would be redesigned as an underground vault; therefore, as part of this project, DB 9A has been redesigned using StormTrap modular management systems.

Located within the pad immediately west of Paseo Del Sur, the StormTrap detention basin continues to provide 2-, 10-, and 25-year detention for all of Drainage Basin 900A, south of Camino Del Sur. The concrete modular system has a footprint of approximately 6500 square feet, with an interior height of 5’ 8”, for a total provided volume of approximately 0.767 acre-feet. The outlet structure for the unit consists of a galvanized steel plate with openings engineered to meet the detention discharge rates at various stages of ponding within the vault. In addition to detention, the vault, and its outlet structure, has been sized to convey the un-detained, 100-year peak flow rate downstream.

It should be noted that the original, above ground basin was able to collect and detain the entire runoff from Drainage Basin 900A, south of Camino Del Sur, within its basin; however, due to vertical constraints stemming from the existing storm drain flow lines along Camino Del Sur, and the location of the underground structure, a portion of the site bypasses the vault in the

proposed condition. The runoff along Paseo Del Sur, north of Templeton Street, and a portion of the perimeter area of the pad is unable to be collected and conveyed towards the detention vault. To account for this bypass, DB 9A has been designed to over-detain the runoff tributary to the vault, to ensure that the total runoff leaving Drainage Basin 9A has met the detention requirements for the site.

Though covered within the companion Water Quality Technical Report for this project, it is worth noting that a Jellyfish Filtration unit will be provided downstream of DB 9A to provide treatment of the runoff conveyed towards DB 9A. For the runoff within the downstream portion of Paseo Del Sur that bypasses the basin, Clearwater Filtration units will be provided within the curb inlet at Drainage Nodes 956.2 and 955 to provide treatment.

The calculations and backup for the sizing of Detention Basin 9A, as well as the detailed outlet works, have been provided within Appendix L of this report. For information regarding the criteria and methodology of designing the Detention Basin, refer to section 4.0, Detention Basins, from the original drainage study.

6.0 CONCLUSION

This drainage study has been prepared to address changes to the northerly draining areas of Black Mountain Ranch North Village Unit 14, pursuant to the following projects:

- Black Mountain Ranch North Village East Unit 14 Grading Plans - Construction Change 'F'
- Black Mountain Ranch North Village East Town Center Improvement Plans – Construction Change 'B'
- Black Mountain Ranch North Village Paseo Del Sur Phase 5 Improvement Plans – Construction Change 'A'

This report is the sixth addendum to the report titled "Drainage Study for Camino Del Sur South Half Phase II, (In Support of BMR NVE Unit 14 Grading Plans – Construction Change 'A' – Northerly Draining Areas)," last revised on July 11, 2013.

The changes incorporated within the aforementioned projects consist of:

<u>BMRNV Unit 14 – Construction Change 'F':</u>

- Replace Detention Basin 9A (above ground detention basin and bioretention swale) within Drainage Basin 900A, with an underground detention vault and an underground Jellyfish Filtration treatment unit.
- Sheet grading of the lots north of Del Sur Ridge Road, west of Paseo Del Sur, and east of Garretson Street within the commercial district of the Town Center, including the removal of the portion of Templeton Street between Garretson Street and Paseo Del Sur.
- Lower the street grades along portions of Del Sur Ridge Road, Garretson Street, Templeton Street, and Paseo Del Sur.

BMRNV East Town Center Improvements – Construction Change 'B':

- Revisions to the storm drain layout for a portion of the system along Del Sur Ridge Road, Templeton Street, and Garretson Street.
- Horizontal and vertical revisions to water, sewer and storm drain due to the lowering of streets listed above.
- Providing driveways, curb ramps and utility services to the Shea Commercial Site.

BMRNV Paseo Del Sur Phase 5 Improvements – Construction Change 'A':

- Revisions to the storm drain layout for the system along Paseo Del Sur, north of Del Sur Ridge Road.
- Horizontal and vertical revisions to water, sewer and storm drain due to the lowering of streets listed above.
- Providing driveways, curb ramps and utility services to the Shea Commercial Site.

Therefore, the following has been updated within this report to support the changes pursuant to the project:

- Updated rational method for the ultimate condition within Drainage Basin 700
- Updated rational method for the ultimate condition within Drainage Basin 900A
- Updated rational method for the ultimate condition within Drainage Basin 900
- Updated pipe flow analysis for the systems within Drainage Basin 700 (only including the pipe flow analysis for Garretson St.)
- Updated pipe flow analysis for the systems within Drainage Basin 900A
- Updated pipe flow analysis for the system within Drainage Basin 900 (only including the pipe flow analysis for Templeton St.)
- Sizing of curb inlets along Paseo Del Sur & Templeton St
- Ultimate sizing and final design of the underground detention vault and outlet structure for Detention Basin 9A

Refer to Appendix A for the revised Rational Method output files. Refer to Appendix B for the revised AES Pipe Flow output files. Refer to Appendix H for revised curb inlet calculations. Refer to Appendix L for revised Detention Basin calculations.

The revised Drainage Study Exhibits for Drainage Basin 700 and Drainage Basin 900 are located within Map Pocket 5 and 6, respectively.

Appendix A

AES Modified Rational Method Analyses

Basin 700

(For Reference Only – from approved C.C.E Drainage Study, used for Q_{100} on revised Pipeflows in this study)

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                        RICK ENGINEERING COMPANY
                            5620 Friars Road
                         San Diego, California 92110
                       619-291-0707   Fax 619-291-4165

 ************************** DESCRIPTION OF STUDY **************************
* BMR NVE Unit 14 - Construction Change 'E'                               *
* Basin 700 Ultimate Condition                                            *
* 100 Year Event                                                          *
 **************************************************************************

  FILE NAME: BMR7HP00.DAT
  TIME/DATE OF STUDY: 15:32 04/30/2013
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020   0.67     2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020   0.50     1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     714.00 TO NODE     715.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  546.70
  DOWNSTREAM ELEVATION(FEET) =  541.80
  ELEVATION DIFFERENCE(FEET) =  4.90
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  6.889
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.041
  SUBAREA RUNOFF(CFS) =  0.55
  TOTAL AREA(ACRES) =  0.30  TOTAL RUNOFF(CFS) =  0.55
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    715.00 TO NODE    708.50 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    541.80  DOWNSTREAM(FEET) =    539.80
 CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0333
 CHANNEL BASE(FEET) =    7.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.916
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.72
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.66
 Tc(MIN.) =   7.54
 SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.35
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       0.90

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.57
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    708.50 =   160.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    708.50 TO NODE    709.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   533.85  DOWNSTREAM(FEET) =   531.45
 FLOW LENGTH(FEET) =   120.09   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.67
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.90
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   7.97
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    709.00 =   280.09 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    709.00 TO NODE    709.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.835
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.35
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =    1.24
 TC(MIN.) =   7.97

****************************************************************************
 FLOW PROCESS FROM NODE    709.00 TO NODE    709.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.835
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    2.36
 TOTAL AREA(ACRES) =      1.50   TOTAL RUNOFF(CFS) =    3.61
 TC(MIN.) =   7.97

****************************************************************************
 FLOW PROCESS FROM NODE    709.00 TO NODE    710.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   530.95  DOWNSTREAM(FEET) =   527.61
 FLOW LENGTH(FEET) =   501.67   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.61
```

```
 PIPE TRAVEL TIME(MIN.) =   1.87    Tc(MIN.) =   9.84
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    710.00 =   781.76 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    710.00 TO NODE    710.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.480
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .5000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.10   SUBAREA RUNOFF(CFS) =    1.91
 TOTAL AREA(ACRES) =       2.60   TOTAL RUNOFF(CFS) =    5.52
 TC(MIN.) =   9.84

****************************************************************************
 FLOW PROCESS FROM NODE    710.00 TO NODE    710.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.480
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.90   SUBAREA RUNOFF(CFS) =    2.41
 TOTAL AREA(ACRES) =       3.50   TOTAL RUNOFF(CFS) =    7.93
 TC(MIN.) =   9.84

****************************************************************************
 FLOW PROCESS FROM NODE    710.00 TO NODE    706.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   527.28  DOWNSTREAM(FEET) =   526.56
 FLOW LENGTH(FEET) =   142.76   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.91
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.93
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =  10.33
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    706.00 =   924.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 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.) =  10.33
 RAINFALL INTENSITY(INCH/HR) =   3.41
 TOTAL STREAM AREA(ACRES) =     3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.93

****************************************************************************
 FLOW PROCESS FROM NODE    705.10 TO NODE    705.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    543.40
 DOWNSTREAM ELEVATION(FEET) =    536.90
 ELEVATION DIFFERENCE(FEET) =      6.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.658
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.19
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
 FLOW PROCESS FROM NODE    705.20 TO NODE    705.20 IS CODE =  81
```

```
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7700
S.C.S. CURVE NUMBER (AMC II) =  0
SUBAREA AREA(ACRES) =  0.50   SUBAREA RUNOFF(CFS) =  1.62
TOTAL AREA(ACRES) =  0.60   TOTAL RUNOFF(CFS) =  1.81
TC(MIN.) =  6.00

********************************************************************************
FLOW PROCESS FROM NODE    705.20 TO NODE    705.40 IS CODE =  41
--------------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =  531.11  DOWNSTREAM(FEET) =  529.78
FLOW LENGTH(FEET) =  128.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  12.0 INCH PIPE IS  6.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  4.45
GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  1.81
PIPE TRAVEL TIME(MIN.) =  0.48    Tc(MIN.) =  6.48
LONGEST FLOWPATH FROM NODE    705.10 TO NODE    705.40 =  198.00 FEET.

********************************************************************************
FLOW PROCESS FROM NODE    705.40 TO NODE    705.40 IS CODE =  81
--------------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.119
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =  0
SUBAREA AREA(ACRES) =  0.20   SUBAREA RUNOFF(CFS) =  0.37
TOTAL AREA(ACRES) =  0.80   TOTAL RUNOFF(CFS) =  2.18
TC(MIN.) =  6.48

********************************************************************************
FLOW PROCESS FROM NODE    705.40 TO NODE    705.40 IS CODE =  81
--------------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.119
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7700
S.C.S. CURVE NUMBER (AMC II) =  0
SUBAREA AREA(ACRES) =  0.50   SUBAREA RUNOFF(CFS) =  1.59
TOTAL AREA(ACRES) =  1.30   TOTAL RUNOFF(CFS) =  3.77
TC(MIN.) =  6.48

********************************************************************************
FLOW PROCESS FROM NODE    705.40 TO NODE    705.70 IS CODE =  41
--------------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =  529.61  DOWNSTREAM(FEET) =  528.57
FLOW LENGTH(FEET) =  128.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  8.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  4.87
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  3.77
PIPE TRAVEL TIME(MIN.) =  0.44    Tc(MIN.) =  6.92
LONGEST FLOWPATH FROM NODE    705.10 TO NODE    705.70 =  326.00 FEET.

********************************************************************************
FLOW PROCESS FROM NODE    705.70 TO NODE    705.70 IS CODE =  81
--------------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.036
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =  0
SUBAREA AREA(ACRES) =  0.30   SUBAREA RUNOFF(CFS) =  0.54
TOTAL AREA(ACRES) =  1.60   TOTAL RUNOFF(CFS) =  4.31
```

TC(MIN.) = 6.92

```
****************************************************************************
 FLOW PROCESS FROM NODE    705.70 TO NODE    705.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.036
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7700
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    1.55
 TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =    5.87
 TC(MIN.) =   6.92

****************************************************************************
 FLOW PROCESS FROM NODE    705.70 TO NODE    706.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   528.40  DOWNSTREAM(FEET) =   526.56
 FLOW LENGTH(FEET) =    72.46   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.32
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.87
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   7.06
 LONGEST FLOWPATH FROM NODE    705.10 TO NODE    706.00 =   398.46 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.008
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    0.90
 TOTAL AREA(ACRES) =      2.60   TOTAL RUNOFF(CFS) =    6.77
 TC(MIN.) =   7.06

****************************************************************************
 FLOW PROCESS FROM NODE    706.00 TO NODE    706.00 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.) =   7.06
 RAINFALL INTENSITY(INCH/HR) =   4.01
 TOTAL STREAM AREA(ACRES) =     2.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.77

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         7.93     10.33        3.414          3.50
     2         6.77      7.06        4.008          2.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        13.52      7.06        4.008
     2        13.70     10.33        3.414

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     13.70   Tc(MIN.) =   10.33
 TOTAL AREA(ACRES) =      6.10
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    706.00 =   924.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    706.00 TO NODE    713.00 IS CODE =  41
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
ELEVATION DATA: UPSTREAM(FEET) =   526.23  DOWNSTREAM(FEET) =   525.63
FLOW LENGTH(FEET) =   120.86   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     13.70
PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =  10.70
LONGEST FLOWPATH FROM NODE    714.00 TO NODE    713.00 =  1045.38 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    713.00 TO NODE    713.00 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.) =  10.70
RAINFALL INTENSITY(INCH/HR) =   3.37
TOTAL STREAM AREA(ACRES) =     6.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.70

****************************************************************************
FLOW PROCESS FROM NODE    716.00 TO NODE    717.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    87.00
UPSTREAM ELEVATION(FEET) =    547.00
DOWNSTREAM ELEVATION(FEET) =    545.80
ELEVATION DIFFERENCE(FEET) =      1.20
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.017
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
SUBAREA RUNOFF(CFS) =      0.38
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
FLOW PROCESS FROM NODE    717.00 TO NODE    713.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  545.80  DOWNSTREAM ELEVATION(FEET) =  536.20
STREET LENGTH(FEET) =   556.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.77
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.29
  HALFSTREET FLOOD WIDTH(FEET) =    8.22
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
STREET FLOW TRAVEL TIME(MIN.) =   4.15   Tc(MIN.) =  10.15
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.434
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.78
TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =       3.16

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.61
```

```
 FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
 LONGEST FLOWPATH FROM NODE    716.00 TO NODE    713.00 =   643.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    713.00 TO NODE    713.00 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.) =  10.15
 RAINFALL INTENSITY(INCH/HR) =   3.43
 TOTAL STREAM AREA(ACRES) =     1.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.16

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        13.70    10.70         3.373          6.10
    2         3.16    10.15         3.434          1.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
    1        16.62    10.15         3.434
    2        16.80    10.70         3.373

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     16.80   Tc(MIN.) =   10.70
 TOTAL AREA(ACRES) =      7.10
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    713.00 =  1045.38 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    713.00 TO NODE    719.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   525.30  DOWNSTREAM(FEET) =   524.82
 FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.56
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.80
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  10.80
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    719.00 =  1093.38 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    719.00 TO NODE    719.00 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.) =  10.80
 RAINFALL INTENSITY(INCH/HR) =   3.36
 TOTAL STREAM AREA(ACRES) =     7.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.80

****************************************************************************
 FLOW PROCESS FROM NODE    718.10 TO NODE    718.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    542.97
 DOWNSTREAM ELEVATION(FEET) =    540.91
 ELEVATION DIFFERENCE(FEET) =      2.06
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.829
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
```

```
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    718.20 TO NODE    718.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  540.91  DOWNSTREAM ELEVATION(FEET) =  534.45
 STREET LENGTH(FEET) =   313.50   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.71
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.86
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
 STREET FLOW TRAVEL TIME(MIN.) =   2.60   Tc(MIN.) =   8.60
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.717
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.67
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.05

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.09
 FLOW VELOCITY(FEET/SEC.) =  2.14   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
 LONGEST FLOWPATH FROM NODE    718.10 TO NODE    718.00 =   413.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    718.00 TO NODE    719.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   529.55  DOWNSTREAM(FEET) =   525.49
 FLOW LENGTH(FEET) =    25.40   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.71
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.05
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   8.64
 LONGEST FLOWPATH FROM NODE    718.10 TO NODE    719.00 =   438.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    719.00 TO NODE    719.00 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.) =   8.64
 RAINFALL INTENSITY(INCH/HR) =   3.71
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.05

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1         16.80     10.80        3.362         7.10
    2          1.05      8.64        3.708         0.30

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       16.28     8.64       3.708
     2       17.75    10.80       3.362

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     17.75   Tc(MIN.) =   10.80
 TOTAL AREA(ACRES) =      7.40
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    719.00 =  1093.38 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    719.00 TO NODE    720.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   524.49  DOWNSTREAM(FEET) =   523.89
 FLOW LENGTH(FEET) =    56.69   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.81
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     17.75
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  10.92
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    720.00 =  1150.07 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    720.00 TO NODE    720.00 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.) =  10.92
 RAINFALL INTENSITY(INCH/HR) =   3.35
 TOTAL STREAM AREA(ACRES) =     7.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.75

****************************************************************************
 FLOW PROCESS FROM NODE    721.00 TO NODE    722.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.00
 UPSTREAM ELEVATION(FEET) =    544.00
 DOWNSTREAM ELEVATION(FEET) =    542.80
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.274
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    722.00 TO NODE    723.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  542.80  DOWNSTREAM ELEVATION(FEET) =  535.60
 STREET LENGTH(FEET) =   326.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.23
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
```

```
   HALFSTREET FLOOD WIDTH(FEET) =    6.50
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.27
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
 STREET FLOW TRAVEL TIME(MIN.) =   2.40   Tc(MIN.) =   8.40
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.755
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     1.69
 TOTAL AREA(ACRES) =      0.60       PEAK FLOW RATE(CFS) =       2.07

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.38
 FLOW VELOCITY(FEET/SEC.) =  2.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
 LONGEST FLOWPATH FROM NODE    721.00 TO NODE    723.00 =   422.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    723.00 TO NODE    720.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   527.28  DOWNSTREAM(FEET) =   524.56
 FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.71
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.07
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   8.45
 LONGEST FLOWPATH FROM NODE    721.00 TO NODE    720.00 =   452.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    720.00 TO NODE    720.00 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.) =   8.45
 RAINFALL INTENSITY(INCH/HR) =   3.74
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.07

****************************************************************************
 FLOW PROCESS FROM NODE    719.10 TO NODE    719.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    537.32
 DOWNSTREAM ELEVATION(FEET) =    537.00
 ELEVATION DIFFERENCE(FEET) =      0.32
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.263
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    719.20 TO NODE    720.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   524.67  DOWNSTREAM(FEET) =   524.56
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.38
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   6.01
 LONGEST FLOWPATH FROM NODE    719.10 TO NODE    720.00 =   102.25 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    720.00 TO NODE    720.00 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.) =   6.01
 RAINFALL INTENSITY(INCH/HR) =   4.21
 TOTAL STREAM AREA(ACRES) =     0.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.38

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         17.75     10.92        3.348          7.40
    2          2.07      8.45        3.745          0.60
    3          0.38      6.01        4.208          0.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         16.34      6.01        4.208
    2         18.28      8.45        3.745
    3         19.90     10.92        3.348

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     19.90   Tc(MIN.) =   10.92
 TOTAL AREA(ACRES) =      8.10
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    720.00 =  1150.07 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    720.00 TO NODE    720.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.56  DOWNSTREAM(FEET) =   521.65
 FLOW LENGTH(FEET) =   382.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     19.90
 PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =  11.96
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    720.50 =  1532.37 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    720.50 TO NODE    720.50 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    725.00 TO NODE    726.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    550.00
 DOWNSTREAM ELEVATION(FEET) =    548.20
 ELEVATION DIFFERENCE(FEET) =      1.80
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.711
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    726.00 TO NODE    727.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   548.20  DOWNSTREAM(FEET) =   540.50
 FLOW LENGTH(FEET) =   362.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   2.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.17
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.76
 PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   7.45
 LONGEST FLOWPATH FROM NODE    725.00 TO NODE    727.00 =   452.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    727.00 TO NODE    727.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.935
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    2.90   SUBAREA RUNOFF(CFS) =   10.27
 TOTAL AREA(ACRES) =      3.10   TOTAL RUNOFF(CFS) =   11.03
 TC(MIN.) =   7.45

****************************************************************************
 FLOW PROCESS FROM NODE    727.00 TO NODE    727.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   531.27  DOWNSTREAM(FEET) =   524.27
 FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.05
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.03
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   7.47
 LONGEST FLOWPATH FROM NODE    725.00 TO NODE    727.30 =   480.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    727.30 TO NODE    727.30 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.) =   7.47
 RAINFALL INTENSITY(INCH/HR) =   3.93
 TOTAL STREAM AREA(ACRES) =     3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.03

****************************************************************************
 FLOW PROCESS FROM NODE    727.10 TO NODE    727.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    549.70
 DOWNSTREAM ELEVATION(FEET) =    547.70
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    727.20 TO NODE    727.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  547.70  DOWNSTREAM ELEVATION(FEET) =  532.61
 STREET LENGTH(FEET) =   395.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.40
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
 STREET FLOW TRAVEL TIME(MIN.) =   2.27   Tc(MIN.) =   8.27
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.779
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =     2.04
 TOTAL AREA(ACRES) =       0.70        PEAK FLOW RATE(CFS) =       2.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.92
 FLOW VELOCITY(FEET/SEC.) =  3.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
 LONGEST FLOWPATH FROM NODE    727.10 TO NODE    727.30 =   495.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    727.30 TO NODE    727.30 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.) =   8.27
 RAINFALL INTENSITY(INCH/HR) =   3.78
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.42

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        11.03      7.47        3.931         3.10
     2         2.42      8.27        3.779         0.70

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        13.35      7.47        3.931
     2        13.02      8.27        3.779

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     13.35   Tc(MIN.) =    7.47
 TOTAL AREA(ACRES) =      3.80
 LONGEST FLOWPATH FROM NODE    727.10 TO NODE    727.30 =   495.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    727.30 TO NODE    720.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.94  DOWNSTREAM(FEET) =   521.82
 FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.80
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.35
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   7.50
 LONGEST FLOWPATH FROM NODE    727.10 TO NODE    720.50 =   525.25 FEET.

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

```
 FLOW PROCESS FROM NODE    720.50 TO NODE    720.50 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        13.35      7.50        3.925         3.80
 LONGEST FLOWPATH FROM NODE    727.10 TO NODE    720.50 =   525.25 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        19.90     11.96        3.234         8.10
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    720.50 =  1532.37 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1       29.75       7.50        3.925
    2       30.90      11.96        3.234

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     30.90   Tc(MIN.) =   11.96
 TOTAL AREA(ACRES) =     11.90

****************************************************************************
 FLOW PROCESS FROM NODE    720.50 TO NODE    720.50 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    720.50 TO NODE    720.50 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.) =  11.96
 RAINFALL INTENSITY(INCH/HR) =   3.23
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.90

****************************************************************************
 FLOW PROCESS FROM NODE    727.40 TO NODE    727.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   276.72
 UPSTREAM ELEVATION(FEET) =    537.25
 DOWNSTREAM ELEVATION(FEET) =    532.61
 ELEVATION DIFFERENCE(FEET) =      4.64
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.041
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    727.50 TO NODE    720.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   522.37  DOWNSTREAM(FEET) =   522.32
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.41
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.76
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   6.01
 LONGEST FLOWPATH FROM NODE    727.40 TO NODE    720.50 =   278.97 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     720.50 TO NODE     720.50 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.) =    6.01
 RAINFALL INTENSITY(INCH/HR) =    4.21
 TOTAL STREAM AREA(ACRES) =      0.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.76

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        30.90     11.96         3.234          11.90
     2         0.76      6.01         4.208           0.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        24.51      6.01         4.208
     2        31.49     11.96         3.234

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      31.49   Tc(MIN.) =   11.96
 TOTAL AREA(ACRES) =      12.10
 LONGEST FLOWPATH FROM NODE     714.00 TO NODE     720.50 =  1532.37 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     720.50 TO NODE     724.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    521.32  DOWNSTREAM(FEET) =    520.86
 FLOW LENGTH(FEET) =     91.90   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =    6.87
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.49
 PIPE TRAVEL TIME(MIN.) =    0.22    Tc(MIN.) =  12.19
 LONGEST FLOWPATH FROM NODE     714.00 TO NODE     724.00 =  1624.27 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     724.00 TO NODE     730.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    520.53  DOWNSTREAM(FEET) =    501.40
 FLOW LENGTH(FEET) =    340.38   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.82
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.49
 PIPE TRAVEL TIME(MIN.) =    0.34    Tc(MIN.) =  12.53
 LONGEST FLOWPATH FROM NODE     714.00 TO NODE     730.00 =  1964.65 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     730.00 TO NODE     730.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     750.70 TO NODE     750.80 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  0100.00
```

```
 UPSTREAM ELEVATION(FEET) =     533.29
 DOWNSTREAM ELEVATION(FEET) =     531.29
 ELEVATION DIFFERENCE(FEET) =       2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       0.38
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.38

****************************************************************************
 FLOW PROCESS FROM NODE     750.80 TO NODE     750.60 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  531.29  DOWNSTREAM ELEVATION(FEET) =  511.68
 STREET LENGTH(FEET) =   500.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.53
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
 STREET FLOW TRAVEL TIME(MIN.) =   2.94   Tc(MIN.) =   8.94
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.652
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     1.64
 TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       2.02

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.21
 FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
 LONGEST FLOWPATH FROM NODE     750.70 TO NODE     750.60 =   600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     750.60 TO NODE     750.60 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.) =   8.94
 RAINFALL INTENSITY(INCH/HR) =   3.65
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.02

****************************************************************************
 FLOW PROCESS FROM NODE     750.40 TO NODE     750.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =     542.96
 DOWNSTREAM ELEVATION(FEET) =     540.66
 ELEVATION DIFFERENCE(FEET) =       2.30
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.727
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       0.38
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.38

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

```
 FLOW PROCESS FROM NODE     750.50 TO NODE     750.60 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
======================================================================
 UPSTREAM ELEVATION(FEET) =  540.66  DOWNSTREAM ELEVATION(FEET) =  511.68
 STREET LENGTH(FEET) =   745.21   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.14
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.95
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
 STREET FLOW TRAVEL TIME(MIN.) =   4.21   Tc(MIN.) =  10.21
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.70      SUBAREA RUNOFF(CFS) =    2.16
 TOTAL AREA(ACRES) =      0.80        PEAK FLOW RATE(CFS) =       2.54

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.07
 FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
 LONGEST FLOWPATH FROM NODE     750.40 TO NODE     750.60 =   845.21 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     750.60 TO NODE     750.60 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.) =  10.21
 RAINFALL INTENSITY(INCH/HR) =   3.43
 TOTAL STREAM AREA(ACRES) =     0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.54

****************************************************************************
 FLOW PROCESS FROM NODE     724.10 TO NODE     724.20 IS CODE =  21
----------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    539.40
 DOWNSTREAM ELEVATION(FEET) =    537.70
 ELEVATION DIFFERENCE(FEET) =      1.70
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.016
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE     724.20 TO NODE     724.40 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   537.70  DOWNSTREAM(FEET) =   524.50
 FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   2.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.10
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      0.76
 PIPE TRAVEL TIME(MIN.) =   2.69    Tc(MIN.) =   8.69
 LONGEST FLOWPATH FROM NODE    724.10 TO NODE    724.40 =   760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    724.40 TO NODE    724.40 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.700
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    6.70   SUBAREA RUNOFF(CFS) =   22.31
 TOTAL AREA(ACRES) =      6.90   TOTAL RUNOFF(CFS) =   23.07
 TC(MIN.) =   8.69

****************************************************************************
 FLOW PROCESS FROM NODE    724.40 TO NODE    750.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.02  DOWNSTREAM(FEET) =   504.42
 FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  26.78
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     23.07
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   8.71
 LONGEST FLOWPATH FROM NODE    724.10 TO NODE    750.60 =   798.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    750.60 TO NODE    750.60 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.) =   8.71
 RAINFALL INTENSITY(INCH/HR) =   3.70
 TOTAL STREAM AREA(ACRES) =     6.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.07

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         2.02      8.94         3.652          0.60
     2         2.54     10.21         3.427          0.80
     3        23.07      8.71         3.695          6.90

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        27.42      8.71         3.695
     2        27.20      8.94         3.652
     3        25.83     10.21         3.427

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     27.42   Tc(MIN.) =    8.71
 TOTAL AREA(ACRES) =      8.30
 LONGEST FLOWPATH FROM NODE    750.40 TO NODE    750.60 =   845.21 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    750.60 TO NODE    750.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.18  DOWNSTREAM(FEET) =   503.88
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  18.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.60
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     27.42
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   8.77
 LONGEST FLOWPATH FROM NODE    750.40 TO NODE    750.00 =   875.21 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    750.00 TO NODE    750.00 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.) =   8.77
 RAINFALL INTENSITY(INCH/HR) =   3.68
 TOTAL STREAM AREA(ACRES) =     8.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.42

****************************************************************************
 FLOW PROCESS FROM NODE    750.10 TO NODE    750.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    547.10
 DOWNSTREAM ELEVATION(FEET) =    545.54
 ELEVATION DIFFERENCE(FEET) =      1.56
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.104
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    750.20 TO NODE    750.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  545.54  DOWNSTREAM ELEVATION(FEET) =  511.68
 STREET LENGTH(FEET) =  1000.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.21
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.91
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
 STREET FLOW TRAVEL TIME(MIN.) =   5.72   Tc(MIN.) =  11.72
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.261
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =     2.93
 TOTAL AREA(ACRES) =      1.10        PEAK FLOW RATE(CFS) =       3.31

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.39
 FLOW VELOCITY(FEET/SEC.) =  3.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
 LONGEST FLOWPATH FROM NODE    750.10 TO NODE    750.30 =  1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    750.30 TO NODE    750.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   504.55
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.31
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =  11.72
 LONGEST FLOWPATH FROM NODE    750.10 TO NODE    750.00 =  1102.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    750.00 TO NODE    750.00 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.) =  11.72
 RAINFALL INTENSITY(INCH/HR) =   3.26
 TOTAL STREAM AREA(ACRES) =     1.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.31

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        27.42     8.77         3.684          8.30
    2         3.31    11.72         3.260          1.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
    1        30.35     8.77         3.684
    2        27.58    11.72         3.260

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     30.35   Tc(MIN.) =    8.77
 TOTAL AREA(ACRES) =      9.40
 LONGEST FLOWPATH FROM NODE    750.10 TO NODE    750.00 =  1102.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    750.00 TO NODE    730.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   503.55  DOWNSTREAM(FEET) =   501.90
 FLOW LENGTH(FEET) =   164.79   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.79
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     30.35
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   9.08
 LONGEST FLOWPATH FROM NODE    750.10 TO NODE    730.00 =  1267.04 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.00 TO NODE    730.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        30.35     9.08         3.625          9.40
 LONGEST FLOWPATH FROM NODE    750.10 TO NODE    730.00 =  1267.04 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        31.49    12.53         3.172         12.10
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    730.00 =  1964.65 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
```

```
      1       57.91        9.08        3.625
      2       58.05       12.53        3.172

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     58.05   Tc(MIN.) =   12.53
  TOTAL AREA(ACRES) =     21.50

****************************************************************************
  FLOW PROCESS FROM NODE     730.00 TO NODE     730.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     730.00 TO NODE     730.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     751.10 TO NODE     751.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    533.29
  DOWNSTREAM ELEVATION(FEET) =    531.29
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE     751.20 TO NODE     751.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  531.29  DOWNSTREAM ELEVATION(FEET) =  510.17
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    5.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
  STREET FLOW TRAVEL TIME(MIN.) =   3.57   Tc(MIN.) =   9.57
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.531
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.91
  TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.87
  FLOW VELOCITY(FEET/SEC.) =  3.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE    751.10 TO NODE    751.30 =   700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     751.30 TO NODE     751.30 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.) =    9.57
 RAINFALL INTENSITY(INCH/HR) =    3.53
 TOTAL STREAM AREA(ACRES) =      0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.29

****************************************************************************
 FLOW PROCESS FROM NODE     751.40 TO NODE     751.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =     536.00
 DOWNSTREAM ELEVATION(FEET) =     532.50
 ELEVATION DIFFERENCE(FEET) =       3.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.371
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       0.38
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.38

****************************************************************************
 FLOW PROCESS FROM NODE     751.50 TO NODE     751.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
 UPSTREAM ELEVATION(FEET) =  532.40  DOWNSTREAM ELEVATION(FEET) =  510.17
 STREET LENGTH(FEET) =   645.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.87
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
 STREET FLOW TRAVEL TIME(MIN.) =   3.75   Tc(MIN.) =   9.75
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.498
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =     2.52
 TOTAL AREA(ACRES) =       0.90        PEAK FLOW RATE(CFS) =       2.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.78
 FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.98
 LONGEST FLOWPATH FROM NODE     751.40 TO NODE     751.30 =   745.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     751.30 TO NODE     751.30 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.) =    9.75
 RAINFALL INTENSITY(INCH/HR) =    3.50
 TOTAL STREAM AREA(ACRES) =      0.90
```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.90

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	2.29	9.57	3.531	0.70
2	2.90	9.75	3.498	0.90

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	5.16	9.57	3.531
2	5.16	9.75	3.498

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 5.16 Tc(MIN.) = 9.75
TOTAL AREA(ACRES) = 1.60
LONGEST FLOWPATH FROM NODE 751.40 TO NODE 751.30 = 745.00 FEET.

****
FLOW PROCESS FROM NODE 751.30 TO NODE 751.30 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.) = 9.75
RAINFALL INTENSITY(INCH/HR) = 3.50
TOTAL STREAM AREA(ACRES) = 1.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 5.16

****
FLOW PROCESS FROM NODE 724.70 TO NODE 724.80 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 537.15
DOWNSTREAM ELEVATION(FEET) = 535.00
ELEVATION DIFFERENCE(FEET) = 2.15
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.789
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.210
SUBAREA RUNOFF(CFS) = 0.76
TOTAL AREA(ACRES) = 0.20 TOTAL RUNOFF(CFS) = 0.76

****
FLOW PROCESS FROM NODE 724.80 TO NODE 724.60 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 529.00
FLOW LENGTH(FEET) = 360.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 2.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.84
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.76
PIPE TRAVEL TIME(MIN.) = 1.56 Tc(MIN.) = 7.56
LONGEST FLOWPATH FROM NODE 724.70 TO NODE 724.60 = 460.00 FEET.

****
FLOW PROCESS FROM NODE 724.60 TO NODE 724.60 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.913
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
SUBAREA AREA(ACRES) = 3.80 SUBAREA RUNOFF(CFS) = 13.38
TOTAL AREA(ACRES) = 4.00 TOTAL RUNOFF(CFS) = 14.14

TC(MIN.) = 7.56

```
****************************************************************************
 FLOW PROCESS FROM NODE    724.60 TO NODE    751.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.45  DOWNSTREAM(FEET) =   503.82
 FLOW LENGTH(FEET) =    46.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.31
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.14
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   7.59
 LONGEST FLOWPATH FROM NODE    724.70 TO NODE    751.30 =   506.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    751.30 TO NODE    751.30 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.) =   7.59
 RAINFALL INTENSITY(INCH/HR) =   3.91
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.14

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1          5.16     9.75        3.498          1.60
    2         14.14     7.59        3.907          4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
    1         18.76     7.59        3.907
    2         17.82     9.75        3.498

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     18.76   Tc(MIN.) =    7.59
 TOTAL AREA(ACRES) =      5.60
 LONGEST FLOWPATH FROM NODE    751.40 TO NODE    751.30 =   745.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    751.30 TO NODE    730.90 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   503.32  DOWNSTREAM(FEET) =   502.72
 FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.15
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     18.76
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.64
 LONGEST FLOWPATH FROM NODE    751.40 TO NODE    730.90 =   775.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.90 TO NODE    730.90 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.) =   7.64
 RAINFALL INTENSITY(INCH/HR) =   3.90
 TOTAL STREAM AREA(ACRES) =     5.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.76

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

```
 FLOW PROCESS FROM NODE     751.70 TO NODE     751.80 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
 UPSTREAM ELEVATION(FEET) =  515.81
 DOWNSTREAM ELEVATION(FEET) =  513.81
 ELEVATION DIFFERENCE(FEET) =  2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =  0.38
 TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.38

****************************************************************************
 FLOW PROCESS FROM NODE     751.80 TO NODE     751.60 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  513.81  DOWNSTREAM ELEVATION(FEET) =  510.17
 STREET LENGTH(FEET) =  210.00  CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =  0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =  0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  0.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =  5.89
   AVERAGE FLOW VELOCITY(FEET/SEC.) =  1.94
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =  0.47
 STREET FLOW TRAVEL TIME(MIN.) =  1.80  Tc(MIN.) =  7.80
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.867
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =  0.30  SUBAREA RUNOFF(CFS) =  1.04
 TOTAL AREA(ACRES) =  0.40  PEAK FLOW RATE(CFS) =  1.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27  HALFSTREET FLOOD WIDTH(FEET) =  7.41
 FLOW VELOCITY(FEET/SEC.) =  2.13  DEPTH*VELOCITY(FT*FT/SEC.) =  0.59
 LONGEST FLOWPATH FROM NODE  751.70 TO NODE  751.60 =  310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     751.60 TO NODE     730.90 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  503.26  DOWNSTREAM(FEET) =  503.22
 FLOW LENGTH(FEET) =  2.25  MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  4.92
 GIVEN PIPE DIAMETER(INCH) =  18.00  NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  1.42
 PIPE TRAVEL TIME(MIN.) =  0.01  Tc(MIN.) =  7.81
 LONGEST FLOWPATH FROM NODE  751.70 TO NODE  730.90 =  312.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     730.90 TO NODE     730.90 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.) =   7.81
 RAINFALL INTENSITY(INCH/HR) =   3.87
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.42

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        18.76     7.64         3.898          5.60
     2         1.42     7.81         3.866          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
     1        20.17     7.64         3.898
     2        20.03     7.81         3.866

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     20.17   Tc(MIN.) =    7.64
 TOTAL AREA(ACRES) =      6.00
 LONGEST FLOWPATH FROM NODE    751.40 TO NODE    730.90 =   775.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.90 TO NODE    730.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.22  DOWNSTREAM(FEET) =   500.56
 FLOW LENGTH(FEET) =   215.20   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.17
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   8.14
 LONGEST FLOWPATH FROM NODE    751.40 TO NODE    730.00 =   990.45 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.00 TO NODE    730.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        20.17     8.14         3.804          6.00
 LONGEST FLOWPATH FROM NODE    751.40 TO NODE    730.00 =   990.45 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        58.05    12.53         3.172         21.50
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    730.00 =  1964.65 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF        Tc       INTENSITY
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
     1       68.58        8.14         3.804
     2       74.87       12.53         3.172

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     74.87   Tc(MIN.) =   12.53
 TOTAL AREA(ACRES) =     27.50

****************************************************************************
 FLOW PROCESS FROM NODE    730.00 TO NODE    730.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    730.00 TO NODE    731.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   501.40  DOWNSTREAM(FEET) =   488.38
 FLOW LENGTH(FEET) =   298.21   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  19.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.32
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     74.87
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  12.78
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    731.00 =  2262.86 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    731.00 TO NODE    731.10 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.05  DOWNSTREAM(FEET) =   486.28
 FLOW LENGTH(FEET) =    13.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  12.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  34.18
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     74.87
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =  12.79
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    731.10 =  2276.36 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    731.10 TO NODE    731.10 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.) =  12.79
 RAINFALL INTENSITY(INCH/HR) =   3.14
 TOTAL STREAM AREA(ACRES) =    27.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     74.87

****************************************************************************
 FLOW PROCESS FROM NODE    731.40 TO NODE    731.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    514.00
 DOWNSTREAM ELEVATION(FEET) =    503.00
 ELEVATION DIFFERENCE(FEET) =     11.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.619
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    731.50 TO NODE    755.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  495.86
 STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.73
```

```
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.21
  HALFSTREET FLOOD WIDTH(FEET) =    4.37
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   7.66
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.895
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.70
 TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       1.08

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.58
 FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
 LONGEST FLOWPATH FROM NODE    731.40 TO NODE    755.00 =   335.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    755.00 TO NODE    731.10 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   488.18  DOWNSTREAM(FEET) =   487.78
 FLOW LENGTH(FEET) =    39.52   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.71
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.08
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   7.84
 LONGEST FLOWPATH FROM NODE    731.40 TO NODE    731.10 =   374.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    731.10 TO NODE    731.10 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.) =   7.84
 RAINFALL INTENSITY(INCH/HR) =   3.86
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.08

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        74.87    12.79         3.143         27.50
     2         1.08     7.84         3.861          0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
     1        62.03     7.84         3.861
     2        75.75    12.79         3.143

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     75.75   Tc(MIN.) =   12.79
 TOTAL AREA(ACRES) =     27.80
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    731.10 =  2276.36 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    731.10 TO NODE    755.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   485.78  DOWNSTREAM(FEET) =   485.50
 FLOW LENGTH(FEET) =    27.75   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  28.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.07
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     75.75
```

```
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =  12.83
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    755.20 =  2304.11 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    755.20 TO NODE    755.30 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    488.90  DOWNSTREAM(FEET) =    488.80
 CHANNEL LENGTH THRU SUBAREA(FEET) =    24.00   CHANNEL SLOPE =  0.0042
 CHANNEL BASE(FEET) =   48.00   "Z" FACTOR =   2.500
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.50
 CHANNEL FLOW THRU SUBAREA(CFS) =     75.75
 FLOW VELOCITY(FEET/SEC.) =   2.34   FLOW DEPTH(FEET) =   0.65
 TRAVEL TIME(MIN.) =   0.17   Tc(MIN.) =  13.00
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    755.30 =  2328.11 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    755.30 TO NODE    755.30 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.) =  13.00
 RAINFALL INTENSITY(INCH/HR) =   3.12
 TOTAL STREAM AREA(ACRES) =    27.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     75.75

****************************************************************************
 FLOW PROCESS FROM NODE    755.40 TO NODE    755.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    510.50
 DOWNSTREAM ELEVATION(FEET) =    508.50
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    755.50 TO NODE    755.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.50  DOWNSTREAM(FEET) =   503.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   2.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.96
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.76
 PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   7.01
 LONGEST FLOWPATH FROM NODE    755.40 TO NODE    755.60 =   340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    755.60 TO NODE    755.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.018
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    2.90   SUBAREA RUNOFF(CFS) =   10.49
 TOTAL AREA(ACRES) =      3.10   TOTAL RUNOFF(CFS) =   11.24
 TC(MIN.) =   7.01

****************************************************************************
 FLOW PROCESS FROM NODE    755.60 TO NODE    755.70 IS CODE =  41
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   486.30
FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.72
GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     11.24
PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   7.11
LONGEST FLOWPATH FROM NODE    755.40 TO NODE    755.70 =   373.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    755.70 TO NODE    755.70 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.000
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    1.08
TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =   12.32
TC(MIN.) =   7.11

****************************************************************************
FLOW PROCESS FROM NODE    755.70 TO NODE    755.30 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    486.30  DOWNSTREAM(FEET) =    485.30
CHANNEL LENGTH THRU SUBAREA(FEET) =   220.00   CHANNEL SLOPE =  0.0045
CHANNEL BASE(FEET) =   45.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.444
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     12.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.25
AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   2.95
Tc(MIN.) =  10.05
SUBAREA AREA(ACRES) =     0.60       SUBAREA RUNOFF(CFS) =    0.93
TOTAL AREA(ACRES) =      4.00        PEAK FLOW RATE(CFS) =      13.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   1.25
LONGEST FLOWPATH FROM NODE    755.40 TO NODE    755.30 =   593.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    755.30 TO NODE    755.30 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.) =  10.05
RAINFALL INTENSITY(INCH/HR) =   3.44
TOTAL STREAM AREA(ACRES) =     4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.25

** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY       AREA
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1        75.75     13.00        3.120         27.80
    2        13.25     10.05        3.444          4.00

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF       Tc       INTENSITY
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1        81.87     10.05        3.444
    2        87.76     13.00        3.120
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    87.76   Tc(MIN.) =   13.00
 TOTAL AREA(ACRES) =     31.80
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE    755.30 =  2328.11 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    755.30 TO NODE   7225.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   483.47  DOWNSTREAM(FEET) =   482.24
 FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  19.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.65
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     87.76
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =  13.06
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE   7225.00 =  2381.11 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7225.00 TO NODE   7225.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    725.10 TO NODE    725.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    548.38
 DOWNSTREAM ELEVATION(FEET) =    546.38
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    725.20 TO NODE    725.30 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  546.38  DOWNSTREAM ELEVATION(FEET) =  538.00
 STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 16.00

 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 =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.18
   HALFSTREET FLOOD WIDTH(FEET) =    2.73
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =   7.97
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.836
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.04
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.41
```

```
 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.26
 FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
 LONGEST FLOWPATH FROM NODE    725.10 TO NODE    725.30 =   375.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    725.30 TO NODE    725.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   531.04  DOWNSTREAM(FEET) =   530.53
 FLOW LENGTH(FEET) =    25.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.41
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   8.05
 LONGEST FLOWPATH FROM NODE    725.10 TO NODE    725.40 =   400.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    725.40 TO NODE    725.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   530.20  DOWNSTREAM(FEET) =   523.07
 FLOW LENGTH(FEET) =    76.11   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.82
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.41
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   8.20
 LONGEST FLOWPATH FROM NODE    725.10 TO NODE    725.70 =   476.36 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    725.70 TO NODE    725.70 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    735.10 TO NODE    735.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    551.73
 DOWNSTREAM ELEVATION(FEET) =    548.38
 ELEVATION DIFFERENCE(FEET) =      3.35
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.406
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    735.20 TO NODE    726.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  548.38  DOWNSTREAM ELEVATION(FEET) =  532.40
 STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.46
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
 STREET FLOW TRAVEL TIME(MIN.) =   5.52   Tc(MIN.) =  11.52
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.283
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =     2.36
 TOTAL AREA(ACRES) =       0.90        PEAK FLOW RATE(CFS) =       2.74

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.60
 FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   0.84
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    726.40 =   870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    726.40 TO NODE    726.40 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.) =  11.52
 RAINFALL INTENSITY(INCH/HR) =   3.28
 TOTAL STREAM AREA(ACRES) =     0.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.74

****************************************************************************
 FLOW PROCESS FROM NODE    726.10 TO NODE    726.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    550.12
 DOWNSTREAM ELEVATION(FEET) =    544.82
 ELEVATION DIFFERENCE(FEET) =      5.30
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.065
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    726.20 TO NODE    726.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  544.82  DOWNSTREAM ELEVATION(FEET) =  532.40
 STREET LENGTH(FEET) =   504.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.16
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    3.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   4.02   Tc(MIN.) =  10.02
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.448
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     1.55
 TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       1.93

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.53
 FLOW VELOCITY(FEET/SEC.) =  2.27   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    726.10 TO NODE    726.40 =   604.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    726.40 TO NODE    726.40 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.) =  10.02
 RAINFALL INTENSITY(INCH/HR) =   3.45
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.93

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         2.74     11.52         3.283          0.90
     2         1.93     10.02         3.448          0.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         4.54     10.02         3.448
     2         4.58     11.52         3.283

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      4.58   Tc(MIN.) =   11.52
 TOTAL AREA(ACRES) =      1.50
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    726.40 =   870.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    726.40 TO NODE    726.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   530.00  DOWNSTREAM(FEET) =   529.50
 FLOW LENGTH(FEET) =    27.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.91
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.58
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =  11.58
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    726.50 =   897.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    726.50 TO NODE    726.50 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.) =  11.58
 RAINFALL INTENSITY(INCH/HR) =   3.28
 TOTAL STREAM AREA(ACRES) =     1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.58

****************************************************************************
 FLOW PROCESS FROM NODE    726.70 TO NODE    726.80 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
 UPSTREAM ELEVATION(FEET) =  536.26
 DOWNSTREAM ELEVATION(FEET) =  534.26
 ELEVATION DIFFERENCE(FEET) =  2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =  0.38
 TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.38

****************************************************************************
 FLOW PROCESS FROM NODE  726.80 TO NODE  726.60 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  532.40
 STREET LENGTH(FEET) =  260.00  CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =  0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =  0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  0.70
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =  6.50
   AVERAGE FLOW VELOCITY(FEET/SEC.) =  1.30
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =  0.33
 STREET FLOW TRAVEL TIME(MIN.) =  3.34  Tc(MIN.) =  9.34
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.576
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =  0.20  SUBAREA RUNOFF(CFS) =  0.64
 TOTAL AREA(ACRES) =  0.30  PEAK FLOW RATE(CFS) =  1.02

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28  HALFSTREET FLOOD WIDTH(FEET) =  7.82
 FLOW VELOCITY(FEET/SEC.) =  1.40  DEPTH*VELOCITY(FT*FT/SEC.) =  0.40
 LONGEST FLOWPATH FROM NODE  726.70 TO NODE  726.60 =  360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  726.60 TO NODE  726.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  530.00  DOWNSTREAM(FEET) =  529.90
 FLOW LENGTH(FEET) =  5.25  MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  3.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  4.58
 GIVEN PIPE DIAMETER(INCH) =  18.00  NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  1.02
 PIPE TRAVEL TIME(MIN.) =  0.02  Tc(MIN.) =  9.36
 LONGEST FLOWPATH FROM NODE  726.70 TO NODE  726.50 =  365.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  726.50 TO NODE  726.50 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.) =  9.36
 RAINFALL INTENSITY(INCH/HR) =  3.57
 TOTAL STREAM AREA(ACRES) =  0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =  1.02
```

```
 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1          4.58     11.58         3.276          1.50
    2          1.02      9.36         3.572          0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1          5.22      9.36         3.572
    2          5.52     11.58         3.276

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.52   Tc(MIN.) =   11.58
 TOTAL AREA(ACRES) =      1.80
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    726.50 =   897.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    726.50 TO NODE    725.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   529.40  DOWNSTREAM(FEET) =   528.70
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.52
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =  12.16
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    725.80 =  1047.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    725.90 TO NODE    725.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.213
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     2.70   SUBAREA RUNOFF(CFS) =     7.81
 TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =   13.33
 TC(MIN.) =  12.16

****************************************************************************
 FLOW PROCESS FROM NODE    725.80 TO NODE    725.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   528.70  DOWNSTREAM(FEET) =   524.33
 FLOW LENGTH(FEET) =   234.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.33
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =  12.59
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    725.70 =  1281.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    725.70 TO NODE    725.70 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         13.33     12.59         3.166          4.50
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    725.70 =  1281.30 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
```

```
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         1.41     8.20        3.793         0.40
LONGEST FLOWPATH FROM NODE    725.10 TO NODE    725.70 =   476.36 FEET.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF        Tc       INTENSITY
NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
    1       12.54        8.20        3.793
    2       14.51       12.59        3.166

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     14.51   Tc(MIN.) =   12.59
TOTAL AREA(ACRES) =      4.90

****************************************************************************
FLOW PROCESS FROM NODE    725.70 TO NODE    725.70 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE    725.70 TO NODE    725.70 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.) =  12.59
RAINFALL INTENSITY(INCH/HR) =   3.17
TOTAL STREAM AREA(ACRES) =     4.90
PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.51

****************************************************************************
FLOW PROCESS FROM NODE    735.30 TO NODE    735.40 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    549.60
DOWNSTREAM ELEVATION(FEET) =    547.00
ELEVATION DIFFERENCE(FEET) =      2.60
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.618
*CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
 DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
SUBAREA RUNOFF(CFS) =      0.76
TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
FLOW PROCESS FROM NODE    735.40 TO NODE    726.30 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   547.00  DOWNSTREAM(FEET) =   541.20
FLOW LENGTH(FEET) =   322.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS   2.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   3.95
GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      0.76
PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =   7.36
LONGEST FLOWPATH FROM NODE    735.30 TO NODE    726.30 =   422.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    726.30 TO NODE    726.30 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.952
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    4.98
TOTAL AREA(ACRES) =      1.60   TOTAL RUNOFF(CFS) =    5.74
```

TC(MIN.) = 7.36

```
****************************************************************************
 FLOW PROCESS FROM NODE    726.30 TO NODE    735.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   533.33  DOWNSTREAM(FEET) =   527.33
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.16
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.74
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   7.44
 LONGEST FLOWPATH FROM NODE    735.30 TO NODE    735.50 =   482.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    735.50 TO NODE    725.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   527.33  DOWNSTREAM(FEET) =   524.33
 FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.74
 PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   8.30
 LONGEST FLOWPATH FROM NODE    735.30 TO NODE    725.70 =   782.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    725.70 TO NODE    725.70 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.) =   8.30
 RAINFALL INTENSITY(INCH/HR) =   3.77
 TOTAL STREAM AREA(ACRES) =     1.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.74

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1        14.51     12.59         3.166          4.90
    2         5.74      8.30         3.773          1.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1        17.91      8.30         3.773
    2        19.32     12.59         3.166

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     19.32   Tc(MIN.) =   12.59
 TOTAL AREA(ACRES) =      6.50
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    725.70 =  1281.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    725.70 TO NODE    730.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   524.30  DOWNSTREAM(FEET) =   503.60
 FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.66
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     19.32
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =  13.04
```

```
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    730.40 =  1681.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.40 TO NODE    730.40 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.) =  13.04
 RAINFALL INTENSITY(INCH/HR) =   3.12
 TOTAL STREAM AREA(ACRES) =     6.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.32

****************************************************************************
 FLOW PROCESS FROM NODE    730.10 TO NODE    730.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    533.26
 ELEVATION DIFFERENCE(FEET) =      3.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    730.20 TO NODE    730.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  533.26  DOWNSTREAM ELEVATION(FEET) =  515.37
 STREET LENGTH(FEET) =   307.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.91
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.22
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
 STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =   7.59
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.908
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.06
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =      1.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.43
 FLOW VELOCITY(FEET/SEC.) =  3.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.82
 LONGEST FLOWPATH FROM NODE    730.10 TO NODE    730.30 =   407.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.30 TO NODE    730.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   506.55  DOWNSTREAM(FEET) =   506.40
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.13
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.43
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   7.75
 LONGEST FLOWPATH FROM NODE    730.10 TO NODE    730.40 =   437.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.40 TO NODE    730.40 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.) =   7.75
 RAINFALL INTENSITY(INCH/HR) =   3.88
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.43

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        19.32     13.04         3.116          6.50
     2         1.43      7.75         3.878          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        16.96      7.75         3.878
     2        20.47     13.04         3.116

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     20.47   Tc(MIN.) =   13.04
 TOTAL AREA(ACRES) =      6.90
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    730.40 =  1681.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.40 TO NODE    730.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   503.60  DOWNSTREAM(FEET) =   501.50
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.14
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.47
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  13.14
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    730.50 =  1751.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    730.50 TO NODE    743.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   501.40  DOWNSTREAM(FEET) =   491.20
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.14
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     20.47
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =  13.60
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    743.00 =  2091.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    743.00 TO NODE    743.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     733.00 TO NODE     734.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
 UPSTREAM ELEVATION(FEET) =  515.37
 DOWNSTREAM ELEVATION(FEET) =  513.00
 ELEVATION DIFFERENCE(FEET) =  2.37
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.700
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =  0.38
 TOTAL AREA(ACRES) =  0.10   TOTAL RUNOFF(CFS) =  0.38

****************************************************************************
 FLOW PROCESS FROM NODE     734.00 TO NODE     735.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  513.00  DOWNSTREAM ELEVATION(FEET) =  500.03
 STREET LENGTH(FEET) =  314.78   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =  0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =  0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  1.07
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =  5.08
   AVERAGE FLOW VELOCITY(FEET/SEC.) =  2.86
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =  0.65
 STREET FLOW TRAVEL TIME(MIN.) =  1.84   Tc(MIN.) =  7.84
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.861
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =  0.40   SUBAREA RUNOFF(CFS) =  1.39
 TOTAL AREA(ACRES) =  0.50   PEAK FLOW RATE(CFS) =  1.77

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =  6.70
 FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =  0.81
 LONGEST FLOWPATH FROM NODE     733.00 TO NODE     735.00 =  414.78 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     735.00 TO NODE     735.00 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.) =  7.84
 RAINFALL INTENSITY(INCH/HR) =  3.86
 TOTAL STREAM AREA(ACRES) =  0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =  1.77

****************************************************************************
 FLOW PROCESS FROM NODE     737.00 TO NODE     738.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
 UPSTREAM ELEVATION(FEET) =  517.30
```

```
 DOWNSTREAM ELEVATION(FEET) =     516.30
 ELEVATION DIFFERENCE(FEET) =       1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     3.600
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       1.52
 TOTAL AREA(ACRES) =       0.40   TOTAL RUNOFF(CFS) =       1.52

****************************************************************************
 FLOW PROCESS FROM NODE     738.00 TO NODE     736.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   516.30  DOWNSTREAM(FEET) =   506.00
 FLOW LENGTH(FEET) =   675.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.52
 PIPE TRAVEL TIME(MIN.) =   2.46    Tc(MIN.) =   8.46
 LONGEST FLOWPATH FROM NODE     737.00 TO NODE     736.00 =   775.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     736.00 TO NODE     736.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.743
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     6.00   SUBAREA RUNOFF(CFS) =   20.21
 TOTAL AREA(ACRES) =       6.40   TOTAL RUNOFF(CFS) =   21.73
 TC(MIN.) =   8.46

****************************************************************************
 FLOW PROCESS FROM NODE     736.00 TO NODE     735.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   494.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.74
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.73
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   8.48
 LONGEST FLOWPATH FROM NODE     737.00 TO NODE     735.00 =   805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     735.00 TO NODE     735.00 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.) =   8.48
 RAINFALL INTENSITY(INCH/HR) =   3.74
 TOTAL STREAM AREA(ACRES) =      6.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.73

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         1.77      7.84         3.861          0.50
     2        21.73      8.48         3.739          6.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
     1        22.81      7.84         3.861
     2        23.44      8.48         3.739
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     23.44   Tc(MIN.) =    8.48
 TOTAL AREA(ACRES) =      6.90
 LONGEST FLOWPATH FROM NODE    737.00 TO NODE    735.00 =   805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    735.00 TO NODE    743.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =  492.63
 FLOW LENGTH(FEET) =    27.75   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.26
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     23.44
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   8.51
 LONGEST FLOWPATH FROM NODE    737.00 TO NODE    743.00 =   832.75 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    743.00 TO NODE    743.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        23.44      8.51        3.732         6.90
 LONGEST FLOWPATH FROM NODE    737.00 TO NODE    743.00 =   832.75 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        20.47     13.60        3.054         6.90
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    743.00 =  2091.30 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1        40.19       8.51        3.732
    2        39.65      13.60        3.054

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     40.19   Tc(MIN.) =    8.51
 TOTAL AREA(ACRES) =     13.80

****************************************************************************
 FLOW PROCESS FROM NODE    743.00 TO NODE    743.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    743.00 TO NODE    742.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.30  DOWNSTREAM(FEET) =   492.03
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.34
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     40.19
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.52
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    742.00 =  2096.55 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    742.00 TO NODE    742.00 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.) =    8.52
 RAINFALL INTENSITY(INCH/HR) =    3.73
 TOTAL STREAM AREA(ACRES) =    13.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.19

****************************************************************************
 FLOW PROCESS FROM NODE     740.00 TO NODE     741.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    512.78
 DOWNSTREAM ELEVATION(FEET) =    508.00
 ELEVATION DIFFERENCE(FEET) =      4.78
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.137
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     741.00 TO NODE     742.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  508.00  DOWNSTREAM ELEVATION(FEET) =  500.03
 STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.74
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    2.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
 STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =   6.77
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.064
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.73
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =      1.11

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   3.47
 FLOW VELOCITY(FEET/SEC.) =  3.69   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
 LONGEST FLOWPATH FROM NODE    740.00 TO NODE    742.00 =   300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     742.00 TO NODE     742.00 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.) =   6.77
 RAINFALL INTENSITY(INCH/HR) =   4.06
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.11

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
```

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)	(ACRE)
1	40.19	8.52	3.732	13.80
2	1.11	6.77	4.064	0.30

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	38.01	6.77	4.064
2	41.21	8.52	3.732

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 41.21 Tc(MIN.) = 8.52
TOTAL AREA(ACRES) = 14.10
LONGEST FLOWPATH FROM NODE 735.10 TO NODE 742.00 = 2096.55 FEET.

****
FLOW PROCESS FROM NODE 742.00 TO NODE 742.20 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 491.70 DOWNSTREAM(FEET) = 491.00
FLOW LENGTH(FEET) = 35.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.12
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.21
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 8.56
LONGEST FLOWPATH FROM NODE 735.10 TO NODE 742.20 = 2131.55 FEET.

****
FLOW PROCESS FROM NODE 742.20 TO NODE 742.30 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 491.00 DOWNSTREAM(FEET) = 490.50
CHANNEL LENGTH THRU SUBAREA(FEET) = 115.00 CHANNEL SLOPE = 0.0043
CHANNEL BASE(FEET) = 60.00 "Z" FACTOR = 2.500
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.50
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.513
*USER SPECIFIED(SUBAREA):
INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.74
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.10
Tc(MIN.) = 9.67
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.95
TOTAL AREA(ACRES) = 14.40 PEAK FLOW RATE(CFS) = 42.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.40 FLOW VELOCITY(FEET/SEC.) = 1.73
LONGEST FLOWPATH FROM NODE 735.10 TO NODE 742.30 = 2246.55 FEET.

****
FLOW PROCESS FROM NODE 742.30 TO NODE 742.40 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 490.50 DOWNSTREAM(FEET) = 489.00
FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.42
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.16
PIPE TRAVEL TIME(MIN.) = 0.06 Tc(MIN.) = 9.72
LONGEST FLOWPATH FROM NODE 735.10 TO NODE 742.40 = 2291.55 FEET.

****
FLOW PROCESS FROM NODE 742.40 TO NODE 742.40 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.) =    9.72
 RAINFALL INTENSITY(INCH/HR) =    3.50
 TOTAL STREAM AREA(ACRES) =    14.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     42.16

****************************************************************************
 FLOW PROCESS FROM NODE    7216.00 TO NODE    7217.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7400
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.34
 DOWNSTREAM ELEVATION(FEET) =    503.19
 ELEVATION DIFFERENCE(FEET) =      0.15
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.844
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.050
 SUBAREA RUNOFF(CFS) =      0.60
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
 FLOW PROCESS FROM NODE    7217.00 TO NODE    7219.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
 UPSTREAM ELEVATION(FEET) =  503.19  DOWNSTREAM ELEVATION(FEET) =  501.53
 STREET LENGTH(FEET) =   318.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 51.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.19
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.23
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
 STREET FLOW TRAVEL TIME(MIN.) =   4.32   Tc(MIN.) =  11.16
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.322
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7400
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.74
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.45
 FLOW VELOCITY(FEET/SEC.) =  1.32   DEPTH*VELOCITY(FT*FT/SEC.) =   0.42
 LONGEST FLOWPATH FROM NODE   7216.00 TO NODE   7219.00 =   368.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    7219.00 TO NODE     742.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.26  DOWNSTREAM(FEET) =   490.85
 FLOW LENGTH(FEET) =   256.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.34
```

```
 PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =  12.14
 LONGEST FLOWPATH FROM NODE   7216.00 TO NODE    742.40 =   624.59 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    742.40 TO NODE    742.40 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.) =  12.14
 RAINFALL INTENSITY(INCH/HR) =   3.21
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.34

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        42.16      9.72        3.503         14.40
    2         1.34     12.14        3.214          0.50

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
    1        43.38      9.72        3.503
    2        40.02     12.14        3.214

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     43.38   Tc(MIN.) =    9.72
 TOTAL AREA(ACRES) =     14.90
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE    742.40 =  2291.55 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    742.40 TO NODE   7222.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.35  DOWNSTREAM(FEET) =   487.00
 FLOW LENGTH(FEET) =   225.36   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  21.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.82
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     43.38
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =  10.11
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE   7222.00 =  2516.91 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7222.00 TO NODE   7222.00 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.) =  10.11
 RAINFALL INTENSITY(INCH/HR) =   3.44
 TOTAL STREAM AREA(ACRES) =    14.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.38

****************************************************************************
 FLOW PROCESS FROM NODE   7220.00 TO NODE   7221.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8300
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    501.65
 DOWNSTREAM ELEVATION(FEET) =    500.70
 ELEVATION DIFFERENCE(FEET) =      0.95
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.890
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
```

```
 SUBAREA RUNOFF(CFS) =      0.35
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
 FLOW PROCESS FROM NODE    7221.00 TO NODE    7222.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  500.70  DOWNSTREAM ELEVATION(FEET) =  495.20
 STREET LENGTH(FEET) =   318.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 51.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.44
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.47
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
 STREET FLOW TRAVEL TIME(MIN.) =   2.50   Tc(MIN.) =   8.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.736
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8300
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.70      SUBAREA RUNOFF(CFS) =     2.17
 TOTAL AREA(ACRES) =      0.80        PEAK FLOW RATE(CFS) =       2.52

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.63
 FLOW VELOCITY(FEET/SEC.) =  2.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
 LONGEST FLOWPATH FROM NODE   7220.00 TO NODE   7222.00 =   393.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    7222.00 TO NODE    7222.00 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.) =   8.50
 RAINFALL INTENSITY(INCH/HR) =   3.74
 TOTAL STREAM AREA(ACRES) =     0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.52

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc      INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        43.38    10.11        3.438         14.90
     2         2.52     8.50        3.736          0.80

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc      INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1        42.45     8.50        3.736
     2        45.70    10.11        3.438

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     45.70   Tc(MIN.) =   10.11
 TOTAL AREA(ACRES) =     15.70
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE   7222.00 =  2516.91 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    7222.00 TO NODE    7225.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   486.87  DOWNSTREAM(FEET) =   484.24
 FLOW LENGTH(FEET) =   141.86   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  18.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.39
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     45.70
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =  10.30
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE   7225.00 =  2658.77 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7225.00 TO NODE   7225.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        45.70     10.30        3.417        15.70
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE   7225.00 =  2658.77 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        87.76     13.06        3.114        31.80
 LONGEST FLOWPATH FROM NODE    714.00 TO NODE   7225.00 =  2381.11 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF        Tc       INTENSITY
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
    1      125.66       10.30        3.417
    2      129.40       13.06        3.114

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    129.40   Tc(MIN.) =   13.06
 TOTAL AREA(ACRES) =     47.50

****************************************************************************
 FLOW PROCESS FROM NODE   7225.00 TO NODE   7225.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   7225.00 TO NODE   7225.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   7101.00 TO NODE   7102.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    546.89
 DOWNSTREAM ELEVATION(FEET) =    545.58
 ELEVATION DIFFERENCE(FEET) =      1.31
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.444
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE   7102.00 TO NODE   7114.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  545.58  DOWNSTREAM ELEVATION(FEET) =  515.65
 STREET LENGTH(FEET) =   700.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 25.00
```

```
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
 STREET FLOW TRAVEL TIME(MIN.) =   3.71   Tc(MIN.) =   9.71
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.506
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =    2.52
 TOTAL AREA(ACRES) =      0.90       PEAK FLOW RATE(CFS) =       2.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.40
 FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
 LONGEST FLOWPATH FROM NODE   7101.00 TO NODE   7114.00 =   770.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7114.00 TO NODE   7114.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   7107.00 TO NODE   7108.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    549.05
 DOWNSTREAM ELEVATION(FEET) =    548.45
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.789
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE   7108.00 TO NODE   7109.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    548.45  DOWNSTREAM(FEET) =    535.85
 CHANNEL LENGTH THRU SUBAREA(FEET) =   557.00   CHANNEL SLOPE =  0.0226
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.631
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      5.19
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.04
 AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   3.05
 Tc(MIN.) =   9.05
 SUBAREA AREA(ACRES) =     2.70      SUBAREA RUNOFF(CFS) =    8.82
 TOTAL AREA(ACRES) =      2.90       PEAK FLOW RATE(CFS) =       9.58

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   3.64
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7109.00 =   617.00 FEET.
```

```
**************************************************************************
 FLOW PROCESS FROM NODE   7109.00 TO NODE   7110.00 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   527.85  DOWNSTREAM(FEET) =   524.33
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.25
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.58
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.07
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7110.00 =   640.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE   7110.00 TO NODE   7111.00 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   527.52  DOWNSTREAM(FEET) =   524.33
 FLOW LENGTH(FEET) =    59.09   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.48
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.58
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   9.15
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7111.00 =   699.09 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE   7111.00 TO NODE   7118.00 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   524.00  DOWNSTREAM(FEET) =   509.26
 FLOW LENGTH(FEET) =   313.53   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.86
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.58
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   9.59
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7118.00 =  1012.62 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE   7118.00 TO NODE   7118.00 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.) =   9.59
 RAINFALL INTENSITY(INCH/HR) =   3.53
 TOTAL STREAM AREA(ACRES) =     2.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.58

**************************************************************************
 FLOW PROCESS FROM NODE   7115.00 TO NODE   7116.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    546.89
 DOWNSTREAM ELEVATION(FEET) =    545.58
 ELEVATION DIFFERENCE(FEET) =      1.31
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.444
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

**************************************************************************
 FLOW PROCESS FROM NODE   7116.00 TO NODE   7117.00 IS CODE =  61
--------------------------------------------------------------------------
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  545.58  DOWNSTREAM ELEVATION(FEET) =  515.91
 STREET LENGTH(FEET) =   697.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 25.00

 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
 STREET FLOW TRAVEL TIME(MIN.) =   3.69   Tc(MIN.) =   9.69
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.509
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =    2.53
 TOTAL AREA(ACRES) =       0.90        PEAK FLOW RATE(CFS) =       2.91

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.40
 FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
 LONGEST FLOWPATH FROM NODE   7115.00 TO NODE   7117.00 =   767.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7117.00 TO NODE   7118.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   509.52  DOWNSTREAM(FEET) =   509.26
 FLOW LENGTH(FEET) =    11.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.62
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.91
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   9.72
 LONGEST FLOWPATH FROM NODE   7115.00 TO NODE   7118.00 =   778.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7118.00 TO NODE   7118.00 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.) =   9.72
 RAINFALL INTENSITY(INCH/HR) =   3.50
 TOTAL STREAM AREA(ACRES) =     0.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.91

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         9.58      9.59        3.528          2.90
     2         2.91      9.72        3.504          0.90

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        12.47      9.59        3.528
     2        12.42      9.72        3.504
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     12.47   Tc(MIN.) =    9.59
 TOTAL AREA(ACRES) =      3.80
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7118.00 =  1012.62 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7118.00 TO NODE   7114.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.93  DOWNSTREAM(FEET) =   508.54
 FLOW LENGTH(FEET) =    39.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.47
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.68
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7114.00 =  1051.87 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7114.00 TO NODE   7114.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        12.47      9.68        3.510         3.80
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7114.00 =  1051.87 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         2.90      9.71        3.506         0.90
 LONGEST FLOWPATH FROM NODE   7101.00 TO NODE   7114.00 =   770.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       15.37       9.68        3.510
     2       15.35       9.71        3.506

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     15.37   Tc(MIN.) =    9.68
 TOTAL AREA(ACRES) =      4.70

****************************************************************************
 FLOW PROCESS FROM NODE   7114.00 TO NODE   7114.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   7114.00 TO NODE   7114.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.20  DOWNSTREAM(FEET) =   507.96
 FLOW LENGTH(FEET) =    24.33   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.40
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.37
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.74
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7114.50 =  1076.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7114.50 TO NODE   7121.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    503.30  DOWNSTREAM(FEET) =    501.80
 CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0050
 CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =   2.500
```

```
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   7.50
 CHANNEL FLOW THRU SUBAREA(CFS) =     15.37
 FLOW VELOCITY(FEET/SEC.) =   1.71   FLOW DEPTH(FEET) =   0.36
 TRAVEL TIME(MIN.) =   2.93   Tc(MIN.) =  12.67
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7121.00 =  1376.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7121.00 TO NODE   7121.00 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.) =  12.67
 RAINFALL INTENSITY(INCH/HR) =   3.16
 TOTAL STREAM AREA(ACRES) =     4.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.37

****************************************************************************
 FLOW PROCESS FROM NODE    756.00 TO NODE    757.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    548.00
 DOWNSTREAM ELEVATION(FEET) =    545.50
 ELEVATION DIFFERENCE(FEET) =      2.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.653
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    757.00 TO NODE   7121.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   545.50  DOWNSTREAM(FEET) =   501.80
 FLOW LENGTH(FEET) =   820.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   2.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.76
 PIPE TRAVEL TIME(MIN.) =   2.37    Tc(MIN.) =   8.37
 LONGEST FLOWPATH FROM NODE    756.00 TO NODE   7121.00 =   920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7121.00 TO NODE   7121.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.760
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     7.30   SUBAREA RUNOFF(CFS) =   24.70
 TOTAL AREA(ACRES) =      7.50   TOTAL RUNOFF(CFS) =   25.46
 TC(MIN.) =   8.37

****************************************************************************
 FLOW PROCESS FROM NODE   7121.00 TO NODE   7121.00 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.) =   8.37
 RAINFALL INTENSITY(INCH/HR) =   3.76
 TOTAL STREAM AREA(ACRES) =     7.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.46

 ** CONFLUENCE DATA **
```

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	15.37	12.67	3.157	4.70
2	25.46	8.37	3.760	7.50

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	38.36	8.37	3.760
2	36.74	12.67	3.157

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 38.36 Tc(MIN.) = 8.37
TOTAL AREA(ACRES) = 12.20
LONGEST FLOWPATH FROM NODE 7107.00 TO NODE 7121.00 = 1376.20 FEET.

****
FLOW PROCESS FROM NODE 7121.00 TO NODE 7122.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 505.77 DOWNSTREAM(FEET) = 505.53
FLOW LENGTH(FEET) = 24.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.06
GIVEN PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.36
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 8.41
LONGEST FLOWPATH FROM NODE 7107.00 TO NODE 7122.00 = 1400.20 FEET.

****
FLOW PROCESS FROM NODE 7122.00 TO NODE 7122.00 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.) = 8.41
RAINFALL INTENSITY(INCH/HR) = 3.75
TOTAL STREAM AREA(ACRES) = 12.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.36

****
FLOW PROCESS FROM NODE 7120.00 TO NODE 7120.50 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH(FEET) = 90.00
UPSTREAM ELEVATION(FEET) = 517.60
DOWNSTREAM ELEVATION(FEET) = 517.30
ELEVATION DIFFERENCE(FEET) = 0.30
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) = 7.388
*CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.946
SUBAREA RUNOFF(CFS) = 0.63
TOTAL AREA(ACRES) = 0.20 TOTAL RUNOFF(CFS) = 0.63

****
FLOW PROCESS FROM NODE 7120.50 TO NODE 7122.00 IS CODE = 61

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
==
UPSTREAM ELEVATION(FEET) = 517.30 DOWNSTREAM ELEVATION(FEET) = 514.17
STREET LENGTH(FEET) = 242.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 51.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 46.00
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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   2.29   Tc(MIN.) =   9.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.511
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.84
  TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       1.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.10
  FLOW VELOCITY(FEET/SEC.) =  1.90   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
  LONGEST FLOWPATH FROM NODE   7120.00 TO NODE   7122.00 =   332.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   7122.00 TO NODE   7122.00 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.) =   9.68
  RAINFALL INTENSITY(INCH/HR) =   3.51
  TOTAL STREAM AREA(ACRES) =     0.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.47

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1        38.36      8.41         3.751          12.20
      2         1.47      9.68         3.511           0.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        39.74      8.41         3.751
      2        37.38      9.68         3.511

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     39.74   Tc(MIN.) =    8.41
  TOTAL AREA(ACRES) =     12.70
  LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7122.00 =  1400.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   7122.00 TO NODE   7123.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   505.20  DOWNSTREAM(FEET) =   485.82
  FLOW LENGTH(FEET) =   647.05   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.31
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     39.74
  PIPE TRAVEL TIME(MIN.) =  0.75    Tc(MIN.) =   9.17
  LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7123.00 =  2047.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   7123.00 TO NODE   7123.00 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.) =   9.17
 RAINFALL INTENSITY(INCH/HR) =   3.61
 TOTAL STREAM AREA(ACRES) =    12.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     39.74

****************************************************************************
 FLOW PROCESS FROM NODE   7124.00 TO NODE   7125.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    517.01
 DOWNSTREAM ELEVATION(FEET) =    516.76
 ELEVATION DIFFERENCE(FEET) =      0.25
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.423
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.403
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
 FLOW PROCESS FROM NODE   7125.00 TO NODE   7126.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    516.00  DOWNSTREAM(FEET) =    498.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   875.00   CHANNEL SLOPE =  0.0206
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.490
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =  0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.44
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.50
 AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   9.75
 Tc(MIN.) =  20.17
 SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.56
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       0.71

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   1.68
 LONGEST FLOWPATH FROM NODE   7124.00 TO NODE   7126.00 =   925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7126.00 TO NODE   7123.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   486.12  DOWNSTREAM(FEET) =   485.82
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.56
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.71
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  20.56
 LONGEST FLOWPATH FROM NODE   7124.00 TO NODE   7123.00 =   985.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7123.00 TO NODE   7123.00 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.) =  20.56
 RAINFALL INTENSITY(INCH/HR) =   2.47
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.71

****************************************************************************
 FLOW PROCESS FROM NODE   7129.00 TO NODE   7130.00 IS CODE =  21
```

```
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
S.C.S. CURVE NUMBER (AMC II) =  0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
UPSTREAM ELEVATION(FEET) =    514.39
DOWNSTREAM ELEVATION(FEET) =    512.80
ELEVATION DIFFERENCE(FEET) =      1.59
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.198
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
SUBAREA RUNOFF(CFS) =      0.34
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
FLOW PROCESS FROM NODE   7130.00 TO NODE   7123.00 IS CODE =  61
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  512.80  DOWNSTREAM ELEVATION(FEET) =  502.81
STREET LENGTH(FEET) =   355.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 51.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.70
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.27
  HALFSTREET FLOOD WIDTH(FEET) =    7.20
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
STREET FLOW TRAVEL TIME(MIN.) =   2.21   Tc(MIN.) =   8.21
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.790
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .8000
S.C.S. CURVE NUMBER (AMC II) =  0
SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    2.73
TOTAL AREA(ACRES) =      1.00        PEAK FLOW RATE(CFS) =      3.07

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.45
FLOW VELOCITY(FEET/SEC.) =  3.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
LONGEST FLOWPATH FROM NODE   7129.00 TO NODE   7123.00 =   444.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE   7123.00 TO NODE   7123.00 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.) =   8.21
RAINFALL INTENSITY(INCH/HR) =   3.79
TOTAL STREAM AREA(ACRES) =     1.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.07

** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY      AREA
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        39.74     9.17         3.608         12.70
    2         0.71    20.56         2.466          0.60
    3         3.07     8.21         3.790          1.00

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

** PEAK FLOW RATE TABLE **
```

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	41.36	8.21	3.790
2	43.15	9.17	3.608
3	29.87	20.56	2.466

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 43.15 Tc(MIN.) = 9.17
TOTAL AREA(ACRES) = 14.30
LONGEST FLOWPATH FROM NODE 7107.00 TO NODE 7123.00 = 2047.25 FEET.

****
FLOW PROCESS FROM NODE 7123.00 TO NODE 7123.00 IS CODE = 10

>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==========

****
FLOW PROCESS FROM NODE 7123.10 TO NODE 7123.20 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 529.70
DOWNSTREAM ELEVATION(FEET) = 527.70
ELEVATION DIFFERENCE(FEET) = 2.00
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.857
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.210
SUBAREA RUNOFF(CFS) = 0.76
TOTAL AREA(ACRES) = 0.20 TOTAL RUNOFF(CFS) = 0.76

****
FLOW PROCESS FROM NODE 7123.20 TO NODE 7123.30 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 527.70 DOWNSTREAM(FEET) = 512.00
FLOW LENGTH(FEET) = 472.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 2.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.89
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.76
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 7.61
LONGEST FLOWPATH FROM NODE 7123.10 TO NODE 7123.30 = 572.00 FEET.

****
FLOW PROCESS FROM NODE 7123.30 TO NODE 7123.30 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.905
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 20.38
TOTAL AREA(ACRES) = 6.00 TOTAL RUNOFF(CFS) = 21.14
TC(MIN.) = 7.61

****
FLOW PROCESS FROM NODE 7123.30 TO NODE 7123.40 IS CODE = 51

>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 490.50 DOWNSTREAM(FEET) = 489.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 150.00 CHANNEL SLOPE = 0.0100
CHANNEL BASE(FEET) = 30.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.030 MAXIMUM DEPTH(FEET) = 5.00
CHANNEL FLOW THRU SUBAREA(CFS) = 21.14
FLOW VELOCITY(FEET/SEC.) = 2.22 FLOW DEPTH(FEET) = 0.31
TRAVEL TIME(MIN.) = 1.13 Tc(MIN.) = 8.73
LONGEST FLOWPATH FROM NODE 7123.10 TO NODE 7123.40 = 722.00 FEET.

```
 FLOW PROCESS FROM NODE    7123.40 TO NODE    7123.40 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.) =    8.73
 RAINFALL INTENSITY(INCH/HR) =    3.69
 TOTAL STREAM AREA(ACRES) =      6.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.14

**********************************************************************
 FLOW PROCESS FROM NODE     731.20 TO NODE     731.30 IS CODE =  21
----------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    100.00
 UPSTREAM ELEVATION(FEET) =     514.00
 DOWNSTREAM ELEVATION(FEET) =     503.50
 ELEVATION DIFFERENCE(FEET) =      10.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     1.644
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       0.38
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.38

**********************************************************************
 FLOW PROCESS FROM NODE     731.30 TO NODE     752.00 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
======================================================================
 UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  495.86
 STREET LENGTH(FEET) =   235.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.91
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.03
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.44
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
 STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   7.60
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.906
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     1.05
 TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       1.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.50
 FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
 LONGEST FLOWPATH FROM NODE     731.20 TO NODE     752.00 =   335.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE     752.00 TO NODE     752.20 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.17  DOWNSTREAM(FEET) =   489.00
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  24.0 INCH PIPE IS    5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.04
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.43
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   7.79
 LONGEST FLOWPATH FROM NODE    731.20 TO NODE    752.20 =   370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    752.20 TO NODE   7123.40 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    489.00  DOWNSTREAM(FEET) =    488.90
 CHANNEL LENGTH THRU SUBAREA(FEET) =    10.00   CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =   30.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
 CHANNEL FLOW THRU SUBAREA(CFS) =      1.43
 FLOW VELOCITY(FEET/SEC.) =   0.74   FLOW DEPTH(FEET) =   0.06
 TRAVEL TIME(MIN.) =   0.22   Tc(MIN.) =   8.02
 LONGEST FLOWPATH FROM NODE    731.20 TO NODE   7123.40 =   380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7123.40 TO NODE   7123.40 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.) =   8.02
 RAINFALL INTENSITY(INCH/HR) =   3.83
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.43

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        21.14      8.73         3.690          6.00
     2         1.43      8.02         3.827          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        21.82      8.02         3.827
     2        22.52      8.73         3.690

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     22.52   Tc(MIN.) =    8.73
 TOTAL AREA(ACRES) =      6.40
 LONGEST FLOWPATH FROM NODE   7123.10 TO NODE   7123.40 =   722.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7123.40 TO NODE   7123.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.00  DOWNSTREAM(FEET) =   485.49
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.53
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.52
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   8.77
 LONGEST FLOWPATH FROM NODE   7123.10 TO NODE   7123.00 =   762.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7123.00 TO NODE   7123.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
```

```
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        22.52     8.77        3.684         6.40
 LONGEST FLOWPATH FROM NODE   7123.10 TO NODE   7123.00 =   762.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        43.15     9.17        3.608        14.30
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7123.00 =  2047.25 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       64.78       8.77        3.684
    2       65.21       9.17        3.608

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     65.21   Tc(MIN.) =    9.17
 TOTAL AREA(ACRES) =     20.70

****************************************************************************
 FLOW PROCESS FROM NODE   7123.00 TO NODE   7123.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   7123.00 TO NODE   7225.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   485.49  DOWNSTREAM(FEET) =   483.74
 FLOW LENGTH(FEET) =    89.31   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.83
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     65.21
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   9.28
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7225.00 =  2136.56 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   7225.00 TO NODE   7225.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        65.21     9.28        3.588        20.70
 LONGEST FLOWPATH FROM NODE   7107.00 TO NODE   7225.00 =  2136.56 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1       129.40     13.06       3.114        47.50
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE   7225.00 =  2658.77 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1      177.51       9.28        3.588
    2      185.99      13.06        3.114

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    185.99   Tc(MIN.) =   13.06
 TOTAL AREA(ACRES) =     68.20

****************************************************************************
 FLOW PROCESS FROM NODE   7225.00 TO NODE   7225.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   7225.00 TO NODE   7230.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   482.22  DOWNSTREAM(FEET) =   481.75
 FLOW LENGTH(FEET) =   106.78   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.47
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    185.99
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =  13.25
 LONGEST FLOWPATH FROM NODE    735.10 TO NODE   7230.00 =  2765.55 FEET.
================================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =     68.20  TC(MIN.) =     13.25
 PEAK FLOW RATE(CFS)   =    185.99
================================================================================
================================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Basin 900

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                          Rick Engineering Company
                        1223 University Ave., Suite 240
                          Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Town Center Improvements                *
* Basin 900 - 100 Year Storm Event - Construction Change "F"             *
* Revisions to Del Sur Ridge Road and 'AR' Street                        *
 **************************************************************************

  FILE NAME: BMR9HP00.DAT
  TIME/DATE OF STUDY: 09:50 07/01/2014
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     900.00 TO NODE     901.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  553.99
  DOWNSTREAM ELEVATION(FEET) =  552.36
  ELEVATION DIFFERENCE(FEET) =  1.63
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  3.059
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =  0.38
  TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.38

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

```
 FLOW PROCESS FROM NODE     901.00 TO NODE     902.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  552.36  DOWNSTREAM ELEVATION(FEET) =  531.33
 STREET LENGTH(FEET) =   550.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.19
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.53
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.81
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
 STREET FLOW TRAVEL TIME(MIN.) =   3.27   Tc(MIN.) =   9.27
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.589
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =    1.62
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       1.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.21
 FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
 LONGEST FLOWPATH FROM NODE     900.00 TO NODE     902.00 =   650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     902.00 TO NODE     903.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   520.36  DOWNSTREAM(FEET) =   517.63
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.99
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.31
 LONGEST FLOWPATH FROM NODE     900.00 TO NODE     903.00 =   677.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     903.00 TO NODE     903.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     902.20 TO NODE     902.30 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    544.00
 DOWNSTREAM ELEVATION(FEET) =    539.86
 ELEVATION DIFFERENCE(FEET) =      4.14
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.242
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     902.30 TO NODE     902.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  539.86  DOWNSTREAM ELEVATION(FEET) =  529.22
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   3.38   Tc(MIN.) =   9.39
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.567
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.96
 TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =        1.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.65
 FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE     902.40 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     902.40 TO NODE     902.40 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.) =   9.39
 RAINFALL INTENSITY(INCH/HR) =   3.57
 TOTAL STREAM AREA(ACRES) =      0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

****************************************************************************
 FLOW PROCESS FROM NODE     901.40 TO NODE     901.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    544.88
 DOWNSTREAM ELEVATION(FEET) =    540.41
 ELEVATION DIFFERENCE(FEET) =      4.47
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.186
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       0.38
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.38

****************************************************************************
 FLOW PROCESS FROM NODE     901.50 TO NODE     902.40 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  540.41  DOWNSTREAM ELEVATION(FEET) =  529.22
 STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
```

```
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.71
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.21
   HALFSTREET FLOOD WIDTH(FEET) =    4.26
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =   8.55
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.725
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.67
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.05

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.48
 FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
 LONGEST FLOWPATH FROM NODE    901.40 TO NODE    902.40 =   465.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.40 TO NODE    902.40 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.) =   8.55
 RAINFALL INTENSITY(INCH/HR) =   3.72
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.05

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         1.34     9.39        3.567         0.40
    2         1.05     8.55        3.725         0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1         2.33     8.55        3.725
    2         2.35     9.39        3.567

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      2.35   Tc(MIN.) =    9.39
 TOTAL AREA(ACRES) =      0.70
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    902.40 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.40 TO NODE    902.40 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.) =   9.39
 RAINFALL INTENSITY(INCH/HR) =   3.57
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.35

****************************************************************************
 FLOW PROCESS FROM NODE    901.10 TO NODE    901.20 IS CODE =  21
----------------------------------------------------------------------------
```

```
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    548.90
  DOWNSTREAM ELEVATION(FEET) =    546.00
  ELEVATION DIFFERENCE(FEET) =      2.90
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.525
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE    901.20 TO NODE    901.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   546.00  DOWNSTREAM(FEET) =   535.00
  FLOW LENGTH(FEET) =   361.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.04
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.52
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   7.00
  LONGEST FLOWPATH FROM NODE    901.10 TO NODE    901.30 =   461.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    901.30 TO NODE    901.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.021
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    2.70   SUBAREA RUNOFF(CFS) =    9.77
  TOTAL AREA(ACRES) =      3.10   TOTAL RUNOFF(CFS) =   11.29
  TC(MIN.) =   7.00

****************************************************************************
  FLOW PROCESS FROM NODE    901.30 TO NODE    902.40 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   523.64  DOWNSTREAM(FEET) =   523.16
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.87
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     11.29
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.04
  LONGEST FLOWPATH FROM NODE    901.10 TO NODE    902.40 =   485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.40 TO NODE    902.40 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.) =   7.04
  RAINFALL INTENSITY(INCH/HR) =   4.01
  TOTAL STREAM AREA(ACRES) =     3.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.29

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1         2.35      9.39         3.567         0.70
      2        11.29      7.04         4.012         3.10
```

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        13.37      7.04        4.012
     2        12.38      9.39        3.567

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.37   Tc(MIN.) =     7.04
 TOTAL AREA(ACRES) =       3.80
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    902.40 =    547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.40 TO NODE    902.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   522.83  DOWNSTREAM(FEET) =   522.28
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.12
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.37
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.09
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    902.50 =    574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.50 TO NODE    902.50 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.) =   7.09
 RAINFALL INTENSITY(INCH/HR) =   4.00
 TOTAL STREAM AREA(ACRES) =     3.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.37

****************************************************************************
 FLOW PROCESS FROM NODE    901.60 TO NODE    901.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    535.00
 DOWNSTREAM ELEVATION(FEET) =    531.00
 ELEVATION DIFFERENCE(FEET) =      4.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.268
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    901.70 TO NODE    902.90 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  531.00  DOWNSTREAM ELEVATION(FEET) =  529.17
 STREET LENGTH(FEET) =   114.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.54
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.73
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
 STREET FLOW TRAVEL TIME(MIN.) =   1.10   Tc(MIN.) =   7.10
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.001
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10      SUBAREA RUNOFF(CFS) =     0.36
 TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.74

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.38
 FLOW VELOCITY(FEET/SEC.) =  1.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.42
 LONGEST FLOWPATH FROM NODE    901.60 TO NODE    902.90 =   214.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.90 TO NODE    902.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   522.39  DOWNSTREAM(FEET) =   522.28
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.30
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.74
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   7.12
 LONGEST FLOWPATH FROM NODE    901.60 TO NODE    902.50 =   219.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.50 TO NODE    902.50 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.) =   7.12
 RAINFALL INTENSITY(INCH/HR) =   4.00
 TOTAL STREAM AREA(ACRES) =     0.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.74

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        13.37     7.09        4.003          3.80
     2         0.74     7.12        3.997          0.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1        14.11     7.09        4.003
     2        14.09     7.12        3.997

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     14.11   Tc(MIN.) =    7.09
 TOTAL AREA(ACRES) =      4.00
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    902.50 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.50 TO NODE    902.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   521.78  DOWNSTREAM(FEET) =   519.77
 FLOW LENGTH(FEET) =   201.08   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.30
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.11
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   7.55
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    902.60 =   775.33 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.60 TO NODE    903.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.44  DOWNSTREAM(FEET) =   517.46
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.30
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.11
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   8.00
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    903.00 =   973.33 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.70 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.829
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20   SUBAREA RUNOFF(CFS) =     0.69
 TOTAL AREA(ACRES) =      4.20   TOTAL RUNOFF(CFS) =   14.80
 TC(MIN.) =   8.00

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        14.80      8.00        3.829        4.20
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    903.00 =   973.33 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         1.99      9.31        3.581        0.60
 LONGEST FLOWPATH FROM NODE    900.00 TO NODE    903.00 =   677.25 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       16.66       8.00        3.829
    2       15.83       9.31        3.581

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     16.66   Tc(MIN.) =    8.00
 TOTAL AREA(ACRES) =      4.80

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   517.13  DOWNSTREAM(FEET) =   504.39
 FLOW LENGTH(FEET) =   394.45   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.0 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.83
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.66
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   8.56
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    904.00 =  1367.78 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    904.10 TO NODE    904.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    530.65
 DOWNSTREAM ELEVATION(FEET) =    527.34
 ELEVATION DIFFERENCE(FEET) =      3.31
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.416
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    904.20 TO NODE    904.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  527.34  DOWNSTREAM ELEVATION(FEET) =  511.87
 STREET LENGTH(FEET) =   450.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.04
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.28
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
 STREET FLOW TRAVEL TIME(MIN.) =   2.86   Tc(MIN.) =   8.86
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.667
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.32
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.70

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.85
 FLOW VELOCITY(FEET/SEC.) =  2.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.76
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    904.30 =   550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.30 TO NODE    904.30 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.) =   8.86
```

```
 RAINFALL INTENSITY(INCH/HR) =   3.67
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.70

****************************************************************************
 FLOW PROCESS FROM NODE    904.80 TO NODE    904.90 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    531.86
 DOWNSTREAM ELEVATION(FEET) =    530.20
 ELEVATION DIFFERENCE(FEET) =      1.66
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.040
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =.     0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    904.90 TO NODE    904.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  530.20  DOWNSTREAM ELEVATION(FEET) =  511.87
 STREET LENGTH(FEET) =   425.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.05
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    4.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.89
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.65
 STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =   8.45
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.744
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.35
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.73

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.55
 FLOW VELOCITY(FEET/SEC.) =  3.16   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
 LONGEST FLOWPATH FROM NODE    904.80 TO NODE    904.30 =   525.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.30 TO NODE    904.30 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.) =   8.45
 RAINFALL INTENSITY(INCH/HR) =   3.74
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.73

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1         1.70      8.86         3.667         0.50
     2         1.73      8.45         3.744         0.50
```

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         3.39      8.45        3.744
     2         3.39      8.86        3.667

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.39   Tc(MIN.) =     8.45
 TOTAL AREA(ACRES) =       1.00
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    904.30 =    550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.30 TO NODE    904.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.69  DOWNSTREAM(FEET) =   505.40
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.39
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   8.55
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    904.40 =    580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.40 TO NODE    904.40 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.) =   8.55
 RAINFALL INTENSITY(INCH/HR) =   3.72
 TOTAL STREAM AREA(ACRES) =      1.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.39

****************************************************************************
 FLOW PROCESS FROM NODE    905.60 TO NODE    905.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =     517.91
 DOWNSTREAM ELEVATION(FEET) =    515.40
 ELEVATION DIFFERENCE(FEET) =      2.51
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.649
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       0.38
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.38

****************************************************************************
 FLOW PROCESS FROM NODE    905.70 TO NODE    904.50 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  511.87
 STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.73
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.92
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.04
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
 STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   7.35
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.954
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.71
 TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       1.09

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.14
 FLOW VELOCITY(FEET/SEC.) =  2.20   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
 LONGEST FLOWPATH FROM NODE    905.60 TO NODE    904.50 =   265.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.50 TO NODE    904.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.54  DOWNSTREAM(FEET) =   505.48
 FLOW LENGTH(FEET) =     3.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.72
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.09
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   7.36
 LONGEST FLOWPATH FROM NODE    905.60 TO NODE    904.40 =   268.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.40 TO NODE    904.40 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.) =   7.36
 RAINFALL INTENSITY(INCH/HR) =   3.95
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.09

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1         3.39      8.55         3.725          1.00
     2         1.09      7.36         3.952          0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         4.29      7.36         3.952
     2         4.42      8.55         3.725

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      4.42   Tc(MIN.) =    8.55
 TOTAL AREA(ACRES) =      1.30
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    904.40 =   580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.40 TO NODE    906.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.30  DOWNSTREAM(FEET) =   504.93
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.42
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   8.85
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    906.00 =   655.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 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.) =   8.85
 RAINFALL INTENSITY(INCH/HR) =   3.67
 TOTAL STREAM AREA(ACRES) =     1.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.42

****************************************************************************
 FLOW PROCESS FROM NODE    903.10 TO NODE    903.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    535.20
 DOWNSTREAM ELEVATION(FEET) =    532.20
 ELEVATION DIFFERENCE(FEET) =      3.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    903.20 TO NODE    903.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   532.20  DOWNSTREAM(FEET) =   519.90
 FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.76
 PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   7.45
 LONGEST FLOWPATH FROM NODE    903.10 TO NODE    903.30 =   520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    903.30 TO NODE    903.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.935
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     2.90   SUBAREA RUNOFF(CFS) =   10.27
 TOTAL AREA(ACRES) =      3.10   TOTAL RUNOFF(CFS) =   11.03
 TC(MIN.) =   7.45

****************************************************************************
 FLOW PROCESS FROM NODE    903.30 TO NODE    906.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.85  DOWNSTREAM(FEET) =   504.93
 FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.65
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     11.03
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   7.51
 LONGEST FLOWPATH FROM NODE    903.10 TO NODE    906.00 =   582.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 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.) =   7.51
 RAINFALL INTENSITY(INCH/HR) =   3.92
 TOTAL STREAM AREA(ACRES) =     3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.03

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1          4.42     8.85        3.668         1.30
    2         11.03     7.51        3.923         3.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
    1         15.16     7.51        3.923
    2         14.73     8.85        3.668

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     15.16   Tc(MIN.) =    7.51
 TOTAL AREA(ACRES) =      4.40
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    906.00 =   655.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    906.00 TO NODE    904.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.83  DOWNSTREAM(FEET) =   503.72
 FLOW LENGTH(FEET) =   206.68   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.71
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.16
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   8.12
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    904.00 =   861.68 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         15.16     8.12        3.808         4.40
 LONGEST FLOWPATH FROM NODE    904.10 TO NODE    904.00 =   861.68 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         16.66     8.56        3.724         4.80
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    904.00 =  1367.78 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
    1         31.46     8.12        3.808
    2         31.49     8.56        3.724

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     31.49   Tc(MIN.) =    8.56
```

```
 TOTAL AREA(ACRES) =      9.20

****************************************************************************
 FLOW PROCESS FROM NODE     904.00 TO NODE     904.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     904.00 TO NODE     905.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   503.39  DOWNSTREAM(FEET) =   494.77
 FLOW LENGTH(FEET) =   360.67   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  14.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.33
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     31.49
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   9.05
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    905.00 =  1728.45 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     905.00 TO NODE     905.00 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.) =   9.05
 RAINFALL INTENSITY(INCH/HR) =   3.63
 TOTAL STREAM AREA(ACRES) =     9.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.49

****************************************************************************
 FLOW PROCESS FROM NODE     905.20 TO NODE     905.30 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    531.86
 DOWNSTREAM ELEVATION(FEET) =    530.30
 ELEVATION DIFFERENCE(FEET) =      1.56
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.104
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     905.30 TO NODE     905.10 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  530.30  DOWNSTREAM ELEVATION(FEET) =  500.00
 STREET LENGTH(FEET) =   587.61   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.70
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.19
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.39
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   2.89   Tc(MIN.) =   8.89
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.661
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =     2.64
 TOTAL AREA(ACRES) =       0.90        PEAK FLOW RATE(CFS) =        3.01

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.17
 FLOW VELOCITY(FEET/SEC.) =  3.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
 LONGEST FLOWPATH FROM NODE    905.20 TO NODE    905.10 =   687.61 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    905.10 TO NODE    905.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.14  DOWNSTREAM(FEET) =   494.77
 FLOW LENGTH(FEET) =    36.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.97
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.01
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   9.01
 LONGEST FLOWPATH FROM NODE    905.20 TO NODE    905.00 =   724.11 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 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.) =   9.01
 RAINFALL INTENSITY(INCH/HR) =   3.64
 TOTAL STREAM AREA(ACRES) =     0.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.01

****************************************************************************
 FLOW PROCESS FROM NODE    905.40 TO NODE    905.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    517.91
 DOWNSTREAM ELEVATION(FEET) =    510.64
 ELEVATION DIFFERENCE(FEET) =      7.27
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.858
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    905.50 TO NODE    905.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  510.64  DOWNSTREAM ELEVATION(FEET) =  500.00
 STREET LENGTH(FEET) =   277.61   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
  STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =   7.71
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.885
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.05
  TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.09
  FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE    905.40 TO NODE    905.00 =   377.61 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 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.) =   7.71
  RAINFALL INTENSITY(INCH/HR) =   3.89
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.43

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        31.49      9.05        3.631         9.20
      2         3.01      9.01        3.638         0.90
      3         1.43      7.71        3.885         0.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        33.68      7.71        3.885
      2        35.78      9.01        3.638
      3        35.83      9.05        3.631

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     35.83   Tc(MIN.) =    9.05
  TOTAL AREA(ACRES) =     10.50
  LONGEST FLOWPATH FROM NODE    902.20 TO NODE    905.00 =  1728.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    904.60 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.44  DOWNSTREAM(FEET) =   494.29
  FLOW LENGTH(FEET) =    15.08   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     35.83
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   9.07
  LONGEST FLOWPATH FROM NODE    902.20 TO NODE    904.60 =  1743.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.60 TO NODE    904.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.50  DOWNSTREAM(FEET) =   494.20
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.38
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     35.83
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   9.14
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    904.70 =  1778.53 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.70 TO NODE    904.70 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.) =   9.14
 RAINFALL INTENSITY(INCH/HR) =   3.61
 TOTAL STREAM AREA(ACRES) =    10.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.83

****************************************************************************
 FLOW PROCESS FROM NODE    957.00 TO NODE    958.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 INDUSTRIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
 UPSTREAM ELEVATION(FEET) =    514.00
 DOWNSTREAM ELEVATION(FEET) =    512.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.021
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    958.00 TO NODE    960.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   512.00  DOWNSTREAM(FEET) =   498.00
 FLOW LENGTH(FEET) =   460.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   2.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.76
 PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =   7.67
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    960.00 =   526.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    960.00 TO NODE    960.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.892
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    3.80   SUBAREA RUNOFF(CFS) =   13.31
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =   14.07
 TC(MIN.) =   7.67

****************************************************************************
 FLOW PROCESS FROM NODE    960.00 TO NODE    904.70 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    494.50  DOWNSTREAM(FEET) =    494.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0007
 CHANNEL BASE(FEET) =   35.00   "Z" FACTOR =   3.000
 MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.50
 CHANNEL FLOW THRU SUBAREA(CFS) =     14.07
```

```
 FLOW VELOCITY(FEET/SEC.) =   0.90   FLOW DEPTH(FEET) =   0.43
 TRAVEL TIME(MIN.) =   7.40   Tc(MIN.) =  15.07
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    904.70 =   926.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.70 TO NODE    904.70 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.) =  15.07
 RAINFALL INTENSITY(INCH/HR) =   2.89
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.07

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        35.83     9.14        3.613         10.50
    2        14.07    15.07        2.894          4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
    1        47.10     9.14        3.613
    2        42.77    15.07        2.894

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     47.10   Tc(MIN.) =    9.14
 TOTAL AREA(ACRES) =     14.50
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    904.70 =  1778.53 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    904.70 TO NODE    992.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.20  DOWNSTREAM(FEET) =   492.41
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.02
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     47.10
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   9.28
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    992.00 =  1878.53 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    992.00 TO NODE    992.00 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.) =   9.28
 RAINFALL INTENSITY(INCH/HR) =   3.59
 TOTAL STREAM AREA(ACRES) =    14.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.10

****************************************************************************
 FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    542.00
 DOWNSTREAM ELEVATION(FEET) =    540.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
SUBAREA RUNOFF(CFS) =      7.20
TOTAL AREA(ACRES) =      1.90   TOTAL RUNOFF(CFS) =      7.20

****************************************************************************
 FLOW PROCESS FROM NODE    921.00 TO NODE    907.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   532.00  DOWNSTREAM(FEET) =   502.00
 FLOW LENGTH(FEET) =   908.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.66
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.20
 PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   7.57
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    907.50 =  1008.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    907.50 TO NODE    907.50 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.912
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =   18.40   SUBAREA RUNOFF(CFS) =   64.79
 TOTAL AREA(ACRES) =     20.30   TOTAL RUNOFF(CFS) =   71.99
 TC(MIN.) =   7.57

****************************************************************************
 FLOW PROCESS FROM NODE    907.50 TO NODE   9801.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   496.56  DOWNSTREAM(FEET) =   494.23
 FLOW LENGTH(FEET) =   233.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     71.99
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   7.95
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE   9801.50 =  1241.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   9801.50 TO NODE    992.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.73  DOWNSTREAM(FEET) =   492.41
 FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  27.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
 GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     71.99
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   8.05
 LONGEST FLOWPATH FROM NODE    920.00 TO NODE    992.00 =  1297.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    992.00 TO NODE    992.00 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.) =   8.05
 RAINFALL INTENSITY(INCH/HR) =   3.82
 TOTAL STREAM AREA(ACRES) =    20.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.99

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
```

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)	(ACRE)
1	47.10	9.28	3.586	14.50
2	71.99	8.05	3.820	20.30

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	116.21	8.05	3.820
2	114.69	9.28	3.586

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 116.21 Tc(MIN.) = 8.05
TOTAL AREA(ACRES) = 34.80
LONGEST FLOWPATH FROM NODE 902.20 TO NODE 992.00 = 1878.53 FEET.

****
FLOW PROCESS FROM NODE 992.00 TO NODE 9903.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 492.20 DOWNSTREAM(FEET) = 491.77
FLOW LENGTH(FEET) = 77.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 37.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.82
GIVEN PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 116.21
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 8.18
LONGEST FLOWPATH FROM NODE 902.20 TO NODE 9903.00 = 1955.53 FEET.
==
END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 34.80 TC(MIN.) = 8.18
PEAK FLOW RATE(CFS) = 116.21
==
==
END OF RATIONAL METHOD ANALYSIS

♀

Basin 900A

Un-Detained Flow

100-Year

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                          Rick Engineering Company
                       1223 University Ave., Suite 240
                         Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Unit 14                                  *
* Construction Change 'F'                                                 *
* Basin 900A - 100 Year Storm Event                                       *
 **************************************************************************

  FILE NAME: BMR9AP00.DAT
  TIME/DATE OF STUDY: 14:33 06/20/2014
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020   0.67     2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020   0.50     1.50 0.0313 0.125 0.0180
  3   51.0     46.0    0.020/0.020/0.020   0.50     1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     911.00 TO NODE     912.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  544.00
  DOWNSTREAM ELEVATION(FEET) =  539.81
  ELEVATION DIFFERENCE(FEET) =  4.19
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.233
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =  0.38
```

```
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     912.00 TO NODE     913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  539.81  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.03
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.58
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
 STREET FLOW TRAVEL TIME(MIN.) =   3.10   Tc(MIN.) =   9.10
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.621
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.30
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.68

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.16
 FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     913.00 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.) =   9.10
 RAINFALL INTENSITY(INCH/HR) =   3.62
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.68

****************************************************************************
 FLOW PROCESS FROM NODE     913.40 TO NODE     913.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE     913.50 TO NODE     913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   368.00   CURB HEIGHT(INCHES) =  6.0
```

```
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.04
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.19
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
 STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =   8.97
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.646
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =    1.31
 TOTAL AREA(ACRES) =      0.50       PEAK FLOW RATE(CFS) =       1.69

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.92
 FLOW VELOCITY(FEET/SEC.) =  2.27   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE    913.40 TO NODE    913.00 =   468.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   8.97
 RAINFALL INTENSITY(INCH/HR) =   3.65
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.69

****************************************************************************
 FLOW PROCESS FROM NODE    912.20 TO NODE    912.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    545.00
 DOWNSTREAM ELEVATION(FEET) =    542.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    912.40 TO NODE    913.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   542.00  DOWNSTREAM(FEET) =   532.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.93
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.38
 PIPE TRAVEL TIME(MIN.) =   1.44    Tc(MIN.) =   7.44
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.20 =   440.00 FEET.

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

```
 FLOW PROCESS FROM NODE     913.20 TO NODE     913.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.936
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =     2.00   SUBAREA RUNOFF(CFS) =    7.08
 TOTAL AREA(ACRES) =       2.10   TOTAL RUNOFF(CFS) =    7.46
 TC(MIN.) =   7.44

****************************************************************************
 FLOW PROCESS FROM NODE     913.20 TO NODE     913.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.84  DOWNSTREAM(FEET) =   523.69
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.46
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   7.48
 LONGEST FLOWPATH FROM NODE     912.20 TO NODE     913.00 =   455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     913.00 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.) =   7.48
 RAINFALL INTENSITY(INCH/HR) =   3.93
 TOTAL STREAM AREA(ACRES) =     2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.46

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         1.68      9.10        3.621         0.50
     2         1.69      8.97        3.646         0.50
     3         7.46      7.48        3.928         2.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        10.58      7.48        3.928
     2        10.29      8.97        3.646
     3        10.24      9.10        3.621

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     10.58   Tc(MIN.) =    7.48
 TOTAL AREA(ACRES) =      3.10
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.69  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.81
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.58
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.54
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     909.00 =   574.25 FEET.

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

```
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 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.) =   7.54
 RAINFALL INTENSITY(INCH/HR) =   3.92
 TOTAL STREAM AREA(ACRES) =      3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.58

****************************************************************************
 FLOW PROCESS FROM NODE    913.60 TO NODE    913.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    913.70 TO NODE    909.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.69
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.96
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
 STREET FLOW TRAVEL TIME(MIN.) =   3.28   Tc(MIN.) =   9.28
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.587
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.97
 TOTAL AREA(ACRES) =      0.40       PEAK FLOW RATE(CFS) =       1.35

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.16
 FLOW VELOCITY(FEET/SEC.) =  2.14   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.20 =   485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.20 TO NODE    909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.25  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      1.35
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.29
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.00 =   490.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 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.) =   9.29
 RAINFALL INTENSITY(INCH/HR) =   3.58
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.35

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         10.58      7.54         3.918          3.10
    2          1.35      9.29         3.584          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         11.82      7.54         3.918
    2         11.03      9.29         3.584

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     11.82   Tc(MIN.) =    7.54
 TOTAL AREA(ACRES) =      3.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    910.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   522.64  DOWNSTREAM(FEET) =   521.73
 FLOW LENGTH(FEET) =    91.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.82
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   7.75
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.00 =   665.75 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.00 TO NODE    910.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   521.40  DOWNSTREAM(FEET) =   512.91
 FLOW LENGTH(FEET) =   256.12   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.91
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.82
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   8.14
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.20 =   921.87 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.20 TO NODE    910.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.29  DOWNSTREAM(FEET) =   506.34
 FLOW LENGTH(FEET) =   123.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.68
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =     11.82
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   8.32
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =   8.32
  RAINFALL INTENSITY(INCH/HR) =   3.77
  TOTAL STREAM AREA(ACRES) =     3.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.82

****************************************************************************
  FLOW PROCESS FROM NODE    910.40 TO NODE    910.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    528.83
  DOWNSTREAM ELEVATION(FEET) =    525.33
  ELEVATION DIFFERENCE(FEET) =      3.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.371
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    910.60 TO NODE    910.30 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  527.40  DOWNSTREAM ELEVATION(FEET) =  513.28
  STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =   7.83
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.862
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.70
  TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       1.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.92
  FLOW VELOCITY(FEET/SEC.) =  2.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE    910.40 TO NODE    910.30 =   412.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) = 7.83
RAINFALL INTENSITY(INCH/HR) = 3.86
TOTAL STREAM AREA(ACRES) = 0.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.07

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	11.82	8.32	3.769	3.50
2	1.07	7.83	3.862	0.30

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	12.61	7.83	3.862
2	12.86	8.32	3.769

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 12.86 Tc(MIN.) = 8.32
TOTAL AREA(ACRES) = 3.80
LONGEST FLOWPATH FROM NODE 911.00 TO NODE 910.30 = 1045.64 FEET.

****
FLOW PROCESS FROM NODE 910.30 TO NODE 914.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 505.84 DOWNSTREAM(FEET) = 499.83
FLOW LENGTH(FEET) = 140.08 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 8.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.04
GIVEN PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.86
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 8.51
LONGEST FLOWPATH FROM NODE 911.00 TO NODE 914.00 = 1185.72 FEET.

****
FLOW PROCESS FROM NODE 914.00 TO NODE 914.00 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.) = 8.51
RAINFALL INTENSITY(INCH/HR) = 3.73
TOTAL STREAM AREA(ACRES) = 3.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 12.86

****
FLOW PROCESS FROM NODE 914.20 TO NODE 914.40 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 516.00
DOWNSTREAM ELEVATION(FEET) = 513.78
ELEVATION DIFFERENCE(FEET) = 2.22
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.760
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.210
SUBAREA RUNOFF(CFS) = 0.38
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.38

****
FLOW PROCESS FROM NODE 914.40 TO NODE 914.00 IS CODE = 62

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

```
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  513.28  DOWNSTREAM ELEVATION(FEET) =  505.13
  STREET LENGTH(FEET) =   122.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =   6.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.115
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.10      SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =       0.20        PEAK FLOW RATE(CFS) =       0.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   3.17
  FLOW VELOCITY(FEET/SEC.) =  3.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
  LONGEST FLOWPATH FROM NODE    914.20 TO NODE    914.00 =   222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   6.50
  RAINFALL INTENSITY(INCH/HR) =   4.11
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.75

  ** CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY       AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.86     8.51        3.732          3.80
      2        0.75     6.50        4.115          0.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF      Tc       INTENSITY
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
      1       12.42     6.50        4.115
      2       13.54     8.51        3.732

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     13.54   Tc(MIN.) =    8.51
  TOTAL AREA(ACRES) =      4.00
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    954.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   498.71
  FLOW LENGTH(FEET) =    79.37   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.21
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     13.54
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   8.70
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    954.20 =  1265.09 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    954.20 TO NODE    954.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.697
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40   SUBAREA RUNOFF(CFS) =    1.33
 TOTAL AREA(ACRES) =       4.40   TOTAL RUNOFF(CFS) =   14.88
 TC(MIN.) =   8.70

****************************************************************************
 FLOW PROCESS FROM NODE    954.20 TO NODE    918.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.61  DOWNSTREAM(FEET) =   497.39
 FLOW LENGTH(FEET) =   121.84   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.41
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.88
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   8.97
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    918.80 =  1386.93 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.80 TO NODE    918.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.645
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =    0.33
 TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =   15.20
 TC(MIN.) =   8.97

****************************************************************************
 FLOW PROCESS FROM NODE    918.80 TO NODE    918.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.29  DOWNSTREAM(FEET) =   495.55
 FLOW LENGTH(FEET) =   173.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  13.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.20
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   9.36
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    918.60 =  1560.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.60 TO NODE    918.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.572
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.00   SUBAREA RUNOFF(CFS) =    3.21
 TOTAL AREA(ACRES) =       5.50   TOTAL RUNOFF(CFS) =   18.42
 TC(MIN.) =   9.36

****************************************************************************
 FLOW PROCESS FROM NODE    918.60 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   495.44  DOWNSTREAM(FEET) =   495.06
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  14.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     18.42
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   9.44
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.44
 RAINFALL INTENSITY(INCH/HR) =   3.56
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.42

****************************************************************************
 FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    512.74
 DOWNSTREAM ELEVATION(FEET) =    511.74
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.600
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      2.65
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      2.65

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.74  DOWNSTREAM(FEET) =   504.69
 FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.65
 PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =   7.41
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.20 =   505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.942
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     3.30   SUBAREA RUNOFF(CFS) =   11.71
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =   14.36
 TC(MIN.) =   7.41

****************************************************************************
 FLOW PROCESS FROM NODE    918.20 TO NODE    918.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
```

```
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.36
 PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   8.56
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.40 =  1065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.40 TO NODE    918.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.90  DOWNSTREAM(FEET) =   495.36
 FLOW LENGTH(FEET) =   259.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.36
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   9.09
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.50 =  1324.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.50 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.26  DOWNSTREAM(FEET) =   495.16
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.36
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.14
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =  1346.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.14
 RAINFALL INTENSITY(INCH/HR) =   3.61
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.36

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        18.42     9.44         3.556          5.50
     2        14.36     9.14         3.614          4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
     1        32.48     9.14         3.614
     2        32.55     9.44         3.556

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     32.55   Tc(MIN.) =    9.44
 TOTAL AREA(ACRES) =      9.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.556
 *USER SPECIFIED(SUBAREA):
```

```
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =  2.40   SUBAREA RUNOFF(CFS) =  7.68
 TOTAL AREA(ACRES) =  11.90   TOTAL RUNOFF(CFS) =  40.23
 TC(MIN.) =  9.44

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    919.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  495.06  DOWNSTREAM(FEET) =  494.56
 CHANNEL LENGTH THRU SUBAREA(FEET) =  140.00   CHANNEL SLOPE =  0.0036
 CHANNEL BASE(FEET) =  45.50   "Z" FACTOR =  0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  6.00
 CHANNEL FLOW THRU SUBAREA(CFS) =  40.23
 FLOW VELOCITY(FEET/SEC.) =  2.73   FLOW DEPTH(FEET) =  0.32
 TRAVEL TIME(MIN.) =  0.85   Tc(MIN.) =  10.30
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    919.00 =  1739.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    919.00 TO NODE    920.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  494.51  DOWNSTREAM(FEET) =  493.67
 FLOW LENGTH(FEET) =  88.30   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  8.19
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  40.23
 PIPE TRAVEL TIME(MIN.) =  0.18   Tc(MIN.) =  10.48
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    920.00 =  1827.82 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  493.57  DOWNSTREAM(FEET) =  493.09
 FLOW LENGTH(FEET) =  56.30   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  8.19
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  40.23
 PIPE TRAVEL TIME(MIN.) =  0.11   Tc(MIN.) =  10.59
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    921.00 =  1884.12 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    921.00 TO NODE    952.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  492.99  DOWNSTREAM(FEET) =  491.45
 FLOW LENGTH(FEET) =  187.54   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  8.19
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  40.23
 PIPE TRAVEL TIME(MIN.) =  0.38   Tc(MIN.) =  10.97
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    952.20 =  2071.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.20 TO NODE    990.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  491.15  DOWNSTREAM(FEET) =  491.06
 FLOW LENGTH(FEET) =  11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  22.3 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.77
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     40.23
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  10.99
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =  10.99
 RAINFALL INTENSITY(INCH/HR) =   3.34
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.23

****************************************************************************
 FLOW PROCESS FROM NODE    988.00 TO NODE    989.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.87
 DOWNSTREAM ELEVATION(FEET) =    503.75
 ELEVATION DIFFERENCE(FEET) =      0.12
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.096
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.76
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
 FLOW PROCESS FROM NODE    989.00 TO NODE    990.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.75  DOWNSTREAM ELEVATION(FEET) =  500.48
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.26
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    7.41
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
 STREET FLOW TRAVEL TIME(MIN.) =   3.39   Tc(MIN.) =   9.39
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.566
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.00
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       1.76

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
 FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
 LONGEST FLOWPATH FROM NODE    988.00 TO NODE    990.00 =   425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) = 9.39
RAINFALL INTENSITY(INCH/HR) = 3.57
TOTAL STREAM AREA(ACRES) = 0.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.76

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	40.23	10.99	3.341	11.90
2	1.76	9.39	3.566	0.60

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	39.44	9.39	3.566
2	41.87	10.99	3.341

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 41.87 Tc(MIN.) = 10.99
TOTAL AREA(ACRES) = 12.50
LONGEST FLOWPATH FROM NODE 911.00 TO NODE 990.00 = 2082.66 FEET.

```
****************************************************************************
```
FLOW PROCESS FROM NODE 990.00 TO NODE 991.00 IS CODE = 41
```
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```
ELEVATION DATA: UPSTREAM(FEET) = 491.21 DOWNSTREAM(FEET) = 491.06
FLOW LENGTH(FEET) = 11.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.33
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.87
PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 11.01
LONGEST FLOWPATH FROM NODE 911.00 TO NODE 991.00 = 2093.66 FEET.

```
****************************************************************************
```
FLOW PROCESS FROM NODE 991.00 TO NODE 991.00 IS CODE = 10
```
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE 957.00 TO NODE 958.00 IS CODE = 21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 503.59
DOWNSTREAM ELEVATION(FEET) = 501.59
ELEVATION DIFFERENCE(FEET) = 2.00
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.857
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.210
SUBAREA RUNOFF(CFS) = 0.38
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.38

****************************************************************************
FLOW PROCESS FROM NODE 958.00 TO NODE 955.00 IS CODE = 62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 2 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) = 501.59 DOWNSTREAM ELEVATION(FEET) = 497.41
```

```
 STREET LENGTH(FEET) =   304.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.21
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.26
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.88
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   2.69   Tc(MIN.) =   8.69
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.698
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =    1.66
 TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       2.04

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.24
 FLOW VELOCITY(FEET/SEC.) =  2.10   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    955.00 =   404.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.76  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.42
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.04
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   8.81
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.81
 RAINFALL INTENSITY(INCH/HR) =   3.68
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.04

****************************************************************************
 FLOW PROCESS FROM NODE    959.00 TO NODE    960.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    960.00 TO NODE    956.20 IS CODE =  62
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.41
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.28
  HALFSTREET FLOOD WIDTH(FEET) =    7.46
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.10
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =   7.99
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.832
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =     2.07
TOTAL AREA(ACRES) =       0.70        PEAK FLOW RATE(CFS) =       2.45

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.60
FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.20 =   350.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    956.20 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   492.48  DOWNSTREAM(FEET) =   492.46
FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.48
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      2.45
PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.00
LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.00 =   352.25 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.00
RAINFALL INTENSITY(INCH/HR) =   3.83
TOTAL STREAM AREA(ACRES) =     0.70
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.45

** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY       AREA
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         2.04     8.81         3.676          0.60
    2         2.45     8.00         3.831          0.70

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF       Tc       INTENSITY
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
    1         4.41     8.00         3.831
    2         4.39     8.81         3.676
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      4.41   Tc(MIN.) =    8.00
 TOTAL AREA(ACRES) =      1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.46  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.41
 PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   8.70
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1          4.41      8.70        3.697        1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         41.87     11.01        3.339       12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc        INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1        42.23       8.70         3.697
    2        45.85      11.01         3.339

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     45.85   Tc(MIN.) =   11.01
 TOTAL AREA(ACRES) =     13.80

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =  11.01
 RAINFALL INTENSITY(INCH/HR) =   3.34
 TOTAL STREAM AREA(ACRES) =    13.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.85

****************************************************************************
 FLOW PROCESS FROM NODE    994.20 TO NODE    994.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    501.47
 DOWNSTREAM ELEVATION(FEET) =    500.54
```

```
 ELEVATION DIFFERENCE(FEET) =      0.93
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
 FLOW PROCESS FROM NODE    994.40 TO NODE    994.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  500.54  DOWNSTREAM ELEVATION(FEET) =  498.52
 STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 51.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **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) =    7.38
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.61
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =   8.13
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.806
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     1.37
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.75

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.27
 FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    994.20 TO NODE    994.00 =   305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    994.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.61  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.58
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.75
 PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   9.20
 LONGEST FLOWPATH FROM NODE    994.20 TO NODE    991.00 =   535.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =   9.20
 RAINFALL INTENSITY(INCH/HR) =   3.60
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.75

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        45.85    11.01         3.339         13.80
     2         1.75     9.20         3.602          0.50
```

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1        44.25      9.20        3.602
    2        47.47     11.01        3.339

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     47.47   Tc(MIN.) =   11.01
 TOTAL AREA(ACRES) =     14.30
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    987.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.73  DOWNSTREAM(FEET) =   490.40
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.09
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     47.47
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =  11.08
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  11.08
 RAINFALL INTENSITY(INCH/HR) =   3.33
 TOTAL STREAM AREA(ACRES) =    14.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.47

****************************************************************************
 FLOW PROCESS FROM NODE    985.00 TO NODE    986.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.80
 DOWNSTREAM ELEVATION(FEET) =    505.60
 ELEVATION DIFFERENCE(FEET) =      0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.228
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.315
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
 FLOW PROCESS FROM NODE    986.00 TO NODE    987.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    505.60  DOWNSTREAM(FEET) =    501.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   330.00   CHANNEL SLOPE =  0.0124
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.825
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.17
 AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   4.71
```

```
 Tc(MIN.) =  15.94
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.38
 TOTAL AREA(ACRES) =      0.40       PEAK FLOW RATE(CFS) =      0.53

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   1.31
 LONGEST FLOWPATH FROM NODE    985.00 TO NODE    987.00 =   380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  15.94
 RAINFALL INTENSITY(INCH/HR) =   2.82
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.53

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc      INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        47.47    11.08        3.331        14.30
    2         0.53    15.94        2.825         0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc      INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
    1        47.92    11.08        3.331
    2        40.79    15.94        2.825

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     47.92   Tc(MIN.) =   11.08
 TOTAL AREA(ACRES) =     14.70
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    983.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.07  DOWNSTREAM(FEET) =   489.98
 FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  23.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.85
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     47.92
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.10
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    983.00 =  2142.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    983.00 TO NODE    983.00 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.) =  11.10
 RAINFALL INTENSITY(INCH/HR) =   3.33
 TOTAL STREAM AREA(ACRES) =    14.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.92

****************************************************************************
 FLOW PROCESS FROM NODE    981.00 TO NODE    982.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.41
```

```
 DOWNSTREAM ELEVATION(FEET) =     505.21
 ELEVATION DIFFERENCE(FEET) =       0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     5.873
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.210
 SUBAREA RUNOFF(CFS) =       0.32
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.32

****************************************************************************
 FLOW PROCESS FROM NODE     982.00 TO NODE     983.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  505.21  DOWNSTREAM ELEVATION(FEET) =  502.12
 STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 51.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.58
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.32
 STREET FLOW TRAVEL TIME(MIN.) =   4.46   Tc(MIN.) =  10.46
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.400
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.52
 TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       0.84

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.84
 FLOW VELOCITY(FEET/SEC.) =  1.43   DEPTH*VELOCITY(FT*FT/SEC.) =   0.38
 LONGEST FLOWPATH FROM NODE     981.00 TO NODE     983.00 =   410.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     983.00 TO NODE     983.00 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.) =  10.46
 RAINFALL INTENSITY(INCH/HR) =   3.40
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.84

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        47.92     11.10         3.329         14.70
     2         0.84     10.46         3.400          0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        47.77     10.46         3.400
     2        48.74     11.10         3.329

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     48.74   Tc(MIN.) =   11.10
```

```
 TOTAL AREA(ACRES) =     15.00
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    983.00 =  2142.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    983.00 TO NODE    999.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.65  DOWNSTREAM(FEET) =   489.10
 FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.79
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     48.74
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  11.23
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    999.00 =  2215.66 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =     15.00  TC(MIN.) =     11.23
 PEAK FLOW RATE(CFS)    =     48.74
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

♀

25-Year

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                        Rick Engineering Company
                      1223 University Ave., Suite 240
                        Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Unit 14                                  *
* Construction Change 'F'                                                 *
* Basin 900A - 25 Year Storm Event                                        *
 **************************************************************************

  FILE NAME: BMR9AP25.DAT
  TIME/DATE OF STUDY: 14:46 06/20/2014
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  3.800
   2)  10.000;  3.000
   3)  15.000;  2.500
   4)  20.000;  2.100
   5)  25.000;  1.900
   6)  30.000;  1.700
   7)  40.000;  1.450
   8)  50.000;  1.300
   9)  60.000;  1.150
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180
  3   51.0     46.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**********************************************************************************
  FLOW PROCESS FROM NODE     911.00 TO NODE     912.00 IS CODE =  21
----------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==================================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  544.00
  DOWNSTREAM ELEVATION(FEET) =  539.81
  ELEVATION DIFFERENCE(FEET) =  4.19
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.233
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
  SUBAREA RUNOFF(CFS) =  0.33
```

```
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE     912.00 TO NODE     913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  539.81  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.13
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
 STREET FLOW TRAVEL TIME(MIN.) =   3.18   Tc(MIN.) =   9.18
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.131
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.45

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.70
 FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     913.00 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.) =   9.18
 RAINFALL INTENSITY(INCH/HR) =   3.13
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.45

****************************************************************************
 FLOW PROCESS FROM NODE     913.40 TO NODE     913.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE     913.50 TO NODE     913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   368.00   CURB HEIGHT(INCHES) =  6.0
```

```
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.74
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
 STREET FLOW TRAVEL TIME(MIN.) =   3.06   Tc(MIN.) =   9.06
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.150
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       1.46

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
 FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
 LONGEST FLOWPATH FROM NODE    913.40 TO NODE    913.00 =   468.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.06
 RAINFALL INTENSITY(INCH/HR) =   3.15
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.46

****************************************************************************
 FLOW PROCESS FROM NODE    912.20 TO NODE    912.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    545.00
 DOWNSTREAM ELEVATION(FEET) =    542.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    912.40 TO NODE    913.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   542.00  DOWNSTREAM(FEET) =   532.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.82
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.33
 PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =   7.48
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.20 =   440.00 FEET.

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

```
 FLOW PROCESS FROM NODE    913.20 TO NODE    913.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.402
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     2.00   SUBAREA RUNOFF(CFS) =     6.12
 TOTAL AREA(ACRES) =       2.10   TOTAL RUNOFF(CFS) =     6.45
 TC(MIN.) =   7.48

****************************************************************************
 FLOW PROCESS FROM NODE    913.20 TO NODE    913.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.84  DOWNSTREAM(FEET) =   523.69
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.45
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   7.53
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.00 =   455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   7.53
 RAINFALL INTENSITY(INCH/HR) =   3.40
 TOTAL STREAM AREA(ACRES) =      2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.45

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         1.45     9.18        3.131         0.50
     2         1.46     9.06        3.150         0.50
     3         6.45     7.53        3.396         2.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1         9.15     7.53        3.396
     2         8.89     9.06        3.150
     3         8.86     9.18        3.131

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.15   Tc(MIN.) =    7.53
 TOTAL AREA(ACRES) =       3.10
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.69  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.15
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.58
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

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

```
 FLOW PROCESS FROM NODE     909.00 TO NODE     909.00 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.) =    7.58
 RAINFALL INTENSITY(INCH/HR) =    3.39
 TOTAL STREAM AREA(ACRES) =      3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.15

****************************************************************************
 FLOW PROCESS FROM NODE     913.60 TO NODE     913.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    100.00
 UPSTREAM ELEVATION(FEET) =     536.26
 DOWNSTREAM ELEVATION(FEET) =     534.26
 ELEVATION DIFFERENCE(FEET) =       2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =       0.33
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.33

****************************************************************************
 FLOW PROCESS FROM NODE     913.70 TO NODE     909.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.75
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =   9.36
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.102
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =    0.84
 TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       1.17

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.70
 FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
 LONGEST FLOWPATH FROM NODE     913.60 TO NODE     909.20 =   485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.20 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.25  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.92
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      1.17
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.38
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.00 =   490.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 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.) =   9.38
 RAINFALL INTENSITY(INCH/HR) =   3.10
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         9.15     7.58        3.387          3.10
     2         1.17     9.38        3.099          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1        10.22     7.58        3.387
     2         9.54     9.38        3.099

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     10.22   Tc(MIN.) =    7.58
 TOTAL AREA(ACRES) =      3.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    910.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   522.64  DOWNSTREAM(FEET) =   521.73
 FLOW LENGTH(FEET) =    91.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.22
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   7.81
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.00 =   665.75 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.00 TO NODE    910.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   521.40  DOWNSTREAM(FEET) =   512.91
 FLOW LENGTH(FEET) =   256.12   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.49
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.22
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   8.21
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.20 =   921.87 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.20 TO NODE    910.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.29  DOWNSTREAM(FEET) =   506.34
 FLOW LENGTH(FEET) =   123.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.22
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     10.22
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   8.40
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =   8.40
 RAINFALL INTENSITY(INCH/HR) =   3.26
 TOTAL STREAM AREA(ACRES) =     3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.22

****************************************************************************
 FLOW PROCESS FROM NODE    910.40 TO NODE    910.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    528.83
 DOWNSTREAM ELEVATION(FEET) =    525.33
 ELEVATION DIFFERENCE(FEET) =      3.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.371
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    910.60 TO NODE    910.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  527.40  DOWNSTREAM ELEVATION(FEET) =  513.28
 STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.19
   HALFSTREET FLOOD WIDTH(FEET) =    3.22
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
 STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =   7.84
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.346
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.60
 TOTAL AREA(ACRES) =      0.30       PEAK FLOW RATE(CFS) =       0.93

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.48
 FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
 LONGEST FLOWPATH FROM NODE    910.40 TO NODE    910.30 =   412.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =   7.84
  RAINFALL INTENSITY(INCH/HR) =   3.35
  TOTAL STREAM AREA(ACRES) =     0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.93

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
      1        10.22      8.40        3.257          3.50
      2         0.93      7.84        3.346          0.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
      1        10.87      7.84        3.346
      2        11.12      8.40        3.257

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     11.12   Tc(MIN.) =    8.40
  TOTAL AREA(ACRES) =      3.80
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    910.30 TO NODE    914.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   505.84  DOWNSTREAM(FEET) =   499.83
  FLOW LENGTH(FEET) =   140.08   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     11.12
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   8.60
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   8.60
  RAINFALL INTENSITY(INCH/HR) =   3.22
  TOTAL STREAM AREA(ACRES) =     3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.12

****************************************************************************
  FLOW PROCESS FROM NODE    914.20 TO NODE    914.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    516.00
  DOWNSTREAM ELEVATION(FEET) =    513.78
  ELEVATION DIFFERENCE(FEET) =      2.22
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.760
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    914.40 TO NODE    914.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  513.28  DOWNSTREAM ELEVATION(FEET) =  505.13
  STREET LENGTH(FEET) =   122.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =   6.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.560
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.18   HALFSTREET FLOOD WIDTH(FEET) =   2.62
  FLOW VELOCITY(FEET/SEC.) =  3.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
  LONGEST FLOWPATH FROM NODE    914.20 TO NODE    914.00 =   222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   6.50
  RAINFALL INTENSITY(INCH/HR) =   3.56
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.65

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1        11.12      8.60         3.224          3.80
      2         0.65      6.50         3.560          0.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        10.72      6.50         3.560
      2        11.71      8.60         3.224

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     11.71   Tc(MIN.) =    8.60
  TOTAL AREA(ACRES) =      4.00
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    954.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   498.71
  FLOW LENGTH(FEET) =    79.37   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     11.71
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   8.79
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    954.20 =  1265.09 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    954.20 TO NODE    954.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.194
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.15
 TOTAL AREA(ACRES) =      4.40   TOTAL RUNOFF(CFS) =   12.86
 TC(MIN.) =   8.79

****************************************************************************
 FLOW PROCESS FROM NODE    954.20 TO NODE    918.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.61  DOWNSTREAM(FEET) =   497.39
 FLOW LENGTH(FEET) =   121.84   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.13
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.86
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   9.07
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    918.80 =  1386.93 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.80 TO NODE    918.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.148
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.28
 TOTAL AREA(ACRES) =      4.50   TOTAL RUNOFF(CFS) =   13.14
 TC(MIN.) =   9.07

****************************************************************************
 FLOW PROCESS FROM NODE    918.80 TO NODE    918.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.29  DOWNSTREAM(FEET) =   495.55
 FLOW LENGTH(FEET) =   173.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.17
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.14
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   9.48
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    918.60 =  1560.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.60 TO NODE    918.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.084
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.78
 TOTAL AREA(ACRES) =      5.50   TOTAL RUNOFF(CFS) =   15.92
 TC(MIN.) =   9.48

****************************************************************************
 FLOW PROCESS FROM NODE    918.60 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   495.44  DOWNSTREAM(FEET) =   495.06
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     15.92
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.56
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.56
  RAINFALL INTENSITY(INCH/HR) =   3.07
  TOTAL STREAM AREA(ACRES) =     5.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.92

****************************************************************************
  FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    512.74
  DOWNSTREAM ELEVATION(FEET) =    511.74
  ELEVATION DIFFERENCE(FEET) =      1.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.600
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
  SUBAREA RUNOFF(CFS) =      2.29
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      2.29

****************************************************************************
  FLOW PROCESS FROM NODE    918.00 TO NODE    918.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.74  DOWNSTREAM(FEET) =   504.69
  FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.29
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   7.47
  LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.20 =   505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.405
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     3.30   SUBAREA RUNOFF(CFS) =   10.11
  TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =   12.40
  TC(MIN.) =   7.47

****************************************************************************
  FLOW PROCESS FROM NODE    918.20 TO NODE    918.40 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   499.00
  FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
```

```
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.40
 PIPE TRAVEL TIME(MIN.) =   1.33    Tc(MIN.) =   8.80
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.40 =  1065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.40 TO NODE    918.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.90  DOWNSTREAM(FEET) =   495.36
 FLOW LENGTH(FEET) =   259.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.40
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   9.42
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.50 =  1324.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.50 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.26  DOWNSTREAM(FEET) =   495.16
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.40
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.47
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =  1346.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.47
 RAINFALL INTENSITY(INCH/HR) =   3.09
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.40

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        15.92      9.56         3.070          5.50
     2        12.40      9.47         3.085          4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        28.24      9.47         3.085
     2        28.26      9.56         3.070

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     28.26   Tc(MIN.) =    9.56
 TOTAL AREA(ACRES) =      9.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.070
 *USER SPECIFIED(SUBAREA):
```

```
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    6.63
 TOTAL AREA(ACRES) =     11.90   TOTAL RUNOFF(CFS) =   34.89
 TC(MIN.) =   9.56

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    919.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.06  DOWNSTREAM(FEET) =    494.56
 CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0036
 CHANNEL BASE(FEET) =   45.50   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   6.00
 CHANNEL FLOW THRU SUBAREA(CFS) =    34.89
 FLOW VELOCITY(FEET/SEC.) =   2.60   FLOW DEPTH(FEET) =   0.29
 TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =  10.46
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    919.00 =  1739.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    919.00 TO NODE    920.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.51  DOWNSTREAM(FEET) =   493.67
 FLOW LENGTH(FEET) =    88.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.79
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    34.89
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  10.63
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    920.00 =  1827.82 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.57  DOWNSTREAM(FEET) =   493.09
 FLOW LENGTH(FEET) =    56.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.37
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    34.89
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  10.74
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    921.00 =  1884.12 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    921.00 TO NODE    952.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.99  DOWNSTREAM(FEET) =   491.45
 FLOW LENGTH(FEET) =   187.54   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.22
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    34.89
 PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =  11.12
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    952.20 =  2071.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.20 TO NODE    990.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.15  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  20.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =    34.89
```

```
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.14
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =  11.14
 RAINFALL INTENSITY(INCH/HR) =   2.89
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.89

****************************************************************************
 FLOW PROCESS FROM NODE    988.00 TO NODE    989.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.87
 DOWNSTREAM ELEVATION(FEET) =    503.75
 ELEVATION DIFFERENCE(FEET) =      0.12
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.096
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.66
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
 FLOW PROCESS FROM NODE    989.00 TO NODE    990.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.75  DOWNSTREAM ELEVATION(FEET) =  500.48
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.09
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    6.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.80
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   3.47   Tc(MIN.) =   9.47
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.085
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.86
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       1.52

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.22
 FLOW VELOCITY(FEET/SEC.) =  1.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
 LONGEST FLOWPATH FROM NODE    988.00 TO NODE    990.00 =   425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =   9.47
 RAINFALL INTENSITY(INCH/HR) =   3.09
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.52

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        34.89     11.14        2.886         11.90
     2         1.52      9.47        3.085          0.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        34.15      9.47        3.085
     2        36.31     11.14        2.886

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     36.31   Tc(MIN.) =   11.14
 TOTAL AREA(ACRES) =     12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.21  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.56
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     36.31
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.16
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    957.00 TO NODE    958.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    958.00 TO NODE    955.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
 STREET LENGTH(FEET) =   304.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.05
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
 STREET FLOW TRAVEL TIME(MIN.) =   2.77   Tc(MIN.) =   8.77
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.196
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =    1.44
 TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       1.77

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.68
 FLOW VELOCITY(FEET/SEC.) =  2.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    955.00 =   404.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.76  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.25
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.77
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   8.89
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.89
 RAINFALL INTENSITY(INCH/HR) =   3.18
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.77

****************************************************************************
 FLOW PROCESS FROM NODE    959.00 TO NODE    960.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    960.00 TO NODE    956.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
```

```
==============================================================================
  UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    6.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   2.05   Tc(MIN.) =   8.05
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.312
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =    1.79
  TOTAL AREA(ACRES) =       0.70        PEAK FLOW RATE(CFS) =       2.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.99
  FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
  LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.20 =   350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.20 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.48  DOWNSTREAM(FEET) =   492.46
  FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.30
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.12
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.06
  LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.00 =   352.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.06
  RAINFALL INTENSITY(INCH/HR) =   3.31
  TOTAL STREAM AREA(ACRES) =     0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.12

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1         1.77      8.89         3.177          0.60
      2         2.12      8.06         3.310          0.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1         3.81      8.06         3.310
      2         3.80      8.89         3.177

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      3.81   Tc(MIN.) =    8.06
```

```
 TOTAL AREA(ACRES) =      1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.46  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.81
 PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   8.79
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1          3.81      8.79        3.193         1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         36.31     11.16        2.884        12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF        Tc       INTENSITY
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
    1        36.61        8.79        3.193
    2        39.75       11.16        2.884

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     39.75   Tc(MIN.) =   11.16
 TOTAL AREA(ACRES) =     13.80

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =  11.16
 RAINFALL INTENSITY(INCH/HR) =   2.88
 TOTAL STREAM AREA(ACRES) =    13.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     39.75

****************************************************************************
 FLOW PROCESS FROM NODE    994.20 TO NODE    994.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    501.47
 DOWNSTREAM ELEVATION(FEET) =    500.54
 ELEVATION DIFFERENCE(FEET) =      0.93
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
```

```
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    994.40 TO NODE    994.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  500.54  DOWNSTREAM ELEVATION(FEET) =  498.52
 STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 51.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.54
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
 STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   8.22
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.284
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     1.18
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.51

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.73
 FLOW VELOCITY(FEET/SEC.) =  1.72   DEPTH*VELOCITY(FT*FT/SEC.) =   0.52
 LONGEST FLOWPATH FROM NODE    994.20 TO NODE    994.00 =   305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    994.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.61  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.43
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.51
 PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   9.34
 LONGEST FLOWPATH FROM NODE    994.20 TO NODE    991.00 =   535.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =   9.34
 RAINFALL INTENSITY(INCH/HR) =   3.11
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.51

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        39.75     11.16        2.884         13.80
     2         1.51      9.34        3.105          0.50

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        38.43      9.34        3.105
     2        41.15     11.16        2.884

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     41.15   Tc(MIN.) =   11.16
 TOTAL AREA(ACRES) =     14.30
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    987.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.73  DOWNSTREAM(FEET) =   490.40
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.85
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     41.15
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  11.23
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  11.23
 RAINFALL INTENSITY(INCH/HR) =   2.88
 TOTAL STREAM AREA(ACRES) =    14.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.15

****************************************************************************
 FLOW PROCESS FROM NODE    985.00 TO NODE    986.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.80
 DOWNSTREAM ELEVATION(FEET) =    505.60
 ELEVATION DIFFERENCE(FEET) =      0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.228
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.877
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    986.00 TO NODE    987.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    505.60  DOWNSTREAM(FEET) =    501.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   330.00   CHANNEL SLOPE =  0.0124
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.396
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.29
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.08
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.07
 Tc(MIN.) =  16.30
 SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.32
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       0.45
```

```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   1.25
 LONGEST FLOWPATH FROM NODE    985.00 TO NODE    987.00 =   380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  16.30
 RAINFALL INTENSITY(INCH/HR) =   2.40
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1        41.15    11.23         2.877         14.30
     2         0.45    16.30         2.396          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
     1        41.53    11.23       2.877
     2        34.73    16.30       2.396

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     41.53   Tc(MIN.) =   11.23
 TOTAL AREA(ACRES) =     14.70
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    983.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.07  DOWNSTREAM(FEET) =   489.98
 FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  21.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.56
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     41.53
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.25
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    983.00 =  2142.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    983.00 TO NODE    983.00 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.) =  11.25
 RAINFALL INTENSITY(INCH/HR) =   2.88
 TOTAL STREAM AREA(ACRES) =    14.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     41.53

****************************************************************************
 FLOW PROCESS FROM NODE    981.00 TO NODE    982.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.41
 DOWNSTREAM ELEVATION(FEET) =    505.21
 ELEVATION DIFFERENCE(FEET) =      0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.873
```

```
*CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
 DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
SUBAREA RUNOFF(CFS) =      0.28
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
FLOW PROCESS FROM NODE    982.00 TO NODE    983.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  505.21  DOWNSTREAM ELEVATION(FEET) =  502.12
STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 51.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.50
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.23
  HALFSTREET FLOOD WIDTH(FEET) =    5.13
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.31
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.30
STREET FLOW TRAVEL TIME(MIN.) =   4.58   Tc(MIN.) =  10.58
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.942
*USER SPECIFIED(SUBAREA):
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.45
TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       0.72

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.30
FLOW VELOCITY(FEET/SEC.) =  1.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.35
LONGEST FLOWPATH FROM NODE    981.00 TO NODE    983.00 =   410.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    983.00 TO NODE    983.00 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.) =  10.58
RAINFALL INTENSITY(INCH/HR) =   2.94
TOTAL STREAM AREA(ACRES) =     0.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.72

** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY       AREA
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1        41.53    11.25         2.875          14.70
    2         0.72    10.58         2.942           0.30

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF       Tc       INTENSITY
NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
    1        41.31    10.58         2.942
    2        42.24    11.25         2.875

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     42.24   Tc(MIN.) =   11.25
TOTAL AREA(ACRES) =     15.00
LONGEST FLOWPATH FROM NODE    911.00 TO NODE    983.00 =  2142.66 FEET.
```

```
**************************************************************************
 FLOW PROCESS FROM NODE     983.00 TO NODE     999.00 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.65  DOWNSTREAM(FEET) =   489.10
 FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  23.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.58
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     42.24
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =  11.39
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    999.00 =  2215.66 FEET.
==========================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =     15.00  TC(MIN.) =     11.39
 PEAK FLOW RATE(CFS)    =     42.24
==========================================================================
==========================================================================
 END OF RATIONAL METHOD ANALYSIS

♀
```

10-Year

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                          Rick Engineering Company
                        1223 University Ave., Suite 240
                          Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Unit 14                                  *
* Construction Change 'F'                                                 *
* Basin 900A - 10 Year Storm Event                                        *
 **************************************************************************

  FILE NAME: BMR9AP10.DAT
  TIME/DATE OF STUDY: 14:45 06/20/2014
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020    0.67    2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020    0.50    1.50 0.0313 0.125 0.0180
  3   51.0     46.0    0.020/0.020/0.020    0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     911.00 TO NODE     912.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  544.00
  DOWNSTREAM ELEVATION(FEET) =  539.81
  ELEVATION DIFFERENCE(FEET) =  4.19
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.233
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SUBAREA RUNOFF(CFS) =  0.28
  TOTAL AREA(ACRES) =  0.10   TOTAL RUNOFF(CFS) =  0.28

**************************************************************************
  FLOW PROCESS FROM NODE     912.00 TO NODE     913.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  539.81  DOWNSTREAM ELEVATION(FEET) =  527.37
```

```
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.64
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   3.24   Tc(MIN.) =   9.24
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.673
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =    0.96
 TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       1.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.19
 FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.24
 RAINFALL INTENSITY(INCH/HR) =   2.67
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.25

****************************************************************************
 FLOW PROCESS FROM NODE    913.40 TO NODE    913.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    913.50 TO NODE    913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   368.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.28
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.94
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
 STREET FLOW TRAVEL TIME(MIN.) =   3.17   Tc(MIN.) =   9.17
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.682
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.97
 TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       1.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.85
 FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    913.40 TO NODE    913.00 =   468.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.17
 RAINFALL INTENSITY(INCH/HR) =   2.68
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.25

****************************************************************************
 FLOW PROCESS FROM NODE    912.20 TO NODE    912.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    545.00
 DOWNSTREAM ELEVATION(FEET) =    542.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    912.40 TO NODE    913.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   542.00  DOWNSTREAM(FEET) =   532.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.59
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.28
 PIPE TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =   7.58
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.20 =   440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.20 TO NODE    913.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.914
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    2.00   SUBAREA RUNOFF(CFS) =    5.24
```

```
 TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =     5.53
 TC(MIN.) =   7.58

****************************************************************************
 FLOW PROCESS FROM NODE     913.20 TO NODE     913.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.84  DOWNSTREAM(FEET) =   523.69
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.53
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   7.62
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.00 =   455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     913.00 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.) =   7.62
 RAINFALL INTENSITY(INCH/HR) =   2.91
 TOTAL STREAM AREA(ACRES) =     2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.53

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         1.25      9.24        2.673         0.50
     2         1.25      9.17        2.682         0.50
     3         5.53      7.62        2.907         2.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
     1         7.83      7.62        2.907
     2         7.59      9.17        2.682
     3         7.58      9.24        2.673

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      7.83   Tc(MIN.) =    7.62
 TOTAL AREA(ACRES) =      3.10
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.69  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.83
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   7.68
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.00 TO NODE     909.00 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.) =   7.68
 RAINFALL INTENSITY(INCH/HR) =   2.90
 TOTAL STREAM AREA(ACRES) =     3.10
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.83

****************************************************************************
 FLOW PROCESS FROM NODE     913.60 TO NODE     913.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
 UPSTREAM ELEVATION(FEET) =  536.26
 DOWNSTREAM ELEVATION(FEET) =  534.26
 ELEVATION DIFFERENCE(FEET) =  2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =  0.28
 TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.28

****************************************************************************
 FLOW PROCESS FROM NODE     913.70 TO NODE     909.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =  385.00  CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =  0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =  0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  0.64
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =  4.81
   AVERAGE FLOW VELOCITY(FEET/SEC.) =  1.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =  0.41
 STREET FLOW TRAVEL TIME(MIN.) =  3.49  Tc(MIN.) =  9.49
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.647
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =  0.30  SUBAREA RUNOFF(CFS) =  0.71
 TOTAL AREA(ACRES) =  0.40  PEAK FLOW RATE(CFS) =  1.00

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25  HALFSTREET FLOOD WIDTH(FEET) =  6.19
 FLOW VELOCITY(FEET/SEC.) =  1.99  DEPTH*VELOCITY(FT*FT/SEC.) =  0.50
 LONGEST FLOWPATH FROM NODE  913.60 TO NODE  909.20 =  485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.20 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  523.25  DOWNSTREAM(FEET) =  523.14
 FLOW LENGTH(FEET) =  5.25  MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  4.69
 GIVEN PIPE DIAMETER(INCH) =  18.00  NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  1.00
 PIPE TRAVEL TIME(MIN.) =  0.02  Tc(MIN.) =  9.50
 LONGEST FLOWPATH FROM NODE  913.60 TO NODE  909.00 =  490.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.00 TO NODE     909.00 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.) =    9.50
 RAINFALL INTENSITY(INCH/HR) =    2.64
 TOTAL STREAM AREA(ACRES) =      0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.00

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         7.83      7.68         2.899          3.10
     2         1.00      9.50         2.645          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         8.74      7.68         2.899
     2         8.14      9.50         2.645

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.74   Tc(MIN.) =     7.68
 TOTAL AREA(ACRES) =       3.50
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     909.00 =    574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.00 TO NODE     910.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    522.64  DOWNSTREAM(FEET) =    521.73
 FLOW LENGTH(FEET) =     91.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.74
 PIPE TRAVEL TIME(MIN.) =    0.24    Tc(MIN.) =    7.91
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     910.00 =    665.75 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.00 TO NODE     910.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    521.40  DOWNSTREAM(FEET) =    512.91
 FLOW LENGTH(FEET) =    256.12   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.04
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.74
 PIPE TRAVEL TIME(MIN.) =    0.43    Tc(MIN.) =    8.34
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     910.20 =    921.87 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.20 TO NODE     910.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    511.29  DOWNSTREAM(FEET) =    506.34
 FLOW LENGTH(FEET) =    123.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.73
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.74
 PIPE TRAVEL TIME(MIN.) =    0.19    Tc(MIN.) =    8.53
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     910.30 =   1045.64 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.30 TO NODE     910.30 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.) =    8.53
 RAINFALL INTENSITY(INCH/HR) =    2.77
 TOTAL STREAM AREA(ACRES) =      3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.74

****************************************************************************
 FLOW PROCESS FROM NODE     910.40 TO NODE     910.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    100.00
 UPSTREAM ELEVATION(FEET) =     528.83
 DOWNSTREAM ELEVATION(FEET) =     525.33
 ELEVATION DIFFERENCE(FEET) =       3.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.371
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =       0.28
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.28

****************************************************************************
 FLOW PROCESS FROM NODE     910.60 TO NODE     910.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  527.40  DOWNSTREAM ELEVATION(FEET) =  513.28
 STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.54
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.18
   HALFSTREET FLOOD WIDTH(FEET) =    2.68
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.86
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   1.82   Tc(MIN.) =   7.82
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.877
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.52
 TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       0.80

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.04
 FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
 LONGEST FLOWPATH FROM NODE     910.40 TO NODE     910.30 =   412.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.30 TO NODE     910.30 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.) =    7.82
 RAINFALL INTENSITY(INCH/HR) =    2.88
 TOTAL STREAM AREA(ACRES) =      0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.80
```

```
** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY       AREA
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         8.74      8.53         2.771          3.50
    2         0.80      7.82         2.877          0.30

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF       Tc       INTENSITY
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         9.22      7.82         2.877
    2         9.51      8.53         2.771

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      9.51   Tc(MIN.) =    8.53
TOTAL AREA(ACRES) =      3.80
LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    910.30 TO NODE    914.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   505.84  DOWNSTREAM(FEET) =   499.83
FLOW LENGTH(FEET) =   140.08   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS   7.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.03
GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      9.51
PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   8.74
LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   8.74
RAINFALL INTENSITY(INCH/HR) =   2.74
TOTAL STREAM AREA(ACRES) =     3.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.51

****************************************************************************
FLOW PROCESS FROM NODE    914.20 TO NODE    914.40 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    516.00
DOWNSTREAM ELEVATION(FEET) =    513.78
ELEVATION DIFFERENCE(FEET) =      2.22
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.760
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
SUBAREA RUNOFF(CFS) =      0.28
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
FLOW PROCESS FROM NODE    914.40 TO NODE    914.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  513.28  DOWNSTREAM ELEVATION(FEET) =  505.13
STREET LENGTH(FEET) =   122.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =   6.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.080
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.10      SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =       0.20        PEAK FLOW RATE(CFS) =       0.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.16   HALFSTREET FLOOD WIDTH(FEET) =   1.50
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    914.20 TO NODE    914.00 =   222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   6.50
  RAINFALL INTENSITY(INCH/HR) =   3.08
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.56

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1         9.51      8.74         2.739          3.80
      2         0.56      6.50         3.080          0.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1         9.02      6.50         3.080
      2        10.01      8.74         2.739

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     10.01   Tc(MIN.) =    8.74
  TOTAL AREA(ACRES) =      4.00
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    954.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   498.71
  FLOW LENGTH(FEET) =    79.37   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.01
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   8.94
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    954.20 =  1265.09 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    954.20 TO NODE    954.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.709
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40   SUBAREA RUNOFF(CFS) =     0.98
 TOTAL AREA(ACRES) =       4.40   TOTAL RUNOFF(CFS) =    10.99
 TC(MIN.) =    8.94

****************************************************************************
 FLOW PROCESS FROM NODE     954.20 TO NODE     918.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.61  DOWNSTREAM(FEET) =   497.39
 FLOW LENGTH(FEET) =   121.84   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.99
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   9.24
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.80 =  1386.93 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.674
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.24
 TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =    11.23
 TC(MIN.) =    9.24

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.29  DOWNSTREAM(FEET) =   495.55
 FLOW LENGTH(FEET) =   173.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.87
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.23
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   9.66
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.60 =  1560.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     918.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.628
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.00   SUBAREA RUNOFF(CFS) =     2.36
 TOTAL AREA(ACRES) =       5.50   TOTAL RUNOFF(CFS) =    13.59
 TC(MIN.) =    9.66

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.44  DOWNSTREAM(FEET) =   495.06
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.16
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.59
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.75
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     916.00 =  1599.52 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.75
 RAINFALL INTENSITY(INCH/HR) =   2.62
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.59

****************************************************************************
 FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    512.74
 DOWNSTREAM ELEVATION(FEET) =    511.74
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.600
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      1.99
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      1.99

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.74  DOWNSTREAM(FEET) =   504.69
 FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.41
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.99
 PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =   7.53
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.20 =   505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.920
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =     3.30   SUBAREA RUNOFF(CFS) =     8.67
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =   10.66
 TC(MIN.) =   7.53

****************************************************************************
 FLOW PROCESS FROM NODE    918.20 TO NODE    918.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.66
 PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   9.08
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.40 =  1065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.40 TO NODE    918.50 IS CODE =  41
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.90  DOWNSTREAM(FEET) =   495.36
 FLOW LENGTH(FEET) =   259.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.66
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   9.65
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.50 =  1324.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.50 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.26  DOWNSTREAM(FEET) =   495.16
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.66
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   9.71
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =  1346.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.71
 RAINFALL INTENSITY(INCH/HR) =   2.62
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.66

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        13.59      9.75         2.618         5.50
     2        10.66      9.71         2.621         4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        24.24      9.71         2.621
     2        24.24      9.75         2.618

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     24.24   Tc(MIN.) =    9.75
 TOTAL AREA(ACRES) =      9.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.618
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    5.65
 TOTAL AREA(ACRES) =     11.90   TOTAL RUNOFF(CFS) =   29.90
 TC(MIN.) =   9.75

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    919.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.06  DOWNSTREAM(FEET) =    494.56
 CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0036
 CHANNEL BASE(FEET) =   45.50   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   6.00
 CHANNEL FLOW THRU SUBAREA(CFS) =     29.90
 FLOW VELOCITY(FEET/SEC.) =   2.43   FLOW DEPTH(FEET) =   0.27
 TRAVEL TIME(MIN.) =   0.96   Tc(MIN.) =  10.71
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    919.00 =  1739.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    919.00 TO NODE    920.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.51  DOWNSTREAM(FEET) =   493.67
 FLOW LENGTH(FEET) =    88.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.58
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     29.90
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  10.88
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    920.00 =  1827.82 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.57  DOWNSTREAM(FEET) =   493.09
 FLOW LENGTH(FEET) =    56.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     29.90
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =  10.99
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    921.00 =  1884.12 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    921.00 TO NODE    952.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.99  DOWNSTREAM(FEET) =   491.45
 FLOW LENGTH(FEET) =   187.54   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.08
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     29.90
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =  11.38
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    952.20 =  2071.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.20 TO NODE    990.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.15  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  18.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     29.90
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.40
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =  11.40
 RAINFALL INTENSITY(INCH/HR) =   2.44
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.90

****************************************************************************
 FLOW PROCESS FROM NODE    988.00 TO NODE    989.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.87
 DOWNSTREAM ELEVATION(FEET) =    503.75
 ELEVATION DIFFERENCE(FEET) =      0.12
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.096
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.57
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
 FLOW PROCESS FROM NODE    989.00 TO NODE    990.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.75  DOWNSTREAM ELEVATION(FEET) =  500.48
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.94
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.22
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
 STREET FLOW TRAVEL TIME(MIN.) =   3.59   Tc(MIN.) =   9.59
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.636
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.74
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       1.31

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.59
 FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
 LONGEST FLOWPATH FROM NODE    988.00 TO NODE    990.00 =   425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =   9.59
 RAINFALL INTENSITY(INCH/HR) =   2.64
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.31

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
```

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)	(ACRE)
1	29.90	11.40	2.440	11.90
2	1.31	9.59	2.636	0.60

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	28.98	9.59	2.636
2	31.11	11.40	2.440

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 31.11 Tc(MIN.) = 11.40
TOTAL AREA(ACRES) = 12.50
LONGEST FLOWPATH FROM NODE 911.00 TO NODE 990.00 = 2082.66 FEET.

****
FLOW PROCESS FROM NODE 990.00 TO NODE 991.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 491.21 DOWNSTREAM(FEET) = 491.06
FLOW LENGTH(FEET) = 11.00 MANNING'S N = 0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.90
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 31.11
PIPE TRAVEL TIME(MIN.) = 0.02 Tc(MIN.) = 11.42
LONGEST FLOWPATH FROM NODE 911.00 TO NODE 991.00 = 2093.66 FEET.

****
FLOW PROCESS FROM NODE 991.00 TO NODE 991.00 IS CODE = 10

>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==

****
FLOW PROCESS FROM NODE 957.00 TO NODE 958.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 503.59
DOWNSTREAM ELEVATION(FEET) = 501.59
ELEVATION DIFFERENCE(FEET) = 2.00
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) = 2.857
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.160
SUBAREA RUNOFF(CFS) = 0.28
TOTAL AREA(ACRES) = 0.10 TOTAL RUNOFF(CFS) = 0.28

****
FLOW PROCESS FROM NODE 958.00 TO NODE 955.00 IS CODE = 62

>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION # 2 USED)<<<<<
==
UPSTREAM ELEVATION(FEET) = 501.59 DOWNSTREAM ELEVATION(FEET) = 497.41
STREET LENGTH(FEET) = 304.00 CURB HEIGHT(INCHES) = 6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 13.00
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) = 0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.90

```
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.25
  HALFSTREET FLOOD WIDTH(FEET) =    6.24
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.77
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =   8.87
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.720
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =    1.22
TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       1.51

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =  8.07
FLOW VELOCITY(FEET/SEC.) =  1.96   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
LONGEST FLOWPATH FROM NODE    957.00 TO NODE    955.00 =   404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.76  DOWNSTREAM(FEET) =   492.46
  FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.07
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.51
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   8.99
  LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.99
  RAINFALL INTENSITY(INCH/HR) =   2.70
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE    959.00 TO NODE    960.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    503.59
  DOWNSTREAM ELEVATION(FEET) =    501.59
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    960.00 TO NODE    956.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.05
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.45
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   2.12   Tc(MIN.) =   8.12
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.832
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =    1.53
 TOTAL AREA(ACRES) =       0.70        PEAK FLOW RATE(CFS) =       1.81

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.38
 FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.20 =   350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.20 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.48  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.81
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.13
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.00 =   352.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.13
 RAINFALL INTENSITY(INCH/HR) =   2.83
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.81

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         1.51      8.99         2.701          0.60
     2         1.81      8.13         2.831          0.70

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         3.25      8.13         2.831
     2         3.24      8.99         2.701

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      3.25   Tc(MIN.) =    8.13
 TOTAL AREA(ACRES) =      1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.46  DOWNSTREAM(FEET) =   491.06
```

```
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.25
 PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   8.89
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1         3.25     8.89        2.716        1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        31.11    11.42        2.438       12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
    1       31.17       8.89        2.716
    2       34.03      11.42        2.438

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     34.03   Tc(MIN.) =   11.42
 TOTAL AREA(ACRES) =     13.80

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =  11.42
 RAINFALL INTENSITY(INCH/HR) =   2.44
 TOTAL STREAM AREA(ACRES) =    13.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.03

****************************************************************************
 FLOW PROCESS FROM NODE    994.20 TO NODE    994.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    501.47
 DOWNSTREAM ELEVATION(FEET) =    500.54
 ELEVATION DIFFERENCE(FEET) =      0.93
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    994.40 TO NODE    994.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
```

```
UPSTREAM ELEVATION(FEET) =  500.54  DOWNSTREAM ELEVATION(FEET) =  498.52
STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 51.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.79
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.25
  HALFSTREET FLOOD WIDTH(FEET) =    6.39
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.50
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.38
STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =   8.28
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.809
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =    1.01
TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       1.30

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.10
FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
LONGEST FLOWPATH FROM NODE    994.20 TO NODE    994.00 =   305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    994.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.61  DOWNSTREAM(FEET) =   491.06
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.29
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.30
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   9.44
  LONGEST FLOWPATH FROM NODE    994.20 TO NODE    991.00 =   535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =   9.44
  RAINFALL INTENSITY(INCH/HR) =   2.65
  TOTAL STREAM AREA(ACRES) =     0.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.30

  ** CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1        34.03    11.42        2.438         13.80
      2         1.30     9.44        2.651          0.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF      Tc       INTENSITY
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
      1        32.59     9.44        2.651
      2        35.22    11.42        2.438

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     35.22   Tc(MIN.) =   11.42
  TOTAL AREA(ACRES) =     14.30
```

```
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    987.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.73  DOWNSTREAM(FEET) =   490.40
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  20.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.55
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     35.22
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  11.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  11.50
 RAINFALL INTENSITY(INCH/HR) =   2.43
 TOTAL STREAM AREA(ACRES) =    14.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.22

****************************************************************************
 FLOW PROCESS FROM NODE    985.00 TO NODE    986.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.80
 DOWNSTREAM ELEVATION(FEET) =    505.60
 ELEVATION DIFFERENCE(FEET) =      0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.228
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.457
 SUBAREA RUNOFF(CFS) =      0.11
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
 FLOW PROCESS FROM NODE    986.00 TO NODE    987.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    505.60  DOWNSTREAM(FEET) =    501.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   330.00   CHANNEL SLOPE =  0.0124
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.034
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.25
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.06
 AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   5.20
 Tc(MIN.) =  16.43
 SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.27
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       0.39

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE    985.00 TO NODE    987.00 =   380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  16.43
 RAINFALL INTENSITY(INCH/HR) =   2.03
 TOTAL STREAM AREA(ACRES) =    0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.39

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1        35.22    11.50        2.430         14.30
     2         0.39    16.43        2.034          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1        35.54    11.50        2.430
     2        29.86    16.43        2.034

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     35.54   Tc(MIN.) =   11.50
 TOTAL AREA(ACRES) =     14.70
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    983.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.07  DOWNSTREAM(FEET) =   489.98
 FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     35.54
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.51
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    983.00 =  2142.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    983.00 TO NODE    983.00 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.) =  11.51
 RAINFALL INTENSITY(INCH/HR) =   2.43
 TOTAL STREAM AREA(ACRES) =    14.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.54

****************************************************************************
 FLOW PROCESS FROM NODE    981.00 TO NODE    982.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.41
 DOWNSTREAM ELEVATION(FEET) =    505.21
 ELEVATION DIFFERENCE(FEET) =      0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.873
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.24
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
 FLOW PROCESS FROM NODE    982.00 TO NODE    983.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  3 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  505.21  DOWNSTREAM ELEVATION(FEET) =  502.12
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 51.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.28
  STREET FLOW TRAVEL TIME(MIN.) =   4.71   Tc(MIN.) =  10.71
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.512
  *USER SPECIFIED(SUBAREA):
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.38
  TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       0.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.85
  FLOW VELOCITY(FEET/SEC.) =  1.35   DEPTH*VELOCITY(FT*FT/SEC.) =   0.33
  LONGEST FLOWPATH FROM NODE    981.00 TO NODE    983.00 =   410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    983.00 TO NODE    983.00 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.) =  10.71
  RAINFALL INTENSITY(INCH/HR) =   2.51
  TOTAL STREAM AREA(ACRES) =     0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.62

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1        35.54     11.51        2.429         14.70
      2         0.62     10.71        2.512          0.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        34.99     10.71        2.512
      2        36.14     11.51        2.429

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     36.14   Tc(MIN.) =   11.51
  TOTAL AREA(ACRES) =     15.00
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    983.00 =  2142.66 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    983.00 TO NODE    999.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   489.65  DOWNSTREAM(FEET) =   489.10
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  21.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.30
```

```
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     36.14
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  11.66
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    999.00 =  2215.66 FEET.
================================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =     15.00  TC(MIN.) =     11.66
 PEAK FLOW RATE(CFS)    =     36.14
================================================================================
================================================================================
 END OF RATIONAL METHOD ANALYSIS
```

♀

2-Year

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                          Rick Engineering Company
                       1223 University Ave., Suite 240
                         Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Unit 14                                  *
* Construction Change 'F'                                                 *
* Basin 900A - 2 Year Storm Event                                         *
 **************************************************************************

  FILE NAME: BMR9AP02.DAT
  TIME/DATE OF STUDY: 09:04 06/26/2014
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  4
   1)   5.000;  2.500
   2)  10.000;  1.800
   3)  15.000;  1.500
   4)  20.000;  1.200
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00  0.0313  0.167  0.0150
  2   18.0     13.0    0.020/0.020/0.020   0.50    1.50  0.0313  0.125  0.0180
  3   51.0     46.0    0.020/0.020/0.020   0.50    1.50  0.0313  0.125  0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     911.00 TO NODE     912.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  544.00
  DOWNSTREAM ELEVATION(FEET) =  539.81
  ELEVATION DIFFERENCE(FEET) =  4.19
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.233
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  SUBAREA RUNOFF(CFS) =  0.21
  TOTAL AREA(ACRES) =  0.10   TOTAL RUNOFF(CFS) =  0.21

**************************************************************************
  FLOW PROCESS FROM NODE     912.00 TO NODE     913.00 IS CODE =  62
--------------------------------------------------------------------------
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  539.81  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    3.61
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   3.34   Tc(MIN.) =   9.34
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.892
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.68
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       0.89

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.13
 FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.34
 RAINFALL INTENSITY(INCH/HR) =   1.89
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.89

****************************************************************************
 FLOW PROCESS FROM NODE    913.40 TO NODE    913.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    913.50 TO NODE    913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   368.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
  STREET FLOW TRAVEL TIME(MIN.) =   3.31   Tc(MIN.) =   9.31
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.896
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       0.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.74
  FLOW VELOCITY(FEET/SEC.) =  2.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE    913.40 TO NODE    913.00 =   468.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.31
  RAINFALL INTENSITY(INCH/HR) =   1.90
  TOTAL STREAM AREA(ACRES) =     0.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.90

****************************************************************************
  FLOW PROCESS FROM NODE    912.20 TO NODE    912.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    545.00
  DOWNSTREAM ELEVATION(FEET) =    542.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    912.40 TO NODE    913.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   542.00  DOWNSTREAM(FEET) =   532.00
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.33
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      0.21
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   7.70
  LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.20 =   440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.20 TO NODE    913.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.122
```

```
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =  2.00   SUBAREA RUNOFF(CFS) =  3.82
 TOTAL AREA(ACRES) =  2.10   TOTAL RUNOFF(CFS) =  4.03
 TC(MIN.) =  7.70

****************************************************************************
 FLOW PROCESS FROM NODE    913.20 TO NODE    913.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  523.84  DOWNSTREAM(FEET) =  523.69
 FLOW LENGTH(FEET) =  15.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  7.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  5.25
 GIVEN PIPE DIAMETER(INCH) =  24.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  4.03
 PIPE TRAVEL TIME(MIN.) =  0.05   Tc(MIN.) =  7.75
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.00 =  455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =  7.75
 RAINFALL INTENSITY(INCH/HR) =  2.12
 TOTAL STREAM AREA(ACRES) =  2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =  4.03

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1        0.89     9.34        1.892         0.50
    2        0.90     9.31        1.896         0.50
    3        4.03     7.75        2.115         2.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        5.63     7.75        2.115
    2        5.40     9.31        1.896
    3        5.39     9.34        1.892

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =  5.63   Tc(MIN.) =  7.75
 TOTAL AREA(ACRES) =  3.10
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =  547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  523.69  DOWNSTREAM(FEET) =  523.14
 FLOW LENGTH(FEET) =  27.25  MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  7.57
 GIVEN PIPE DIAMETER(INCH) =  18.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  5.63
 PIPE TRAVEL TIME(MIN.) =  0.06   Tc(MIN.) =  7.81
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =  574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 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.) =   7.81
 RAINFALL INTENSITY(INCH/HR) =   2.11
 TOTAL STREAM AREA(ACRES) =      3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.63

****************************************************************************
 FLOW PROCESS FROM NODE     913.60 TO NODE     913.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =     536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =       0.21
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.21

****************************************************************************
 FLOW PROCESS FROM NODE     913.70 TO NODE     909.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    3.77
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
 STREET FLOW TRAVEL TIME(MIN.) =   3.60   Tc(MIN.) =   9.60
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.856
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.50
 TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       0.71

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.13
 FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
 LONGEST FLOWPATH FROM NODE     913.60 TO NODE     909.20 =   485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.20 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.25  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.25
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.71
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.62
 LONGEST FLOWPATH FROM NODE     913.60 TO NODE     909.00 =   490.25 FEET.

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

```
 FLOW PROCESS FROM NODE     909.00 TO NODE     909.00 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.) =    9.62
 RAINFALL INTENSITY(INCH/HR) =    1.85
 TOTAL STREAM AREA(ACRES) =      0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.71

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1          5.63      7.81         2.107          3.10
    2          0.71      9.62         1.853          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1          6.26      7.81         2.107
    2          5.67      9.62         1.853

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.26   Tc(MIN.) =     7.81
 TOTAL AREA(ACRES) =       3.50
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     909.00 =    574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.00 TO NODE     910.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    522.64  DOWNSTREAM(FEET) =    521.73
 FLOW LENGTH(FEET) =     91.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS    8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =    5.92
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.26
 PIPE TRAVEL TIME(MIN.) =    0.26    Tc(MIN.) =    8.07
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     910.00 =    665.75 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.00 TO NODE     910.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    521.40  DOWNSTREAM(FEET) =    512.91
 FLOW LENGTH(FEET) =    256.12   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS    6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =    9.13
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.26
 PIPE TRAVEL TIME(MIN.) =    0.47    Tc(MIN.) =    8.53
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     910.20 =    921.87 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.20 TO NODE     910.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    511.29  DOWNSTREAM(FEET) =    506.34
 FLOW LENGTH(FEET) =    123.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS    6.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =    9.76
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.26
 PIPE TRAVEL TIME(MIN.) =    0.21    Tc(MIN.) =    8.75
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     910.30 =   1045.64 FEET.

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

```
 FLOW PROCESS FROM NODE     910.30 TO NODE     910.30 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.) =    8.75
 RAINFALL INTENSITY(INCH/HR) =    1.98
 TOTAL STREAM AREA(ACRES) =      3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.26

****************************************************************************
 FLOW PROCESS FROM NODE     910.40 TO NODE     910.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    100.00
 UPSTREAM ELEVATION(FEET) =     528.83
 DOWNSTREAM ELEVATION(FEET) =     525.33
 ELEVATION DIFFERENCE(FEET) =       3.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.371
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =       0.21
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.21

****************************************************************************
 FLOW PROCESS FROM NODE     910.60 TO NODE     910.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  527.40  DOWNSTREAM ELEVATION(FEET) =  513.28
 STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.16
   HALFSTREET FLOOD WIDTH(FEET) =    1.50
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
 STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =   7.56
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.142
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.39
 TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       0.60

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   3.06
 FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
 LONGEST FLOWPATH FROM NODE     910.40 TO NODE     910.30 =   412.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.30 TO NODE     910.30 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.) =    7.56
```

```
 RAINFALL INTENSITY(INCH/HR) =   2.14
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.60

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1          6.26     8.75        1.976         3.50
    2          0.60     7.56        2.142         0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
    1          6.37     7.56        2.142
    2          6.81     8.75        1.976

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      6.81   Tc(MIN.) =    8.75
 TOTAL AREA(ACRES) =      3.80
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    914.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.84  DOWNSTREAM(FEET) =   499.83
 FLOW LENGTH(FEET) =   140.08   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.81
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   8.98
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   8.98
 RAINFALL INTENSITY(INCH/HR) =   1.94
 TOTAL STREAM AREA(ACRES) =     3.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.81

****************************************************************************
 FLOW PROCESS FROM NODE    914.20 TO NODE    914.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    516.00
 DOWNSTREAM ELEVATION(FEET) =    513.78
 ELEVATION DIFFERENCE(FEET) =      2.22
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.760
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    914.40 TO NODE    914.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  513.28  DOWNSTREAM ELEVATION(FEET) =  505.13
 STREET LENGTH(FEET) =   122.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.32
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.16
   HALFSTREET FLOOD WIDTH(FEET) =    1.50
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
 STREET FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =   6.50
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.290
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.21
 TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.16   HALFSTREET FLOOD WIDTH(FEET) =   1.50
 FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
 LONGEST FLOWPATH FROM NODE    914.20 TO NODE    914.00 =   222.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   6.50
 RAINFALL INTENSITY(INCH/HR) =   2.29
 TOTAL STREAM AREA(ACRES) =     0.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.42

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         6.81     8.98        1.943         3.80
    2         0.42     6.50        2.290         0.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1         6.20     6.50        2.290
    2         7.17     8.98        1.943

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      7.17   Tc(MIN.) =    8.98
 TOTAL AREA(ACRES) =      4.00
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    914.00 TO NODE    954.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   498.71
 FLOW LENGTH(FEET) =    79.37   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.17
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   9.20
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    954.20 =  1265.09 FEET.

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

```
 FLOW PROCESS FROM NODE     954.20 TO NODE     954.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.912
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40   SUBAREA RUNOFF(CFS) =     0.69
 TOTAL AREA(ACRES) =       4.40   TOTAL RUNOFF(CFS) =     7.86
 TC(MIN.) =   9.20

****************************************************************************
 FLOW PROCESS FROM NODE     954.20 TO NODE     918.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.61  DOWNSTREAM(FEET) =   497.39
 FLOW LENGTH(FEET) =   121.84   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.86
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   9.52
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.80 =  1386.93 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.867
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.17
 TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =     8.02
 TC(MIN.) =   9.52

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.29  DOWNSTREAM(FEET) =   495.55
 FLOW LENGTH(FEET) =   173.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.02
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   9.99
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.60 =  1560.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     918.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.802
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.00   SUBAREA RUNOFF(CFS) =     1.62
 TOTAL AREA(ACRES) =       5.50   TOTAL RUNOFF(CFS) =     9.65
 TC(MIN.) =   9.99

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.44  DOWNSTREAM(FEET) =   495.06
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.52
```

```
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.65
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  10.09
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =  10.09
 RAINFALL INTENSITY(INCH/HR) =   1.79
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.65

****************************************************************************
 FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    512.74
 DOWNSTREAM ELEVATION(FEET) =    511.74
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.600
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      1.49
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      1.49

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.74  DOWNSTREAM(FEET) =   504.69
 FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.05
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.49
 PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =   7.67
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.20 =   505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.127
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     3.30   SUBAREA RUNOFF(CFS) =     6.32
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =    7.80
 TC(MIN.) =   7.67

****************************************************************************
 FLOW PROCESS FROM NODE    918.20 TO NODE    918.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.80
 PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   9.16
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.40 =  1065.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    918.40 TO NODE    918.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.90  DOWNSTREAM(FEET) =   495.36
 FLOW LENGTH(FEET) =   259.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.80
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   9.77
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.50 =  1324.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.50 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.26  DOWNSTREAM(FEET) =   495.16
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.42
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.80
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   9.85
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =  1346.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.85
 RAINFALL INTENSITY(INCH/HR) =   1.82
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.80

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1          9.65     10.09         1.795          5.50
    2          7.80      9.85         1.820          4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         17.31      9.85         1.820
    2         17.34     10.09         1.795

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     17.34   Tc(MIN.) =   10.09
 TOTAL AREA(ACRES) =      9.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.795
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    3.88
 TOTAL AREA(ACRES) =     11.90   TOTAL RUNOFF(CFS) =   21.22
 TC(MIN.) =  10.09

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

```
 FLOW PROCESS FROM NODE    916.00 TO NODE    919.00 IS CODE =  51
----------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.06  DOWNSTREAM(FEET) =    494.56
 CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0036
 CHANNEL BASE(FEET) =   45.50   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   6.00
 CHANNEL FLOW THRU SUBAREA(CFS) =     21.22
 FLOW VELOCITY(FEET/SEC.) =   2.14   FLOW DEPTH(FEET) =   0.22
 TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =  11.18
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    919.00 =  1739.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    919.00 TO NODE    920.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.51  DOWNSTREAM(FEET) =   493.67
 FLOW LENGTH(FEET) =    88.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.96
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.22
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =  11.36
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    920.00 =  1827.82 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.57  DOWNSTREAM(FEET) =   493.09
 FLOW LENGTH(FEET) =    56.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  16.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.64
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.22
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =  11.49
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    921.00 =  1884.12 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    921.00 TO NODE    952.20 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.99  DOWNSTREAM(FEET) =   491.45
 FLOW LENGTH(FEET) =   187.54   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  16.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.53
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.22
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =  11.90
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    952.20 =  2071.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.20 TO NODE    990.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.15  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     21.22
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.93
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =  11.93
 RAINFALL INTENSITY(INCH/HR) =   1.68
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.22

****************************************************************************
 FLOW PROCESS FROM NODE    988.00 TO NODE    989.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.87
 DOWNSTREAM ELEVATION(FEET) =    503.75
 ELEVATION DIFFERENCE(FEET) =      0.12
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.096
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    989.00 TO NODE    990.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.75  DOWNSTREAM ELEVATION(FEET) =  500.48
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.68
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    4.84
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   3.68   Tc(MIN.) =   9.68
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.844
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.52
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       0.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.22
 FLOW VELOCITY(FEET/SEC.) =  1.75   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
 LONGEST FLOWPATH FROM NODE    988.00 TO NODE    990.00 =   425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =   9.68
 RAINFALL INTENSITY(INCH/HR) =   1.84
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.94
```

```
 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         21.22     11.93        1.684          11.90
    2          0.94      9.68        1.844           0.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         20.32      9.68        1.844
    2         22.07     11.93        1.684

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     22.07   Tc(MIN.) =   11.93
 TOTAL AREA(ACRES) =     12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.21  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.02
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     22.07
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  11.95
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    957.00 TO NODE    958.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    958.00 TO NODE    955.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
 STREET LENGTH(FEET) =   304.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.38
  STREET FLOW TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =   9.05
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.933
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     0.87
  TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       1.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.85
  FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE    957.00 TO NODE    955.00 =   404.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.76  DOWNSTREAM(FEET) =   492.46
  FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.70
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.08
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   9.19
  LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   9.19
  RAINFALL INTENSITY(INCH/HR) =   1.91
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE    959.00 TO NODE    960.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    503.59
  DOWNSTREAM ELEVATION(FEET) =    501.59
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    960.00 TO NODE    956.20 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.86
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   2.25   Tc(MIN.) =   8.25
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.046
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =     1.10
 TOTAL AREA(ACRES) =       0.70        PEAK FLOW RATE(CFS) =       1.32

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.21
 FLOW VELOCITY(FEET/SEC.) =  2.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.20 =   350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.20 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.48  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.76
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.32
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.26
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.00 =   352.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.26
 RAINFALL INTENSITY(INCH/HR) =   2.04
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.32

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1         1.08     9.19        1.914         0.60
     2         1.32     8.26        2.044         0.70

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1         2.33     8.26        2.044
     2         2.31     9.19        1.914

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      2.33   Tc(MIN.) =    8.26
 TOTAL AREA(ACRES) =      1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   492.46  DOWNSTREAM(FEET) =   491.06
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.95
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.33
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   9.10
  LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1          2.33      9.10        1.926         1.30
  LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF      Tc       INTENSITY      AREA
  NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
     1         22.07     11.95        1.683        12.50
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1        21.62       9.10        1.926
     2        24.11      11.95        1.683

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     24.11   Tc(MIN.) =   11.95
  TOTAL AREA(ACRES) =     13.80

****************************************************************************
  FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =  11.95
  RAINFALL INTENSITY(INCH/HR) =   1.68
  TOTAL STREAM AREA(ACRES) =    13.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.11

****************************************************************************
  FLOW PROCESS FROM NODE    994.20 TO NODE    994.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    501.47
  DOWNSTREAM ELEVATION(FEET) =    500.54
  ELEVATION DIFFERENCE(FEET) =      0.93
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.688
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    994.40 TO NODE    994.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>(STREET TABLE SECTION #  3 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  500.54  DOWNSTREAM ELEVATION(FEET) =  498.52
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 51.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.33
  STREET FLOW TRAVEL TIME(MIN.) =   2.43   Tc(MIN.) =   8.43
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.020
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.73
  TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       0.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.93
  FLOW VELOCITY(FEET/SEC.) =  1.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.42
  LONGEST FLOWPATH FROM NODE    994.20 TO NODE    994.00 =   305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    994.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.61  DOWNSTREAM(FEET) =   491.06
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.99
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      0.94
  PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =   9.71
  LONGEST FLOWPATH FROM NODE    994.20 TO NODE    991.00 =   535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 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.) =   9.71
  RAINFALL INTENSITY(INCH/HR) =   1.84
  TOTAL STREAM AREA(ACRES) =    0.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.94

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        24.11     11.95         1.683         13.80
     2         0.94      9.71         1.841          0.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        22.99      9.71         1.841
     2        24.97     11.95         1.683

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =     24.97   Tc(MIN.) =   11.95
 TOTAL AREA(ACRES) =     14.30
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    987.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.73  DOWNSTREAM(FEET) =   490.40
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.85
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     24.97
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =  12.03
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  12.03
 RAINFALL INTENSITY(INCH/HR) =   1.68
 TOTAL STREAM AREA(ACRES) =    14.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.97

****************************************************************************
 FLOW PROCESS FROM NODE    985.00 TO NODE    986.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.80
 DOWNSTREAM ELEVATION(FEET) =    505.60
 ELEVATION DIFFERENCE(FEET) =      0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.046
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.354
 SUBAREA RUNOFF(CFS) =      0.18
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
 FLOW PROCESS FROM NODE    986.00 TO NODE    987.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    505.60  DOWNSTREAM(FEET) =    501.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   330.00   CHANNEL SLOPE =  0.0124
 CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   4.000
 MANNING'S FACTOR = 0.035   MAXIMUM DEPTH(FEET) =   2.00
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.737
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.30
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.10
 AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.00
 Tc(MIN.) =  11.05
 SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.23
 TOTAL AREA(ACRES) =      0.40         PEAK FLOW RATE(CFS) =       0.41

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   1.20
 LONGEST FLOWPATH FROM NODE    985.00 TO NODE    987.00 =   380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    987.00 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.) =  11.05
 RAINFALL INTENSITY(INCH/HR) =   1.74
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.41

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        24.97     12.03         1.678         14.30
     2         0.41     11.05         1.737          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        24.53     11.05         1.737
     2        25.37     12.03         1.678

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     25.37   Tc(MIN.) =   12.03
 TOTAL AREA(ACRES) =     14.70
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    987.00 =  2133.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    987.00 TO NODE    983.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   490.07  DOWNSTREAM(FEET) =   489.98
 FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.47
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.37
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  12.05
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    983.00 =  2142.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    983.00 TO NODE    983.00 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.) =  12.05
 RAINFALL INTENSITY(INCH/HR) =   1.68
 TOTAL STREAM AREA(ACRES) =    14.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.37

****************************************************************************
 FLOW PROCESS FROM NODE    981.00 TO NODE    982.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    505.41
 DOWNSTREAM ELEVATION(FEET) =    505.21
 ELEVATION DIFFERENCE(FEET) =      0.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.873
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.18
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

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

```
 FLOW PROCESS FROM NODE     982.00 TO NODE     983.00 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
======================================================================
 UPSTREAM ELEVATION(FEET) =  505.21  DOWNSTREAM ELEVATION(FEET) =  502.12
 STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 51.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  46.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.31
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    3.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.24
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.25
 STREET FLOW TRAVEL TIME(MIN.) =   4.84   Tc(MIN.) =  10.84
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.750
 *USER SPECIFIED(SUBAREA):
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .7600
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =    0.27
 TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       0.45

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.81
 FLOW VELOCITY(FEET/SEC.) =  1.27   DEPTH*VELOCITY(FT*FT/SEC.) =   0.28
 LONGEST FLOWPATH FROM NODE     981.00 TO NODE     983.00 =   410.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     983.00 TO NODE     983.00 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.) =  10.84
 RAINFALL INTENSITY(INCH/HR) =   1.75
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        25.37     12.05         1.677          14.70
     2         0.45     10.84         1.750           0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        24.76     10.84        1.750
     2        25.79     12.05        1.677

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     25.79   Tc(MIN.) =   12.05
 TOTAL AREA(ACRES) =     15.00
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     983.00 =  2142.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     983.00 TO NODE     999.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.65  DOWNSTREAM(FEET) =   489.10
 FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  17.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     25.79
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =  12.21
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    999.00 =  2215.66 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =     15.00  TC(MIN.) =     12.21
 PEAK FLOW RATE(CFS)   =     25.79
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

♀

Detained Flow

25-Year

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                          Rick Engineering Company
                        1223 University Ave., Suite 240
                          Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Unit 14                                  *
* Construction Change 'F' - Basin 900A                                    *
* 25 Year - DETAINED - (Excluding Cam. Del Sur)                           *
 **************************************************************************

  FILE NAME: 9A_DET25.DAT
  TIME/DATE OF STUDY: 15:10 07/03/2014
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  3.800
   2)  10.000;  3.000
   3)  15.000;  2.500
   4)  20.000;  2.100
   5)  25.000;  1.900
   6)  30.000;  1.700
   7)  40.000;  1.450
   8)  50.000;  1.300
   9)  60.000;  1.150
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180
  3   51.0     46.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     911.00 TO NODE     912.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  544.00
  DOWNSTREAM ELEVATION(FEET) =  539.81
  ELEVATION DIFFERENCE(FEET) =  4.19
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.233
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
  SUBAREA RUNOFF(CFS) =  0.33
```

```
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE     912.00 TO NODE     913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  539.81  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.13
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
 STREET FLOW TRAVEL TIME(MIN.) =   3.18   Tc(MIN.) =   9.18
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.131
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     1.13
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.45

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.70
 FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     913.00 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.) =   9.18
 RAINFALL INTENSITY(INCH/HR) =   3.13
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.45

****************************************************************************
 FLOW PROCESS FROM NODE     913.40 TO NODE     913.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE     913.50 TO NODE     913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   368.00   CURB HEIGHT(INCHES) =  6.0
```

```
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.74
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.00
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
 STREET FLOW TRAVEL TIME(MIN.) =   3.06   Tc(MIN.) =   9.06
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.150
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.46

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.36
 FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
 LONGEST FLOWPATH FROM NODE    913.40 TO NODE    913.00 =   468.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.06
 RAINFALL INTENSITY(INCH/HR) =   3.15
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.46

****************************************************************************
 FLOW PROCESS FROM NODE    912.20 TO NODE    912.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    545.00
 DOWNSTREAM ELEVATION(FEET) =    542.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    912.40 TO NODE    913.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   542.00  DOWNSTREAM(FEET) =   532.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.82
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.33
 PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =   7.48
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.20 =   440.00 FEET.

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

```
 FLOW PROCESS FROM NODE     913.20 TO NODE     913.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.402
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     2.00   SUBAREA RUNOFF(CFS) =     6.12
 TOTAL AREA(ACRES) =       2.10   TOTAL RUNOFF(CFS) =     6.45
 TC(MIN.) =   7.48

****************************************************************************
 FLOW PROCESS FROM NODE     913.20 TO NODE     913.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.84  DOWNSTREAM(FEET) =   523.69
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.45
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   7.53
 LONGEST FLOWPATH FROM NODE     912.20 TO NODE     913.00 =   455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     913.00 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.) =   7.53
 RAINFALL INTENSITY(INCH/HR) =   3.40
 TOTAL STREAM AREA(ACRES) =     2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.45

 ** CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         1.45      9.18        3.131         0.50
     2         1.46      9.06        3.150         0.50
     3         6.45      7.53        3.396         2.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF      Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1         9.15      7.53        3.396
     2         8.89      9.06        3.150
     3         8.86      9.18        3.131

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      9.15   Tc(MIN.) =    7.53
 TOTAL AREA(ACRES) =      3.10
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.69  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.15
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.58
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     909.00 =   574.25 FEET.

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

```
 FLOW PROCESS FROM NODE     909.00 TO NODE     909.00 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.) =    7.58
 RAINFALL INTENSITY(INCH/HR) =    3.39
 TOTAL STREAM AREA(ACRES) =      3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.15

****************************************************************************
 FLOW PROCESS FROM NODE     913.60 TO NODE     913.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    100.00
 UPSTREAM ELEVATION(FEET) =     536.26
 DOWNSTREAM ELEVATION(FEET) =     534.26
 ELEVATION DIFFERENCE(FEET) =       2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =       0.33
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.33

****************************************************************************
 FLOW PROCESS FROM NODE     913.70 TO NODE     909.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.75
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =   9.36
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.102
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.84
 TOTAL AREA(ACRES) =       0.40        PEAK FLOW RATE(CFS) =       1.17

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.70
 FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
 LONGEST FLOWPATH FROM NODE     913.60 TO NODE     909.20 =   485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.20 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.25  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.92
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      1.17
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.38
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.00 =   490.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 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.) =   9.38
 RAINFALL INTENSITY(INCH/HR) =   3.10
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         9.15      7.58         3.387          3.10
     2         1.17      9.38         3.099          0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        10.22      7.58         3.387
     2         9.54      9.38         3.099

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     10.22   Tc(MIN.) =    7.58
 TOTAL AREA(ACRES) =      3.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    910.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   522.64  DOWNSTREAM(FEET) =   521.73
 FLOW LENGTH(FEET) =    91.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.22
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   7.81
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.00 =   665.75 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.00 TO NODE    910.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   521.40  DOWNSTREAM(FEET) =   512.91
 FLOW LENGTH(FEET) =   256.12   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.49
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.22
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   8.21
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.20 =   921.87 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.20 TO NODE    910.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.29  DOWNSTREAM(FEET) =   506.34
 FLOW LENGTH(FEET) =   123.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.22
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     10.22
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   8.40
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =   8.40
 RAINFALL INTENSITY(INCH/HR) =   3.26
 TOTAL STREAM AREA(ACRES) =     3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.22

****************************************************************************
 FLOW PROCESS FROM NODE    910.40 TO NODE    910.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    528.83
 DOWNSTREAM ELEVATION(FEET) =    525.33
 ELEVATION DIFFERENCE(FEET) =      3.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.371
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    910.60 TO NODE    910.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  527.40  DOWNSTREAM ELEVATION(FEET) =  513.28
 STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.19
   HALFSTREET FLOOD WIDTH(FEET) =    3.22
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
 STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =   7.84
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.346
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.60
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       0.93

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   4.48
 FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
 LONGEST FLOWPATH FROM NODE    910.40 TO NODE    910.30 =   412.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =   7.84
 RAINFALL INTENSITY(INCH/HR) =   3.35
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.93

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1         10.22      8.40         3.257          3.50
    2          0.93      7.84         3.346          0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         10.87      7.84         3.346
    2         11.12      8.40         3.257

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     11.12   Tc(MIN.) =    8.40
 TOTAL AREA(ACRES) =      3.80
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    914.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.84  DOWNSTREAM(FEET) =   499.83
 FLOW LENGTH(FEET) =   140.08   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   7.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.12
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   8.60
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   8.60
 RAINFALL INTENSITY(INCH/HR) =   3.22
 TOTAL STREAM AREA(ACRES) =     3.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.12

****************************************************************************
 FLOW PROCESS FROM NODE    914.20 TO NODE    914.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    516.00
 DOWNSTREAM ELEVATION(FEET) =    513.78
 ELEVATION DIFFERENCE(FEET) =      2.22
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.760
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    914.40 TO NODE    914.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  513.28  DOWNSTREAM ELEVATION(FEET) =  505.13
  STREET LENGTH(FEET) =   122.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =   6.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.560
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.18   HALFSTREET FLOOD WIDTH(FEET) =   2.62
  FLOW VELOCITY(FEET/SEC.) =  3.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
  LONGEST FLOWPATH FROM NODE    914.20 TO NODE    914.00 =   222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   6.50
  RAINFALL INTENSITY(INCH/HR) =   3.56
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.65

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1        11.12      8.60         3.224          3.80
      2         0.65      6.50         3.560          0.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        10.72      6.50         3.560
      2        11.71      8.60         3.224

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     11.71   Tc(MIN.) =    8.60
  TOTAL AREA(ACRES) =      4.00
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    954.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   498.71
  FLOW LENGTH(FEET) =    79.37   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =     11.71
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   8.79
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    954.20 =  1265.09 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    954.20 TO NODE    954.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.194
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40   SUBAREA RUNOFF(CFS) =    1.15
 TOTAL AREA(ACRES) =       4.40   TOTAL RUNOFF(CFS) =   12.86
 TC(MIN.) =   8.79

****************************************************************************
 FLOW PROCESS FROM NODE    954.20 TO NODE    918.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.61  DOWNSTREAM(FEET) =   497.39
 FLOW LENGTH(FEET) =   121.84   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.13
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.86
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   9.07
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    918.80 =  1386.93 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.80 TO NODE    918.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.148
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =    0.28
 TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =   13.14
 TC(MIN.) =   9.07

****************************************************************************
 FLOW PROCESS FROM NODE    918.80 TO NODE    918.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.29  DOWNSTREAM(FEET) =   495.55
 FLOW LENGTH(FEET) =   173.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.17
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.14
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   9.48
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    918.60 =  1560.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.60 TO NODE    918.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.084
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.00   SUBAREA RUNOFF(CFS) =    2.78
 TOTAL AREA(ACRES) =       5.50   TOTAL RUNOFF(CFS) =   15.92
 TC(MIN.) =   9.48

****************************************************************************
 FLOW PROCESS FROM NODE    918.60 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   495.44  DOWNSTREAM(FEET) =   495.06
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     15.92
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.56
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.56
 RAINFALL INTENSITY(INCH/HR) =   3.07
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.92

****************************************************************************
 FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    512.74
 DOWNSTREAM ELEVATION(FEET) =    511.74
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.600
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      2.29
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      2.29

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.74  DOWNSTREAM(FEET) =   504.69
 FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.29
 PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   7.47
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.20 =   505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.405
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     3.30   SUBAREA RUNOFF(CFS) =   10.11
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =   12.40
 TC(MIN.) =   7.47

****************************************************************************
 FLOW PROCESS FROM NODE    918.20 TO NODE    918.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
```

```
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.40
 PIPE TRAVEL TIME(MIN.) =   1.33    Tc(MIN.) =   8.80
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.40 =  1065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.40 TO NODE    918.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.90  DOWNSTREAM(FEET) =   495.36
 FLOW LENGTH(FEET) =   259.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.40
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   9.42
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.50 =  1324.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.50 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.26  DOWNSTREAM(FEET) =   495.16
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.40
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   9.47
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =  1346.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.47
 RAINFALL INTENSITY(INCH/HR) =   3.09
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.40

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        15.92      9.56         3.070          5.50
     2        12.40      9.47         3.085          4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        28.24      9.47         3.085
     2        28.26      9.56         3.070

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     28.26   Tc(MIN.) =    9.56
 TOTAL AREA(ACRES) =      9.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.070
 *USER SPECIFIED(SUBAREA):
```

```
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =  2.40   SUBAREA RUNOFF(CFS) =  6.63
 TOTAL AREA(ACRES) =  11.90   TOTAL RUNOFF(CFS) =  34.89
 TC(MIN.) =  9.56

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    919.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  495.06  DOWNSTREAM(FEET) =  494.56
 CHANNEL LENGTH THRU SUBAREA(FEET) =  140.00   CHANNEL SLOPE =  0.0036
 CHANNEL BASE(FEET) =  45.50   "Z" FACTOR =  0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  6.00
 CHANNEL FLOW THRU SUBAREA(CFS) =  34.89
 FLOW VELOCITY(FEET/SEC.) =  2.60   FLOW DEPTH(FEET) =  0.29
 TRAVEL TIME(MIN.) =  0.90   Tc(MIN.) =  10.46
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    919.00 =  1739.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    919.00 TO NODE    919.00 IS CODE =  7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  25.76   RAIN INTENSITY(INCH/HOUR) =  1.87
 TOTAL AREA(ACRES) =  11.90   TOTAL RUNOFF(CFS) =  11.10

****************************************************************************
 FLOW PROCESS FROM NODE    919.00 TO NODE    920.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  494.51  DOWNSTREAM(FEET) =  493.67
 FLOW LENGTH(FEET) =  88.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  6.72
 GIVEN PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  11.10
 PIPE TRAVEL TIME(MIN.) =  0.22   Tc(MIN.) =  25.98
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    920.00 =  1827.82 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  493.57  DOWNSTREAM(FEET) =  493.09
 FLOW LENGTH(FEET) =  56.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  6.47
 GIVEN PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  11.10
 PIPE TRAVEL TIME(MIN.) =  0.15   Tc(MIN.) =  26.12
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    921.00 =  1884.12 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    921.00 TO NODE    952.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  492.99  DOWNSTREAM(FEET) =  491.45
 FLOW LENGTH(FEET) =  187.54   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  6.38
 GIVEN PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  11.10
 PIPE TRAVEL TIME(MIN.) =  0.49   Tc(MIN.) =  26.61
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    952.20 =  2071.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    952.20 TO NODE    990.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.15  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.10
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  26.64
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =  26.64
 RAINFALL INTENSITY(INCH/HR) =   1.83
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.10

****************************************************************************
 FLOW PROCESS FROM NODE    988.00 TO NODE    989.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.87
 DOWNSTREAM ELEVATION(FEET) =    503.75
 ELEVATION DIFFERENCE(FEET) =      0.12
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.096
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.66
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
 FLOW PROCESS FROM NODE    989.00 TO NODE    990.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
 UPSTREAM ELEVATION(FEET) =  503.75  DOWNSTREAM ELEVATION(FEET) =  500.48
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.09
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    6.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.80
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   3.47   Tc(MIN.) =   9.47
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.085
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.86
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =       1.52

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.22
 FLOW VELOCITY(FEET/SEC.) =  1.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
 LONGEST FLOWPATH FROM NODE    988.00 TO NODE    990.00 =   425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =   9.47
 RAINFALL INTENSITY(INCH/HR) =   3.09
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.52

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       TC       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1        11.10     26.64         1.834         11.90
     2         1.52      9.47         3.085          0.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       TC       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         8.12      9.47         3.085
     2        12.00     26.64         1.834

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     12.00   Tc(MIN.) =   26.64
 TOTAL AREA(ACRES) =     12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.21  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.91
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     12.00
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  26.67
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    957.00 TO NODE    958.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    958.00 TO NODE    955.00 IS CODE =  62
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
STREET LENGTH(FEET) =   304.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
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) =   0.0180
Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.05
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.26
  HALFSTREET FLOOD WIDTH(FEET) =    6.75
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
STREET FLOW TRAVEL TIME(MIN.) =   2.77   Tc(MIN.) =   8.77
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.196
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =    1.44
TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       1.77

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.68
FLOW VELOCITY(FEET/SEC.) =  2.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
LONGEST FLOWPATH FROM NODE    957.00 TO NODE    955.00 =   404.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   492.76  DOWNSTREAM(FEET) =   492.46
FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.25
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      1.77
PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   8.89
LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.89
RAINFALL INTENSITY(INCH/HR) =   3.18
TOTAL STREAM AREA(ACRES) =     0.60
PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.77

****************************************************************************
FLOW PROCESS FROM NODE    959.00 TO NODE    960.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    503.59
DOWNSTREAM ELEVATION(FEET) =    501.59
ELEVATION DIFFERENCE(FEET) =      2.00
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.640
```

```
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    960.00 TO NODE    956.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
 STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.22
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.96
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.03
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
 STREET FLOW TRAVEL TIME(MIN.) =   2.05   Tc(MIN.) =   8.05
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.312
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.79
 TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       2.12

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.99
 FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.20 =   350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.20 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.48  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.30
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.12
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.06
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.00 =   352.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.06
 RAINFALL INTENSITY(INCH/HR) =   3.31
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.12

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         1.77      8.89         3.177          0.60
     2         2.12      8.06         3.310          0.70

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1         3.81      8.06        3.310
    2         3.80      8.89        3.177

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.81   Tc(MIN.) =     8.06
 TOTAL AREA(ACRES) =       1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.46  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.81
 PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   8.79
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1         3.81      8.79        3.193       1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
    1        12.00     26.67        1.833      12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1        10.70      8.79        3.193
    2        14.19     26.67        1.833

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      14.19   Tc(MIN.) =   26.67
 TOTAL AREA(ACRES) =      13.80

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    919.00 TO NODE    919.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.833
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.17
 TOTAL AREA(ACRES) =      13.90   TOTAL RUNOFF(CFS) =   14.36
 TC(MIN.) =  26.67
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      13.90  TC(MIN.) =      26.67
 PEAK FLOW RATE(CFS)    =      14.36
============================================================================
============================================================================
```

END OF RATIONAL METHOD ANALYSIS

♀

10-Year

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                        Rick Engineering Company
                      1223 University Ave., Suite 240
                        Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Unit 14                                  *
* Construction Change 'F' - Basin 900A                                    *
* 10 Year - DETAINED - (Excluding Cam. Del Sur)                           *
 **************************************************************************

  FILE NAME: 9A_DET10.DAT
  TIME/DATE OF STUDY: 15:08 07/03/2014
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020    0.67    2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020    0.50    1.50 0.0313 0.125 0.0180
  3   51.0     46.0    0.020/0.020/0.020    0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE     911.00 TO NODE     912.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  544.00
  DOWNSTREAM ELEVATION(FEET) =  539.81
  ELEVATION DIFFERENCE(FEET) =  4.19
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =  2.233
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SUBAREA RUNOFF(CFS) =  0.28
  TOTAL AREA(ACRES) =  0.10  TOTAL RUNOFF(CFS) =  0.28

**************************************************************************
  FLOW PROCESS FROM NODE     912.00 TO NODE     913.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  539.81  DOWNSTREAM ELEVATION(FEET) =  527.37
```

```
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.64
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   3.24   Tc(MIN.) =   9.24
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.673
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =    0.96
 TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       1.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.19
 FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.24
 RAINFALL INTENSITY(INCH/HR) =   2.67
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.25

****************************************************************************
 FLOW PROCESS FROM NODE    913.40 TO NODE    913.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    913.50 TO NODE    913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   368.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.28
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.94
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
 STREET FLOW TRAVEL TIME(MIN.) =   3.17   Tc(MIN.) =   9.17
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.682
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.97
 TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       1.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.85
 FLOW VELOCITY(FEET/SEC.) =  2.13   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    913.40 TO NODE    913.00 =   468.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.17
 RAINFALL INTENSITY(INCH/HR) =   2.68
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.25

****************************************************************************
 FLOW PROCESS FROM NODE    912.20 TO NODE    912.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    545.00
 DOWNSTREAM ELEVATION(FEET) =    542.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    912.40 TO NODE    913.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   542.00  DOWNSTREAM(FEET) =   532.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.59
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.28
 PIPE TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =   7.58
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.20 =   440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.20 TO NODE    913.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.914
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    2.00   SUBAREA RUNOFF(CFS) =     5.24
```

```
 TOTAL AREA(ACRES) =      2.10   TOTAL RUNOFF(CFS) =    5.53
 TC(MIN.) =   7.58

****************************************************************************
 FLOW PROCESS FROM NODE    913.20 TO NODE    913.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.84  DOWNSTREAM(FEET) =   523.69
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.53
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   7.62
 LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.00 =   455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   7.62
 RAINFALL INTENSITY(INCH/HR) =   2.91
 TOTAL STREAM AREA(ACRES) =     2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.53

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         1.25      9.24         2.673          0.50
    2         1.25      9.17         2.682          0.50
    3         5.53      7.62         2.907          2.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
    1         7.83      7.62         2.907
    2         7.59      9.17         2.682
    3         7.58      9.24         2.673

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      7.83   Tc(MIN.) =    7.62
 TOTAL AREA(ACRES) =      3.10
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.69  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.83
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   7.68
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 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.) =   7.68
 RAINFALL INTENSITY(INCH/HR) =   2.90
 TOTAL STREAM AREA(ACRES) =     3.10
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.83

****************************************************************************
 FLOW PROCESS FROM NODE     913.60 TO NODE     913.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE     913.70 TO NODE     909.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.64
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.81
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.84
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
 STREET FLOW TRAVEL TIME(MIN.) =   3.49   Tc(MIN.) =   9.49
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.647
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.71
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       1.00

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.19
 FLOW VELOCITY(FEET/SEC.) =  1.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.20 =   485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.20 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.25  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.00
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.50
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.00 =   490.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.00 TO NODE     909.00 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.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =    2.64
  TOTAL STREAM AREA(ACRES) =     0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.00

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1          7.83      7.68         2.899         3.10
     2          1.00      9.50         2.645         0.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1          8.74      7.68         2.899
     2          8.14      9.50         2.645

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      8.74   Tc(MIN.) =    7.68
  TOTAL AREA(ACRES) =      3.50
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    909.00 TO NODE    910.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   522.64  DOWNSTREAM(FEET) =   521.73
  FLOW LENGTH(FEET) =    91.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      8.74
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   7.91
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.00 =   665.75 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    910.00 TO NODE    910.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   521.40  DOWNSTREAM(FEET) =   512.91
  FLOW LENGTH(FEET) =   256.12   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.04
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      8.74
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   8.34
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.20 =   921.87 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    910.20 TO NODE    910.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   511.29  DOWNSTREAM(FEET) =   506.34
  FLOW LENGTH(FEET) =   123.77   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.73
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      8.74
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   8.53
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =    8.53
 RAINFALL INTENSITY(INCH/HR) =    2.77
 TOTAL STREAM AREA(ACRES) =      3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.74

****************************************************************************
 FLOW PROCESS FROM NODE     910.40 TO NODE     910.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =     528.83
 DOWNSTREAM ELEVATION(FEET) =     525.33
 ELEVATION DIFFERENCE(FEET) =       3.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.371
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =       0.28
 TOTAL AREA(ACRES) =       0.10   TOTAL RUNOFF(CFS) =       0.28

****************************************************************************
 FLOW PROCESS FROM NODE     910.60 TO NODE     910.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  527.40  DOWNSTREAM ELEVATION(FEET) =  513.28
 STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.54
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.18
   HALFSTREET FLOOD WIDTH(FEET) =    2.68
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.86
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
 STREET FLOW TRAVEL TIME(MIN.) =   1.82   Tc(MIN.) =   7.82
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.877
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =     0.20      SUBAREA RUNOFF(CFS) =     0.52
 TOTAL AREA(ACRES) =       0.30        PEAK FLOW RATE(CFS) =       0.80

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.04
 FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
 LONGEST FLOWPATH FROM NODE     910.40 TO NODE     910.30 =   412.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     910.30 TO NODE     910.30 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.) =    7.82
 RAINFALL INTENSITY(INCH/HR) =    2.88
 TOTAL STREAM AREA(ACRES) =      0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.80
```

```
** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY      AREA
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1         8.74      8.53        2.771         3.50
    2         0.80      7.82        2.877         0.30

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF       Tc       INTENSITY
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1         9.22      7.82        2.877
    2         9.51      8.53        2.771

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      9.51   Tc(MIN.) =    8.53
TOTAL AREA(ACRES) =      3.80
LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    910.30 TO NODE    914.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   505.84  DOWNSTREAM(FEET) =   499.83
FLOW LENGTH(FEET) =   140.08   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS   7.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.03
GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      9.51
PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   8.74
LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   8.74
RAINFALL INTENSITY(INCH/HR) =   2.74
TOTAL STREAM AREA(ACRES) =     3.80
PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.51

****************************************************************************
FLOW PROCESS FROM NODE    914.20 TO NODE    914.40 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
UPSTREAM ELEVATION(FEET) =    516.00
DOWNSTREAM ELEVATION(FEET) =    513.78
ELEVATION DIFFERENCE(FEET) =      2.22
URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.760
TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
SUBAREA RUNOFF(CFS) =      0.28
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
FLOW PROCESS FROM NODE    914.40 TO NODE    914.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  513.28  DOWNSTREAM ELEVATION(FEET) =  505.13
STREET LENGTH(FEET) =   122.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =   6.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.080
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.28
  TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.16   HALFSTREET FLOOD WIDTH(FEET) =   1.50
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    914.20 TO NODE    914.00 =   222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   6.50
  RAINFALL INTENSITY(INCH/HR) =   3.08
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.56

  ** CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY       AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
      1         9.51      8.74         2.739          3.80
      2         0.56      6.50         3.080          0.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1         9.02      6.50         3.080
      2        10.01      8.74         2.739

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     10.01   Tc(MIN.) =    8.74
  TOTAL AREA(ACRES) =      4.00
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    954.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   498.71
  FLOW LENGTH(FEET) =    79.37   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     10.01
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   8.94
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    954.20 =  1265.09 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    954.20 TO NODE    954.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.709
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40   SUBAREA RUNOFF(CFS) =     0.98
 TOTAL AREA(ACRES) =       4.40   TOTAL RUNOFF(CFS) =    10.99
 TC(MIN.) =   8.94

****************************************************************************
 FLOW PROCESS FROM NODE     954.20 TO NODE     918.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.61  DOWNSTREAM(FEET) =   497.39
 FLOW LENGTH(FEET) =   121.84   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.99
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   9.24
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.80 =  1386.93 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.674
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.24
 TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =    11.23
 TC(MIN.) =   9.24

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.29  DOWNSTREAM(FEET) =   495.55
 FLOW LENGTH(FEET) =   173.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  11.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.87
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.23
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   9.66
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.60 =  1560.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     918.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.628
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.00   SUBAREA RUNOFF(CFS) =     2.36
 TOTAL AREA(ACRES) =       5.50   TOTAL RUNOFF(CFS) =    13.59
 TC(MIN.) =   9.66

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.44  DOWNSTREAM(FEET) =   495.06
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.16
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     13.59
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   9.75
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     916.00 =  1599.52 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.75
 RAINFALL INTENSITY(INCH/HR) =   2.62
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.59

****************************************************************************
 FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    512.74
 DOWNSTREAM ELEVATION(FEET) =    511.74
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.600
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      1.99
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      1.99

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.74  DOWNSTREAM(FEET) =   504.69
 FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.41
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.99
 PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =   7.53
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.20 =   505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.920
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    3.30   SUBAREA RUNOFF(CFS) =    8.67
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =   10.66
 TC(MIN.) =   7.53

****************************************************************************
 FLOW PROCESS FROM NODE    918.20 TO NODE    918.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.66
 PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   9.08
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.40 =  1065.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.40 TO NODE    918.50 IS CODE =  41
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =   498.90  DOWNSTREAM(FEET) =   495.36
FLOW LENGTH(FEET) =   259.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     10.66
PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   9.65
LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.50 =  1324.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    918.50 TO NODE    916.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
ELEVATION DATA: UPSTREAM(FEET) =   495.26  DOWNSTREAM(FEET) =   495.16
FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     10.66
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   9.71
LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =  1346.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.71
RAINFALL INTENSITY(INCH/HR) =   2.62
TOTAL STREAM AREA(ACRES) =     4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.66

** CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY      AREA
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1        13.59      9.75         2.618         5.50
    2        10.66      9.71         2.621         4.00

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

** PEAK FLOW RATE TABLE **
STREAM      RUNOFF       Tc       INTENSITY
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1        24.24      9.71         2.621
    2        24.24      9.75         2.618

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     24.24   Tc(MIN.) =    9.75
TOTAL AREA(ACRES) =      9.50
LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.618
*USER SPECIFIED(SUBAREA):
SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    5.65
TOTAL AREA(ACRES) =     11.90   TOTAL RUNOFF(CFS) =   29.90
TC(MIN.) =   9.75

****************************************************************************
FLOW PROCESS FROM NODE    916.00 TO NODE    919.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    495.06  DOWNSTREAM(FEET) =    494.56
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0036
  CHANNEL BASE(FEET) =   45.50   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   6.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     29.90
  FLOW VELOCITY(FEET/SEC.) =   2.43   FLOW DEPTH(FEET) =   0.27
  TRAVEL TIME(MIN.) =   0.96   Tc(MIN.) =  10.71
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    919.00 =  1739.52 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    919.00 TO NODE    919.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  27.15   RAIN INTENSITY(INCH/HOUR) =  1.55
  TOTAL AREA(ACRES) =    11.90   TOTAL RUNOFF(CFS) =      9.30

****************************************************************************
  FLOW PROCESS FROM NODE    919.00 TO NODE    920.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.51  DOWNSTREAM(FEET) =   493.67
  FLOW LENGTH(FEET) =    88.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.30
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =  27.38
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    920.00 =  1827.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.57  DOWNSTREAM(FEET) =   493.09
  FLOW LENGTH(FEET) =    56.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.30
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =  27.53
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    921.00 =  1884.12 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    921.00 TO NODE    952.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.99  DOWNSTREAM(FEET) =   491.45
  FLOW LENGTH(FEET) =   187.54   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.30
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =  28.05
  LONGEST FLOWPATH FROM NODE    911.00 TO NODE    952.20 =  2071.66 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    952.20 TO NODE    990.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.15  DOWNSTREAM(FEET) =   491.06
  FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.96
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      9.30
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  28.08
```

```
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =  28.08
 RAINFALL INTENSITY(INCH/HR) =   1.52
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.30

****************************************************************************
 FLOW PROCESS FROM NODE    988.00 TO NODE    989.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.87
 DOWNSTREAM ELEVATION(FEET) =    503.75
 ELEVATION DIFFERENCE(FEET) =      0.12
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.096
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.57
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
 FLOW PROCESS FROM NODE    989.00 TO NODE    990.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.75  DOWNSTREAM ELEVATION(FEET) =  500.48
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.94
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.22
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
 STREET FLOW TRAVEL TIME(MIN.) =   3.59   Tc(MIN.) =   9.59
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.636
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =    0.40     SUBAREA RUNOFF(CFS) =    0.74
 TOTAL AREA(ACRES) =      0.60       PEAK FLOW RATE(CFS) =       1.31

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.59
 FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.55
 LONGEST FLOWPATH FROM NODE    988.00 TO NODE    990.00 =   425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =    9.59
 RAINFALL INTENSITY(INCH/HR) =    2.64
 TOTAL STREAM AREA(ACRES) =      0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
     1         9.30     28.08         1.522          11.90
     2         1.31      9.59         2.636           0.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         6.68      9.59         2.636
     2        10.05     28.08         1.522

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     10.05   Tc(MIN.) =   28.08
 TOTAL AREA(ACRES) =      12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.21  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.55
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     10.05
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =  28.10
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    957.00 TO NODE    958.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    958.00 TO NODE    955.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
 STREET LENGTH(FEET) =   304.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.24
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.77
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   2.87   Tc(MIN.) =   8.87
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.720
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =    1.22
 TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       1.51

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.07
 FLOW VELOCITY(FEET/SEC.) =  1.96   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    955.00 =   404.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    955.00 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.76  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.07
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.51
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   8.99
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.99
 RAINFALL INTENSITY(INCH/HR) =   2.70
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.51

****************************************************************************
 FLOW PROCESS FROM NODE    959.00 TO NODE    960.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    960.00 TO NODE    956.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
```

```
 STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.05
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.45
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   2.12   Tc(MIN.) =   8.12
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.832
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =    1.53
 TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       1.81

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.38
 FLOW VELOCITY(FEET/SEC.) =  2.21   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.20 =   350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.20 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.48  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.81
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.13
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.00 =   352.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.13
 RAINFALL INTENSITY(INCH/HR) =   2.83
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.81

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1         1.51      8.99         2.701         0.60
     2         1.81      8.13         2.831         0.70

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         3.25      8.13         2.831
     2         3.24      8.99         2.701

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      3.25   Tc(MIN.) =    8.13
 TOTAL AREA(ACRES) =      1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.46  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.35
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.25
 PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   8.89
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1          3.25      8.89        2.716         1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF      Tc       INTENSITY      AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         10.05     28.10        1.521        12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
    1         8.88       8.89        2.716
    2        11.88      28.10        1.521

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     11.88   Tc(MIN.) =   28.10
 TOTAL AREA(ACRES) =     13.80

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.521
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.14
 TOTAL AREA(ACRES) =     13.90   TOTAL RUNOFF(CFS) =   12.01
 TC(MIN.) =  28.10
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =     13.90  TC(MIN.) =     28.10
 PEAK FLOW RATE(CFS)   =     12.01
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

♀

2-Year

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

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2003 Advanced Engineering Software (aes)
            Ver. 1.5A Release Date: 01/01/2003  License ID 1261

                          Analysis prepared by:

                          Rick Engineering Company
                        1223 University Ave., Suite 240
                          Riverside, California 92507


 ************************** DESCRIPTION OF STUDY **************************
* J-16630 BMR North Village East Unit 14                                  *
* Construction Change 'F'  - Basin 900A                                   *
* 2 Year - DETAINED - (Excluding Cam. Del Sur)                            *
 ****************************************************************************

  FILE NAME: 9A_DET02.DAT
  TIME/DATE OF STUDY: 15:04 07/03/2014
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  4
   1)   5.000;  2.500
   2)  10.000;  1.800
   3)  15.000;  1.500
   4)  20.000;  1.200
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *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   30.0     20.0    0.018/0.018/0.020    0.67    2.00 0.0313 0.167 0.0150
  2   18.0     13.0    0.020/0.020/0.020    0.50    1.50 0.0313 0.125 0.0180
  3   51.0     46.0    0.020/0.020/0.020    0.50    1.50 0.0313 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE     911.00 TO NODE     912.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    544.00
  DOWNSTREAM ELEVATION(FEET) =    539.81
  ELEVATION DIFFERENCE(FEET) =      4.19
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.233
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE     912.00 TO NODE     913.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  539.81  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   447.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    3.61
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   3.34   Tc(MIN.) =   9.34
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.892
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.68
 TOTAL AREA(ACRES) =       0.50        PEAK FLOW RATE(CFS) =       0.89

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.13
 FLOW VELOCITY(FEET/SEC.) =  2.35   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.34
 RAINFALL INTENSITY(INCH/HR) =   1.89
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.89

****************************************************************************
 FLOW PROCESS FROM NODE    913.40 TO NODE    913.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    913.50 TO NODE    913.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   368.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
  STREET FLOW TRAVEL TIME(MIN.) =   3.31   Tc(MIN.) =   9.31
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.896
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  SUBAREA AREA(ACRES) =     0.40      SUBAREA RUNOFF(CFS) =     0.68
  TOTAL AREA(ACRES) =      0.50        PEAK FLOW RATE(CFS) =       0.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.74
  FLOW VELOCITY(FEET/SEC.) =  2.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE    913.40 TO NODE    913.00 =   468.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.00 TO NODE    913.00 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.) =   9.31
  RAINFALL INTENSITY(INCH/HR) =   1.90
  TOTAL STREAM AREA(ACRES) =     0.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.90

****************************************************************************
  FLOW PROCESS FROM NODE    912.20 TO NODE    912.40 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    545.00
  DOWNSTREAM ELEVATION(FEET) =    542.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.496
  *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
   DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    912.40 TO NODE    913.20 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   542.00  DOWNSTREAM(FEET) =   532.00
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.33
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      0.21
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   7.70
  LONGEST FLOWPATH FROM NODE    912.20 TO NODE    913.20 =   440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    913.20 TO NODE    913.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.122
```

```
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =  0
 SUBAREA AREA(ACRES) =     2.00   SUBAREA RUNOFF(CFS) =     3.82
 TOTAL AREA(ACRES) =       2.10   TOTAL RUNOFF(CFS) =     4.03
 TC(MIN.) =   7.70

****************************************************************************
 FLOW PROCESS FROM NODE     913.20 TO NODE     913.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.84  DOWNSTREAM(FEET) =   523.69
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.25
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.03
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   7.75
 LONGEST FLOWPATH FROM NODE     912.20 TO NODE     913.00 =   455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     913.00 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.) =   7.75
 RAINFALL INTENSITY(INCH/HR) =   2.12
 TOTAL STREAM AREA(ACRES) =     2.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.03

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1          0.89      9.34         1.892          0.50
    2          0.90      9.31         1.896          0.50
    3          4.03      7.75         2.115          2.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1          5.63      7.75         2.115
    2          5.40      9.31         1.896
    3          5.39      9.34         1.892

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      5.63   Tc(MIN.) =    7.75
 TOTAL AREA(ACRES) =      3.10
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     913.00 =   547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     913.00 TO NODE     909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.69  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =    27.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      5.63
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   7.81
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     909.00 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     909.00 TO NODE     909.00 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.) =   7.81
 RAINFALL INTENSITY(INCH/HR) =   2.11
 TOTAL STREAM AREA(ACRES) =     3.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.63

****************************************************************************
 FLOW PROCESS FROM NODE    913.60 TO NODE    913.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    536.26
 DOWNSTREAM ELEVATION(FEET) =    534.26
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    913.70 TO NODE    909.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  534.26  DOWNSTREAM ELEVATION(FEET) =  527.37
 STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    3.77
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.36
 STREET FLOW TRAVEL TIME(MIN.) =   3.60   Tc(MIN.) =   9.60
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.856
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.30      SUBAREA RUNOFF(CFS) =     0.50
 TOTAL AREA(ACRES) =      0.40        PEAK FLOW RATE(CFS) =       0.71

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.13
 FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.20 =   485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.20 TO NODE    909.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   523.25  DOWNSTREAM(FEET) =   523.14
 FLOW LENGTH(FEET) =     5.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.25
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      0.71
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   9.62
 LONGEST FLOWPATH FROM NODE    913.60 TO NODE    909.00 =   490.25 FEET.

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

```
 FLOW PROCESS FROM NODE    909.00 TO NODE    909.00 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.) =   9.62
 RAINFALL INTENSITY(INCH/HR) =   1.85
 TOTAL STREAM AREA(ACRES) =     0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.71

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1          5.63      7.81        2.107         3.10
    2          0.71      9.62        1.853         0.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1          6.26      7.81        2.107
    2          5.67      9.62        1.853

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      6.26   Tc(MIN.) =    7.81
 TOTAL AREA(ACRES) =      3.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    909.00 =   574.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    909.00 TO NODE    910.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   522.64  DOWNSTREAM(FEET) =   521.73
 FLOW LENGTH(FEET) =    91.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.26
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   8.07
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.00 =   665.75 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.00 TO NODE    910.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   521.40  DOWNSTREAM(FEET) =   512.91
 FLOW LENGTH(FEET) =   256.12   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.26
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   8.53
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.20 =   921.87 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.20 TO NODE    910.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.29  DOWNSTREAM(FEET) =   506.34
 FLOW LENGTH(FEET) =   123.77   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.76
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.26
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   8.75
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

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

```
 FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =   8.75
 RAINFALL INTENSITY(INCH/HR) =   1.98
 TOTAL STREAM AREA(ACRES) =     3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.26

****************************************************************************
 FLOW PROCESS FROM NODE    910.40 TO NODE    910.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    528.83
 DOWNSTREAM ELEVATION(FEET) =    525.33
 ELEVATION DIFFERENCE(FEET) =      3.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.371
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    910.60 TO NODE    910.30 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  527.40  DOWNSTREAM ELEVATION(FEET) =  513.28
 STREET LENGTH(FEET) =   312.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.16
   HALFSTREET FLOOD WIDTH(FEET) =    1.50
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
 STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =   7.56
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.142
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.39
 TOTAL AREA(ACRES) =      0.30        PEAK FLOW RATE(CFS) =       0.60

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   3.06
 FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
 LONGEST FLOWPATH FROM NODE    910.40 TO NODE    910.30 =   412.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 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.) =   7.56
```

```
 RAINFALL INTENSITY(INCH/HR) =   2.14
 TOTAL STREAM AREA(ACRES) =     0.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.60

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)     (ACRE)
    1          6.26      8.75         1.976          3.50
    2          0.60      7.56         2.142          0.30

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
    1          6.37      7.56         2.142
    2          6.81      8.75         1.976

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.81   Tc(MIN.) =    8.75
 TOTAL AREA(ACRES) =      3.80
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    910.30 =  1045.64 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    910.30 TO NODE    914.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.84  DOWNSTREAM(FEET) =   499.83
 FLOW LENGTH(FEET) =   140.08   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.81
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   8.98
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   8.98
 RAINFALL INTENSITY(INCH/HR) =   1.94
 TOTAL STREAM AREA(ACRES) =     3.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.81

****************************************************************************
 FLOW PROCESS FROM NODE    914.20 TO NODE    914.40 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    516.00
 DOWNSTREAM ELEVATION(FEET) =    513.78
 ELEVATION DIFFERENCE(FEET) =      2.22
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.760
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =       0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =       0.21

****************************************************************************
 FLOW PROCESS FROM NODE    914.40 TO NODE    914.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  513.28  DOWNSTREAM ELEVATION(FEET) =  505.13
 STREET LENGTH(FEET) =   122.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.32
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.16
   HALFSTREET FLOOD WIDTH(FEET) =    1.50
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.06
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
 STREET FLOW TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =   6.50
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.290
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.21
 TOTAL AREA(ACRES) =      0.20        PEAK FLOW RATE(CFS) =       0.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.16   HALFSTREET FLOOD WIDTH(FEET) =   1.50
 FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
 LONGEST FLOWPATH FROM NODE    914.20 TO NODE    914.00 =   222.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 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.) =   6.50
 RAINFALL INTENSITY(INCH/HR) =   2.29
 TOTAL STREAM AREA(ACRES) =     0.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.42

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1         6.81      8.98         1.943         3.80
     2         0.42      6.50         2.290         0.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         6.20      6.50         2.290
     2         7.17      8.98         1.943

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      7.17   Tc(MIN.) =    8.98
 TOTAL AREA(ACRES) =      4.00
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    914.00 =  1185.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    914.00 TO NODE    954.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   498.71
 FLOW LENGTH(FEET) =    79.37   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.17
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   9.20
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    954.20 =  1265.09 FEET.

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

```
 FLOW PROCESS FROM NODE     954.20 TO NODE     954.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.912
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.40   SUBAREA RUNOFF(CFS) =     0.69
 TOTAL AREA(ACRES) =       4.40   TOTAL RUNOFF(CFS) =     7.86
 TC(MIN.) =   9.20

****************************************************************************
 FLOW PROCESS FROM NODE     954.20 TO NODE     918.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.61  DOWNSTREAM(FEET) =   497.39
 FLOW LENGTH(FEET) =   121.84   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.86
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   9.52
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.80 =  1386.93 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.867
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.17
 TOTAL AREA(ACRES) =       4.50   TOTAL RUNOFF(CFS) =     8.02
 TC(MIN.) =   9.52

****************************************************************************
 FLOW PROCESS FROM NODE     918.80 TO NODE     918.60 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.29  DOWNSTREAM(FEET) =   495.55
 FLOW LENGTH(FEET) =   173.59   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      8.02
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   9.99
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     918.60 =  1560.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     918.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.802
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) POOR COVER RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     1.00   SUBAREA RUNOFF(CFS) =     1.62
 TOTAL AREA(ACRES) =       5.50   TOTAL RUNOFF(CFS) =     9.65
 TC(MIN.) =   9.99

****************************************************************************
 FLOW PROCESS FROM NODE     918.60 TO NODE     916.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.44  DOWNSTREAM(FEET) =   495.06
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.52
```

```
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      9.65
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =  10.09
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =  10.09
 RAINFALL INTENSITY(INCH/HR) =   1.79
 TOTAL STREAM AREA(ACRES) =     5.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.65

****************************************************************************
 FLOW PROCESS FROM NODE    917.00 TO NODE    918.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    512.74
 DOWNSTREAM ELEVATION(FEET) =    511.74
 ELEVATION DIFFERENCE(FEET) =      1.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.600
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      1.49
 TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      1.49

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.20 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.74  DOWNSTREAM(FEET) =   504.69
 FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.05
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.49
 PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =   7.67
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.20 =   505.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    918.00 TO NODE    918.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.127
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     3.30   SUBAREA RUNOFF(CFS) =     6.32
 TOTAL AREA(ACRES) =      4.00   TOTAL RUNOFF(CFS) =    7.80
 TC(MIN.) =   7.67

****************************************************************************
 FLOW PROCESS FROM NODE    918.20 TO NODE    918.40 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   504.59  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.80
 PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   9.16
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.40 =  1065.00 FEET.
```

```
**************************************************************************
 FLOW PROCESS FROM NODE    918.40 TO NODE    918.50 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   498.90  DOWNSTREAM(FEET) =   495.36
 FLOW LENGTH(FEET) =   259.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.80
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   9.77
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    918.50 =  1324.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    918.50 TO NODE    916.00 IS CODE =  41
--------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.26  DOWNSTREAM(FEET) =   495.16
 FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.42
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.80
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   9.85
 LONGEST FLOWPATH FROM NODE    917.00 TO NODE    916.00 =  1346.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 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.) =   9.85
 RAINFALL INTENSITY(INCH/HR) =   1.82
 TOTAL STREAM AREA(ACRES) =     4.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.80

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)    (ACRE)
    1         9.65     10.09         1.795          5.50
    2         7.80      9.85         1.820          4.00

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)    (MIN.)    (INCH/HOUR)
    1        17.31      9.85        1.820
    2        17.34     10.09        1.795

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     17.34   Tc(MIN.) =   10.09
 TOTAL AREA(ACRES) =      9.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    916.00 =  1599.52 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    916.00 TO NODE    916.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.795
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    2.40   SUBAREA RUNOFF(CFS) =    3.88
 TOTAL AREA(ACRES) =     11.90   TOTAL RUNOFF(CFS) =   21.22
 TC(MIN.) =  10.09

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

```
 FLOW PROCESS FROM NODE     916.00 TO NODE     919.00 IS CODE =  51
----------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    495.06  DOWNSTREAM(FEET) =    494.56
 CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0036
 CHANNEL BASE(FEET) =   45.50   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   6.00
 CHANNEL FLOW THRU SUBAREA(CFS) =     21.22
 FLOW VELOCITY(FEET/SEC.) =   2.14   FLOW DEPTH(FEET) =   0.22
 TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =  11.18
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     919.00 =  1739.52 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     919.00 TO NODE     919.00 IS CODE =   7
----------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
======================================================================
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  26.29   RAIN INTENSITY(INCH/HOUR) =  1.20
 TOTAL AREA(ACRES) =    11.90   TOTAL RUNOFF(CFS) =      6.40

****************************************************************************
 FLOW PROCESS FROM NODE     919.00 TO NODE     920.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.51  DOWNSTREAM(FEET) =   493.67
 FLOW LENGTH(FEET) =    88.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   8.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.40
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =  26.55
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     920.00 =  1827.82 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     920.00 TO NODE     921.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.57  DOWNSTREAM(FEET) =   493.09
 FLOW LENGTH(FEET) =    56.30   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   8.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.55
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.40
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =  26.71
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     921.00 =  1884.12 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     921.00 TO NODE     952.20 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.99  DOWNSTREAM(FEET) =   491.45
 FLOW LENGTH(FEET) =   187.54   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS   8.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.40
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =  27.29
 LONGEST FLOWPATH FROM NODE     911.00 TO NODE     952.20 =  2071.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     952.20 TO NODE     990.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.15  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS   8.1 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.35
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.40
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  27.32
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  27.32
 RAINFALL INTENSITY(INCH/HR) =   1.20
 TOTAL STREAM AREA(ACRES) =    11.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.40

****************************************************************************
 FLOW PROCESS FROM NODE    988.00 TO NODE    989.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    503.87
 DOWNSTREAM ELEVATION(FEET) =    503.75
 ELEVATION DIFFERENCE(FEET) =      0.12
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.096
 *CAUTION: SUBAREA SLOPE EXCEEDS COUNTY NOMOGRAPH
  DEFINITION. EXTRAPOLATION OF NOMOGRAPH USED.
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    989.00 TO NODE    990.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  503.75  DOWNSTREAM ELEVATION(FEET) =  500.48
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 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 =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      0.68
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    4.84
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   3.68   Tc(MIN.) =   9.68
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.844
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.52
 TOTAL AREA(ACRES) =      0.60        PEAK FLOW RATE(CFS) =      0.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   6.22
 FLOW VELOCITY(FEET/SEC.) =  1.75   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
 LONGEST FLOWPATH FROM NODE    988.00 TO NODE    990.00 =   425.00 FEET.

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

```
 FLOW PROCESS FROM NODE    990.00 TO NODE    990.00 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.) =   9.68
 RAINFALL INTENSITY(INCH/HR) =   1.84
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.94

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
      1        6.40    27.32         1.200          11.90
      2        0.94     9.68         1.844           0.60
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
      1        5.11     9.68         1.844
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
      2        7.01    27.32         1.200

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      7.01   Tc(MIN.) =   27.32
 TOTAL AREA(ACRES) =     12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    990.00 =  2082.66 FEET.
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE

****************************************************************************
 FLOW PROCESS FROM NODE    990.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.21  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =    11.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.01
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =  27.35
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    957.00 TO NODE    958.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     958.00 TO NODE     955.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
 STREET LENGTH(FEET) =   304.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.66
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.38
 STREET FLOW TRAVEL TIME(MIN.) =   3.05   Tc(MIN.) =   9.05
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.933
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =    0.87
 TOTAL AREA(ACRES) =       0.60        PEAK FLOW RATE(CFS) =       1.08

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.85
 FLOW VELOCITY(FEET/SEC.) =  1.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    955.00 =   404.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     955.00 TO NODE     956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.76  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =    30.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.70
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.08
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   9.19
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     956.00 TO NODE     956.00 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.) =   9.19
 RAINFALL INTENSITY(INCH/HR) =   1.91
 TOTAL STREAM AREA(ACRES) =     0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.08

****************************************************************************
 FLOW PROCESS FROM NODE     959.00 TO NODE     960.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    503.59
 DOWNSTREAM ELEVATION(FEET) =    501.59
 ELEVATION DIFFERENCE(FEET) =      2.00
```

```
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.857
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.360
 SUBAREA RUNOFF(CFS) =      0.21
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
 FLOW PROCESS FROM NODE    960.00 TO NODE    956.20 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  501.59  DOWNSTREAM ELEVATION(FEET) =  497.41
 STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 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) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.43
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.86
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.44
 STREET FLOW TRAVEL TIME(MIN.) =   2.25   Tc(MIN.) =   8.25
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.046
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =    1.10
 TOTAL AREA(ACRES) =      0.70        PEAK FLOW RATE(CFS) =       1.32

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.21
 FLOW VELOCITY(FEET/SEC.) =  2.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.20 =   350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.20 TO NODE    956.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.48  DOWNSTREAM(FEET) =   492.46
 FLOW LENGTH(FEET) =     2.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.76
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.32
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   8.26
 LONGEST FLOWPATH FROM NODE    959.00 TO NODE    956.00 =   352.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 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.) =   8.26
 RAINFALL INTENSITY(INCH/HR) =   2.04
 TOTAL STREAM AREA(ACRES) =     0.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.32

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
    1         1.08     9.19        1.914          0.60
    2         1.32     8.26        2.044          0.70
```

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         2.33      8.26        2.044
     2         2.31      9.19        1.914

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       2.33   Tc(MIN.) =    8.26
 TOTAL AREA(ACRES) =       1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    956.00 =   434.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    956.00 TO NODE    991.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   492.46  DOWNSTREAM(FEET) =   491.06
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.95
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.33
 PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   9.10
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1         2.33      9.10        1.926         1.30
 LONGEST FLOWPATH FROM NODE    957.00 TO NODE    991.00 =   634.25 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
     1         7.01     27.35        1.200        12.50
 LONGEST FLOWPATH FROM NODE    911.00 TO NODE    991.00 =  2093.66 FEET.
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1        6.70      9.10        1.926
     2        8.46     27.35        1.200

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.46   Tc(MIN.) =   27.35
 TOTAL AREA(ACRES) =      13.80
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    991.00 TO NODE    991.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
*ERROR-TIME OF CONCENTRATION EXCEEDS RAINFALL TABLE
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.200
 *USER SPECIFIED(SUBAREA):
 SINGLE FAMILY DEVELOPMENT RUNOFF COEFFICIENT = .9000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =     0.10   SUBAREA RUNOFF(CFS) =     0.11
 TOTAL AREA(ACRES) =     13.90   TOTAL RUNOFF(CFS) =     8.57
```

```
  TC(MIN.) =  27.35
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      13.90  TC(MIN.) =      27.35
  PEAK FLOW RATE(CFS)    =       8.57
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

♀

Appendix G

AES Pipe Flow Hydraulic Analyses

For

Ultimate Condition

Basin 700

STARTING HGL FOR LATERAL PIPEFLOW

HGL at Node	743	For Pipe Flow	743.PIP

$EGL_{MAIN} = HGL_{LAT} + V^2/2g$

$HGL_{LAT} = EGL_{MAIN} - V^2/2g$

$g =$ 32.2 Ft/S^2

$EGL_{MAIN} =$	497.054	From Pipe Flow	7422.PIP

$V_{LAT} = Q_{LAT} / A_{LAT}$

$Q_{LAT} =$	20.47	CFS

$A_{LAT} = \Pi D_{LAT}^2/4$

$D_{LAT} =$	30	Inches

$HGL_{MAIN} =$	496.784

```
**************************************************************************
                PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
          (Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
        (c) Copyright 1982-2000 Advanced Engineering Software (aes)
            Ver. 8.0  Release Date: 01/01/2000  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                          1223 University Avenue, Suite 240
                           Riverside, California 92507-3418
                          (909) 782-0707  Fax (909) 782-0723

 ************************** DESCRIPTION OF STUDY **************************
* J - 16630 - Construction Change "F"                                     *
* BMRNV East Town Center and Paseo Del Sur Phase 5 Improvements           *
* Starting HGL taken from J-16630 (Pipe flow 7422.PIP)                    *
 *************************************************************************

  FILE NAME: 743.PIP
  TIME/DATE OF STUDY: 15:51 09/29/2014

**************************************************************************
              GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
                        NODAL POINT STATUS TABLE
                (Note: "*" indicates nodal point data used.)
                      UPSTREAM RUN                    DOWNSTREAM RUN
   NODE     MODEL    PRESSURE      PRESSURE+          FLOW         PRESSURE+
  NUMBER  PROCESS  HEAD(FT)    MOMENTUM(POUNDS)   DEPTH(FT)   MOMENTUM(POUNDS)
  743.00-              3.99*          1004.70        1.02             479.90
        } FRICTION         } HYDRAULIC JUMP
  743.10-              1.54 Dc         388.12        0.99*            497.91
        } JUNCTION
  743.10-              1.54 Dc         388.12        1.08*            455.93
        } FRICTION
  730.50-              1.54 Dc         388.12        0.80*            627.80
        } JUNCTION
  730.50-              1.62 Dc         423.43        0.92*            610.14
        } FRICTION
  730.40-              1.62 Dc         423.43        0.95*            590.58
        } JUNCTION
  730.40-              1.58 Dc         390.56        0.86*            587.72
        } FRICTION
  743.20-              1.58 Dc         390.56        0.97*            515.17
        } JUNCTION
  743.20-              1.59 Dc         390.56        0.99*            504.60
        } FRICTION
  725.70-              1.58*Dc         390.56        1.58*Dc          390.56
        } JUNCTION
  725.70-              2.64*           432.03        0.99             262.52
        } FRICTION         } HYDRAULIC JUMP
  725.80-              1.31*Dc         235.83        1.31*Dc          235.84
        } JUNCTION
  725.80-              1.84            187.21        0.45*            273.95
        } FRICTION
  725.90-              1.08*Dc         127.54        1.08*Dc          127.54
        } CATCH BASIN
  725.90-              4.64*           429.18        1.08 Dc           40.98
--------------------------------------------------------------------------
  MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE =  25
```

```
------------------------------------------------------------------------------
  NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST
  CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA
  DESIGN MANUALS.
******************************************************************************
  DOWNSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =   743.00            FLOWLINE ELEVATION =   492.79
  PIPE FLOW =      20.47 CFS        PIPE DIAMETER =  30.00 INCHES
  ASSUMED DOWNSTREAM CONTROL HGL =   496.780 FEET
------------------------------------------------------------------------------
  NODE   743.00 : HGL = <  496.780>;EGL= <  497.050>;FLOWLINE= <  492.790>

******************************************************************************
  FLOW PROCESS FROM NODE   743.00 TO NODE   743.10 IS CODE =  1
  UPSTREAM NODE   743.10     ELEVATION =   496.03  (HYDRAULIC JUMP OCCURS)
------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      20.47 CFS     PIPE DIAMETER =  30.00 INCHES
  PIPE LENGTH =     162.00 FEET          MANNING'S N  =  0.01300
------------------------------------------------------------------------------
  HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS
------------------------------------------------------------------------------
  NORMAL DEPTH(FT) =      1.03          CRITICAL DEPTH(FT) =      1.54
==============================================================================
  UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     0.99
==============================================================================
  GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
------------------------------------------------------------------------------
  DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
   CONTROL(FT)          (FT)    (FT/SEC)    ENERGY(FT)    MOMENTUM(POUNDS)
         0.000          0.985     11.385         2.999           497.91
         2.329          0.987     11.360         2.992           497.10
         4.749          0.988     11.335         2.985           496.29
         7.268          0.990     11.310         2.978           495.50
         9.894          0.992     11.286         2.971           494.70
        12.638          0.993     11.261         2.964           493.91
        15.512          0.995     11.237         2.957           493.12
        18.531          0.997     11.212         2.950           492.34
        21.711          0.998     11.188         2.943           491.56
        25.071          1.000     11.164         2.936           490.79
        28.635          1.001     11.140         2.930           490.02
        32.432          1.003     11.116         2.923           489.26
        36.494          1.005     11.092         2.916           488.50
        40.866          1.006     11.068         2.910           487.74
        45.600          1.008     11.045         2.903           486.99
        50.767          1.009     11.021         2.897           486.24
        56.458          1.011     10.998         2.890           485.50
        62.796          1.013     10.974         2.884           484.76
        69.954          1.014     10.951         2.878           484.02
        78.187          1.016     10.928         2.871           483.29
        87.887          1.018     10.905         2.865           482.56
        99.715          1.019     10.882         2.859           481.84
       114.906          1.021     10.859         2.853           481.12
       136.238          1.022     10.836         2.847           480.40
       162.000          1.024     10.820         2.843           479.90
------------------------------------------------------------------------------
  HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS
==============================================================================
  DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) =     3.99
==============================================================================
  PRESSURE FLOW PROFILE COMPUTED INFORMATION:
```

DISTANCE FROM CONTROL(FT)	PRESSURE HEAD(FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	3.990	4.170	4.260	1004.70
85.097	2.500	4.170	2.770	548.30

ASSUMED DOWNSTREAM PRESSURE HEAD(FT) = 2.50

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
85.097	2.500	4.169	2.770	548.30
87.184	2.461	4.182	2.733	537.05
89.170	2.423	4.207	2.698	526.30
91.095	2.384	4.239	2.664	515.92
92.969	2.346	4.278	2.630	505.89
94.798	2.307	4.322	2.598	496.20
96.585	2.269	4.372	2.566	486.84
98.329	2.230	4.426	2.535	477.82
100.033	2.192	4.486	2.504	469.15
101.693	2.153	4.551	2.475	460.83
103.310	2.115	4.621	2.446	452.87
104.881	2.076	4.697	2.419	445.29
106.403	2.037	4.777	2.392	438.10
107.872	1.999	4.864	2.366	431.31
109.284	1.960	4.956	2.342	424.94
110.635	1.922	5.054	2.319	419.01
111.917	1.883	5.159	2.297	413.52
113.124	1.845	5.270	2.276	408.50
114.248	1.806	5.389	2.257	403.98
115.278	1.768	5.515	2.240	399.96
116.203	1.729	5.650	2.225	396.48
117.008	1.690	5.793	2.212	393.57
117.677	1.652	5.946	2.201	391.24
118.189	1.613	6.109	2.193	389.53
118.520	1.575	6.283	2.188	388.48
118.638	1.536	6.468	2.186	388.12
162.000	1.536	6.468	2.186	388.12

----------END OF HYDRAULIC JUMP ANALYSIS----------

PRESSURE+MOMENTUM BALANCE OCCURS AT 97.03 FEET UPSTREAM OF NODE 743.00
DOWNSTREAM DEPTH = 2.259 FEET, UPSTREAM CONJUGATE DEPTH = 1.013 FEET

NODE 743.10 : HGL = < 497.015>;EGL= < 499.029>;FLOWLINE= < 496.030>

****

FLOW PROCESS FROM NODE 743.10 TO NODE 743.10 IS CODE = 5

UPSTREAM NODE 743.10 ELEVATION = 496.53 (FLOW IS SUPERCRITICAL)

CALCULATE JUNCTION LOSSES:

PIPE	FLOW (CFS)	DIAMETER (INCHES)	ANGLE (DEGREES)	FLOWLINE ELEVATION	CRITICAL DEPTH(FT.)	VELOCITY (FT/SEC)
UPSTREAM	20.47	30.00	0.00	496.53	1.54	10.032
DOWNSTREAM	20.47	30.00	-	496.03	1.54	11.388
LATERAL #1	0.00	0.00	0.00	0.00	0.00	0.000
LATERAL #2	0.00	0.00	0.00	0.00	0.00	0.000
Q5	0.00===Q5 EQUALS BASIN INPUT===					

LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:

DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES

```
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.01639
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.02316
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.01977
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.079 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 0.148)+( 0.000) =   0.148
--------------------------------------------------------------------------------
 NODE   743.10 : HGL = <  497.614>;EGL= <  499.177>;FLOWLINE= <  496.530>

********************************************************************************
 FLOW PROCESS FROM NODE   743.10 TO NODE   730.50 IS CODE =  1
 UPSTREAM NODE   730.50     ELEVATION =   499.00  (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      20.47 CFS     PIPE DIAMETER =  30.00 INCHES
 PIPE LENGTH =     165.09 FEET          MANNING'S N  =  0.01300
--------------------------------------------------------------------------------
 NORMAL DEPTH(FT) =      1.11          CRITICAL DEPTH(FT) =      1.54
================================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     0.80
================================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
--------------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)         (FT)     (FT/SEC)    ENERGY(FT)    MOMENTUM(POUNDS)
        0.000         0.800      15.117        4.351          627.80
        3.964         0.812      14.798        4.215          616.21
        8.010         0.825      14.491        4.088          605.12
       12.146         0.837      14.196        3.968          594.50
       16.380         0.850      13.911        3.856          584.33
       20.724         0.862      13.636        3.751          574.59
       25.188         0.875      13.371        3.653          565.26
       29.788         0.887      13.116        3.560          556.33
       34.538         0.900      12.869        3.473          547.76
       39.458         0.912      12.631        3.391          539.55
       44.572         0.925      12.400        3.314          531.69
       49.906         0.937      12.178        3.241          524.15
       55.494         0.950      11.962        3.173          516.92
       61.379         0.962      11.754        3.109          509.99
       67.614         0.975      11.552        3.048          503.35
       74.265         0.987      11.357        2.991          496.99
       81.424         1.000      11.167        2.937          490.90
       89.211         1.012      10.984        2.887          485.05
       97.798         1.025      10.806        2.839          479.46
      107.432         1.037      10.633        2.794          474.10
      118.500         1.049      10.466        2.751          468.97
      131.651         1.062      10.303        2.711          464.05
      148.097         1.074      10.146        2.674          459.35
      165.090         1.084      10.029        2.647          455.93
--------------------------------------------------------------------------------
 NODE   730.50 : HGL = <  499.800>;EGL= <  503.351>;FLOWLINE= <  499.000>

********************************************************************************
 FLOW PROCESS FROM NODE   730.50 TO NODE   730.50 IS CODE =  5
 UPSTREAM NODE   730.50     ELEVATION =   499.50  (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
    UPSTREAM      20.47      24.00       0.00     499.50       1.62        14.521
```

```
   DOWNSTREAM      20.47    30.00        -       499.00       1.54        15.122
   LATERAL #1       0.00     0.00     0.00         0.00       0.00         0.000
   LATERAL #2       0.00     0.00     0.00         0.00       0.00         0.000
      Q5            0.00===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:     MANNING'S N = 0.01300;  FRICTION SLOPE = 0.04379
  DOWNSTREAM:   MANNING'S N = 0.01300;  FRICTION SLOPE = 0.05070
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.04725
  JUNCTION LENGTH =    4.00 FEET
  FRICTION LOSSES =   0.189 FEET          ENTRANCE LOSSES =   0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.343)+( 0.000) =    0.343
-------------------------------------------------------------------------------
  NODE    730.50 : HGL = <  500.419>;EGL= <  503.694>;FLOWLINE= <  499.500>

*******************************************************************************
  FLOW PROCESS FROM NODE    730.50 TO NODE    730.40 IS CODE =  1
  UPSTREAM NODE   730.40      ELEVATION =    502.92  (FLOW IS SUPERCRITICAL)
-------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =       20.47 CFS      PIPE DIAMETER =   24.00 INCHES
  PIPE LENGTH =        76.00 FEET           MANNING'S N  =   0.01300
-------------------------------------------------------------------------------
  NORMAL DEPTH(FT) =       0.91            CRITICAL DEPTH(FT) =       1.62
===============================================================================
  UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =      0.95
===============================================================================
  GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
-------------------------------------------------------------------------------
  DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
   CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
         0.000          0.948     13.960          3.976           590.58
         1.872          0.946     13.987          3.986           591.52
         3.829          0.945     14.014          3.996           592.46
         5.879          0.943     14.041          4.007           593.41
         8.031          0.942     14.068          4.017           594.36
        10.294          0.940     14.096          4.028           595.31
        12.681          0.939     14.123          4.038           596.27
        15.204          0.938     14.151          4.049           597.24
        17.879          0.936     14.178          4.060           598.21
        20.724          0.935     14.206          4.070           599.18
        23.762          0.933     14.234          4.081           600.16
        27.019          0.932     14.262          4.092           601.14
        30.527          0.931     14.290          4.103           602.13
        34.328          0.929     14.318          4.114           603.12
        38.471          0.928     14.346          4.126           604.12
        43.023          0.926     14.375          4.137           605.12
        48.069          0.925     14.403          4.148           606.12
        53.727          0.924     14.432          4.160           607.13
        60.159          0.922     14.460          4.171           608.15
        67.607          0.921     14.489          4.183           609.16
        76.000          0.919     14.517          4.194           610.14
-------------------------------------------------------------------------------
  NODE    730.40 : HGL = <  503.868>;EGL= <  506.896>;FLOWLINE= <  502.920>

*******************************************************************************
  FLOW PROCESS FROM NODE    730.40 TO NODE    730.40 IS CODE =  5
  UPSTREAM NODE   730.40      ELEVATION =    503.25  (FLOW IS SUPERCRITICAL)
```

```
--------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
      PIPE          FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                    (CFS)    (INCHES)  (DEGREES)  ELEVATION  DEPTH(FT.)  (FT/SEC)
    UPSTREAM        19.32      24.00       0.00      503.25       1.58       14.917
   DOWNSTREAM       20.47      24.00         -       502.92       1.62       13.964
   LATERAL #1        1.15      18.00      90.00      503.75       0.40        3.033
   LATERAL #2        0.00       0.00       0.00        0.00       0.00        0.000
      Q5             0.00===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:     MANNING'S N = 0.01300;  FRICTION SLOPE = 0.04906
  DOWNSTREAM:   MANNING'S N = 0.01300;  FRICTION SLOPE = 0.03941
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.04424
  JUNCTION LENGTH =    4.00 FEET
  FRICTION LOSSES =   0.177 FEET          ENTRANCE LOSSES =   0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.671)+( 0.000) =    0.671
--------------------------------------------------------------------------------
  NODE    730.40 : HGL = <  504.112>;EGL= <  507.567>;FLOWLINE= <  503.250>

********************************************************************************
  FLOW PROCESS FROM NODE    730.40 TO NODE    743.20 IS CODE =  1
  UPSTREAM NODE    743.20     ELEVATION =    513.05   (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      19.32 CFS     PIPE DIAMETER =  24.00 INCHES
  PIPE LENGTH =     196.00 FEET          MANNING'S N  =  0.01300
--------------------------------------------------------------------------------
  NORMAL DEPTH(FT) =      0.86          CRITICAL DEPTH(FT) =      1.58
================================================================================
  UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     0.97
================================================================================
  GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
--------------------------------------------------------------------------------
  DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC       PRESSURE+
   CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)   MOMENTUM(POUNDS)
          0.000         0.974     12.711          3.485          515.17
          1.487         0.970     12.790          3.511          517.68
          3.055         0.965     12.869          3.538          520.23
          4.709         0.960     12.950          3.566          522.82
          6.459         0.956     13.032          3.594          525.44
          8.313         0.951     13.115          3.623          528.11
         10.283         0.946     13.199          3.653          530.83
         12.382         0.942     13.284          3.683          533.58
         14.623         0.937     13.370          3.714          536.38
         17.025         0.932     13.457          3.746          539.22
         19.609         0.927     13.545          3.778          542.10
         22.400         0.923     13.634          3.811          545.03
         25.428         0.918     13.725          3.845          548.01
         28.732         0.913     13.817          3.880          551.03
         32.361         0.909     13.909          3.915          554.11
         36.376         0.904     14.003          3.951          557.22
         40.860         0.899     14.099          3.988          560.39
         45.923         0.895     14.195          4.026          563.61
         51.720         0.890     14.293          4.064          566.88
         58.480         0.885     14.392          4.104          570.20
         66.555         0.881     14.493          4.144          573.57
         76.537         0.876     14.595          4.186          577.00
```

```
        89.535          0.871      14.698          4.228          580.48
       108.041          0.867      14.803          4.271          584.02
       140.049          0.862      14.909          4.315          587.61
       196.000          0.862      14.912          4.317          587.72
--------------------------------------------------------------------------------
  NODE   743.20 : HGL = <  514.024>;EGL= <  516.535>;FLOWLINE= <  513.050>

********************************************************************************
  FLOW PROCESS FROM NODE   743.20 TO NODE   743.20 IS CODE =  5
  UPSTREAM NODE   743.20     ELEVATION =   513.38  (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
       PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                   (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
     UPSTREAM      19.32      24.00       0.00     513.38       1.58        12.380
    DOWNSTREAM     19.32      24.00         -      513.05       1.58        12.715
    LATERAL #1      0.00       0.00       0.00       0.00       0.00         0.000
    LATERAL #2      0.00       0.00       0.00       0.00       0.00         0.000
       Q5           0.00===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.02969
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.03188
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.03078
  JUNCTION LENGTH =   4.00 FEET
  FRICTION LOSSES =  0.123 FEET         ENTRANCE LOSSES =  0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.220)+( 0.000) =   0.220
--------------------------------------------------------------------------------
  NODE   743.20 : HGL = <  514.375>;EGL= <  516.755>;FLOWLINE= <  513.380>

********************************************************************************
  FLOW PROCESS FROM NODE   743.20 TO NODE   725.70 IS CODE =  1
  UPSTREAM NODE   725.70     ELEVATION =   519.65  (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      19.32 CFS     PIPE DIAMETER =  24.00 INCHES
  PIPE LENGTH =     194.95 FEET          MANNING'S N  =  0.01300
--------------------------------------------------------------------------------
  NORMAL DEPTH(FT) =      0.97          CRITICAL DEPTH(FT) =      1.58
================================================================================
  UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.58
================================================================================
  GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
--------------------------------------------------------------------------------
  DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
   CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
          0.000         1.576      7.274          2.398          390.56
          0.046         1.552      7.385          2.399          390.75
          0.165         1.528      7.502          2.402          391.21
          0.362         1.503      7.624          2.407          391.95
          0.646         1.479      7.753          2.413          392.98
          1.027         1.455      7.888          2.422          394.33
          1.514         1.431      8.030          2.433          395.99
          2.122         1.407      8.180          2.446          397.98
          2.864         1.383      8.336          2.462          400.33
          3.759         1.358      8.501          2.481          403.04
          4.828         1.334      8.674          2.503          406.13
          6.098         1.310      8.856          2.529          409.62
```

```
         7.600          1.286          9.047          2.558          413.53
         9.375          1.262          9.249          2.591          417.89
        11.473          1.238          9.461          2.628          422.71
        13.961          1.213          9.684          2.671          428.03
        16.924          1.189          9.919          2.718          433.88
        20.481          1.165         10.168          2.771          440.28
        24.796          1.141         10.430          2.831          447.27
        30.111          1.117         10.707          2.898          454.89
        36.802          1.093         11.000          2.973          463.18
        45.500          1.068         11.310          3.056          472.19
        57.387          1.044         11.639          3.149          481.96
        75.121          1.020         11.988          3.253          492.57
       107.232          0.996         12.358          3.369          504.05
       194.950          0.995         12.376          3.375          504.60
--------------------------------------------------------------------------------
  NODE   725.70 : HGL = <  521.226>;EGL= <  522.048>;FLOWLINE= <  519.650>

********************************************************************************
  FLOW PROCESS FROM NODE   725.70 TO NODE   725.70 IS CODE =  5
  UPSTREAM NODE   725.70     ELEVATION =   520.10  (FLOW IS AT CRITICAL DEPTH)
--------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
    UPSTREAM      13.33      24.00      90.00     520.10       1.31        4.243
   DOWNSTREAM     19.32      24.00          -     519.65       1.58        7.256
   LATERAL #1      4.81      18.00      90.00     520.15       0.84        2.722
   LATERAL #2      1.18      18.00       0.00     520.15       0.41        0.668
      Q5           0.00===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00347
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00782
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00565
  JUNCTION LENGTH =   4.00 FEET
  FRICTION LOSSES =  0.023 FEET         ENTRANCE LOSSES =  0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.976)+( 0.000) =   0.976
--------------------------------------------------------------------------------
  NODE   725.70 : HGL = <  522.745>;EGL= <  523.024>;FLOWLINE= <  520.100>

********************************************************************************
  FLOW PROCESS FROM NODE   725.70 TO NODE   725.80 IS CODE =  1
  UPSTREAM NODE   725.80     ELEVATION =   522.47  (HYDRAULIC JUMP OCCURS)
--------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      13.33 CFS     PIPE DIAMETER =  24.00 INCHES
  PIPE LENGTH =     158.24 FEET          MANNING'S N  =  0.01300
--------------------------------------------------------------------------------
  HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS
--------------------------------------------------------------------------------
  NORMAL DEPTH(FT) =      0.98          CRITICAL DEPTH(FT) =      1.31
================================================================================
  UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.31
================================================================================
  GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
--------------------------------------------------------------------------------
  DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
   CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
```

0.000	1.310	6.111	1.890	235.84
0.048	1.297	6.183	1.891	235.89
0.160	1.283	6.257	1.892	236.03
0.342	1.270	6.332	1.893	236.23
0.601	1.257	6.410	1.895	236.51
0.945	1.244	6.491	1.898	236.88
1.383	1.230	6.573	1.902	237.32
1.927	1.217	6.658	1.906	237.85
2.588	1.204	6.746	1.911	238.46
3.381	1.190	6.836	1.917	239.16
4.324	1.177	6.928	1.923	239.96
5.440	1.164	7.024	1.931	240.84
6.753	1.151	7.122	1.939	241.83
8.297	1.137	7.224	1.948	242.91
10.113	1.124	7.328	1.959	244.09
12.254	1.111	7.436	1.970	245.38
14.790	1.098	7.547	1.983	246.78
17.816	1.084	7.662	1.996	248.30
21.464	1.071	7.781	2.012	249.93
25.930	1.058	7.903	2.028	251.68
31.515	1.044	8.029	2.046	253.55
38.726	1.031	8.159	2.066	255.56
48.510	1.018	8.294	2.087	257.70
63.001	1.005	8.434	2.110	259.98
89.039	0.991	8.578	2.135	262.41
158.240	0.991	8.584	2.136	262.52

HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS

DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) = 2.64

PRESSURE FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	PRESSURE HEAD(FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	2.645	4.243	2.924	432.03
56.037	2.000	4.243	2.280	305.64

ASSUMED DOWNSTREAM PRESSURE HEAD(FT) = 2.00

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
56.037	2.000	4.242	2.280	305.64
58.256	1.973	4.253	2.254	300.57
60.332	1.945	4.274	2.229	295.76
62.324	1.918	4.302	2.205	291.15
64.250	1.890	4.335	2.182	286.71
66.117	1.863	4.372	2.160	282.44
67.931	1.835	4.414	2.138	278.33
69.694	1.808	4.461	2.117	274.39
71.409	1.780	4.511	2.097	270.60
73.074	1.753	4.565	2.077	266.98
74.691	1.726	4.624	2.058	263.52
76.256	1.698	4.687	2.039	260.24
77.768	1.671	4.753	2.022	257.13
79.224	1.643	4.825	2.005	254.21
80.620	1.616	4.900	1.989	251.47
81.952	1.588	4.980	1.974	248.92
83.214	1.561	5.066	1.960	246.58

```
        84.400          1.534       5.156          1.946          244.44
        85.502          1.506       5.251          1.934          242.51
        86.511          1.479       5.352          1.924          240.81
        87.416          1.451       5.458          1.914          239.34
        88.203          1.424       5.571          1.906          238.11
        88.857          1.396       5.690          1.899          237.13
        89.357          1.369       5.816          1.894          236.42
        89.680          1.341       5.949          1.891          235.98
        89.795          1.314       6.090          1.890          235.83
       158.240          1.314       6.090          1.890          235.83
-------------------------END OF HYDRAULIC JUMP ANALYSIS-------------------------
| PRESSURE+MOMENTUM BALANCE OCCURS AT    75.50 FEET UPSTREAM OF NODE  725.70 |
|       DOWNSTREAM DEPTH = 1.711 FEET, UPSTREAM CONJUGATE DEPTH = 0.995 FEET |
-------------------------------------------------------------------------------
  NODE   725.80 : HGL = <  523.780>;EGL= <  524.360>;FLOWLINE= <  522.470>

*******************************************************************************
  FLOW PROCESS FROM NODE   725.80 TO NODE   725.80 IS CODE =  5
  UPSTREAM NODE   725.80     ELEVATION =   522.97  (FLOW IS AT CRITICAL DEPTH)
  (NOTE: POSSIBLE JUMP IN OR UPSTREAM OF STRUCTURE)
-------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
       PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                   (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
     UPSTREAM       7.81      18.00      90.00     522.97       1.08        17.768
    DOWNSTREAM     13.33      24.00          -     522.47       1.31         6.113
    LATERAL #1      5.52      18.00       0.00     522.97       0.91         4.948
    LATERAL #2      0.00       0.00       0.00       0.00       0.00         0.000
       Q5           0.00===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.15002
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00594
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.07798
  JUNCTION LENGTH =   4.00 FEET
  FRICTION LOSSES =  0.312 FEET         ENTRANCE LOSSES =  0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 3.957)+( 0.000) =   3.957
-------------------------------------------------------------------------------
  NODE   725.80 : HGL = <  523.415>;EGL= <  528.318>;FLOWLINE= <  522.970>

*******************************************************************************
  FLOW PROCESS FROM NODE   725.80 TO NODE   725.90 IS CODE =  1
  UPSTREAM NODE   725.90     ELEVATION =   531.82  (FLOW IS SUPERCRITICAL)
-------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =       7.81 CFS     PIPE DIAMETER =  18.00 INCHES
  PIPE LENGTH =      59.00 FEET          MANNING'S N  =  0.01300
-------------------------------------------------------------------------------
  NORMAL DEPTH(FT) =      0.45          CRITICAL DEPTH(FT) =      1.08
===============================================================================
  UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.08
===============================================================================
  GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
-------------------------------------------------------------------------------
  DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
   CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
          0.000         1.083       5.717          1.590           127.54
          0.009         1.057       5.866          1.592           127.64
```

```
         0.036          1.032          6.025          1.596          127.96
         0.085          1.006          6.196          1.603          128.51
         0.158          0.981          6.379          1.613          129.31
         0.258          0.955          6.575          1.627          130.36
         0.390          0.930          6.786          1.645          131.70
         0.558          0.904          7.014          1.668          133.34
         0.768          0.879          7.258          1.697          135.31
         1.026          0.853          7.522          1.732          137.63
         1.341          0.828          7.808          1.775          140.33
         1.724          0.802          8.117          1.826          143.45
         2.188          0.777          8.453          1.887          147.03
         2.749          0.751          8.818          1.959          151.11
         3.428          0.726          9.215          2.045          155.76
         4.253          0.700          9.650          2.147          161.03
         5.261          0.675         10.127          2.268          166.99
         6.504          0.649         10.652          2.412          173.74
         8.054          0.624         11.231          2.584          181.37
        10.019          0.598         11.872          2.788          190.00
        12.566          0.573         12.586          3.034          199.80
        15.979          0.547         13.384          3.331          210.92
        20.793          0.522         14.281          3.691          223.59
        28.211          0.496         15.294          4.131          238.09
        42.103          0.471         16.445          4.673          254.73
        59.000          0.445         17.762          5.348          273.95
------------------------------------------------------------------------------
  NODE   725.90 : HGL = <  532.903>;EGL= <  533.411>;FLOWLINE= <  531.820>

******************************************************************************
  FLOW PROCESS FROM NODE   725.90 TO NODE   725.90 IS CODE =  8
  UPSTREAM NODE   725.90     ELEVATION =   528.87  (FLOW IS AT CRITICAL DEPTH)
------------------------------------------------------------------------------
  CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
  PIPE FLOW =       7.81 CFS          PIPE DIAMETER =  18.00 INCHES
  FLOW VELOCITY =   5.72 FEET/SEC.    VELOCITY HEAD =  0.508 FEET
  CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(  0.508) =  0.102
------------------------------------------------------------------------------
  NODE   725.90 : HGL = <  533.512>;EGL= <  533.512>;FLOWLINE= <  528.870>

******************************************************************************
  UPSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =   725.90           FLOWLINE ELEVATION =   528.87
  ASSUMED UPSTREAM CONTROL HGL =   529.95 FOR DOWNSTREAM RUN ANALYSIS

==============================================================================
  END OF GRADUALLY VARIED FLOW ANALYSIS
```

```
**************************************************************************
                PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
          (Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
        (c) Copyright 1982-2000 Advanced Engineering Software (aes)
            Ver. 8.0  Release Date: 01/01/2000  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                          1223 University Avenue, Suite 240
                           Riverside, California 92507-3418
                          (909) 782-0707  Fax (909) 782-0723

 ************************** DESCRIPTION OF STUDY **************************
* J-16630 Construction Change "F" (from 743.PIP)                          *
* BMRNV East Town Center and paseo Del Sur Phase 5 Improvements           *
* CVurb inlet along 'AN' Street, at Node 730.3                            *
 **************************************************************************

  FILE NAME: 7304.LAT
  TIME/DATE OF STUDY: 16:10 09/29/2014

**************************************************************************
              GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
                        NODAL POINT STATUS TABLE
                 (Note: "*" indicates nodal point data used.)
                          UPSTREAM RUN                  DOWNSTREAM RUN
   NODE     MODEL     PRESSURE      PRESSURE+          FLOW        PRESSURE+
  NUMBER   PROCESS   HEAD(FT)    MOMENTUM(POUNDS)   DEPTH(FT)   MOMENTUM(POUNDS)
  730.40-              0.45 Dc          14.05         0.22*            25.30
        } FRICTION
  730.30-              0.45*Dc          14.05         0.45*Dc          14.05
        } CATCH BASIN
  730.30-              0.64*             7.46         0.45 Dc           5.12
--------------------------------------------------------------------------
  MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE =  25
--------------------------------------------------------------------------
  NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST
  CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA
  DESIGN MANUALS.
**************************************************************************
  DOWNSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =   730.40          FLOWLINE ELEVATION =   503.75
  PIPE FLOW =      1.43 CFS       PIPE DIAMETER =  18.00 INCHES
  ASSUMED DOWNSTREAM CONTROL HGL =   504.112 FEET
  *NOTE: ASSUMED DOWNSTREAM CONTROL DEPTH(  0.36 FT.)
         IS LESS THAN CRITICAL DEPTH(  0.45 FT.)
  ===> CRITICAL DEPTH IS ASSUMED AS DOWNSTREAM CONTROL DEPTH
       FOR UPSTREAM RUN ANALYSIS
--------------------------------------------------------------------------
  NODE   730.40 : HGL = <  503.972>;EGL= <  505.174>;FLOWLINE= <  503.750>

**************************************************************************
  FLOW PROCESS FROM NODE   730.40 TO NODE   730.30 IS CODE =  1
  UPSTREAM NODE   730.30     ELEVATION =   506.78  (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      1.43 CFS     PIPE DIAMETER =  18.00 INCHES
  PIPE LENGTH =     30.25 FEET          MANNING'S N  =  0.01300
--------------------------------------------------------------------------
```

```
 NORMAL DEPTH(FT) =      0.21          CRITICAL DEPTH(FT) =      0.45
===============================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     0.45
===============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
-------------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)         (FT)     (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
        0.000         0.448       3.224         0.610            14.05
        0.004         0.439       3.320         0.610            14.06
        0.018         0.429       3.423         0.611            14.10
        0.041         0.420       3.531         0.614            14.15
        0.076         0.410       3.645         0.617            14.23
        0.124         0.401       3.766         0.621            14.34
        0.187         0.392       3.894         0.627            14.48
        0.267         0.382       4.030         0.634            14.64
        0.366         0.373       4.174         0.643            14.84
        0.488         0.363       4.329         0.654            15.07
        0.637         0.354       4.493         0.667            15.33
        0.816         0.344       4.669         0.683            15.63
        1.031         0.335       4.857         0.701            15.98
        1.289         0.325       5.059         0.723            16.37
        1.600         0.316       5.276         0.748            16.81
        1.975         0.307       5.509         0.778            17.30
        2.429         0.297       5.761         0.813            17.85
        2.983         0.288       6.034         0.853            18.46
        3.667         0.278       6.331         0.901            19.15
        4.524         0.269       6.653         0.957            19.91
        5.623         0.259       7.005         1.022            20.76
        7.078         0.250       7.390         1.098            21.71
        9.102         0.240       7.813         1.189            22.77
       12.177         0.231       8.280         1.296            23.96
       17.852         0.222       8.797         1.424            25.30
       30.250         0.222       8.797         1.424            25.30
-------------------------------------------------------------------------------
 NODE   730.30 : HGL = <  507.228>;EGL= <  507.390>;FLOWLINE= <  506.780>

*******************************************************************************
 FLOW PROCESS FROM NODE   730.30 TO NODE   730.30 IS CODE =  8
 UPSTREAM NODE   730.30     ELEVATION =   506.78  (FLOW IS AT CRITICAL DEPTH)
-------------------------------------------------------------------------------
 CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
 PIPE FLOW =       1.43 CFS          PIPE DIAMETER =  18.00 INCHES
 FLOW VELOCITY =   3.22 FEET/SEC.    VELOCITY HEAD =  0.161 FEET
 CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(  0.161) =  0.032
-------------------------------------------------------------------------------
 NODE   730.30 : HGL = <  507.422>;EGL= <  507.422>;FLOWLINE= <  506.780>

*******************************************************************************
 UPSTREAM PIPE FLOW CONTROL DATA:
 NODE NUMBER =   730.30           FLOWLINE ELEVATION =   506.78
 ASSUMED UPSTREAM CONTROL HGL =   507.23 FOR DOWNSTREAM RUN ANALYSIS

===============================================================================
 END OF GRADUALLY VARIED FLOW ANALYSIS
```

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2000 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2000 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
1223 University Avenue, Suite 240
Riverside, California 92507-3418
(909) 782-0707 Fax (909) 782-0723

DESCRIPTION OF STUDY
* J-16630 Construction Change "F" (from 743.PIP)
* BMRNV East Town Center and Paseo Del Sur Phase 5 Improvements
* Storm drain along 'AN' Street, south of Del Sur Ridge Road

FILE NAME: 7257S.LAT
TIME/DATE OF STUDY: 09:34 07/10/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
725.70-		2.59*	205.62	0.22	25.43
	} FRICTION		} HYDRAULIC JUMP		
725.40-		0.44*Dc	13.80	0.44*Dc	13.80
	} JUNCTION				
725.40-		0.46 Dc	13.83	0.32*	16.36
	} FRICTION				
725.30-		0.44*Dc	13.80	0.44*Dc	13.80
	} CATCH BASIN				
725.30-		0.63*	7.20	0.44 Dc	5.03

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 725.70 FLOWLINE ELEVATION = 520.15
PIPE FLOW = 1.41 CFS PIPE DIAMETER = 18.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 522.745 FEET

NODE 725.70 : HGL = < 522.745>;EGL= < 522.755>;FLOWLINE= < 520.150>

FLOW PROCESS FROM NODE 725.70 TO NODE 725.40 IS CODE = 1
UPSTREAM NODE 725.40 ELEVATION = 527.00 (HYDRAULIC JUMP OCCURS)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 1.41 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 76.06 FEET MANNING'S N = 0.01300

HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS

NORMAL DEPTH(FT) = 0.22 CRITICAL DEPTH(FT) = 0.44

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.44

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.445	3.211	0.605	13.80
0.004	0.436	3.305	0.606	13.81
0.019	0.427	3.404	0.607	13.84
0.043	0.418	3.509	0.609	13.90
0.080	0.408	3.619	0.612	13.97
0.131	0.399	3.736	0.616	14.07
0.197	0.390	3.860	0.622	14.20

0.281	0.381	3.991	0.628	14.35
0.386	0.372	4.130	0.637	14.53
0.514	0.363	4.278	0.647	14.75
0.669	0.353	4.436	0.659	14.99
0.856	0.344	4.604	0.674	15.28
1.081	0.335	4.784	0.691	15.59
1.351	0.326	4.976	0.711	15.95
1.675	0.317	5.182	0.734	16.36
2.064	0.308	5.404	0.761	16.81
2.536	0.299	5.642	0.793	17.32
3.110	0.289	5.900	0.830	17.88
3.817	0.280	6.178	0.873	18.51
4.702	0.271	6.480	0.924	19.21
5.834	0.262	6.809	0.982	19.99
7.329	0.253	7.167	1.051	20.85
9.406	0.244	7.560	1.132	21.81
12.553	0.234	7.991	1.226	22.89
18.347	0.225	8.465	1.339	24.09
76.060	0.216	8.991	1.472	25.43

HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS

DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) = 2.59

PRESSURE FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	PRESSURE HEAD(FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	2.595	0.798	2.605	205.62
12.183	1.500	0.798	1.510	84.88

ASSUMED DOWNSTREAM PRESSURE HEAD(FT) = 1.50

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
12.183	1.500	0.798	1.510	84.88
12.650	1.458	0.804	1.468	80.26
13.116	1.416	0.816	1.426	75.71
13.581	1.373	0.831	1.384	71.24
14.045	1.331	0.850	1.342	66.88
14.508	1.289	0.872	1.301	62.63
14.970	1.247	0.898	1.259	58.50
15.430	1.205	0.927	1.218	54.51
15.889	1.162	0.959	1.177	50.66
16.347	1.120	0.996	1.136	46.96
16.802	1.078	1.037	1.095	43.42
17.255	1.036	1.083	1.054	40.04
17.705	0.994	1.135	1.014	36.83
18.152	0.951	1.193	0.973	33.80
18.595	0.909	1.258	0.934	30.95
19.032	0.867	1.332	0.895	28.28
19.463	0.825	1.416	0.856	25.81
19.886	0.783	1.512	0.818	23.53
20.298	0.740	1.622	0.781	21.46
20.697	0.698	1.749	0.746	19.60
21.076	0.656	1.897	0.712	17.97
21.431	0.614	2.072	0.680	16.57
21.749	0.572	2.279	0.652	15.43
22.018	0.529	2.528	0.629	14.56
22.211	0.487	2.833	0.612	14.00
22.289	0.445	3.211	0.605	13.80
76.060	0.445	3.211	0.605	13.80

END OF HYDRAULIC JUMP ANALYSIS

PRESSURE+MOMENTUM BALANCE OCCURS AT 19.62 FEET UPSTREAM OF NODE 725.70
DOWNSTREAM DEPTH = 0.809 FEET, UPSTREAM CONJUGATE DEPTH = 0.219 FEET

NODE 725.40 : HGL = < 527.445>;EGL= < 527.605>;FLOWLINE= < 527.000>

FLOW PROCESS FROM NODE 725.40 TO NODE 725.40 IS CODE = 5
UPSTREAM NODE 725.40 ELEVATION = 527.33 (FLOW IS AT CRITICAL DEPTH)
(NOTE: POSSIBLE JUMP IN OR UPSTREAM OF STRUCTURE)

CALCULATE JUNCTION LOSSES:

PIPE	FLOW (CFS)	DIAMETER (INCHES)	ANGLE (DEGREES)	FLOWLINE ELEVATION	CRITICAL DEPTH(FT.)	VELOCITY (FT/SEC)

UPSTREAM	1.41	18.00	90.00	527.33	0.44	5.183
DOWNSTREAM	1.41	18.00	-	527.00	0.44	3.212
LATERAL #1	0.00	0.00	0.00	0.00	0.00	0.000
LATERAL #2	0.00	0.00	0.00	0.00	0.00	0.000
Q5	0.00===Q5 EQUALS BASIN INPUT===					

LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
UPSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.01884
DOWNSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00491
AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.01187
JUNCTION LENGTH = 4.00 FEET
FRICTION LOSSES = 0.047 FEET ENTRANCE LOSSES = 0.000 FEET
JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
JUNCTION LOSSES = (0.459)+(0.000) = 0.459

NODE 725.40 : HGL = < 527.647>;EGL= < 528.064>;FLOWLINE= < 527.330>

****

FLOW PROCESS FROM NODE 725.40 TO NODE 725.30 IS CODE = 1
UPSTREAM NODE 725.30 ELEVATION = 527.84 (FLOW IS SUPERCRITICAL)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 1.41 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 25.25 FEET MANNING'S N = 0.01300

NORMAL DEPTH(FT) = 0.31 CRITICAL DEPTH(FT) = 0.44

==========

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.44

==========

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.445	3.211	0.605	13.80
0.008	0.440	3.265	0.605	13.81
0.035	0.434	3.321	0.606	13.82
0.080	0.429	3.379	0.606	13.83
0.148	0.424	3.439	0.607	13.86
0.239	0.418	3.500	0.609	13.89
0.357	0.413	3.564	0.610	13.93
0.504	0.408	3.629	0.612	13.98
0.685	0.402	3.697	0.615	14.04
0.903	0.397	3.767	0.617	14.10
1.164	0.392	3.839	0.621	14.18
1.473	0.386	3.914	0.624	14.26
1.839	0.381	3.992	0.628	14.35
2.271	0.376	4.072	0.633	14.46
2.781	0.370	4.155	0.638	14.57
3.384	0.365	4.241	0.644	14.69
4.100	0.360	4.331	0.651	14.83
4.957	0.354	4.423	0.658	14.97
5.992	0.349	4.520	0.666	15.13
7.263	0.343	4.620	0.675	15.30
8.855	0.338	4.724	0.685	15.49
10.916	0.333	4.832	0.696	15.68
13.717	0.327	4.944	0.707	15.89
17.875	0.322	5.061	0.720	16.12
25.250	0.317	5.182	0.734	16.36

NODE 725.30 : HGL = < 528.285>;EGL= < 528.445>;FLOWLINE= < 527.840>

****

FLOW PROCESS FROM NODE 725.30 TO NODE 725.30 IS CODE = 8
UPSTREAM NODE 725.30 ELEVATION = 527.85 (FLOW IS AT CRITICAL DEPTH)

CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
PIPE FLOW = 1.41 CFS PIPE DIAMETER = 18.00 INCHES
FLOW VELOCITY = 3.21 FEET/SEC. VELOCITY HEAD = 0.160 FEET
CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(0.160) = 0.032

NODE 725.30 : HGL = < 528.477>;EGL= < 528.477>;FLOWLINE= < 527.850>

****

UPSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 725.30 FLOWLINE ELEVATION = 527.85
ASSUMED UPSTREAM CONTROL HGL = 528.29 FOR DOWNSTREAM RUN ANALYSIS

END OF GRADUALLY VARIED FLOW ANALYSIS

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2000 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2000 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
1223 University Avenue, Suite 240
Riverside, California 92507-3418
(909) 782-0707 Fax (909) 782-0723

DESCRIPTION OF STUDY
* J-16630 Construction Change "F" (from 743.PIP)
* BMRNV East Town Center and Paseo Del Sur Phase 5 Improvements
* Del Sur Ridge east of 'AN' Street

FILE NAME: 7257E.LAT
TIME/DATE OF STUDY: 09:39 07/10/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
725.70-		2.60*	240.13	0.79	87.31
	} FRICTION		} HYDRAULIC JUMP		
735.50-		0.92*Dc	84.45	0.92*Dc	84.45
	} JUNCTION				
735.50-		1.28*	99.22	0.80	87.22
	} FRICTION		} HYDRAULIC JUMP		
726.30-		0.92*Dc	84.45	0.92*Dc	84.45
	} CATCH BASIN				
726.30-		1.38*	47.03	0.92 Dc	28.59

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 725.70 FLOWLINE ELEVATION = 520.15
PIPE FLOW = 5.74 CFS PIPE DIAMETER = 18.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 522.750 FEET

NODE 725.70 : HGL = < 522.750>;EGL= < 522.914>;FLOWLINE= < 520.150>

FLOW PROCESS FROM NODE 725.70 TO NODE 735.50 IS CODE = 1
UPSTREAM NODE 735.50 ELEVATION = 523.05 (HYDRAULIC JUMP OCCURS)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 5.74 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 289.91 FEET MANNING'S N = 0.01300

HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS

NORMAL DEPTH(FT) = 0.79 CRITICAL DEPTH(FT) = 0.92

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.92

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.921	5.041	1.316	84.45
0.033	0.916	5.075	1.316	84.46
0.100	0.911	5.109	1.317	84.48
0.202	0.906	5.144	1.317	84.51
0.344	0.900	5.180	1.317	84.54
0.530	0.895	5.216	1.318	84.58
0.764	0.890	5.253	1.319	84.63

1.051	0.885	5.290	1.320	84.69
1.398	0.880	5.328	1.321	84.76
1.812	0.874	5.367	1.322	84.84
2.301	0.869	5.406	1.323	84.93
2.876	0.864	5.446	1.325	85.03
3.551	0.859	5.486	1.326	85.13
4.340	0.853	5.527	1.328	85.25
5.265	0.848	5.569	1.330	85.38
6.351	0.843	5.611	1.332	85.51
7.632	0.838	5.654	1.334	85.66
9.155	0.833	5.698	1.337	85.82
10.985	0.827	5.742	1.340	85.98
13.216	0.822	5.787	1.342	86.16
15.997	0.817	5.833	1.346	86.35
19.573	0.812	5.880	1.349	86.55
24.409	0.806	5.927	1.352	86.76
31.546	0.801	5.976	1.356	86.98
44.322	0.796	6.025	1.360	87.22
289.910	0.794	6.043	1.361	87.31

HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS

DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) = 2.60

PRESSURE FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	PRESSURE HEAD(FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	2.600	3.248	2.764	240.13
156.759	1.500	3.248	1.664	118.83

ASSUMED DOWNSTREAM PRESSURE HEAD(FT) = 1.50

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
156.759	1.500	3.247	1.664	118.83
159.815	1.477	3.258	1.642	116.41
162.686	1.454	3.277	1.621	114.10
165.453	1.431	3.302	1.600	111.88
168.142	1.408	3.332	1.580	109.72
170.765	1.385	3.366	1.561	107.64
173.330	1.362	3.404	1.542	105.63
175.841	1.339	3.446	1.523	103.70
178.301	1.316	3.493	1.505	101.83
180.711	1.293	3.543	1.488	100.05
183.072	1.270	3.597	1.471	98.34
185.380	1.247	3.655	1.454	96.71
187.636	1.224	3.717	1.438	95.17
189.834	1.201	3.784	1.423	93.71
191.971	1.178	3.855	1.409	92.35
194.041	1.155	3.931	1.395	91.07
196.035	1.132	4.012	1.382	89.90
197.946	1.109	4.098	1.370	88.82
199.759	1.086	4.190	1.358	87.85
201.461	1.063	4.287	1.348	86.99
203.030	1.040	4.391	1.339	86.25
204.442	1.017	4.501	1.331	85.62
205.659	0.994	4.619	1.325	85.12
206.635	0.970	4.744	1.320	84.76
207.300	0.947	4.878	1.317	84.53
207.553	0.924	5.021	1.316	84.45
289.910	0.924	5.021	1.316	84.45

END OF HYDRAULIC JUMP ANALYSIS

PRESSURE+MOMENTUM BALANCE OCCURS AT 200.98 FEET UPSTREAM OF NODE 725.70
DOWNSTREAM DEPTH = 1.069 FEET, UPSTREAM CONJUGATE DEPTH = 0.796 FEET

NODE 735.50 : HGL = < 523.971>;EGL= < 524.366>;FLOWLINE= < 523.050>

****

FLOW PROCESS FROM NODE 735.50 TO NODE 735.50 IS CODE = 5
UPSTREAM NODE 735.50 ELEVATION = 523.38 (FLOW IS AT CRITICAL DEPTH)

CALCULATE JUNCTION LOSSES:

PIPE	FLOW (CFS)	DIAMETER (INCHES)	ANGLE (DEGREES)	FLOWLINE ELEVATION	CRITICAL DEPTH(FT.)	VELOCITY (FT/SEC)
UPSTREAM	5.74	18.00	90.00	523.38	0.92	3.570

DOWNSTREAM	5.74	18.00	-	523.05	0.92	5.023
LATERAL #1	0.00	0.00	0.00	0.00	0.00	0.000
LATERAL #2	0.00	0.00	0.00	0.00	0.00	0.000
Q5	0.00===Q5 EQUALS BASIN INPUT===					

LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
UPSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00279
DOWNSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00610
AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00445
JUNCTION LENGTH = 4.00 FEET
FRICTION LOSSES = 0.018 FEET ENTRANCE LOSSES = 0.000 FEET
JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
JUNCTION LOSSES = (0.493)+(0.000) = 0.493

NODE 735.50 : HGL = < 524.662>;EGL= < 524.860>;FLOWLINE= < 523.380>

****

FLOW PROCESS FROM NODE 735.50 TO NODE 726.30 IS CODE = 1
UPSTREAM NODE 726.30 ELEVATION = 524.00 (HYDRAULIC JUMP OCCURS)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 5.74 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 62.00 FEET MANNING'S N = 0.01300

HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS

NORMAL DEPTH(FT) = 0.79 CRITICAL DEPTH(FT) = 0.92

==========

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.92

==========

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.924	5.021	1.316	84.45
0.016	0.919	5.055	1.316	84.46
0.064	0.914	5.091	1.316	84.47
0.149	0.908	5.126	1.317	84.49
0.274	0.903	5.162	1.317	84.52
0.442	0.898	5.199	1.318	84.56
0.658	0.892	5.236	1.318	84.61
0.928	0.887	5.274	1.319	84.67
1.256	0.882	5.313	1.320	84.73
1.652	0.876	5.352	1.321	84.81
2.123	0.871	5.392	1.323	84.90
2.681	0.866	5.432	1.324	84.99
3.337	0.860	5.473	1.326	85.10
4.108	0.855	5.515	1.328	85.22
5.015	0.850	5.557	1.329	85.34
6.082	0.844	5.601	1.332	85.48
7.345	0.839	5.644	1.334	85.63
8.850	0.834	5.689	1.336	85.78
10.660	0.828	5.734	1.339	85.95
12.873	0.823	5.780	1.342	86.13
15.634	0.818	5.827	1.345	86.33
19.191	0.812	5.875	1.348	86.53
24.008	0.807	5.924	1.352	86.74
31.123	0.801	5.973	1.356	86.97
43.877	0.796	6.023	1.360	87.21
62.000	0.796	6.024	1.360	87.22

HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS

==========

DOWNSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 1.28

==========

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	1.282	3.568	1.480	99.22
1.456	1.267	3.603	1.469	98.17
2.893	1.253	3.639	1.459	97.16
4.309	1.239	3.676	1.449	96.17
5.705	1.225	3.715	1.439	95.22
7.078	1.210	3.756	1.429	94.31
8.428	1.196	3.798	1.420	93.43

9.755	1.182	3.843	1.411	92.58
11.056	1.167	3.889	1.402	91.77
12.330	1.153	3.937	1.394	90.99
13.575	1.139	3.986	1.386	90.25
14.788	1.125	4.038	1.378	89.55
15.968	1.110	4.092	1.370	88.89
17.111	1.096	4.148	1.363	88.27
18.214	1.082	4.206	1.357	87.70
19.272	1.067	4.266	1.350	87.16
20.281	1.053	4.329	1.344	86.67
21.236	1.039	4.394	1.339	86.22
22.130	1.024	4.462	1.334	85.82
22.954	1.010	4.533	1.329	85.47
23.699	0.996	4.606	1.326	85.17
24.354	0.982	4.683	1.322	84.92
24.904	0.967	4.762	1.320	84.72
25.330	0.953	4.845	1.318	84.57
25.609	0.939	4.931	1.317	84.48
25.711	0.924	5.021	1.316	84.45
62.000	0.924	5.021	1.316	84.45

----------END OF HYDRAULIC JUMP ANALYSIS----------

| PRESSURE+MOMENTUM BALANCE OCCURS AT 19.21 FEET UPSTREAM OF NODE 735.50 |
| DOWNSTREAM DEPTH = 1.068 FEET, UPSTREAM CONJUGATE DEPTH = 0.797 FEET |

NODE 726.30 : HGL = < 524.924>;EGL= < 525.316>;FLOWLINE= < 524.000>

****

FLOW PROCESS FROM NODE 726.30 TO NODE 726.30 IS CODE = 8
UPSTREAM NODE 726.30 ELEVATION = 524.01 (FLOW IS AT CRITICAL DEPTH)

CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
PIPE FLOW = 5.74 CFS PIPE DIAMETER = 18.00 INCHES
FLOW VELOCITY = 5.02 FEET/SEC. VELOCITY HEAD = 0.392 FEET
CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(0.392) = 0.078

NODE 726.30 : HGL = < 525.394>;EGL= < 525.394>;FLOWLINE= < 524.010>

****

UPSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 726.30 FLOWLINE ELEVATION = 524.01
ASSUMED UPSTREAM CONTROL HGL = 524.93 FOR DOWNSTREAM RUN ANALYSIS

==========

END OF GRADUALLY VARIED FLOW ANALYSIS

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2000 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2000 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
1223 University Avenue, Suite 240
Riverside, California 92507-3418
(909) 782-0707 Fax (909) 782-0723

DESCRIPTION OF STUDY
* J-16630 Construction Change "F" (from 743.PIP)
* BMRNV Town Center East and Paseo Del Sur Phase 5 Improvements
* Storm Drain along Del Sur Ridge, west of 'AN' Street

FILE NAME: 7258.LAT
TIME/DATE OF STUDY: 16:42 07/09/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
725.80-		0.91 Dc	80.20	0.67*	90.68
	} FRICTION				
726.50-		0.91*Dc	80.20	0.90*Dc	80.20
	} JUNCTION				
726.50-		1.24*	81.61	0.60	71.83
	} FRICTION	} HYDRAULIC JUMP			
726.40-		0.82*Dc	62.76	0.82*Dc	62.76
	} CATCH BASIN				
726.40-		1.22*	34.40	0.82 Dc	21.74

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 725.80 FLOWLINE ELEVATION = 522.97
PIPE FLOW = 5.52 CFS PIPE DIAMETER = 18.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 523.420 FEET
*NOTE: ASSUMED DOWNSTREAM CONTROL DEPTH(0.45 FT.)
IS LESS THAN CRITICAL DEPTH(0.91 FT.)
===> CRITICAL DEPTH IS ASSUMED AS DOWNSTREAM CONTROL DEPTH
FOR UPSTREAM RUN ANALYSIS

NODE 725.80 : HGL = < 523.641>;EGL= < 524.450>;FLOWLINE= < 522.970>

FLOW PROCESS FROM NODE 725.80 TO NODE 726.50 IS CODE = 1
UPSTREAM NODE 726.50 ELEVATION = 526.47 (FLOW IS SUPERCRITICAL)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 5.52 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 205.94 FEET MANNING'S N = 0.01300

NORMAL DEPTH(FT) = 0.66 CRITICAL DEPTH(FT) = 0.91

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.90

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.902	4.971	1.286	80.20
0.033	0.892	5.035	1.286	80.23
0.106	0.883	5.101	1.287	80.28
0.222	0.873	5.168	1.288	80.36
0.387	0.864	5.238	1.290	80.47

0.605	0.854	5.309	1.292	80.61
0.882	0.845	5.383	1.295	80.79
1.225	0.835	5.459	1.298	80.99
1.642	0.825	5.537	1.302	81.23
2.141	0.816	5.618	1.306	81.50
2.735	0.806	5.701	1.311	81.81
3.438	0.797	5.787	1.317	82.15
4.264	0.787	5.875	1.323	82.53
5.236	0.778	5.966	1.331	82.95
6.379	0.768	6.061	1.339	83.41
7.727	0.758	6.158	1.348	83.91
9.325	0.749	6.258	1.357	84.45
11.231	0.739	6.362	1.368	85.03
13.530	0.730	6.469	1.380	85.67
16.345	0.720	6.579	1.393	86.35
19.866	0.711	6.694	1.407	87.07
24.415	0.701	6.813	1.422	87.85
30.589	0.691	6.935	1.439	88.69
39.736	0.682	7.062	1.457	89.58
56.178	0.672	7.194	1.476	90.52
205.940	0.671	7.216	1.480	90.68

NODE 726.50 : HGL = < 527.372>;EGL= < 527.756>;FLOWLINE= < 526.470>

****

FLOW PROCESS FROM NODE 726.50 TO NODE 726.50 IS CODE = 5
UPSTREAM NODE 726.50 ELEVATION = 526.80 (FLOW IS AT CRITICAL DEPTH)

CALCULATE JUNCTION LOSSES:

PIPE	FLOW (CFS)	DIAMETER (INCHES)	ANGLE (DEGREES)	FLOWLINE ELEVATION	CRITICAL DEPTH(FT.)	VELOCITY (FT/SEC)
UPSTREAM	4.58	18.00	90.00	526.80	0.82	2.926
DOWNSTREAM	5.52	18.00	-	526.47	0.91	4.948
LATERAL #1	0.94	18.00	90.00	526.80	0.36	0.839
LATERAL #2	0.00	0.00	0.00	0.00	0.00	0.000
Q5	0.00===Q5 EQUALS BASIN INPUT===					

LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
UPSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00187
DOWNSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00600
AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00393
JUNCTION LENGTH = 4.00 FEET
FRICTION LOSSES = 0.016 FEET ENTRANCE LOSSES = 0.000 FEET
JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
JUNCTION LOSSES = (0.420)+(0.000) = 0.420

NODE 726.50 : HGL = < 528.043>;EGL= < 528.176>;FLOWLINE= < 526.800>

****

FLOW PROCESS FROM NODE 726.50 TO NODE 726.40 IS CODE = 1
UPSTREAM NODE 726.40 ELEVATION = 527.35 (HYDRAULIC JUMP OCCURS)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 4.58 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 27.25 FEET MANNING'S N = 0.01300

HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS

NORMAL DEPTH(FT) = 0.57 CRITICAL DEPTH(FT) = 0.82

==========

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.82

==========

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.822	4.621	1.153	62.76
0.017	0.812	4.692	1.154	62.78
0.069	0.801	4.766	1.154	62.82
0.159	0.791	4.841	1.156	62.90
0.293	0.781	4.920	1.157	63.01
0.474	0.771	5.001	1.160	63.15
0.708	0.761	5.084	1.163	63.32
1.001	0.751	5.171	1.167	63.53
1.360	0.741	5.261	1.171	63.77
1.795	0.731	5.353	1.176	64.06

2.314	0.721	5.449	1.182	64.38
2.931	0.711	5.549	1.189	64.74
3.661	0.701	5.652	1.197	65.14
4.522	0.691	5.759	1.206	65.59
5.540	0.681	5.870	1.216	66.08
6.744	0.671	5.985	1.227	66.61
8.175	0.661	6.105	1.240	67.20
9.889	0.651	6.229	1.254	67.84
11.962	0.641	6.358	1.269	68.53
14.508	0.631	6.492	1.286	69.27
17.702	0.621	6.632	1.304	70.08
21.839	0.610	6.778	1.324	70.94
27.250	0.601	6.924	1.346	71.83

HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS

DOWNSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 1.24

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	1.243	2.925	1.376	81.61
0.738	1.226	2.962	1.362	80.30
1.466	1.209	3.000	1.349	79.02
2.184	1.192	3.040	1.336	77.79
2.891	1.175	3.082	1.323	76.59
3.587	1.158	3.127	1.310	75.43
4.271	1.142	3.173	1.298	74.32
4.941	1.125	3.221	1.286	73.24
5.598	1.108	3.272	1.274	72.21
6.239	1.091	3.325	1.263	71.22
6.864	1.074	3.381	1.252	70.28
7.471	1.057	3.439	1.241	69.39
8.060	1.041	3.500	1.231	68.54
8.627	1.024	3.564	1.221	67.74
9.172	1.007	3.630	1.212	67.00
9.692	0.990	3.700	1.203	66.31
10.184	0.973	3.774	1.194	65.67
10.646	0.956	3.850	1.187	65.09
11.074	0.939	3.931	1.180	64.57
11.465	0.923	4.015	1.173	64.11
11.814	0.906	4.104	1.168	63.71
12.117	0.889	4.197	1.163	63.38
12.367	0.872	4.295	1.159	63.11
12.556	0.855	4.398	1.156	62.92
12.678	0.838	4.507	1.154	62.80
12.721	0.822	4.621	1.153	62.76
27.250	0.822	4.621	1.153	62.76

END OF HYDRAULIC JUMP ANALYSIS

PRESSURE+MOMENTUM BALANCE OCCURS AT 6.59 FEET UPSTREAM OF NODE 726.50
DOWNSTREAM DEPTH = 1.082 FEET, UPSTREAM CONJUGATE DEPTH = 0.613 FEET

NODE 726.40 : HGL = < 528.172>;EGL= < 528.503>;FLOWLINE= < 527.350>

FLOW PROCESS FROM NODE 726.40 TO NODE 726.40 IS CODE = 8
UPSTREAM NODE 726.40 ELEVATION = 527.35 (FLOW IS AT CRITICAL DEPTH)

CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
PIPE FLOW = 4.58 CFS PIPE DIAMETER = 18.00 INCHES
FLOW VELOCITY = 4.62 FEET/SEC. VELOCITY HEAD = 0.332 FEET
CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(0.332) = 0.066

NODE 726.40 : HGL = < 528.570>;EGL= < 528.570>;FLOWLINE= < 527.350>

UPSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 726.40 FLOWLINE ELEVATION = 527.35
ASSUMED UPSTREAM CONTROL HGL = 528.17 FOR DOWNSTREAM RUN ANALYSIS

END OF GRADUALLY VARIED FLOW ANALYSIS

Basin 900

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2000 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2000 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
1223 University Avenue, Suite 240
Riverside, California 92507-3418
(909) 782-0707 Fax (909) 782-0723

********** DESCRIPTION OF STUDY **********
* J-16630 Construction Change "F" *
* BMRNV East Town Center and Paseo Del Sur Phase 5 Improvements *
* Storm drain along 'AR' Street (Node 904 - 903.3) *

FILE NAME: 904.LAT
TIME/DATE OF STUDY: 10:09 07/01/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
904.00-		2.00*	338.55	1.41 Dc	281.26
	} FRICTION				
906.00-		1.62*	289.96	1.40 Dc	281.26
	} JUNCTION				
906.00-		2.33*	334.58	0.66	272.54
	} FRICTION	} HYDRAULIC JUMP			
906.10-		2.01	271.71	0.49*	396.20
	} FRICTION				
903.30-		1.19*Dc	182.81	1.19*Dc	182.81
	} CATCH BASIN				
903.30-		1.77*	101.01	1.19 Dc	62.37

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 904.00 FLOWLINE ELEVATION = 503.72
PIPE FLOW = 15.20 CFS PIPE DIAMETER = 24.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 505.720 FEET

NODE 904.00 : HGL = < 505.720>;EGL= < 506.083>;FLOWLINE= < 503.720>

FLOW PROCESS FROM NODE 904.00 TO NODE 906.00 IS CODE = 1
UPSTREAM NODE 906.00 ELEVATION = 504.83 (FLOW SEALS IN REACH)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 15.20 CFS PIPE DIAMETER = 24.00 INCHES
PIPE LENGTH = 206.68 FEET MANNING'S N = 0.01300

NORMAL DEPTH(FT) = 1.51 CRITICAL DEPTH(FT) = 1.41

DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) = 2.00

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	2.000	4.837	2.363	338.55
17.328	1.980	4.845	2.345	334.93
31.092	1.961	4.860	2.327	331.50
43.456	1.941	4.879	2.311	328.23
54.950	1.921	4.901	2.294	325.07
65.841	1.901	4.927	2.279	322.02
76.292	1.882	4.956	2.263	319.09

86.416	1.862	4.987	2.248	316.25
96.294	1.842	5.021	2.234	313.52
105.993	1.823	5.058	2.220	310.88
115.567	1.803	5.097	2.206	308.35
125.066	1.783	5.138	2.193	305.91
134.534	1.763	5.182	2.181	303.58
144.018	1.744	5.228	2.168	301.35
153.566	1.724	5.277	2.157	299.22
163.234	1.704	5.328	2.145	297.20
173.086	1.685	5.381	2.134	295.29
183.204	1.665	5.437	2.124	293.48
193.697	1.645	5.496	2.114	291.79
204.719	1.625	5.557	2.105	290.21
206.680	1.622	5.568	2.104	289.96

NODE 906.00 : HGL = < 506.452>;EGL= < 506.934>;FLOWLINE= < 504.830>

****

FLOW PROCESS FROM NODE 906.00 TO NODE 906.00 IS CODE = 5
UPSTREAM NODE 906.00 ELEVATION = 504.93 (FLOW UNSEALS IN REACH)

CALCULATE JUNCTION LOSSES:

PIPE	FLOW (CFS)	DIAMETER (INCHES)	ANGLE (DEGREES)	FLOWLINE ELEVATION	CRITICAL DEPTH(FT.)	VELOCITY (FT/SEC)
UPSTREAM	11.00	24.00	90.00	504.93	1.19	3.502
DOWNSTREAM	15.20	24.00	-	504.83	1.41	5.569
LATERAL #1	4.20	18.00	0.00	504.93	0.79	2.377
LATERAL #2	0.00	0.00	0.00	0.00	0.00	0.000
Q5	0.00===Q5 EQUALS BASIN INPUT===					

LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
UPSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00236
DOWNSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00460
AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00348
JUNCTION LENGTH = 4.00 FEET
FRICTION LOSSES = 0.014 FEET ENTRANCE LOSSES = 0.000 FEET
JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
JUNCTION LOSSES = (0.513)+(0.000) = 0.513

NODE 906.00 : HGL = < 507.256>;EGL= < 507.446>;FLOWLINE= < 504.930>

****

FLOW PROCESS FROM NODE 906.00 TO NODE 906.10 IS CODE = 1
UPSTREAM NODE 906.10 ELEVATION = 505.35 (HYDRAULIC JUMP OCCURS)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 11.00 CFS PIPE DIAMETER = 24.00 INCHES
PIPE LENGTH = 42.00 FEET MANNING'S N = 0.01300

HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS

NORMAL DEPTH(FT) = 0.98 CRITICAL DEPTH(FT) = 1.19

==========

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.49

==========

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.494	18.223	5.654	396.20
4.586	0.513	17.250	5.137	376.22
9.222	0.533	16.366	4.695	358.16
13.911	0.553	15.559	4.314	341.79
18.656	0.572	14.820	3.985	326.92
23.462	0.592	14.141	3.699	313.38
28.337	0.611	13.516	3.450	301.02
33.286	0.631	12.939	3.232	289.74
38.319	0.651	12.405	3.042	279.42
42.000	0.665	12.046	2.919	272.54

HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS

==========

DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) = 2.33

==========

PRESSURE FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	PRESSURE HEAD(FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	2.326	3.501	2.516	334.58
42.000	2.005	3.501	2.196	271.71

----------END OF HYDRAULIC JUMP ANALYSIS----------

PRESSURE+MOMENTUM BALANCE OCCURS AT 16.91 FEET UPSTREAM OF NODE 906.00
DOWNSTREAM DEPTH = 2.197 FEET, UPSTREAM CONJUGATE DEPTH = 0.598 FEET

NODE 906.10 : HGL = < 505.844>;EGL= < 511.004>;FLOWLINE= < 505.350>

****

FLOW PROCESS FROM NODE 906.10 TO NODE 903.30 IS CODE = 1
UPSTREAM NODE 903.30 ELEVATION = 510.85 (FLOW IS SUPERCRITICAL)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 11.00 CFS PIPE DIAMETER = 24.00 INCHES
PIPE LENGTH = 20.00 FEET MANNING'S N = 0.01300

NORMAL DEPTH(FT) = 0.41 CRITICAL DEPTH(FT) = 1.19

==========

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 1.19

==========

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	1.189	5.648	1.685	182.81
0.006	1.158	5.832	1.687	183.00
0.025	1.127	6.029	1.692	183.60
0.060	1.096	6.240	1.701	184.63
0.111	1.065	6.468	1.715	186.12
0.183	1.034	6.713	1.734	188.11
0.278	1.003	6.978	1.759	190.65
0.400	0.971	7.265	1.791	193.76
0.554	0.940	7.576	1.832	197.52
0.746	0.909	7.914	1.882	201.97
0.982	0.878	8.283	1.944	207.20
1.272	0.847	8.686	2.019	213.28
1.628	0.816	9.128	2.111	220.31
2.063	0.785	9.615	2.221	228.41
2.597	0.754	10.152	2.355	237.71
3.255	0.723	10.748	2.518	248.37
4.070	0.691	11.412	2.715	260.59
5.091	0.660	12.154	2.956	274.60
6.385	0.629	12.989	3.251	290.71
8.054	0.598	13.933	3.615	309.26
10.257	0.567	15.009	4.067	330.71
13.265	0.536	16.241	4.634	355.62
17.592	0.505	17.665	5.354	384.73
20.000	0.494	18.223	5.654	396.20

NODE 903.30 : HGL = < 512.039>;EGL= < 512.535>;FLOWLINE= < 510.850>

****

FLOW PROCESS FROM NODE 903.30 TO NODE 903.30 IS CODE = 8
UPSTREAM NODE 903.30 ELEVATION = 510.86 (FLOW IS AT CRITICAL DEPTH)

CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
PIPE FLOW = 11.00 CFS PIPE DIAMETER = 24.00 INCHES
FLOW VELOCITY = 5.65 FEET/SEC. VELOCITY HEAD = 0.496 FEET
CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(0.496) = 0.099

NODE 903.30 : HGL = < 512.634>;EGL= < 512.634>;FLOWLINE= < 510.860>

****

UPSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 903.30 FLOWLINE ELEVATION = 510.86
ASSUMED UPSTREAM CONTROL HGL = 512.05 FOR DOWNSTREAM RUN ANALYSIS

==========

END OF GRADUALLY VARIED FLOW ANALYSIS

STARTING HGL FOR LATERAL PIPEFLOW

HGL at Node	906	For Pipe Flow	906 LAT

$EGL_{MAIN} = HGL_{LAT} + V^2/2g$

$HGL_{LAT} = EGL_{MAIN} - V^2/2g$

$g =$ 32.2 Ft/S^2

$EGL_{MAIN} =$	507.446	From Pipe Flow	904 LAT

$V_{LAT} = Q_{LAT} / A_{LAT}$

$Q_{LAT} =$ 4.4 CFS

$A_{LAT} = \Pi D_{LAT}^2/4$

$D_{LAT} =$ 18 Inches

$HGL_{MAIN} =$	507.350

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2000 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2000 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
1223 University Avenue, Suite 240
Riverside, California 92507-3418
(909) 782-0707 Fax (909) 782-0723

********** DESCRIPTION OF STUDY **********
* J - 16630 BMRNV East Town Center Improvements *
* Construction Change "F" *
* Southern Inlet along 'AR" Street *

FILE NAME: 906.LAT
TIME/DATE OF STUDY: 10:45 07/01/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
906.00-		2.42*	205.38	0.80 Dc	59.56
	} FRICTION				
904.40-		2.18*	179.09	0.80 Dc	59.56
	} JUNCTION				
904.40-		2.28*	181.36	0.60	44.42
	} FRICTION				
904.30-		2.02*	152.76	0.70 Dc	42.61
	} CATCH BASIN				
904.30-		2.09*	147.69	0.70 Dc	15.06

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 906.00 FLOWLINE ELEVATION = 504.93
PIPE FLOW = 4.40 CFS PIPE DIAMETER = 18.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 507.350 FEET

NODE 906.00 : HGL = < 507.350>;EGL= < 507.446>;FLOWLINE= < 504.930>

FLOW PROCESS FROM NODE 906.00 TO NODE 904.40 IS CODE = 1
UPSTREAM NODE 904.40 ELEVATION = 505.30 (FLOW IS UNDER PRESSURE)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 4.40 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 75.00 FEET MANNING'S N = 0.01300
SF=(Q/K)**2 = ((4.40)/(105.043))**2 = 0.00175
HF=L*SF = (75.00)*(0.00175) = 0.132

NODE 904.40 : HGL = < 507.482>;EGL= < 507.578>;FLOWLINE= < 505.300>

FLOW PROCESS FROM NODE 904.40 TO NODE 904.40 IS CODE = 5
UPSTREAM NODE 904.40 ELEVATION = 505.40 (FLOW IS UNDER PRESSURE)

CALCULATE JUNCTION LOSSES:

PIPE	FLOW (CFS)	DIAMETER (INCHES)	ANGLE (DEGREES)	FLOWLINE ELEVATION	CRITICAL DEPTH(FT.)	VELOCITY (FT/SEC)
UPSTREAM	3.40	18.00	90.00	505.40	0.70	1.924
DOWNSTREAM	4.40	18.00	-	505.30	0.80	2.490
LATERAL #1	1.00	18.00	90.00	505.40	0.37	0.566
LATERAL #2	0.00	0.00	0.00	0.00	0.00	0.000
Q5	0.00===Q5 EQUALS BASIN INPUT===					

```
  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00105
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00175
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00140
  JUNCTION LENGTH =    4.00 FEET
  FRICTION LOSSES =  0.006 FEET         ENTRANCE LOSSES =  0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.159)+( 0.000) =    0.159
--------------------------------------------------------------------------------
  NODE    904.40 : HGL = <  507.680>;EGL= <  507.737>;FLOWLINE= <  505.400>

********************************************************************************
  FLOW PROCESS FROM NODE    904.40 TO NODE    904.30 IS CODE =  1
  UPSTREAM NODE   904.30     ELEVATION =   505.69  (FLOW IS UNDER PRESSURE)
--------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =       3.40 CFS      PIPE DIAMETER =  18.00 INCHES
  PIPE LENGTH =      29.25 FEET           MANNING'S N  =  0.01300
  SF=(Q/K)**2 = ((      3.40)/(   105.051))**2 = 0.00105
  HF=L*SF = (     29.25)*(0.00105) =      0.031
--------------------------------------------------------------------------------
  NODE    904.30 : HGL = <  507.710>;EGL= <  507.768>;FLOWLINE= <  505.690>

********************************************************************************
  FLOW PROCESS FROM NODE    904.30 TO NODE    904.30 IS CODE =  8
  UPSTREAM NODE   904.30     ELEVATION =   505.69  (FLOW IS UNDER PRESSURE)
--------------------------------------------------------------------------------
  CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
  PIPE FLOW =       3.40 CFS          PIPE DIAMETER =  18.00 INCHES
  FLOW VELOCITY =   1.92 FEET/SEC.    VELOCITY HEAD =  0.058 FEET
  CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(  0.058) =  0.012
--------------------------------------------------------------------------------
  NODE    904.30 : HGL = <  507.779>;EGL= <  507.779>;FLOWLINE= <  505.690>

********************************************************************************
  UPSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =   904.30            FLOWLINE ELEVATION =   505.69
  ASSUMED UPSTREAM CONTROL HGL =    506.39 FOR DOWNSTREAM RUN ANALYSIS

================================================================================
  END OF GRADUALLY VARIED FLOW ANALYSIS
```

STARTING HGL FOR LATERAL PIPEFLOW

HGL at Node	904.4	For Pipe Flow	9044 LAT

$EGL_{MAIN} = HGL_{LAT} + V^2/2g$

$HGL_{LAT} = EGL_{MAIN} - V^2/2g$

$g =$ 32.2 Ft/S^2

$EGL_{MAIN} =$	507.737	From Pipe Flow	906 LAT

$V_{LAT} = Q_{LAT} / A_{LAT}$

$Q_{LAT} =$ 11 CFS

$A_{LAT} = \Pi D_{LAT}^2/4$

$D_{LAT} =$ 18 Inches

$HGL_{MAIN} =$	507.731

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2000 Advanced Engineering Software (aes)
Ver. 8.0 Release Date: 01/01/2000 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
1223 University Avenue, Suite 240
Riverside, California 92507-3418
(909) 782-0707 Fax (909) 782-0723

DESCRIPTION OF STUDY
* J - 16630 BMRNV East Town Center Improvements *
* Construction Change "F" *
* Northern Inlet along "AR" Street *

FILE NAME: 9044.LAT
TIME/DATE OF STUDY: 10:53 07/01/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
904.40-		2.33*	175.66	0.20	17.18
	} FRICTION				
904.50-		1.60*	95.20	0.39 Dc	10.07
	} CATCH BASIN				
904.50-		1.61*	94.67	0.39 Dc	3.68

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 904.40 FLOWLINE ELEVATION = 505.40
PIPE FLOW = 1.10 CFS PIPE DIAMETER = 18.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 507.731 FEET

NODE 904.40 : HGL = < 507.731>;EGL= < 507.737>;FLOWLINE= < 505.400>

FLOW PROCESS FROM NODE 904.40 TO NODE 904.50 IS CODE = 1
UPSTREAM NODE 904.50 ELEVATION = 506.13 (FLOW IS UNDER PRESSURE)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 1.10 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 3.25 FEET MANNING'S N = 0.01300
SF=(Q/K)**2 = ((1.10)/(103.626))**2 = 0.00011
HF=L*SF = (3.25)*(0.00011) = 0.000

NODE 904.50 : HGL = < 507.731>;EGL= < 507.737>;FLOWLINE= < 506.130>

FLOW PROCESS FROM NODE 904.50 TO NODE 904.50 IS CODE = 8
UPSTREAM NODE 904.50 ELEVATION = 506.13 (FLOW IS UNDER PRESSURE)

CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
PIPE FLOW = 1.10 CFS PIPE DIAMETER = 18.00 INCHES
FLOW VELOCITY = 0.62 FEET/SEC. VELOCITY HEAD = 0.006 FEET
CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(0.006) = 0.001

NODE 904.50 : HGL = < 507.739>;EGL= < 507.739>;FLOWLINE= < 506.130>

UPSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 904.50 FLOWLINE ELEVATION = 506.13
ASSUMED UPSTREAM CONTROL HGL = 506.52 FOR DOWNSTREAM RUN ANALYSIS

END OF GRADUALLY VARIED FLOW ANALYSIS

Basin 900A

```
**************************************************************************
                PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
          (Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
        (c) Copyright 1982-2000 Advanced Engineering Software (aes)
            Ver. 8.0  Release Date: 01/01/2000  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                          1223 University Avenue, Suite 240
                           Riverside, California 92507-3418
                          (909) 782-0707  Fax (909) 782-0723

 ************************* DESCRIPTION OF STUDY *************************
* BMR NVE Unit 14 - Construction Change 'F'                             *
* Storm drain from Paseo Del Sur to underground detention basin 9A      *
* Basin 900A                                                            *
 ************************************************************************

  FILE NAME: 916.PIP
  TIME/DATE OF STUDY: 08:48 10/01/2014

**************************************************************************
              GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
                        NODAL POINT STATUS TABLE
                (Note: "*" indicates nodal point data used.)
                          UPSTREAM RUN                  DOWNSTREAM RUN
   NODE      MODEL     PRESSURE      PRESSURE+          FLOW        PRESSURE+
  NUMBER    PROCESS   HEAD(FT)   MOMENTUM(POUNDS)   DEPTH(FT)   MOMENTUM(POUNDS)
  916.00-                6.17*          1640.97        1.27            346.90
        } FRICTION
  918.60-                5.93*          1568.82        1.45 Dc         337.71
        } JUNCTION
  918.60-                6.32*          1644.87        1.11            273.60
        } FRICTION
  918.80-                5.10*          1270.70        1.31 Dc         262.63
        } JUNCTION
  918.80-                5.37*           994.19        1.26            277.07
        } FRICTION
  954.20-                4.88*           897.57        1.39 Dc         273.31
        } JUNCTION
  954.20-                4.91*           879.68        1.05            258.87
        } FRICTION
  914.00-                4.19*           739.38        1.32 Dc         240.81
        } JUNCTION
  914.00-                4.84*           855.38        0.72            333.04
        } FRICTION          } HYDRAULIC JUMP
  910.30-                1.29 Dc         224.82        0.85*           280.16
        } JUNCTION
  910.30-                1.55            217.88        0.70*           294.49
        } FRICTION
  910.20-                1.23 Dc         201.02        0.73*           278.84
        } JUNCTION
  910.20-                1.23 Dc         201.02        0.75*           272.00
        } FRICTION
  910.00-                1.23*Dc         201.02        1.23*Dc         201.02
        } JUNCTION
  910.00-                1.79*           247.05        0.86            239.34
        } FRICTION          } HYDRAULIC JUMP
  909.00-                1.23*Dc         201.02        1.23*Dc         201.02
```

```
        } JUNCTION
  909.00-               1.89*              248.13          0.88              227.41
        } FRICTION          } HYDRAULIC JUMP
  913.00-               1.25*Dc            194.22          1.25*Dc           194.22
        } JUNCTION
  913.00-               1.83*              179.85          0.81              131.35
        } FRICTION
  913.20-               1.54*              148.37          0.93              122.58
        } JUNCTION
  913.20-               1.46*              139.45          1.06 Dc           119.86
--------------------------------------------------------------------------------
  MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE =  25
--------------------------------------------------------------------------------
  NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST
  CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA
  DESIGN MANUALS.
********************************************************************************
  DOWNSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =   916.00            FLOWLINE ELEVATION =   495.74
  PIPE FLOW =      18.42 CFS        PIPE DIAMETER =  30.00 INCHES
  ASSUMED DOWNSTREAM CONTROL HGL =   501.910 FEET
--------------------------------------------------------------------------------
  NODE   916.00 : HGL = <  501.910>;EGL= <  502.129>;FLOWLINE= <  495.740>

********************************************************************************
  FLOW PROCESS FROM NODE   916.00 TO NODE   918.60 IS CODE =  1
  UPSTREAM NODE   918.60     ELEVATION =   496.05  (FLOW IS UNDER PRESSURE)
--------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      18.42 CFS     PIPE DIAMETER =  30.00 INCHES
  PIPE LENGTH =       36.90 FEET          MANNING'S N  =  0.01300
  SF=(Q/K)**2 = ((     18.42)/(   410.214))**2 = 0.00202
  HF=L*SF = (     36.90)*(0.00202) =      0.074
--------------------------------------------------------------------------------
  NODE   918.60 : HGL = <  501.984>;EGL= <  502.203>;FLOWLINE= <  496.050>

********************************************************************************
  FLOW PROCESS FROM NODE   918.60 TO NODE   918.60 IS CODE =  5
  UPSTREAM NODE   918.60     ELEVATION =   496.15  (FLOW IS UNDER PRESSURE)
--------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
       PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE   CRITICAL   VELOCITY
                   (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)  (FT/SEC)
     UPSTREAM      15.20      30.00      90.00     496.15       1.31       3.097
    DOWNSTREAM     18.42      30.00        -       496.05       1.45       3.752
    LATERAL #1      0.00       0.00       0.00       0.00       0.00       0.000
    LATERAL #2      0.00       0.00       0.00       0.00       0.00       0.000
       Q5           3.22===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00137
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00202
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00169
  JUNCTION LENGTH =   4.00 FEET
  FRICTION LOSSES =  0.007 FEET         ENTRANCE LOSSES =  0.044 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.374)+( 0.044) =   0.418
--------------------------------------------------------------------------------
  NODE   918.60 : HGL = <  502.472>;EGL= <  502.621>;FLOWLINE= <  496.150>
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   918.60 TO NODE   918.80 IS CODE =  1
 UPSTREAM NODE  918.80     ELEVATION =   497.61  (FLOW IS UNDER PRESSURE)
----------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      15.20 CFS     PIPE DIAMETER =  30.00 INCHES
 PIPE LENGTH =     173.64 FEET          MANNING'S N  =  0.01300
 SF=(Q/K)**2 = ((     15.20)/(   410.163))**2 = 0.00137
 HF=L*SF = (    173.64)*(0.00137) =      0.238
----------------------------------------------------------------------------
 NODE   918.80 : HGL = <  502.711>;EGL= <  502.860>;FLOWLINE= <  497.610>

****************************************************************************
 FLOW PROCESS FROM NODE   918.80 TO NODE   918.80 IS CODE =  5
 UPSTREAM NODE   918.80     ELEVATION =   497.71  (FLOW IS UNDER PRESSURE)
----------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW    DIAMETER   ANGLE    FLOWLINE   CRITICAL   VELOCITY
                  (CFS)   (INCHES) (DEGREES) ELEVATION  DEPTH(FT.)  (FT/SEC)
    UPSTREAM      14.88     24.00     90.00     497.71      1.39        4.736
   DOWNSTREAM     15.20     30.00         -     497.61      1.31        3.097
   LATERAL #1      0.32     18.00      0.00     497.81      0.21        0.181
   LATERAL #2      0.00      0.00      0.00       0.00      0.00        0.000
      Q5           0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00433
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00137
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00285
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.011 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 0.574)+( 0.000) =   0.574
----------------------------------------------------------------------------
 NODE   918.80 : HGL = <  503.085>;EGL= <  503.433>;FLOWLINE= <  497.710>

****************************************************************************
 FLOW PROCESS FROM NODE   918.80 TO NODE   954.20 IS CODE =  1
 UPSTREAM NODE   954.20     ELEVATION =   498.73  (FLOW IS UNDER PRESSURE)
----------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      14.88 CFS     PIPE DIAMETER =  24.00 INCHES
 PIPE LENGTH =     121.84 FEET          MANNING'S N  =  0.01300
 SF=(Q/K)**2 = ((     14.88)/(   226.224))**2 = 0.00433
 HF=L*SF = (    121.84)*(0.00433) =      0.527
----------------------------------------------------------------------------
 NODE   954.20 : HGL = <  503.612>;EGL= <  503.960>;FLOWLINE= <  498.730>

****************************************************************************
 FLOW PROCESS FROM NODE   954.20 TO NODE   954.20 IS CODE =  5
 UPSTREAM NODE   954.20     ELEVATION =   498.83  (FLOW IS UNDER PRESSURE)
----------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW    DIAMETER   ANGLE    FLOWLINE   CRITICAL   VELOCITY
                  (CFS)   (INCHES) (DEGREES) ELEVATION  DEPTH(FT.)  (FT/SEC)
    UPSTREAM      13.54     24.00      0.00     498.83      1.32        4.310
   DOWNSTREAM     14.88     24.00         -     498.73      1.39        4.736
   LATERAL #1      1.34     18.00     45.00     498.84      0.43        0.758
```

```
   LATERAL #2       0.00      0.00       0.00       0.00       0.00         0.000
      Q5            0.00===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:     MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00358
  DOWNSTREAM:   MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00433
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00395
  JUNCTION LENGTH =    4.00 FEET
  FRICTION LOSSES =   0.016 FEET          ENTRANCE LOSSES =   0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.069)+( 0.000) =    0.069
-------------------------------------------------------------------------------
  NODE    954.20 : HGL = <  503.740>;EGL= <  504.029>;FLOWLINE= <  498.830>

*******************************************************************************
  FLOW PROCESS FROM NODE    954.20 TO NODE    914.00 IS CODE =  1
  UPSTREAM NODE    914.00     ELEVATION =    499.83  (FLOW IS UNDER PRESSURE)
-------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =       13.54 CFS      PIPE DIAMETER =   24.00 INCHES
  PIPE LENGTH =        79.37 FEET           MANNING'S N  =  0.01300
  SF=(Q/K)**2 = ((      13.54)/(   226.221))**2 = 0.00358
  HF=L*SF = (      79.37)*(0.00358) =       0.284
-------------------------------------------------------------------------------
  NODE    914.00 : HGL = <  504.025>;EGL= <  504.313>;FLOWLINE= <  499.830>

*******************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    914.00 IS CODE =  5
  UPSTREAM NODE    914.00     ELEVATION =    499.83  (FLOW IS UNDER PRESSURE)
-------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
       PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                   (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
     UPSTREAM       12.86     24.00      90.00     499.83       1.29         4.093
    DOWNSTREAM      13.54     24.00        -       499.83       1.32         4.310
    LATERAL #1       0.00      0.00       0.00       0.00       0.00         0.000
    LATERAL #2       0.00      0.00       0.00       0.00       0.00         0.000
       Q5            0.68===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:     MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00323
  DOWNSTREAM:   MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00358
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00341
  JUNCTION LENGTH =    4.00 FEET
  FRICTION LOSSES =   0.014 FEET          ENTRANCE LOSSES =   0.058 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.562)+( 0.058) =    0.620
-------------------------------------------------------------------------------
  NODE    914.00 : HGL = <  504.673>;EGL= <  504.933>;FLOWLINE= <  499.830>

*******************************************************************************
  FLOW PROCESS FROM NODE    914.00 TO NODE    910.30 IS CODE =  1
  UPSTREAM NODE    910.30     ELEVATION =    505.84  (HYDRAULIC JUMP OCCURS)
-------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =       12.86 CFS      PIPE DIAMETER =   24.00 INCHES
  PIPE LENGTH =       140.08 FEET           MANNING'S N  =  0.01300
```

HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS

NORMAL DEPTH(FT) = 0.72 CRITICAL DEPTH(FT) = 1.29

UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 0.85

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	0.850	10.102	2.436	280.16
1.079	0.845	10.187	2.457	281.85
2.223	0.840	10.273	2.479	283.59
3.437	0.834	10.361	2.502	285.35
4.727	0.829	10.450	2.526	287.16
6.101	0.823	10.541	2.550	289.01
7.569	0.818	10.633	2.575	290.90
9.140	0.813	10.727	2.601	292.83
10.826	0.807	10.822	2.627	294.81
12.643	0.802	10.919	2.654	296.82
14.605	0.797	11.017	2.683	298.88
16.735	0.791	11.117	2.712	300.99
19.058	0.786	11.219	2.742	303.14
21.603	0.781	11.323	2.772	305.34
24.411	0.775	11.428	2.804	307.59
27.533	0.770	11.535	2.837	309.89
31.034	0.764	11.644	2.871	312.24
35.005	0.759	11.755	2.906	314.64
39.571	0.754	11.868	2.942	317.09
44.919	0.748	11.983	2.980	319.60
51.335	0.743	12.101	3.018	322.16
59.298	0.738	12.220	3.058	324.78
69.711	0.732	12.341	3.099	327.46
84.598	0.727	12.465	3.141	330.19
110.454	0.721	12.591	3.185	332.99
140.080	0.721	12.593	3.185	333.04

HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS

DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) = 4.84

PRESSURE FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	PRESSURE HEAD(FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	4.843	4.093	5.103	855.38
71.661	2.000	4.093	2.260	298.05

ASSUMED DOWNSTREAM PRESSURE HEAD(FT) = 2.00

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
71.661	2.000	4.092	2.260	298.05
72.338	1.972	4.104	2.233	292.78
72.979	1.943	4.125	2.208	287.78
73.598	1.915	4.153	2.183	282.97
74.199	1.886	4.187	2.159	278.34
74.782	1.858	4.225	2.135	273.87

```
        75.350          1.830          4.268          2.113          269.57
        75.902          1.801          4.315          2.090          265.43
        76.438          1.773          4.366          2.069          261.46
        76.959          1.744          4.422          2.048          257.66
        77.463          1.716          4.482          2.028          254.03
        77.950          1.688          4.546          2.009          250.58
        78.419          1.659          4.614          1.990          247.31
        78.869          1.631          4.687          1.972          244.23
        79.298          1.602          4.765          1.955          241.35
        79.705          1.574          4.848          1.939          238.67
        80.089          1.545          4.935          1.924          236.19
        80.447          1.517          5.028          1.910          233.93
        80.776          1.489          5.127          1.897          231.90
        81.075          1.460          5.231          1.885          230.10
        81.341          1.432          5.341          1.875          228.54
        81.569          1.403          5.458          1.866          227.24
        81.755          1.375          5.582          1.859          226.20
        81.896          1.347          5.714          1.854          225.44
        81.985          1.318          5.853          1.851          224.98
        82.016          1.290          6.001          1.849          224.82
       140.080          1.290          6.001          1.849          224.82
-------------------------END OF HYDRAULIC JUMP ANALYSIS-------------------------
| PRESSURE+MOMENTUM BALANCE OCCURS AT     67.82 FEET UPSTREAM OF NODE  914.00 |
|       DOWNSTREAM DEPTH = 2.152 FEET, UPSTREAM CONJUGATE DEPTH = 0.731 FEET |
--------------------------------------------------------------------------------
  NODE    910.30 : HGL = <  506.690>;EGL= <  508.276>;FLOWLINE= <  505.840>

********************************************************************************
  FLOW PROCESS FROM NODE    910.30 TO NODE    910.30 IS CODE =  5
  UPSTREAM NODE   910.30     ELEVATION =    506.34  (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
       PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                   (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
     UPSTREAM       11.82     24.00       0.00     506.34       1.23        12.083
    DOWNSTREAM      12.86     24.00         -      505.84       1.29        10.105
    LATERAL #1       0.00      0.00       0.00       0.00       0.00         0.000
    LATERAL #2       0.00      0.00       0.00       0.00       0.00         0.000
       Q5            1.04===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.03968
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.02281
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.03124
  JUNCTION LENGTH =    4.00 FEET
  FRICTION LOSSES =   0.125 FEET          ENTRANCE LOSSES =   0.317 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.713)+( 0.317) =    1.030
--------------------------------------------------------------------------------
  NODE    910.30 : HGL = <  507.039>;EGL= <  509.306>;FLOWLINE= <  506.340>

********************************************************************************
  FLOW PROCESS FROM NODE    910.30 TO NODE    910.20 IS CODE =  1
  UPSTREAM NODE   910.20     ELEVATION =    511.29  (FLOW IS SUPERCRITICAL)
--------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =       11.82 CFS      PIPE DIAMETER =   24.00 INCHES
  PIPE LENGTH =      123.78 FEET           MANNING'S N  =  0.01300
--------------------------------------------------------------------------------
```

```
 NORMAL DEPTH(FT) =      0.70          CRITICAL DEPTH(FT) =      1.23
===============================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     0.73
===============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
-------------------------------------------------------------------------------
 DISTANCE FROM    FLOW DEPTH  VELOCITY     SPECIFIC       PRESSURE+
  CONTROL(FT)       (FT)     (FT/SEC)   ENERGY(FT)   MOMENTUM(POUNDS)
        0.000       0.734      11.299       2.718          278.84
        1.354       0.733      11.330       2.727          279.44
        2.772       0.731      11.361       2.737          280.05
        4.259       0.730      11.392       2.746          280.67
        5.821       0.728      11.423       2.756          281.28
        7.466       0.727      11.454       2.765          281.91
        9.203       0.726      11.485       2.775          282.53
       11.041       0.724      11.517       2.785          283.16
       12.992       0.723      11.549       2.795          283.80
       15.070       0.721      11.581       2.805          284.43
       17.290       0.720      11.613       2.815          285.07
       19.674       0.718      11.645       2.825          285.72
       22.244       0.717      11.677       2.835          286.37
       25.032       0.715      11.710       2.846          287.02
       28.074       0.714      11.743       2.856          287.68
       31.420       0.712      11.776       2.867          288.34
       35.133       0.711      11.809       2.877          289.01
       39.301       0.709      11.842       2.888          289.68
       44.044       0.708      11.875       2.899          290.35
       49.542       0.706      11.909       2.910          291.03
       56.071       0.705      11.943       2.921          291.71
       64.093       0.704      11.976       2.932          292.40
       74.476       0.702      12.011       2.943          293.09
       89.172       0.701      12.045       2.955          293.79
      114.436       0.699      12.079       2.966          294.49
      123.780       0.699      12.079       2.966          294.49
-------------------------------------------------------------------------------
 NODE   910.20 : HGL = <  512.024>;EGL= <  514.008>;FLOWLINE= <  511.290>

*******************************************************************************
 FLOW PROCESS FROM NODE   910.20 TO NODE   910.20 IS CODE =  5
 UPSTREAM NODE   910.20     ELEVATION =   511.62  (FLOW IS SUPERCRITICAL)
-------------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
    UPSTREAM      11.82      24.00       0.00     511.62       1.23       10.954
   DOWNSTREAM     11.82      24.00         -      511.29       1.23       11.303
   LATERAL #1      0.00       0.00       0.00       0.00       0.00        0.000
   LATERAL #2      0.00       0.00       0.00       0.00       0.00        0.000
      Q5           0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.03027
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.03300
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.03163
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.127 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 0.227)+( 0.000) =   0.227
-------------------------------------------------------------------------------
```

```
 NODE    910.20 : HGL = <  512.372>;EGL= <  514.235>;FLOWLINE= <  511.620>

****************************************************************************
 FLOW PROCESS FROM NODE    910.20 TO NODE    910.00 IS CODE =  1
 UPSTREAM NODE    910.00     ELEVATION =    520.37  (FLOW IS SUPERCRITICAL)
----------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      11.82 CFS     PIPE DIAMETER =  24.00 INCHES
 PIPE LENGTH =     265.11 FEET          MANNING'S N  =  0.01300
----------------------------------------------------------------------------
 NORMAL DEPTH(FT) =      0.73           CRITICAL DEPTH(FT) =      1.23
============================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.23
============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
----------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)          (FT)     (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
        0.000          1.235       5.805          1.758           201.02
        0.023          1.215       5.918          1.759           201.10
        0.097          1.195       6.037          1.761           201.34
        0.226          1.175       6.160          1.764           201.76
        0.417          1.155       6.290          1.769           202.35
        0.677          1.135       6.425          1.776           203.14
        1.014          1.115       6.567          1.785           204.11
        1.437          1.095       6.716          1.795           205.30
        1.959          1.074       6.871          1.808           206.69
        2.592          1.054       7.035          1.823           208.31
        3.354          1.034       7.206          1.841           210.17
        4.264          1.014       7.387          1.862           212.28
        5.346          0.994       7.576          1.886           214.65
        6.630          0.974       7.776          1.914           217.30
        8.156          0.954       7.986          1.945           220.24
        9.972          0.934       8.208          1.981           223.50
       12.143          0.914       8.442          2.022           227.09
       14.759          0.894       8.689          2.067           231.03
       17.945          0.874       8.951          2.119           235.35
       21.882          0.854       9.228          2.177           240.08
       26.855          0.834       9.522          2.243           245.24
       33.339          0.814       9.834          2.317           250.87
       42.228          0.794      10.166          2.400           257.01
       55.527          0.774      10.520          2.494           263.69
       79.676          0.754      10.897          2.599           270.95
      265.110          0.752      10.951          2.615           272.00
----------------------------------------------------------------------------
 NODE    910.00 : HGL = <  521.605>;EGL= <  522.128>;FLOWLINE= <  520.370>

****************************************************************************
 FLOW PROCESS FROM NODE    910.00 TO NODE    910.00 IS CODE =  5
 UPSTREAM NODE    910.00     ELEVATION =    520.70  (FLOW IS AT CRITICAL DEPTH)
----------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
    UPSTREAM       11.82      24.00      90.00     520.70        1.23       3.985
   DOWNSTREAM      11.82      24.00          -     520.37        1.23       5.806
   LATERAL #1       0.00       0.00       0.00       0.00        0.00       0.000
   LATERAL #2       0.00       0.00       0.00       0.00        0.00       0.000
      Q5            0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
```

```
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00242
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00555
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00398
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.016 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 0.608)+( 0.000) =   0.608
-------------------------------------------------------------------------------
 NODE   910.00 : HGL = <  522.490>;EGL= <  522.736>;FLOWLINE= <  520.700>

*******************************************************************************
 FLOW PROCESS FROM NODE   910.00 TO NODE   909.00 IS CODE =  1
 UPSTREAM NODE   909.00     ELEVATION =   522.60  (HYDRAULIC JUMP OCCURS)
-------------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      11.82 CFS     PIPE DIAMETER =  24.00 INCHES
 PIPE LENGTH =       95.05 FEET          MANNING'S N  =  0.01300
-------------------------------------------------------------------------------
 HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS
-------------------------------------------------------------------------------
 NORMAL DEPTH(FT) =      0.84           CRITICAL DEPTH(FT) =      1.23
===============================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.23
===============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
-------------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY     SPECIFIC       PRESSURE+
  CONTROL(FT)          (FT)    (FT/SEC)    ENERGY(FT)   MOMENTUM(POUNDS)
        0.000          1.235       5.805         1.758           201.02
        0.027          1.219       5.893         1.759           201.07
        0.113          1.203       5.985         1.760           201.22
        0.263          1.187       6.080         1.762           201.47
        0.484          1.172       6.178         1.765           201.83
        0.784          1.156       6.280         1.769           202.30
        1.171          1.140       6.386         1.774           202.89
        1.655          1.125       6.495         1.780           203.60
        2.249          1.109       6.608         1.787           204.43
        2.968          1.093       6.726         1.796           205.38
        3.827          1.077       6.848         1.806           206.47
        4.849          1.062       6.975         1.818           207.70
        6.058          1.046       7.106         1.831           209.07
        7.487          1.030       7.243         1.845           210.59
        9.175          1.015       7.386         1.862           212.27
       11.173          0.999       7.534         1.881           214.10
       13.550          0.983       7.688         1.901           216.11
       16.397          0.967       7.848         1.924           218.30
       19.844          0.952       8.015         1.950           220.67
       24.080          0.936       8.190         1.978           223.23
       29.397          0.920       8.372         2.009           226.00
       36.288          0.905       8.562         2.043           228.98
       45.674          0.889       8.760         2.081           232.19
       59.626          0.873       8.967         2.123           235.64
       84.792          0.857       9.185         2.168           239.33
       95.050          0.857       9.185         2.168           239.34
-------------------------------------------------------------------------------
 HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS
===============================================================================
 DOWNSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.79
===============================================================================
```

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	1.790	3.984	2.036	247.05
0.997	1.768	4.022	2.019	243.82
1.976	1.745	4.062	2.002	240.69
2.937	1.723	4.105	1.985	237.66
3.880	1.701	4.150	1.969	234.72
4.803	1.679	4.197	1.952	231.88
5.706	1.657	4.247	1.937	229.15
6.589	1.634	4.299	1.922	226.52
7.449	1.612	4.355	1.907	223.99
8.286	1.590	4.412	1.892	221.58
9.099	1.568	4.473	1.879	219.28
9.885	1.546	4.536	1.865	217.10
10.643	1.523	4.602	1.852	215.03
11.371	1.501	4.672	1.840	213.09
12.067	1.479	4.744	1.829	211.28
12.727	1.457	4.820	1.818	209.59
13.349	1.434	4.900	1.808	208.05
13.930	1.412	4.983	1.798	206.64
14.465	1.390	5.070	1.789	205.37
14.951	1.368	5.161	1.782	204.26
15.382	1.346	5.256	1.775	203.29
15.752	1.323	5.356	1.769	202.49
16.056	1.301	5.460	1.764	201.86
16.284	1.279	5.570	1.761	201.40
16.430	1.257	5.684	1.759	201.11
16.481	1.235	5.805	1.758	201.02
95.050	1.235	5.805	1.758	201.02

----------END OF HYDRAULIC JUMP ANALYSIS----------

PRESSURE+MOMENTUM BALANCE OCCURS AT 2.40 FEET UPSTREAM OF NODE 910.00
DOWNSTREAM DEPTH = 1.735 FEET, UPSTREAM CONJUGATE DEPTH = 0.857 FEET

NODE 909.00 : HGL = < 523.835>;EGL= < 524.358>;FLOWLINE= < 522.600>

****

FLOW PROCESS FROM NODE 909.00 TO NODE 909.00 IS CODE = 5
UPSTREAM NODE 909.00 ELEVATION = 523.10 (FLOW IS AT CRITICAL DEPTH)

CALCULATE JUNCTION LOSSES:

PIPE	FLOW (CFS)	DIAMETER (INCHES)	ANGLE (DEGREES)	FLOWLINE ELEVATION	CRITICAL DEPTH(FT.)	VELOCITY (FT/SEC)
UPSTREAM	10.58	18.00	90.00	523.10	1.25	5.987
DOWNSTREAM	11.82	24.00	-	522.60	1.23	5.806
LATERAL #1	1.24	18.00	90.00	523.10	0.42	0.757
LATERAL #2	0.00	0.00	0.00	0.00	0.00	0.000
Q5	0.00===Q5 EQUALS BASIN INPUT===					

LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
UPSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.01014
DOWNSTREAM: MANNING'S N = 0.01300; FRICTION SLOPE = 0.00555
AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00785
JUNCTION LENGTH = 4.00 FEET
FRICTION LOSSES = 0.031 FEET ENTRANCE LOSSES = 0.000 FEET
JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
JUNCTION LOSSES = (1.185)+(0.000) = 1.185

```
 NODE   909.00 : HGL = <  524.987>;EGL= <  525.544>;FLOWLINE= <  523.100>

****************************************************************************
 FLOW PROCESS FROM NODE   909.00 TO NODE   913.00 IS CODE =  1
 UPSTREAM NODE   913.00     ELEVATION =   524.05  (HYDRAULIC JUMP OCCURS)
----------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      10.58 CFS     PIPE DIAMETER =  18.00 INCHES
 PIPE LENGTH =       27.25 FEET          MANNING'S N  =  0.01300
----------------------------------------------------------------------------
 HYDRAULIC JUMP: DOWNSTREAM RUN ANALYSIS RESULTS
----------------------------------------------------------------------------
 NORMAL DEPTH(FT) =       0.78           CRITICAL DEPTH(FT) =       1.25
============================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.25
============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
----------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
        0.000          1.249       6.725          1.952           194.22
        0.026          1.231       6.816          1.953           194.28
        0.108          1.212       6.913          1.955           194.47
        0.251          1.194       7.015          1.958           194.80
        0.460          1.175       7.122          1.963           195.27
        0.741          1.156       7.235          1.970           195.88
        1.102          1.138       7.354          1.978           196.64
        1.554          1.119       7.479          1.988           197.55
        2.105          1.101       7.611          2.001           198.62
        2.770          1.082       7.749          2.015           199.86
        3.564          1.063       7.895          2.032           201.28
        4.506          1.045       8.048          2.051           202.88
        5.619          1.026       8.209          2.073           204.67
        6.933          1.008       8.378          2.098           206.67
        8.484          0.989       8.557          2.127           208.88
       10.321          0.971       8.745          2.159           211.31
       12.505          0.952       8.942          2.194           213.98
       15.123          0.933       9.151          2.234           216.90
       18.295          0.915       9.371          2.279           220.08
       22.196          0.896       9.603          2.329           223.55
       27.101          0.878       9.848          2.384           227.31
       27.250          0.877       9.854          2.386           227.41
----------------------------------------------------------------------------
 HYDRAULIC JUMP: UPSTREAM RUN ANALYSIS RESULTS
============================================================================
 DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) =     1.89
============================================================================
 PRESSURE FLOW PROFILE COMPUTED INFORMATION:
----------------------------------------------------------------------------
 DISTANCE FROM      PRESSURE    VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)      HEAD(FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
        0.000          1.887       5.987          2.444           248.13
       15.655          1.500       5.987          2.057           205.45
============================================================================
 ASSUMED DOWNSTREAM PRESSURE HEAD(FT) =     1.50
============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
----------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
       15.655          1.500       5.985          2.057           205.45
```

```
        16.015          1.490          5.991          2.048          204.46
        16.334          1.480          6.001          2.039          203.57
        16.629          1.470          6.014          2.032          202.73
        16.904          1.460          6.030          2.025          201.96
        17.162          1.450          6.047          2.018          201.22
        17.406          1.440          6.067          2.012          200.53
        17.636          1.430          6.088          2.006          199.88
        17.852          1.420          6.111          2.000          199.27
        18.057          1.410          6.136          1.995          198.70
        18.249          1.400          6.162          1.990          198.16
        18.429          1.390          6.190          1.985          197.66
        18.598          1.380          6.219          1.981          197.19
        18.756          1.370          6.250          1.977          196.75
        18.902          1.360          6.282          1.973          196.35
        19.036          1.350          6.315          1.969          195.99
        19.159          1.340          6.350          1.966          195.65
        19.271          1.330          6.386          1.963          195.36
        19.370          1.320          6.424          1.961          195.09
        19.458          1.309          6.462          1.958          194.86
        19.533          1.299          6.503          1.956          194.67
        19.595          1.289          6.544          1.955          194.51
        19.644          1.279          6.587          1.954          194.38
        19.680          1.269          6.632          1.953          194.29
        19.702          1.259          6.677          1.952          194.23
        19.709          1.249          6.725          1.952          194.22
        27.250          1.249          6.725          1.952          194.22
-------------------------END OF HYDRAULIC JUMP ANALYSIS-------------------------
| PRESSURE+MOMENTUM BALANCE OCCURS AT    11.07 FEET UPSTREAM OF NODE  909.00 |
|       DOWNSTREAM DEPTH = 1.613 FEET, UPSTREAM CONJUGATE DEPTH = 0.927 FEET |
-------------------------------------------------------------------------------
  NODE   913.00 : HGL = <  525.299>;EGL= <  526.002>;FLOWLINE= <  524.050>

*******************************************************************************
  FLOW PROCESS FROM NODE   913.00 TO NODE   913.00 IS CODE =  5
  UPSTREAM NODE   913.00     ELEVATION =   524.38  (FLOW IS AT CRITICAL DEPTH)
-------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
    UPSTREAM        7.46     18.00       0.00     524.38       1.06        4.222
   DOWNSTREAM      10.58     18.00          -     524.05       1.25        6.727
   LATERAL #1       0.00      0.00       0.00       0.00       0.00        0.000
   LATERAL #2       0.00      0.00       0.00       0.00       0.00        0.000
      Q5            3.12===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00504
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00987
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00746
  JUNCTION LENGTH =   4.00 FEET
  FRICTION LOSSES =  0.030 FEET         ENTRANCE LOSSES =  0.141 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.342)+( 0.141) =   0.482
-------------------------------------------------------------------------------
  NODE   913.00 : HGL = <  526.208>;EGL= <  526.484>;FLOWLINE= <  524.380>

*******************************************************************************
  FLOW PROCESS FROM NODE   913.00 TO NODE   913.20 IS CODE =  1
  UPSTREAM NODE   913.20     ELEVATION =   524.76  (FLOW IS UNDER PRESSURE)
```

```
--------------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =       7.46 CFS      PIPE DIAMETER =  18.00 INCHES
 PIPE LENGTH =      18.75 FEET          MANNING'S N  =  0.01300
 SF=(Q/K)**2 = ((      7.46)/(   105.057))**2 = 0.00504
 HF=L*SF = (     18.75)*(0.00504) =      0.095
--------------------------------------------------------------------------------
 NODE   913.20 : HGL = <  526.302>;EGL= <  526.579>;FLOWLINE= <  524.760>

********************************************************************************
 FLOW PROCESS FROM NODE   913.20 TO NODE   913.20 IS CODE =  5
 UPSTREAM NODE   913.20     ELEVATION =   524.86  (FLOW SEALS IN REACH)
--------------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW    DIAMETER   ANGLE    FLOWLINE   CRITICAL   VELOCITY
                  (CFS)   (INCHES) (DEGREES) ELEVATION  DEPTH(FT.)  (FT/SEC)
    UPSTREAM       7.46     18.00      0.00    524.86       1.06       4.257
   DOWNSTREAM      7.46     18.00       -      524.76       1.06       4.221
   LATERAL #1      0.00      0.00      0.00      0.00       0.00       0.000
   LATERAL #2      0.00      0.00      0.00      0.00       0.00       0.000
      Q5           0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00445
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00504
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00474
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.019 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 0.019)+( 0.000) =   0.019
--------------------------------------------------------------------------------
 NODE   913.20 : HGL = <  526.316>;EGL= <  526.598>;FLOWLINE= <  524.860>

********************************************************************************
 UPSTREAM PIPE FLOW CONTROL DATA:
 NODE NUMBER =   913.20            FLOWLINE ELEVATION =   524.86
 ASSUMED UPSTREAM CONTROL HGL =    525.92 FOR DOWNSTREAM RUN ANALYSIS

================================================================================
 END OF GRADUALLY VARIED FLOW ANALYSIS
```

```
**************************************************************************
                PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
          (Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
        (c) Copyright 1982-2000 Advanced Engineering Software (aes)
            Ver. 8.0  Release Date: 01/01/2000  License ID 1261

                              Analysis prepared by:

                            RICK ENGINEERING COMPANY
                         1223 University Avenue, Suite 240
                          Riverside, California 92507-3418
                         (909) 782-0707  Fax (909) 782-0723

 ************************** DESCRIPTION OF STUDY **************************
* BMR NVE Unit 14 - Construction Change 'F'                               *
* Storm drain from underground detention basin 9A to Camino Del Sur       *
* Basin 900A     16630                                                    *
 **************************************************************************

  FILE NAME: 990.LAT
  TIME/DATE OF STUDY: 09:03 10/01/2014

**************************************************************************
              GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
                        NODAL POINT STATUS TABLE
                (Note: "*" indicates nodal point data used.)
                          UPSTREAM RUN                  DOWNSTREAM RUN
   NODE      MODEL     PRESSURE      PRESSURE+          FLOW         PRESSURE+
  NUMBER    PROCESS   HEAD(FT)   MOMENTUM(POUNDS)   DEPTH(FT)   MOMENTUM(POUNDS)
  990.00-                2.25          908.86         1.89*          909.20
        } FRICTION
  952.20-                2.07*Dc       899.03         2.07*Dc        899.03
        } JUNCTION
  952.20-                3.56*        1354.04         1.80           923.26
        } FRICTION
  921.00-                2.58*         968.69         2.07 Dc        899.03
        } JUNCTION
  921.00-                3.64*        1389.44         1.83           917.52
        } FRICTION
  920.00-                3.39*        1276.89         2.07 Dc        899.03
        } JUNCTION
  920.00-                3.60*        1369.16         1.80           923.97
        } FRICTION
  919.00-                3.15*        1172.23         1.85           913.96
        } JUNCTION
  919.00-                3.13         1163.05         1.30*         1169.96
        } FRICTION
  919.20-                2.07*Dc       899.03         2.07*Dc        899.03
        } CATCH BASIN
  919.20-                4.87*        1484.37         2.07 Dc        294.55
--------------------------------------------------------------------------
  MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE =  25
--------------------------------------------------------------------------
  NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST
  CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA
  DESIGN MANUALS.
**************************************************************************
  DOWNSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =   990.00          FLOWLINE ELEVATION =   491.31
  PIPE FLOW =      40.23 CFS      PIPE DIAMETER =  36.00 INCHES
```

```
 ASSUMED DOWNSTREAM CONTROL HGL =   493.560 FEET
---------------------------------------------------------------------------
 NODE   990.00 : HGL = <  493.200>;EGL= <  494.342>;FLOWLINE= <  491.310>

****************************************************************************
 FLOW PROCESS FROM NODE   990.00 TO NODE   952.20 IS CODE =  1
 UPSTREAM NODE   952.20     ELEVATION =   491.40  (FLOW IS SUPERCRITICAL)
---------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      40.23 CFS     PIPE DIAMETER =  36.00 INCHES
 PIPE LENGTH =       8.75 FEET          MANNING'S N  =  0.01300
---------------------------------------------------------------------------
 NORMAL DEPTH(FT) =      1.67          CRITICAL DEPTH(FT) =      2.07
===========================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     2.07
===========================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
---------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
        0.000          2.065      7.751          2.999           899.03
        0.051          2.049      7.818          2.999           899.11
        0.211          2.033      7.887          3.000           899.35
        0.489          2.017      7.957          3.001           899.75
        0.897          2.001      8.028          3.003           900.32
        1.448          1.985      8.102          3.005           901.06
        2.156          1.969      8.177          3.008           901.97
        3.040          1.953      8.253          3.012           903.06
        4.119          1.937      8.331          3.016           904.32
        5.418          1.921      8.411          3.021           905.78
        6.965          1.905      8.493          3.026           907.41
        8.750          1.890      8.575          3.032           909.20
---------------------------------------------------------------------------
 NODE   952.20 : HGL = <  493.465>;EGL= <  494.399>;FLOWLINE= <  491.400>

****************************************************************************
 FLOW PROCESS FROM NODE   952.20 TO NODE   952.20 IS CODE =  5
 UPSTREAM NODE   952.20     ELEVATION =   491.50  (FLOW IS AT CRITICAL DEPTH)
---------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
    UPSTREAM      40.23      36.00      90.00     491.50       2.07        5.691
   DOWNSTREAM     40.23      36.00        -       491.40       2.07        7.754
   LATERAL #1      0.00       0.00       0.00       0.00       0.00        0.000
   LATERAL #2      0.00       0.00       0.00       0.00       0.00        0.000
      Q5           0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00364
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00543
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00453
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.018 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 1.168)+( 0.000) =   1.168
---------------------------------------------------------------------------
 NODE   952.20 : HGL = <  495.064>;EGL= <  495.567>;FLOWLINE= <  491.500>
```

```
**************************************************************************
 FLOW PROCESS FROM NODE   952.20 TO NODE   921.00 IS CODE =  1
 UPSTREAM NODE   921.00     ELEVATION =   493.04  (FLOW SEALS IN REACH)
--------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      40.23 CFS     PIPE DIAMETER =  36.00 INCHES
 PIPE LENGTH =     187.55 FEET          MANNING'S N  =  0.01300
==========================================================================
 DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) =     3.56
==========================================================================
 PRESSURE FLOW PROFILE COMPUTED INFORMATION:
--------------------------------------------------------------------------
 DISTANCE FROM      PRESSURE   VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)       HEAD(FT)   (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
        0.000          3.564      5.691          4.067          1354.04
      123.300          3.000      5.691          3.503          1105.33
--------------------------------------------------------------------------
 NORMAL DEPTH(FT) =      1.79          CRITICAL DEPTH(FT) =      2.07
==========================================================================
 ASSUMED DOWNSTREAM PRESSURE HEAD(FT) =     3.00
==========================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
--------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)         (FT)     (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
      123.300         3.000      5.690          3.503          1105.33
      130.655         2.963      5.703          3.468          1089.89
      137.341         2.925      5.728          3.435          1075.39
      143.667         2.888      5.760          3.403          1061.53
      149.721         2.850      5.798          3.373          1048.26
      155.553         2.813      5.841          3.343          1035.52
      161.193         2.776      5.889          3.315          1023.29
      166.658         2.738      5.943          3.287          1011.58
      171.961         2.701      6.001          3.260          1000.38
      177.109         2.663      6.063          3.235           989.69
      182.106         2.626      6.130          3.210           979.52
      186.953         2.589      6.202          3.186           969.88
      187.550         2.584      6.211          3.183           968.69
--------------------------------------------------------------------------
 NODE   921.00 : HGL = <  495.624>;EGL= <  496.223>;FLOWLINE= <  493.040>

**************************************************************************
 FLOW PROCESS FROM NODE   921.00 TO NODE   921.00 IS CODE =  5
 UPSTREAM NODE   921.00     ELEVATION =   493.14  (FLOW UNSEALS IN REACH)
--------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)  (FT/SEC)
    UPSTREAM       40.23      36.00      90.00     493.14       2.07        5.691
   DOWNSTREAM      40.23      36.00          -     493.04       2.07        6.213
   LATERAL #1       0.00       0.00       0.00       0.00       0.00        0.000
   LATERAL #2       0.00       0.00       0.00       0.00       0.00        0.000
      Q5            0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00364
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00336
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00350
 JUNCTION LENGTH =   4.00 FEET
```

```
  FRICTION LOSSES =  0.014 FEET          ENTRANCE LOSSES =  0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 1.064)+( 0.000) =   1.064
------------------------------------------------------------------------------
  NODE   921.00 : HGL = <  496.784>;EGL= <  497.287>;FLOWLINE= <  493.140>

******************************************************************************
  FLOW PROCESS FROM NODE   921.00 TO NODE   920.00 IS CODE =  1
  UPSTREAM NODE   920.00     ELEVATION =   493.60  (FLOW IS UNDER PRESSURE)
------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      40.23 CFS     PIPE DIAMETER =  36.00 INCHES
  PIPE LENGTH =       56.30 FEET          MANNING'S N  =  0.01300
  SF=(Q/K)**2 = ((     40.23)/(   667.015))**2 = 0.00364
  HF=L*SF = (     56.30)*(0.00364) =      0.205
------------------------------------------------------------------------------
  NODE   920.00 : HGL = <  496.989>;EGL= <  497.492>;FLOWLINE= <  493.600>

******************************************************************************
  FLOW PROCESS FROM NODE   920.00 TO NODE   920.00 IS CODE =  5
  UPSTREAM NODE   920.00     ELEVATION =   493.70  (FLOW IS UNDER PRESSURE)
------------------------------------------------------------------------------
  CALCULATE JUNCTION LOSSES:
       PIPE        FLOW    DIAMETER   ANGLE    FLOWLINE   CRITICAL   VELOCITY
                   (CFS)   (INCHES) (DEGREES) ELEVATION  DEPTH(FT.)  (FT/SEC)
     UPSTREAM      40.23     36.00     45.00    493.70      2.07        5.691
    DOWNSTREAM     40.23     36.00       -      493.60      2.07        5.691
    LATERAL #1      0.00      0.00      0.00      0.00      0.00        0.000
    LATERAL #2      0.00      0.00      0.00      0.00      0.00        0.000
       Q5           0.00===Q5 EQUALS BASIN INPUT===

  LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
  DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
      Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
  UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00364
  DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00364
  AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00364
  JUNCTION LENGTH =   4.00 FEET
  FRICTION LOSSES =  0.015 FEET          ENTRANCE LOSSES =  0.000 FEET
  JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
  JUNCTION LOSSES = ( 0.309)+( 0.000) =   0.309
------------------------------------------------------------------------------
  NODE   920.00 : HGL = <  497.298>;EGL= <  497.801>;FLOWLINE= <  493.700>

******************************************************************************
  FLOW PROCESS FROM NODE   920.00 TO NODE   919.00 IS CODE =  1
  UPSTREAM NODE   919.00     ELEVATION =   494.50  (FLOW IS UNDER PRESSURE)
------------------------------------------------------------------------------
  CALCULATE FRICTION LOSSES(LACFCD):
  PIPE FLOW    =      40.23 CFS     PIPE DIAMETER =  36.00 INCHES
  PIPE LENGTH =       97.17 FEET          MANNING'S N  =  0.01300
  SF=(Q/K)**2 = ((     40.23)/(   666.978))**2 = 0.00364
  HF=L*SF = (     97.17)*(0.00364) =      0.354
------------------------------------------------------------------------------
  NODE   919.00 : HGL = <  497.652>;EGL= <  498.155>;FLOWLINE= <  494.500>

******************************************************************************
  FLOW PROCESS FROM NODE   919.00 TO NODE   919.00 IS CODE =  5
  UPSTREAM NODE   919.00     ELEVATION =   494.83  (FLOW IS UNDER PRESSURE)
  (NOTE: POSSIBLE JUMP IN OR UPSTREAM OF STRUCTURE)
------------------------------------------------------------------------------
```

```
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW     DIAMETER    ANGLE     FLOWLINE    CRITICAL    VELOCITY
                  (CFS)    (INCHES)  (DEGREES) ELEVATION  DEPTH(FT.)   (FT/SEC)
    UPSTREAM      40.23      36.00      45.00     494.83       2.07        13.728
   DOWNSTREAM     40.23      36.00        -       494.50       2.07         5.691
   LATERAL #1      0.00       0.00       0.00       0.00       0.00         0.000
   LATERAL #2      0.00       0.00       0.00       0.00       0.00         0.000
      Q5           0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.02411
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00364
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.01387
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.055 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 0.900)+( 0.000) =   0.900
-------------------------------------------------------------------------------
 NODE   919.00 : HGL = <  496.128>;EGL= <  499.055>;FLOWLINE= <  494.830>

*******************************************************************************
 FLOW PROCESS FROM NODE   919.00 TO NODE   919.20 IS CODE =  1
 UPSTREAM NODE  919.20     ELEVATION =   496.24  (FLOW IS SUPERCRITICAL)
-------------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =      40.23 CFS     PIPE DIAMETER =  36.00 INCHES
 PIPE LENGTH =       11.12 FEET          MANNING'S N  =  0.01300
-------------------------------------------------------------------------------
 NORMAL DEPTH(FT) =      0.84          CRITICAL DEPTH(FT) =      2.07
===============================================================================
 UPSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     2.07
===============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
-------------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
        0.000          2.065      7.751          2.999          899.03
        0.020          2.016      7.962          3.001          899.79
        0.082          1.967      8.189          3.009          902.13
        0.193          1.918      8.431          3.022          906.15
        0.358          1.868      8.690          3.042          911.95
        0.586          1.819      8.968          3.069          919.67
        0.885          1.770      9.267          3.104          929.45
        1.267          1.721      9.589          3.149          941.44
        1.745          1.672      9.935          3.205          955.81
        2.335          1.622     10.310          3.274          972.78
        3.056          1.573     10.714          3.357          992.57
        3.932          1.524     11.152          3.456         1015.45
        4.995          1.475     11.628          3.576         1041.71
        6.282          1.426     12.146          3.718         1071.71
        7.843          1.376     12.711          3.887         1105.85
        9.743          1.327     13.330          4.088         1144.60
       11.120          1.298     13.724          4.225         1169.96
-------------------------------------------------------------------------------
 NODE   919.20 : HGL = <  498.305>;EGL= <  499.239>;FLOWLINE= <  496.240>

*******************************************************************************
 FLOW PROCESS FROM NODE   919.20 TO NODE   919.20 IS CODE =  8
 UPSTREAM NODE  919.20     ELEVATION =   494.56  (FLOW IS AT CRITICAL DEPTH)
```

```
------------------------------------------------------------------------------
  CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
  PIPE FLOW =      40.23 CFS          PIPE DIAMETER =  36.00 INCHES
  FLOW VELOCITY =   7.75 FEET/SEC.    VELOCITY HEAD =  0.934 FEET
  CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(  0.934) =  0.187
------------------------------------------------------------------------------
  NODE   919.20 : HGL = <  499.425>;EGL= <  499.425>;FLOWLINE= <  494.560>

******************************************************************************
  UPSTREAM PIPE FLOW CONTROL DATA:
  NODE NUMBER =   919.20            FLOWLINE ELEVATION =   494.56
  ASSUMED UPSTREAM CONTROL HGL =    496.63 FOR DOWNSTREAM RUN ANALYSIS

==============================================================================
  END OF GRADUALLY VARIED FLOW ANALYSIS
```

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2012 Advanced Engineering Software (aes)
Ver. 19.0 Release Date: 06/01/2012 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
5620 Friars Rd
San Diego CA 92110
619-291-0707 Fax 619-291-4165

********** DESCRIPTION OF STUDY **********
* J-16630 Construction Change "F" *
* BMRNV East Town Center and Paseo Del Sur Phase 5 Improvements *
* Western inlet storm drain at northern end of Paseo Del Sur (Node 956.2) *
****

FILE NAME: 956W.LAT
TIME/DATE OF STUDY: 09:20 09/23/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
993.50-	} FRICTION	1.93*	152.33	0.81 Dc	61.34
956.00-	} JUNCTION	1.47*	101.28	0.81 Dc	61.34
956.00-	} FRICTION	1.35*	74.09	0.55	29.02
956.20-	} CATCH BASIN	1.33*	72.10	0.60 Dc	28.68
956.20-		1.38*	67.70	0.60 Dc	10.28

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

****
DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 993.50 FLOWLINE ELEVATION = 492.02
PIPE FLOW = 4.50 CFS PIPE DIAMETER = 18.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 493.950 FEET

NODE 993.50 : HGL = < 493.950>;EGL= < 494.051>;FLOWLINE= < 492.020>

****
FLOW PROCESS FROM NODE 993.50 TO NODE 956.00 IS CODE = 1
UPSTREAM NODE 956.00 ELEVATION = 492.70 (FLOW SEALS IN REACH)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 4.50 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 118.86 FEET MANNING'S N = 0.01300

DOWNSTREAM CONTROL ASSUMED PRESSURE HEAD(FT) = 1.93

PRESSURE FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	PRESSURE HEAD(FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	1.930	2.546	2.031	152.33
110.660	1.500	2.546	1.601	104.91

NORMAL DEPTH(FT) = 0.81 CRITICAL DEPTH(FT) = 0.81

ASSUMED DOWNSTREAM PRESSURE HEAD(FT) = 1.50

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
110.660	1.500	2.546	1.601	104.91
117.303	1.473	2.556	1.574	101.98

```
      118.860          1.466       2.561          1.568          101.28
------------------------------------------------------------------------------
 NODE   956.00 : HGL = <  494.166>;EGL= <  494.268>;FLOWLINE= <  492.700>

******************************************************************************
 FLOW PROCESS FROM NODE   956.00 TO NODE   956.00 IS CODE =  5
 UPSTREAM NODE   956.00     ELEVATION =   493.03  (FLOW IS SUBCRITICAL)
------------------------------------------------------------------------------
 CALCULATE JUNCTION LOSSES:
      PIPE        FLOW    DIAMETER    ANGLE    FLOWLINE   CRITICAL   VELOCITY
                  (CFS)   (INCHES) (DEGREES) ELEVATION  DEPTH(FT.)  (FT/SEC)
    UPSTREAM       2.50     18.00     90.00    493.03       0.60       1.490
   DOWNSTREAM      4.50     18.00         -    492.70       0.81       2.561
   LATERAL #1      2.00     18.00     90.00    493.03       0.53       1.276
   LATERAL #2      0.00      0.00      0.00      0.00       0.00       0.000
      Q5           0.00===Q5 EQUALS BASIN INPUT===

 LACFCD AND OCEMA FLOW JUNCTION FORMULAE USED:
 DY=(Q2*V2-Q1*V1*COS(DELTA1)-Q3*V3*COS(DELTA3)-
     Q4*V4*COS(DELTA4))/((A1+A2)*16.1)+FRICTION LOSSES
 UPSTREAM:    MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00050
 DOWNSTREAM:  MANNING'S N = 0.01300;  FRICTION SLOPE = 0.00163
 AVERAGED FRICTION SLOPE IN JUNCTION ASSUMED AS 0.00107
 JUNCTION LENGTH =   4.00 FEET
 FRICTION LOSSES =  0.004 FEET         ENTRANCE LOSSES =  0.000 FEET
 JUNCTION LOSSES = (DY+HV1-HV2)+(ENTRANCE LOSSES)
 JUNCTION LOSSES = ( 0.150)+( 0.000) =   0.150
------------------------------------------------------------------------------
 NODE   956.00 : HGL = <  494.383>;EGL= <  494.418>;FLOWLINE= <  493.030>

******************************************************************************
 FLOW PROCESS FROM NODE   956.00 TO NODE   956.20 IS CODE =  1
 UPSTREAM NODE   956.20     ELEVATION =   493.05  (FLOW IS SUBCRITICAL)
------------------------------------------------------------------------------
 CALCULATE FRICTION LOSSES(LACFCD):
 PIPE FLOW    =       2.50 CFS     PIPE DIAMETER =  18.00 INCHES
 PIPE LENGTH =        1.75 FEET          MANNING'S N  =  0.01300
------------------------------------------------------------------------------
 NORMAL DEPTH(FT) =      0.48          CRITICAL DEPTH(FT) =      0.60
==============================================================================
 DOWNSTREAM CONTROL ASSUMED FLOWDEPTH(FT) =     1.35
==============================================================================
 GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:
------------------------------------------------------------------------------
 DISTANCE FROM      FLOW DEPTH  VELOCITY      SPECIFIC        PRESSURE+
  CONTROL(FT)          (FT)    (FT/SEC)     ENERGY(FT)    MOMENTUM(POUNDS)
         0.000         1.353      1.489          1.388             74.09
         1.750         1.334      1.506          1.369             72.10
------------------------------------------------------------------------------
 NODE   956.20 : HGL = <  494.384>;EGL= <  494.419>;FLOWLINE= <  493.050>

******************************************************************************
 FLOW PROCESS FROM NODE   956.20 TO NODE   956.20 IS CODE =  8
 UPSTREAM NODE   956.20     ELEVATION =   493.05  (FLOW IS SUBCRITICAL)
------------------------------------------------------------------------------
 CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
 PIPE FLOW =       2.50 CFS          PIPE DIAMETER =  18.00 INCHES
 FLOW VELOCITY =   1.51 FEET/SEC.    VELOCITY HEAD =  0.035 FEET
 CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(  0.035) =  0.007
------------------------------------------------------------------------------
 NODE   956.20 : HGL = <  494.426>;EGL= <  494.426>;FLOWLINE= <  493.050>

******************************************************************************
 UPSTREAM PIPE FLOW CONTROL DATA:
 NODE NUMBER =   956.20          FLOWLINE ELEVATION =   493.05
 ASSUMED UPSTREAM CONTROL HGL =    493.65 FOR DOWNSTREAM RUN ANALYSIS

==============================================================================
 END OF GRADUALLY VARIED FLOW ANALYSIS
♀
```

PIPE-FLOW HYDRAULICS COMPUTER PROGRAM PACKAGE
(Reference: LACFCD,LACRD, AND OCEMA HYDRAULICS CRITERION)
(c) Copyright 1982-2012 Advanced Engineering Software (aes)
Ver. 19.0 Release Date: 06/01/2012 License ID 1261

Analysis prepared by:

RICK ENGINEERING COMPANY
5620 Friars Rd
San Diego CA 92110
619-291-0707 Fax 619-291-4165

********** DESCRIPTION OF STUDY **********
* J-16630 Construction Change "F" *
* BMRNV East Town Center and Paseo Del Sur Phase 5 Improvements *
* Eastern inlet storm drain at northern end of Paseo Del Sur (Node 955) *
****

FILE NAME: 956E.LAT
TIME/DATE OF STUDY: 09:31 09/23/2014

GRADUALLY VARIED FLOW ANALYSIS FOR PIPE SYSTEM
NODAL POINT STATUS TABLE
(Note: "*" indicates nodal point data used.)

NODE NUMBER	MODEL PROCESS	UPSTREAM RUN PRESSURE HEAD(FT)	UPSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)	DOWNSTREAM RUN FLOW DEPTH(FT)	DOWNSTREAM RUN PRESSURE+ MOMENTUM(POUNDS)
956.00-		1.35*	71.14	0.45	22.65
	} FRICTION				
955.00-		1.05*	43.97	0.53 Dc	21.55
	} CATCH BASIN				
955.00-		1.08*	39.50	0.53 Dc	7.78

MAXIMUM NUMBER OF ENERGY BALANCES USED IN EACH PROFILE = 25

NOTE: STEADY FLOW HYDRAULIC HEAD-LOSS COMPUTATIONS BASED ON THE MOST CONSERVATIVE FORMULAE FROM THE CURRENT LACRD,LACFCD, AND OCEMA DESIGN MANUALS.

DOWNSTREAM PIPE FLOW CONTROL DATA:
NODE NUMBER = 956.00 FLOWLINE ELEVATION = 493.03
PIPE FLOW = 2.00 CFS PIPE DIAMETER = 18.00 INCHES
ASSUMED DOWNSTREAM CONTROL HGL = 494.380 FEET

NODE 956.00 : HGL = < 494.380>;EGL= < 494.402>;FLOWLINE= < 493.030>

FLOW PROCESS FROM NODE 956.00 TO NODE 955.00 IS CODE = 1
UPSTREAM NODE 955.00 ELEVATION = 493.33 (FLOW IS SUBCRITICAL)

CALCULATE FRICTION LOSSES(LACFCD):
PIPE FLOW = 2.00 CFS PIPE DIAMETER = 18.00 INCHES
PIPE LENGTH = 29.75 FEET MANNING'S N = 0.01300

NORMAL DEPTH(FT) = 0.44 CRITICAL DEPTH(FT) = 0.53

DOWNSTREAM CONTROL ASSUMED FLOWDEPTH(FT) = 1.35

GRADUALLY VARIED FLOW PROFILE COMPUTED INFORMATION:

DISTANCE FROM CONTROL(FT)	FLOW DEPTH (FT)	VELOCITY (FT/SEC)	SPECIFIC ENERGY(FT)	PRESSURE+ MOMENTUM(POUNDS)
0.000	1.350	1.194	1.372	71.14
3.262	1.317	1.216	1.340	67.84
6.514	1.285	1.241	1.309	64.62
9.757	1.252	1.269	1.277	61.48
12.991	1.219	1.300	1.246	58.42
16.215	1.187	1.333	1.214	55.46
19.427	1.154	1.371	1.183	52.58
22.629	1.121	1.411	1.152	49.81
25.817	1.089	1.455	1.122	47.14
28.991	1.056	1.504	1.091	44.57
29.750	1.048	1.516	1.084	43.97

NODE 955.00 : HGL = < 494.378>;EGL= < 494.414>;FLOWLINE= < 493.330>

```
 FLOW PROCESS FROM NODE    955.00 TO NODE    955.00 IS CODE =  8
 UPSTREAM NODE   955.00     ELEVATION =   493.34  (FLOW IS SUBCRITICAL)
----------------------------------------------------------------------------
 CALCULATE CATCH BASIN ENTRANCE LOSSES(LACFCD):
 PIPE FLOW =       2.00 CFS          PIPE DIAMETER =  18.00 INCHES
 FLOW VELOCITY =   1.52 FEET/SEC.    VELOCITY HEAD =  0.036 FEET
 CATCH BASIN ENERGY LOSS = .2*(VELOCITY HEAD) = .2*(  0.036) =  0.007
----------------------------------------------------------------------------
 NODE   955.00 : HGL = <  494.421>;EGL= <  494.421>;FLOWLINE= <  493.340>

****************************************************************************
 UPSTREAM PIPE FLOW CONTROL DATA:
 NODE NUMBER =   955.00           FLOWLINE ELEVATION =   493.34
 ASSUMED UPSTREAM CONTROL HGL =    493.87 FOR DOWNSTREAM RUN ANALYSIS

============================================================================
 END OF GRADUALLY VARIED FLOW ANALYSIS
♀
```

Appendix H

Inlet Design Calculations

BMR BASIN 9A INLET SIZING

```
**************************************************************************
          CAPACITY OF TYPE B INLETS ON A GRADE
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
 **************************************************************************
```

NODE 910.3

DISCHARGE = 1.1 CFS
STREET CROSS SLOPE = .02 FT/FT
STREET SLOPE = .03 FT/FT
COMPUTED DEPTH OF FLOW AT THE CURB = .2 FT
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 = 4.1 FT
LENGTH OF INLET OPENING = 4.0 FT
LENGTH OF INLET TO BE USED = 5.0 FT

```
**************************************************************************
          CAPACITY OF TYPE B INLETS ON A GRADE
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
**************************************************************************
```

NODE 914

DISCHARGE = .75 CFS
STREET CROSS SLOPE = .02 FT/FT
STREET SLOPE = .03 FT/FT
COMPUTED DEPTH OF FLOW AT THE CURB = .17 FT
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 = 3 FT
LENGTH OF INLET OPENING = 4 FT
LENGTH OF INLET TO BE USED = 5 FT

```
**************************************************************************
          CAPACITY OF TYPE B INLETS IN A SUMP
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
**************************************************************************
```

NODE 956.2

DISCHARGE = 2.5 CFS
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING CHART 1-103.6C (Q/L=1.5) = 1.7 FT
LENGTH OF INLET OPENING USED = 4 FT
LENGTH OF INLET TO BE USED = 5 FT

```
**********************************************************************
                    CAPACITY OF TYPE B INLETS ON A GRADE
                  COPYRIGHT 1992 RICK ENGINEERING COMPANY
**********************************************************************
 NODE 956.2 (Check for depth of flow)

      DISCHARGE =  2.5  CFS
      STREET CROSS SLOPE =  .02  FT/FT
      STREET SLOPE =  .03  FT/FT
      COMPUTED DEPTH OF FLOW AT THE CURB =  .25  FT
~~      LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW~~
~~      USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 =  8  FT~~
~~      LENGTH OF INLET OPENING =  8  FT~~
~~      LENGTH OF INLET TO BE USED =  9  FT~~

   **********************************************************************
            CAPACITY OF TYPE B INLETS IN A SUMP
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
   **********************************************************************

   NODE 955

   DISCHARGE = 2  CFS
   LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
   USING CHART 1-103.6C (Q/L=1.5) =  1.3  FT
   LENGTH OF INLET OPENING USED =  4  FT
   LENGTH OF INLET TO BE USED =  5  FT

   **********************************************************************
            CAPACITY OF TYPE B INLETS ON A GRADE
            COPYRIGHT 1992 RICK ENGINEERING COMPANY
   **********************************************************************

   NODE 955 (Check for depth of flow)

   DISCHARGE = 2  CFS
   STREET CROSS SLOPE = .02  FT/FT
   STREET SLOPE = .03  FT/FT
   COMPUTED DEPTH OF FLOW AT THE CURB = .24  FT
~~   LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW~~
~~   USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 = 6.7  FT~~
~~   LENGTH OF INLET OPENING = 7.7  FT~~
~~   LENGTH OF INLET TO BE USED = 8.7  FT~~

   **********************************************************************
            CAPACITY OF TYPE B INLETS IN A SUMP
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
   **********************************************************************
   NODE 990

   DISCHARGE = 1.75  CFS
   LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
   USING CHART 1-103.6C (Q/L=1.5) =  1.2  FT
   LENGTH OF INLET OPENING USED =  4  FT
   LENGTH OF INLET TO BE USED =  5  FT
```

```
**************************************************************************
          CAPACITY OF TYPE B INLETS ON A GRADE
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
**************************************************************************
NODE 990  (check for depth of flow)

DISCHARGE =  1.75  CFS
STREET CROSS SLOPE =  .02  FT/FT
STREET SLOPE =  .03  FT/FT
COMPUTED DEPTH OF FLOW AT THE CURB =  .23  FT
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 =  6  FT
LENGTH OF INLET OPENING =  6  FT
LENGTH OF INLET TO BE USED =  7  FT


**************************************************************************
          CAPACITY OF TYPE B INLETS IN A SUMP
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
**************************************************************************
NODE 904.3


DISCHARGE =  3.4  CFS
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING CHART 1-103.6C (Q/L=1.5) =  2.3  FT
LENGTH OF INLET OPENING USED =  4  FT
LENGTH OF INLET TO BE USED =  5  FT

**************************************************************************
          CAPACITY OF TYPE B INLETS ON A GRADE
          COPYRIGHT 1992 RICK ENGINEERING COMPANY
**************************************************************************
NODE 904.3 (Check for depth of flow)


DISCHARGE =  3.4  CFS
STREET CROSS SLOPE =  .02  FT/FT
STREET SLOPE =  .02  FT/FT
COMPUTED DEPTH OF FLOW AT THE CURB =  .3  FT
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 =  9.8  FT
LENGTH OF INLET OPENING =  4  FT
LENGTH OF INLET TO BE USED =  5  FT
DISCHARGE INTERCEPTED BY INLET =  1.6  CFS
BYPASS =  1.8  CFS
```

****
CAPACITY OF TYPE B INLETS IN A SUMP
COPYRIGHT 1992 RICK ENGINEERING COMPANY
****
NODE 904.5

DISCHARGE = 1.1 CFS
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING CHART 1-103.6C (Q/L=1.5) = .7 FT
LENGTH OF INLET OPENING USED = 4 FT
LENGTH OF INLET TO BE USED = 5 FT

****
CAPACITY OF TYPE B INLETS ON A GRADE
COPYRIGHT 1992 RICK ENGINEERING COMPANY
****
NODE 904.5 (Check for depth of flow)

DISCHARGE = 1.1 CFS
STREET CROSS SLOPE = .02 FT/FT
STREET SLOPE = .02 FT/FT
COMPUTED DEPTH OF FLOW AT THE CURB = .21 FT
~~LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW~~
~~USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 = 4 FT~~
~~LENGTH OF INLET OPENING = 4 FT~~
~~LENGTH OF INLET TO BE USED = 5 FT~~

BMR BASIN 700

****

CAPACITY OF TYPE B INLETS ON A GRADE
COPYRIGHT 1992 RICK ENGINEERING COMPANY

****

NODE 730.3

DISCHARGE = 1.43 CFS
STREET CROSS SLOPE = .02 FT/FT
STREET SLOPE = .0524 FT/FT
COMPUTED DEPTH OF FLOW AT THE CURB = .2 FT
LENGTH OF INLET REQUIRED TO INTERCEPT 100% OF FLOW
USING THE FOLLOWING EQUATION Q=0.7L(A+Y)^3/2 = 5.3 FT
LENGTH OF INLET OPENING = 5.5 FT
LENGTH OF INLET TO BE USED = 6.5 FT

Appendix L

Detention Basin Calculations

BASIN 900 (BASINS 9A, 9B) - FINAL ENGINEERED BASINS

6-HOUR STORM EVENT			
2-YR PRECIP	10-YR PRECIP	25-YR PRECIP	100-YR PRECIP
1.4	2.0	2.3	2.8

Drainage Area	Area (Ac)
Existing Conditon Area[1]	47.6
Proposed Conditon Area[2]	47.7

Drainage Basin 900 A		
Drainage Area	Area (Ac)	Percentage of Proposed
On-Site Area - Node 919	11.9	N/A
Paseo Del Sur (PDS) Area - Node 956	1.3	N/A
Perimeter Area - Node 919	0.1	N/A
Total	13.3	0.28

Drainage Basin 900		
9B Area (Node 904.7)	14.2	0.30
Middle School	20.2	0.42

Existing Condition	
Storm Event	Entire Basin 900 $Q_{Existing}$ (CFS)
2	32.0
10	46.6
25	55.6
100	65.1

Basin 9A (Designed as part of J-15009H - Construction Change 'E')								
Storm Event	$Q_{Existing}$ (9A Portion Pro-Rated) (CFS)	$Q_{ultimate}$ On-site Area (at Node 919) (CFS)	$Q_{ultimate}$ PDS Area (at Node 956) (CFS)	$Q_{ultimate}$ Perimeter Area (at Node 991) (CFS)	$Q_{ultimate}$ On-Site & PDS & Perimeter (at Node 991) (CFS)	Basin 9A Detention Volume (Ac-Ft)[3]	$Q_{Detained}$ On-site Area (at Node 919) (CFS)[4]	$Q_{Detained}$ On-Site & PDS & Perimeter (at Node 991) (CFS)[4]
2	8.9	21.2	2.3	0.2	23.8	0.492	6.4	8.6
10	13.0	29.9	3.3	0.2	33.2	0.692	9.3	12.0
25	15.5	34.9	3.8	0.3	38.8	0.793	11.1	14.4
100	18.2	40.2	4.4	0.3	45.0	N/A	N/A	N/A

Notes:
1. Measured from Node 920 on Basin 900 Existing Condition Map.
2. The proposed area is determined by summing the total area within Drainage Basin 900.
3. A HEC-1 computer program was used to determine the detention volume requirements for each basin.
4. $Q_{Detained}$ is the flow leaving the drainage basin following detention. Refer to the detained Modified Rational Method within Appendix A of this report.

RICK ENGINEERING COMPANY™
5620 Friars Road
San Diego, CA 92110-2596
Tel: (619) 291-0707
Fax: (619) 291-4165

Date 7-2-14
Job No. 16630
Page
Done By JJR
Checked By

DETENTION BASIN 9A

EMERGENCY OVERFLOW

Q_{100} = 40.2 CFS (OUTLET FLOW FROM 9A NODE 919)

Havail ≈ 1'4" - Top of outlet structure will be 1'4" taller than Stormtreep BASIN 9A VAULT TOP

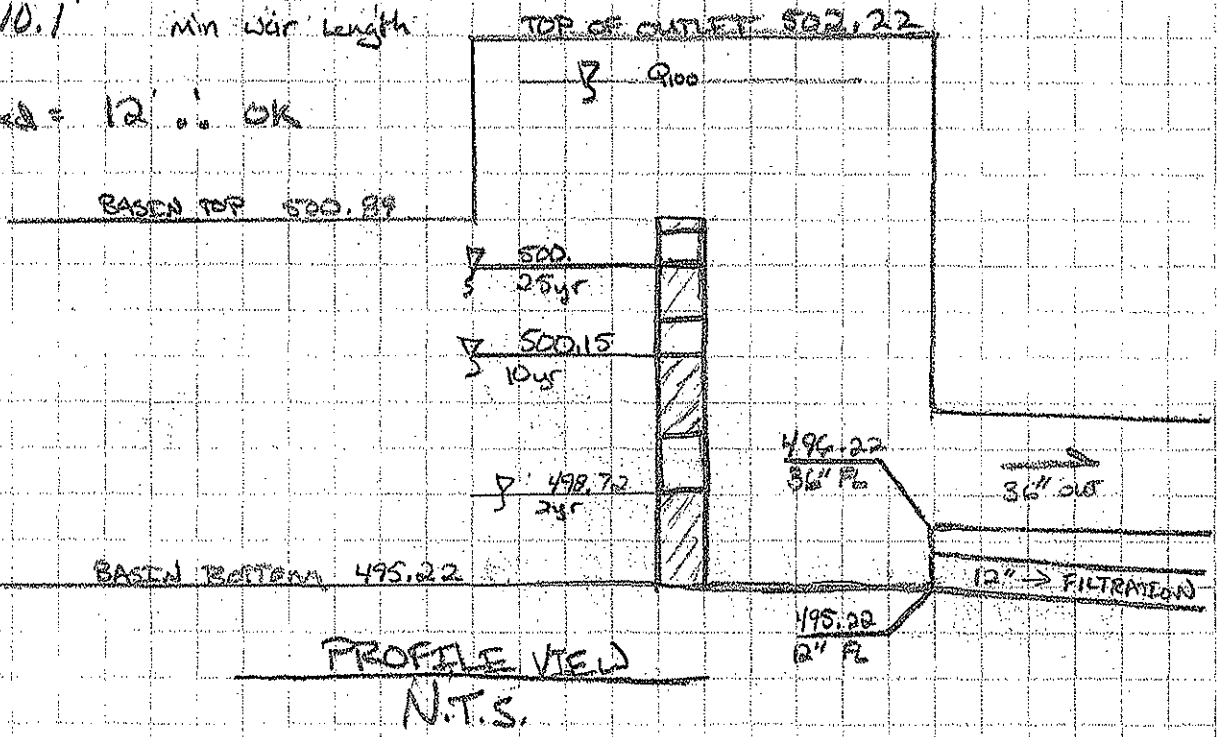
C = 2.6

$Q = CLH^{3/2}$

$L = \frac{Q}{CH^{3/2}} \Rightarrow \frac{40.2}{(2.6)(1.33)^{3/2}} = 10.1'$

$L_{required}$ = 10.1' min weir length

$L_{provided}$ = 12' ∴ OK



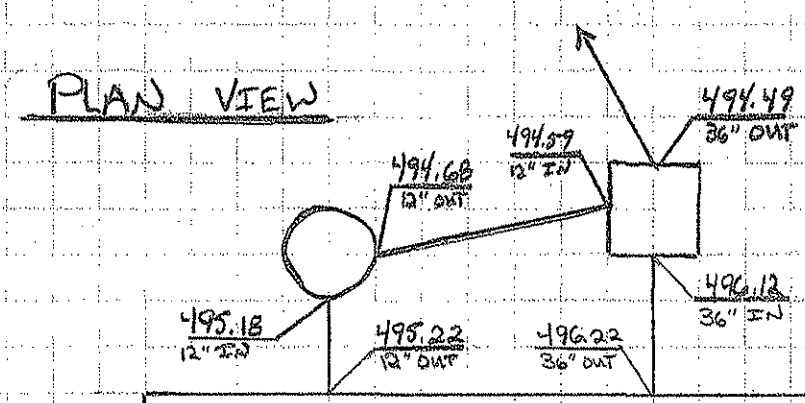
PROFILE VIEW
N.T.S.

RICK ENGINEERING COMPANY™
5620 Friars Road
San Diego, CA 92110-2596
Tel: (619) 291-0707
Fax: (619) 291-4165

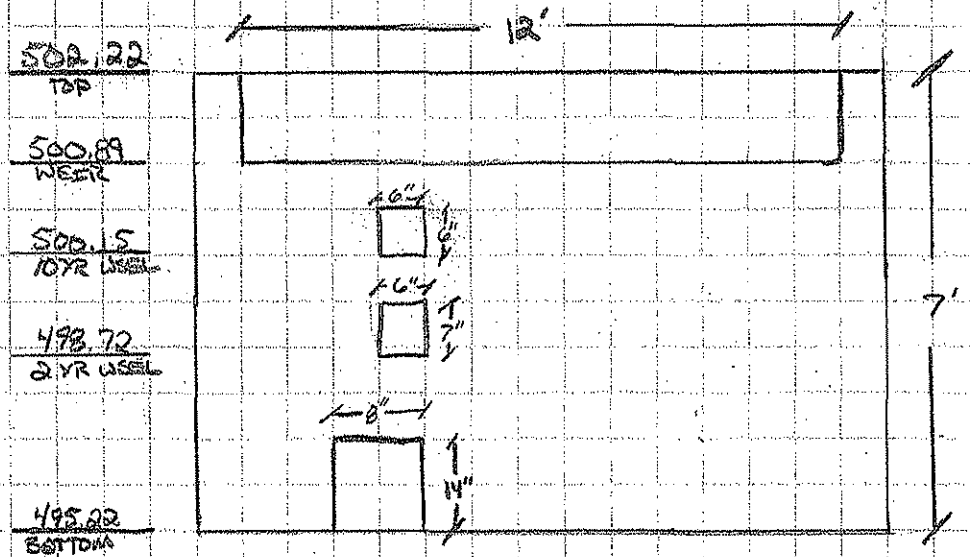
Date 7-2-14
Job No. 16630
Page
Done By JVR
Checked By

BMR DETENTION 9A OUTLET WORKS

PLAN VIEW



SECTION VIEW

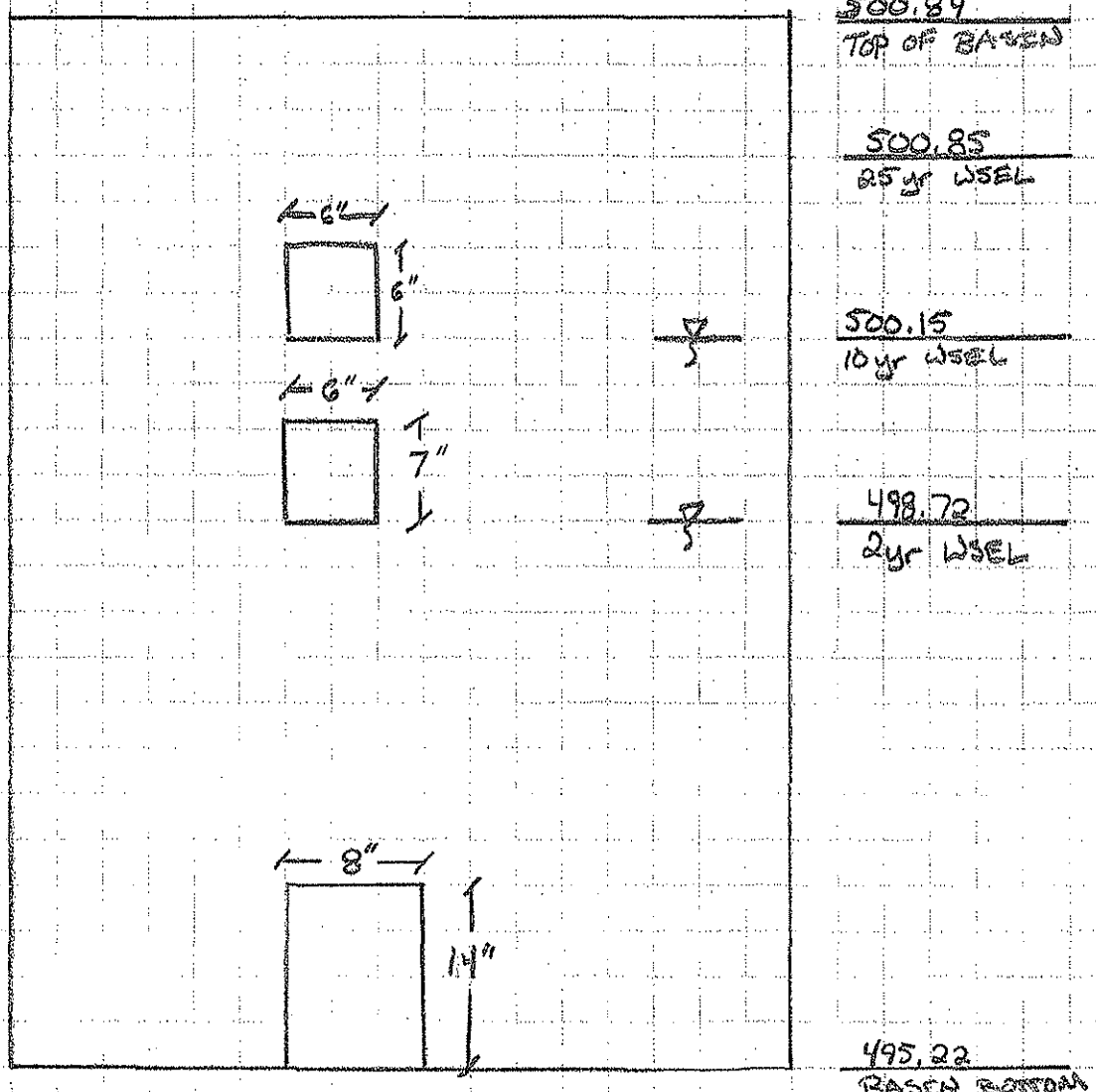


SECTION A-A
N.T.S.

RICK ENGINEERING COMPANY™
5620 Friars Road
San Diego, CA 92110-2596
Tel: (619) 291-0707
Fax: (619) 291-4165

Date 7-2-14
Job No. 16630
Page
Done By JVR
Checked By

DETENTION 9A OUTLETS



N.T.S.

2- Year Outlet

Enter information in yellow boxes. All other information is self-generated.

	feet	
Height of Height of Opening, Hd (ft.):	1.17	14"
Width of Opening, L (ft.):	0.67	8"
Invert of Opening	495.22	
Basin Floor Elevation, Z (ft):	495.22	
Step Increments for Elevation (ft):	0.2	

		Weir			Q_{weir} =	Orifice			$Q_{orifice}$ =	Controlling	Flow Type
Water Surface Elevation, E	Elevations of Interest	C	L	h	$CL(H)^{1.5}$	C	A	H	$CA(2gH)^{0.5}$	Discharge, Qout	
495.22	WQ Flowline	2.6	0.667	0.0	0.00	0.6	0.00	0.0	0.00	0.00	weir flow
495.42		2.6	0.667	0.2	0.16	0.6	0.13	0.1	0.20	0.16	weir flow
495.62		2.6	0.667	0.4	0.44	0.6	0.27	0.2	0.57	0.44	weir flow
495.82		2.6	0.667	0.6	0.81	0.6	0.40	0.3	1.05	0.81	weir flow
496.02		2.6	0.667	0.8	1.24	0.6	0.53	0.4	1.62	1.24	weir flow
496.22		2.6	0.667	1.0	1.73	0.6	0.67	0.5	2.27	1.73	weir flow
496.42		2.6	0.667	1.2	2.28	0.6	0.78	0.6	2.94	2.28	weir flow
496.62		2.6	0.667	1.4	2.87	0.6	0.78	0.8	3.38	2.87	weir flow
496.82		2.6	0.667	1.6	3.51	0.6	0.78	1.0	3.78	3.51	weir flow
497.02		2.6	0.667	1.8	4.19	0.6	0.78	1.2	4.13	4.13	orifice flow
497.22		2.6	0.667	2.0	4.90	0.6	0.78	1.4	4.46	4.46	orifice flow
497.42		2.6	0.667	2.2	5.66	0.6	0.78	1.6	4.76	4.76	orifice flow
497.62		2.6	0.667	2.4	6.44	0.6	0.78	1.8	5.05	5.05	orifice flow
497.82		2.6	0.667	2.6	7.27	0.6	0.78	2.0	5.32	5.32	orifice flow
498.02		2.6	0.667	2.8	8.12	0.6	0.78	2.2	5.58	5.58	orifice flow
498.22		2.6	0.667	3.0	9.01	0.6	0.78	2.4	5.82	5.82	orifice flow
498.42		2.6	0.667	3.2	9.92	0.6	0.78	2.6	6.06	6.06	orifice flow
498.72		2.6	0.667	3.5	11.35	0.6	0.78	2.9	6.40	6.40	orifice flow
498.82		2.6	0.667	3.6	11.84	0.6	0.78	3.0	6.50	6.50	orifice flow
499.02		2.6	0.667	3.8	12.84	0.6	0.78	3.2	6.72	6.72	orifice flow
499.22		2.6	0.667	4.0	13.87	0.6	0.78	3.4	6.92	6.92	orifice flow
499.42		2.6	0.667	4.2	14.92	0.6	0.78	3.6	7.12	7.12	orifice flow
499.62		2.6	0.667	4.4	16.00	0.6	0.78	3.8	7.32	7.32	orifice flow
499.82		2.6	0.667	4.6	17.10	0.6	0.78	4.0	7.51	7.51	orifice flow
500.02		2.6	0.667	4.8	18.23	0.6	0.78	4.2	7.69	7.69	orifice flow
500.15		2.6	0.667	4.9	18.97	0.6	0.78	4.3	7.81	7.81	orifice flow
500.42		2.6	0.667	5.2	20.55	0.6	0.78	4.6	8.05	8.05	orifice flow
500.62		2.6	0.667	5.4	21.75	0.6	0.78	4.8	8.22	8.22	orifice flow
500.85		2.6	0.667	5.6	23.15	0.6	0.78	5.0	8.41	8.41	orifice flow
500.89		2.6	0.667	5.7	23.40	0.6	0.78	5.1	8.45	8.45	orifice flow

10 -Yr Outlet

Enter information in yellow boxes. All other information is self-generated.

	feet	
Height of Height of Opening, Hd (ft.):	0.58	7"
Width of Opening, L (ft.):	0.50	6"
Invert of Opening	498.72	
Basin Floor Elevation, Z (ft):	495.22	
Step Increments for Elevation (ft):	0.2	

		Weir			Q_{weir} =	Orifice			$Q_{orifice}$ =	Controlling	Flow Type
Water Surface Elevation, E	Elevations of Interest	C	L	h	$CL(H)^{1.5}$	C	A	H	$CA(2gH)^{0.5}$	Discharge, Qout	
495.22											
495.42											
495.62											
495.82											
496.02											
496.22											
496.42											
496.62											
496.82											
497.02											
497.22											
497.42											
497.62											
497.82											
498.02											
498.22											
498.42											
498.72		1.6	0.500	0.0	0.00	0.6	0.00	0.0	0.00	0.00	weir flow
498.82		2.6	0.500	0.1	0.04	0.6	0.05	0.1	0.05	0.04	weir flow
499.02		2.6	0.500	0.3	0.21	0.6	0.15	0.1	0.28	0.21	weir flow
499.22		2.6	0.500	0.5	0.46	0.6	0.25	0.2	0.60	0.46	weir flow
499.42		2.6	0.500	0.7	0.76	0.6	0.29	0.4	0.90	0.76	weir flow
499.62		2.6	0.500	0.9	1.11	0.6	0.29	0.6	1.10	1.10	orifice flow
499.82		2.6	0.500	1.1	1.50	0.6	0.29	0.8	1.26	1.26	orifice flow
500.02		2.6	0.500	1.3	1.93	0.6	0.29	1.0	1.41	1.41	orifice flow
500.15		2.6	0.500	1.4	2.22	0.6	0.29	1.1	1.50	1.50	orifice flow
500.42		2.6	0.500	1.7	2.88	0.6	0.29	1.4	1.67	1.67	orifice flow
500.62		2.6	0.500	1.9	3.40	0.6	0.29	1.6	1.78	1.78	orifice flow
500.85		2.6	0.500	2.1	4.04	0.6	0.29	1.8	1.90	1.90	orifice flow
500.89		2.6	0.500	2.2	4.16	0.6	0.29	1.9	1.92	1.92	orifice flow

25-Yr Outlet

Enter information in yellow boxes. All other information is self-generated.

	feet	
Height of Height of Opening, Hd (ft.):	0.5	6"
Width of Opening, L (ft.):	0.5	6"
Invert of Opening	500.15	
Basin Floor Elevation, Z (ft):	495.22	
Step Increments for Elevation (ft):	0.2	

		Weir			Q_{weir} =	Orifice			$Q_{orifice}$ =	Controlling	Flow Type
Water Surface Elevation, E	Elevations of Interest	C	L	h	$CL(H)^{1.5}$	C	A	H	$CA(2gH)^{0.5}$	Discharge, Qout	
495.22											
495.42											
495.62											
495.82											
496.02											
496.22											
496.42											
496.62											
496.82											
497.02											
497.22											
497.42											
497.62											
497.82											
498.02											
498.22											
498.42											
498.72											
498.82											
499.02											
499.22											
499.42											
499.62											
499.82											
500.02											
500.15		2.6	0.500	0.0	0.00	0.6	0.00	0.0	0.00	0.00	weir flow
500.42		2.6	0.500	0.3	0.18	0.6	0.14	0.1	0.24	0.18	weir flow
500.62		2.6	0.500	0.5	0.42	0.6	0.24	0.2	0.55	0.42	weir flow
500.85		2.6	0.500	0.7	0.76	0.6	0.25	0.5	0.81	0.76	weir flow
500.89		2.6	0.500	0.7	0.83	0.6	0.25	0.5	0.84	0.83	weir flow

TOTAL COMBINED:

This Combines the flows from the Water Quality Outlet, the 2- and 10-yr Outlet, and the 25-Yr Outlet. This is the total, detained Qout at each WSEL.

WATER SURFACE ELEVATION (WSEL, ft)	Point of Interest	TOTAL DISCHARGE (Qout, cfs)
495.22		0.00
495.42		0.16
495.62		0.44
495.82		0.81
496.02		1.24
496.22		1.73
496.42		2.28
496.62		2.87
496.82		3.51
497.02		4.13
497.22		4.46
497.42		4.76
497.62		5.05
497.82		5.32
498.02		5.58
498.22		5.82
498.42		6.06
498.72		6.40
498.82		6.55
499.02		6.93
499.22		7.38
499.42		7.88
499.62		8.41
499.82		8.77
500.02		9.10
500.15		9.31
500.42		9.90
500.62		10.42
500.85		11.08
500.89		11.20

2 - YEAR


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   02JUL14  TIME  12:24:43   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                        *DIAGRAM
 *** FREE ***
               1        ID   8MR NVE UNIT 14
               2        ID   UNDERGROUND DETENTION BASIN 9A
               3        ID   15009_H
               4        IT       1 01JAN90    1200     800
               5        IO       5         0

               6        KK   9A_02
               7        KM   RATIONAL METHOD HYDROGRAPH PROGRAM
               8        KM   COPYRIGHT 1992, RICK ENGINEERING COMPANY
               9        KM   6HR RAINFALL IS  1.4  INCHES
              10        KM   RATIONAL METHOD RUNOFF COEFFICIENT IS  .9
              11        KM   RATIONAL METHOD TIME OF CONCENTRATION IS  10  MIN.
              12        KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
              13        KM   IT 2 01JAN90 1200 200
              14        BA   .0186
              15        IN      10 01JAN90    1155
              16        QI       0        0      .9       .9        1        1      1.1      1.1      1.2      1.3
              17        QI     1.4      1.5     1.6      1.8        2      2.3      2.7      3.4        5    21.22
              18        QI    11.1        4       3      2.4      2.1      1.9      1.7      1.5      1.4      1.3
              19        QI     1.2      1.2     1.1      1.1        1        1       .9       .9        0        0
              20        QI       0        0       0        0        0        0        0        0

              21        KK  DETAIN
              22        KO       2        2       0        0       21
              23        RS       1     STOR      -1
              24        SV       0    0.068   0.135    0.203    0.271    0.338    0.406    0.474    0.541    0.609
              25        SE  495.22   495.72  496.22   496.72   497.22   497.72   498.22   498.72   499.22   499.72
              26        SQ       0     0.16    0.81     1.73     2.87     4.13     4.76     5.32     5.82     6.29
              27        SQ    6.72     7.12    7.51
              28        SE  495.22   495.42  495.82   496.22   496.62   497.02   497.42   497.82   498.22   498.62
              29        SE  499.02   499.42  499.82
              30        ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    6       9A_02
              V
              V
   21       DETAIN

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   02JUL14  TIME  12:24:43   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```


```
                        8MR NVE UNIT 14
                        UNDERGROUND DETENTION BASIN 9A
                        15009_H

   5 IO          OUTPUT CONTROL VARIABLES
                       IPRNT         5  PRINT CONTROL
                       IPLOT         0  PLOT CONTROL
                       QSCAL        0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN         1  MINUTES IN COMPUTATION INTERVAL
                       IDATE    1JAN90  STARTING DATE
                       ITIME      1200  STARTING TIME
                         NQ       800  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE    2JAN90  ENDING DATE
                      NDTIME      0119  ENDING TIME
                      ICENT         19  CENTURY MARK

                    COMPUTATION INTERVAL     .02 HOURS
                        TOTAL TIME BASE   13.32 HOURS

           ENGLISH UNITS
                DRAINAGE AREA        SQUARE MILES
                PRECIPITATION DEPTH  INCHES
```

```
LENGTH, ELEVATION      FEET
FLOW                   CUBIC FEET PER SECOND
STORAGE VOLUME         ACRE-FEET
SURFACE AREA           ACRES
TEMPERATURE            DEGREES FAHRENHEIT
```

*** ***

```
           **************
           *            *
21 KK      *   DETAIN   *
           *            *
           **************

22 KO           OUTPUT CONTROL VARIABLES
                      IPRNT         2  PRINT CONTROL
                      IPLOT         2  PLOT CONTROL
                      QSCAL        0.  HYDROGRAPH PLOT SCALE
                      IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                       IOUT        21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2       800  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT      .017  TIME INTERVAL IN HOURS

           HYDROGRAPH ROUTING DATA

23 RS           STORAGE ROUTING
                      NSTPS         1  NUMBER OF SUBREACHES
                       ITYP      STOR  TYPE OF INITIAL CONDITION
                     RSVRIC     -1.00  INITIAL CONDITION
                          X       .00  WORKING R AND D COEFFICIENT
```

24 SV	STORAGE	.0	.1	.1	.2	.3	.3	.4	.5	.5	.6
25 SE	ELEVATION	495.22	495.72	496.22	496.72	497.22	497.72	498.22	498.72	499.22	499.72
26 SQ	DISCHARGE	0.	0.	1.	2.	3.	4.	5.	5.	6.	6.
		7.	7.	8.							
28 SE	ELEVATION	495.22	495.42	495.82	496.22	496.62	497.02	497.42	497.82	498.22	498.62
		499.02	499.42	499.82							

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.03	.07	.08	.14	.19	.20	.24	.27	.30
OUTFLOW	.00	.16	.65	.81	1.73	2.87	3.19	4.13	4.45	4.76
ELEVATION	495.22	495.42	495.72	495.82	496.22	496.62	496.72	497.02	497.22	497.42
STORAGE	.34	.35	.41	.46	.47	.51	.54	.57	.61	.62
OUTFLOW	5.18	5.32	5.82	6.29	6.40	6.72	6.92	7.12	7.41	7.51
ELEVATION	497.72	497.82	498.22	498.62	498.72	499.02	499.22	499.42	499.72	499.82

****

HYDROGRAPH AT STATION DETAIN

****

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JAN	1200	1	0.	.0	495.2	*	1	JAN	1627	268	4.	.2	496.9	*	1	JAN	2054	535	0.	.0	495.4
1	JAN	1201	2	0.	.0	495.2	*	1	JAN	1628	269	4.	.2	496.8	*	1	JAN	2055	536	0.	.0	495.4
1	JAN	1202	3	0.	.0	495.2	*	1	JAN	1629	270	4.	.2	496.8	*	1	JAN	2056	537	0.	.0	495.4
1	JAN	1203	4	0.	.0	495.2	*	1	JAN	1630	271	3.	.2	496.8	*	1	JAN	2057	538	0.	.0	495.4
1	JAN	1204	5	0.	.0	495.2	*	1	JAN	1631	272	3.	.2	496.8	*	1	JAN	2058	539	0.	.0	495.3
1	JAN	1205	6	0.	.0	495.2	*	1	JAN	1632	273	3.	.2	496.8	*	1	JAN	2059	540	0.	.0	495.3
1	JAN	1206	7	0.	.0	495.2	*	1	JAN	1633	274	3.	.2	496.7	*	1	JAN	2100	541	0.	.0	495.3
1	JAN	1207	8	0.	.0	495.2	*	1	JAN	1634	275	3.	.2	496.7	*	1	JAN	2101	542	0.	.0	495.3
1	JAN	1208	9	0.	.0	495.2	*	1	JAN	1635	276	3.	.2	496.7	*	1	JAN	2102	543	0.	.0	495.3
1	JAN	1209	10	0.	.0	495.2	*	1	JAN	1636	277	3.	.2	496.7	*	1	JAN	2103	544	0.	.0	495.3
1	JAN	1210	11	0.	.0	495.2	*	1	JAN	1637	278	3.	.2	496.7	*	1	JAN	2104	545	0.	.0	495.3
1	JAN	1211	12	0.	.0	495.2	*	1	JAN	1638	279	3.	.2	496.7	*	1	JAN	2105	546	0.	.0	495.3
1	JAN	1212	13	0.	.0	495.2	*	1	JAN	1639	280	3.	.2	496.6	*	1	JAN	2106	547	0.	.0	495.3
1	JAN	1213	14	0.	.0	495.2	*	1	JAN	1640	281	3.	.2	496.6	*	1	JAN	2107	548	0.	.0	495.3
1	JAN	1214	15	0.	.0	495.3	*	1	JAN	1641	282	3.	.2	496.6	*	1	JAN	2108	549	0.	.0	495.3
1	JAN	1215	16	0.	.0	495.3	*	1	JAN	1642	283	3.	.2	496.6	*	1	JAN	2109	550	0.	.0	495.3
1	JAN	1216	17	0.	.0	495.3	*	1	JAN	1643	284	3.	.2	496.6	*	1	JAN	2110	551	0.	.0	495.3
1	JAN	1217	18	0.	.0	495.3	*	1	JAN	1644	285	3.	.2	496.6	*	1	JAN	2111	552	0.	.0	495.3
1	JAN	1218	19	0.	.0	495.3	*	1	JAN	1645	286	3.	.2	496.6	*	1	JAN	2112	553	0.	.0	495.3
1	JAN	1219	20	0.	.0	495.3	*	1	JAN	1646	287	3.	.2	496.5	*	1	JAN	2113	554	0.	.0	495.3
1	JAN	1220	21	0.	.0	495.3	*	1	JAN	1647	288	3.	.2	496.5	*	1	JAN	2114	555	0.	.0	495.3
1	JAN	1221	22	0.	.0	495.3	*	1	JAN	1648	289	3.	.2	496.5	*	1	JAN	2115	556	0.	.0	495.3
1	JAN	1222	23	0.	.0	495.3	*	1	JAN	1649	290	3.	.2	496.5	*	1	JAN	2116	557	0.	.0	495.3
1	JAN	1223	24	0.	.0	495.3	*	1	JAN	1650	291	2.	.2	496.5	*	1	JAN	2117	558	0.	.0	495.3
1	JAN	1224	25	0.	.0	495.3	*	1	JAN	1651	292	2.	.2	496.5	*	1	JAN	2118	559	0.	.0	495.3
1	JAN	1225	26	0.	.0	495.3	*	1	JAN	1652	293	2.	.2	496.5	*	1	JAN	2119	560	0.	.0	495.3
1	JAN	1226	27	0.	.0	495.4	*	1	JAN	1653	294	2.	.2	496.4	*	1	JAN	2120	561	0.	.0	495.3
1	JAN	1227	28	0.	.0	495.4	*	1	JAN	1654	295	2.	.2	496.4	*	1	JAN	2121	562	0.	.0	495.3
1	JAN	1228	29	0.	.0	495.4	*	1	JAN	1655	296	2.	.2	496.4	*	1	JAN	2122	563	0.	.0	495.3
1	JAN	1229	30	0.	.0	495.4	*	1	JAN	1656	297	2.	.2	496.4	*	1	JAN	2123	564	0.	.0	495.3
1	JAN	1230	31	0.	.0	495.4	*	1	JAN	1657	298	2.	.2	496.4	*	1	JAN	2124	565	0.	.0	495.3
1	JAN	1231	32	0.	.0	495.4	*	1	JAN	1658	299	2.	.2	496.4	*	1	JAN	2125	566	0.	.0	495.3
1	JAN	1232	33	0.	.0	495.4	*	1	JAN	1659	300	2.	.2	496.4	*	1	JAN	2126	567	0.	.0	495.3
1	JAN	1233	34	0.	.0	495.4	*	1	JAN	1700	301	2.	.2	496.4	*	1	JAN	2127	568	0.	.0	495.3
1	JAN	1234	35	0.	.0	495.4	*	1	JAN	1701	302	2.	.2	496.4	*	1	JAN	2128	569	0.	.0	495.3
1	JAN	1235	36	0.	.0	495.4	*	1	JAN	1702	303	2.	.2	496.4	*	1	JAN	2129	570	0.	.0	495.3
1	JAN	1236	37	0.	.0	495.4	*	1	JAN	1703	304	2.	.2	496.3	*	1	JAN	2130	571	0.	.0	495.3
1	JAN	1237	38	0.	.0	495.4	*	1	JAN	1704	305	2.	.2	496.3	*	1	JAN	2131	572	0.	.0	495.3
1	JAN	1238	39	0.	.0	495.5	*	1	JAN	1705	306	2.	.1	496.3	*	1	JAN	2132	573	0.	.0	495.3
1	JAN	1239	40	0.	.0	495.5	*	1	JAN	1706	307	2.	.1	496.3	*	1	JAN	2133	574	0.	.0	495.3
1	JAN	1240	41	0.	.0	495.5	*	1	JAN	1707	308	2.	.1	496.3	*	1	JAN	2134	575	0.	.0	495.3
1	JAN	1241	42	0.	.0	495.5	*	1	JAN	1708	309	2.	.1	496.3	*	1	JAN	2135	576	0.	.0	495.3
1	JAN	1242	43	0.	.0	495.5	*	1	JAN	1709	310	2.	.1	496.3	*	1	JAN	2136	577	0.	.0	495.3
1	JAN	1243	44	0.	.0	495.5	*	1	JAN	1710	311	2.	.1	496.3	*	1	JAN	2137	578	0.	.0	495.3
1	JAN	1244	45	0.	.0	495.5	*	1	JAN	1711	312	2.	.1	496.3	*	1	JAN	2138	579	0.	.0	495.3
1	JAN	1245	46	0.	.0	495.5	*	1	JAN	1712	313	2.	.1	496.3	*	1	JAN	2139	580	0.	.0	495.3
1	JAN	1246	47	0.	.0	495.5	*	1	JAN	1713	314	2.	.1	496.3	*	1	JAN	2140	581	0.	.0	495.3
1	JAN	1247	48	0.	.0	495.5	*	1	JAN	1714	315	2.	.1	496.3	*	1	JAN	2141	582	0.	.0	495.3
1	JAN	1248	49	0.	.0	495.5	*	1	JAN	1715	316	2.	.1	496.2	*	1	JAN	2142	583	0.	.0	495.3
1	JAN	1249	50	0.	.0	495.5	*	1	JAN	1716	317	2.	.1	496.2	*	1	JAN	2143	584	0.	.0	495.3
1	JAN	1250	51	0.	.0	495.5	*	1	JAN	1717	318	2.	.1	496.2	*	1	JAN	2144	585	0.	.0	495.3
1	JAN	1251	52	0.	.0	495.5	*	1	JAN	1718	319	2.	.1	496.2	*	1	JAN	2145	586	0.	.0	495.3
1	JAN	1252	53	0.	.0	495.6	*	1	JAN	1719	320	2.	.1	496.2	*	1	JAN	2146	587	0.	.0	495.3
1	JAN	1253	54	0.	.0	495.6	*	1	JAN	1720	321	2.	.1	496.2	*	1	JAN	2147	588	0.	.0	495.3

1	JAN	1254	55	0.	.0	495.6	*	1	JAN	1721	322	2.	.1	496.2	*	1	JAN	2148	589	0.	.0	495.3
1	JAN	1255	56	0.	.0	495.6	*	1	JAN	1722	323	2.	.1	496.2	*	1	JAN	2149	590	0.	.0	495.3
1	JAN	1256	57	0.	.0	495.6	*	1	JAN	1723	324	2.	.1	496.2	*	1	JAN	2150	591	0.	.0	495.3
1	JAN	1257	58	0.	.1	495.6	*	1	JAN	1724	325	2.	.1	496.2	*	1	JAN	2151	592	0.	.0	495.3
1	JAN	1258	59	0.	.1	495.6	*	1	JAN	1725	326	2.	.1	496.2	*	1	JAN	2152	593	0.	.0	495.3
1	JAN	1259	60	0.	.1	495.6	*	1	JAN	1726	327	2.	.1	496.2	*	1	JAN	2153	594	0.	.0	495.3
1	JAN	1300	61	0.	.1	495.6	*	1	JAN	1727	328	2.	.1	496.2	*	1	JAN	2154	595	0.	.0	495.3
1	JAN	1301	62	0.	.1	495.6	*	1	JAN	1728	329	2.	.1	496.2	*	1	JAN	2155	596	0.	.0	495.3
1	JAN	1302	63	0.	.1	495.6	*	1	JAN	1729	330	2.	.1	496.2	*	1	JAN	2156	597	0.	.0	495.3
1	JAN	1303	64	1.	.1	495.6	*	1	JAN	1730	331	2.	.1	496.2	*	1	JAN	2157	598	0.	.0	495.3
1	JAN	1304	65	1.	.1	495.6	*	1	JAN	1731	332	2.	.1	496.2	*	1	JAN	2158	599	0.	.0	495.3
1	JAN	1305	66	1.	.1	495.6	*	1	JAN	1732	333	2.	.1	496.1	*	1	JAN	2159	600	0.	.0	495.3
1	JAN	1306	67	1.	.1	495.6	*	1	JAN	1733	334	2.	.1	496.1	*	1	JAN	2200	601	0.	.0	495.3
1	JAN	1307	68	1.	.1	495.7	*	1	JAN	1734	335	2.	.1	496.1	*	1	JAN	2201	602	0.	.0	495.3
1	JAN	1308	69	1.	.1	495.7	*	1	JAN	1735	336	2.	.1	496.1	*	1	JAN	2202	603	0.	.0	495.3
1	JAN	1309	70	1.	.1	495.7	*	1	JAN	1736	337	2.	.1	496.1	*	1	JAN	2203	604	0.	.0	495.3
1	JAN	1310	71	1.	.1	495.7	*	1	JAN	1737	338	2.	.1	496.1	*	1	JAN	2204	605	0.	.0	495.3
1	JAN	1311	72	1.	.1	495.7	*	1	JAN	1738	339	1.	.1	496.1	*	1	JAN	2205	606	0.	.0	495.3
1	JAN	1312	73	1.	.1	495.7	*	1	JAN	1739	340	1.	.1	496.1	*	1	JAN	2206	607	0.	.0	495.3
1	JAN	1313	74	1.	.1	495.7	*	1	JAN	1740	341	1.	.1	496.1	*	1	JAN	2207	608	0.	.0	495.3
1	JAN	1314	75	1.	.1	495.7	*	1	JAN	1741	342	1.	.1	496.1	*	1	JAN	2208	609	0.	.0	495.3
1	JAN	1315	76	1.	.1	495.7	*	1	JAN	1742	343	1.	.1	496.1	*	1	JAN	2209	610	0.	.0	495.3
1	JAN	1316	77	1.	.1	495.7	*	1	JAN	1743	344	1.	.1	496.1	*	1	JAN	2210	611	0.	.0	495.3
1	JAN	1317	78	1.	.1	495.7	*	1	JAN	1744	345	1.	.1	496.1	*	1	JAN	2211	612	0.	.0	495.3
1	JAN	1318	79	1.	.1	495.7	*	1	JAN	1745	346	1.	.1	496.1	*	1	JAN	2212	613	0.	.0	495.3
1	JAN	1319	80	1.	.1	495.7	*	1	JAN	1746	347	1.	.1	496.1	*	1	JAN	2213	614	0.	.0	495.3
1	JAN	1320	81	1.	.1	495.7	*	1	JAN	1747	348	1.	.1	496.1	*	1	JAN	2214	615	0.	.0	495.3
1	JAN	1321	82	1.	.1	495.7	*	1	JAN	1748	349	1.	.1	496.1	*	1	JAN	2215	616	0.	.0	495.3
1	JAN	1322	83	1.	.1	495.7	*	1	JAN	1749	350	1.	.1	496.1	*	1	JAN	2216	617	0.	.0	495.3
1	JAN	1323	84	1.	.1	495.7	*	1	JAN	1750	351	1.	.1	496.1	*	1	JAN	2217	618	0.	.0	495.3
1	JAN	1324	85	1.	.1	495.8	*	1	JAN	1751	352	1.	.1	496.1	*	1	JAN	2218	619	0.	.0	495.3
1	JAN	1325	86	1.	.1	495.8	*	1	JAN	1752	353	1.	.1	496.1	*	1	JAN	2219	620	0.	.0	495.3
1	JAN	1326	87	1.	.1	495.8	*	1	JAN	1753	354	1.	.1	496.0	*	1	JAN	2220	621	0.	.0	495.3
1	JAN	1327	88	1.	.1	495.8	*	1	JAN	1754	355	1.	.1	496.0	*	1	JAN	2221	622	0.	.0	495.3
1	JAN	1328	89	1.	.1	495.8	*	1	JAN	1755	356	1.	.1	496.0	*	1	JAN	2222	623	0.	.0	495.3
1	JAN	1329	90	1.	.1	495.8	*	1	JAN	1756	357	1.	.1	496.0	*	1	JAN	2223	624	0.	.0	495.3
1	JAN	1330	91	1.	.1	495.8	*	1	JAN	1757	358	1.	.1	496.0	*	1	JAN	2224	625	0.	.0	495.3
1	JAN	1331	92	1.	.1	495.8	*	1	JAN	1758	359	1.	.1	496.0	*	1	JAN	2225	626	0.	.0	495.3
1	JAN	1332	93	1.	.1	495.8	*	1	JAN	1759	360	1.	.1	496.0	*	1	JAN	2226	627	0.	.0	495.3
1	JAN	1333	94	1.	.1	495.8	*	1	JAN	1800	361	1.	.1	496.0	*	1	JAN	2227	628	0.	.0	495.3
1	JAN	1334	95	1.	.1	495.8	*	1	JAN	1801	362	1.	.1	496.0	*	1	JAN	2228	629	0.	.0	495.3
1	JAN	1335	96	1.	.1	495.8	*	1	JAN	1802	363	1.	.1	496.0	*	1	JAN	2229	630	0.	.0	495.3
1	JAN	1336	97	1.	.1	495.8	*	1	JAN	1803	364	1.	.1	496.0	*	1	JAN	2230	631	0.	.0	495.3
1	JAN	1337	98	1.	.1	495.8	*	1	JAN	1804	365	1.	.1	496.0	*	1	JAN	2231	632	0.	.0	495.3
1	JAN	1338	99	1.	.1	495.8	*	1	JAN	1805	366	1.	.1	496.0	*	1	JAN	2232	633	0.	.0	495.3
1	JAN	1339	100	1.	.1	495.8	*	1	JAN	1806	367	1.	.1	496.0	*	1	JAN	2233	634	0.	.0	495.3
1	JAN	1340	101	1.	.1	495.9	*	1	JAN	1807	368	1.	.1	496.0	*	1	JAN	2234	635	0.	.0	495.3
1	JAN	1341	102	1.	.1	495.9	*	1	JAN	1808	369	1.	.1	496.0	*	1	JAN	2235	636	0.	.0	495.3
1	JAN	1342	103	1.	.1	495.9	*	1	JAN	1809	370	1.	.1	496.0	*	1	JAN	2236	637	0.	.0	495.3
1	JAN	1343	104	1.	.1	495.9	*	1	JAN	1810	371	1.	.1	496.0	*	1	JAN	2237	638	0.	.0	495.3
1	JAN	1344	105	1.	.1	495.9	*	1	JAN	1811	372	1.	.1	496.0	*	1	JAN	2238	639	0.	.0	495.3
1	JAN	1345	106	1.	.1	495.9	*	1	JAN	1812	373	1.	.1	496.0	*	1	JAN	2239	640	0.	.0	495.3
1	JAN	1346	107	1.	.1	495.9	*	1	JAN	1813	374	1.	.1	495.9	*	1	JAN	2240	641	0.	.0	495.3
1	JAN	1347	108	1.	.1	495.9	*	1	JAN	1814	375	1.	.1	495.9	*	1	JAN	2241	642	0.	.0	495.3
1	JAN	1348	109	1.	.1	495.9	*	1	JAN	1815	376	1.	.1	495.9	*	1	JAN	2242	643	0.	.0	495.3
1	JAN	1349	110	1.	.1	495.9	*	1	JAN	1816	377	1.	.1	495.9	*	1	JAN	2243	644	0.	.0	495.3
1	JAN	1350	111	1.	.1	495.9	*	1	JAN	1817	378	1.	.1	495.9	*	1	JAN	2244	645	0.	.0	495.3
1	JAN	1351	112	1.	.1	495.9	*	1	JAN	1818	379	1.	.1	495.9	*	1	JAN	2245	646	0.	.0	495.3
1	JAN	1352	113	1.	.1	495.9	*	1	JAN	1819	380	1.	.1	495.9	*	1	JAN	2246	647	0.	.0	495.3
1	JAN	1353	114	1.	.1	495.9	*	1	JAN	1820	381	1.	.1	495.9	*	1	JAN	2247	648	0.	.0	495.3
1	JAN	1354	115	1.	.1	495.9	*	1	JAN	1821	382	1.	.1	495.9	*	1	JAN	2248	649	0.	.0	495.3
1	JAN	1355	116	1.	.1	495.9	*	1	JAN	1822	383	1.	.1	495.9	*	1	JAN	2249	650	0.	.0	495.3
1	JAN	1356	117	1.	.1	495.9	*	1	JAN	1823	384	1.	.1	495.8	*	1	JAN	2250	651	0.	.0	495.3
1	JAN	1357	118	1.	.1	495.9	*	1	JAN	1824	385	1.	.1	495.8	*	1	JAN	2251	652	0.	.0	495.3
1	JAN	1358	119	1.	.1	496.0	*	1	JAN	1825	386	1.	.1	495.8	*	1	JAN	2252	653	0.	.0	495.3
1	JAN	1359	120	1.	.1	496.0	*	1	JAN	1826	387	1.	.1	495.8	*	1	JAN	2253	654	0.	.0	495.3
1	JAN	1400	121	1.	.1	496.0	*	1	JAN	1827	388	1.	.1	495.8	*	1	JAN	2254	655	0.	.0	495.3
1	JAN	1401	122	1.	.1	496.0	*	1	JAN	1828	389	1.	.1	495.8	*	1	JAN	2255	656	0.	.0	495.3
1	JAN	1402	123	1.	.1	496.0	*	1	JAN	1829	390	1.	.1	495.8	*	1	JAN	2256	657	0.	.0	495.3
1	JAN	1403	124	1.	.1	496.0	*	1	JAN	1830	391	1.	.1	495.8	*	1	JAN	2257	658	0.	.0	495.3
1	JAN	1404	125	1.	.1	496.0	*	1	JAN	1831	392	1.	.1	495.8	*	1	JAN	2258	659	0.	.0	495.3
1	JAN	1405	126	1.	.1	496.0	*	1	JAN	1832	393	1.	.1	495.8	*	1	JAN	2259	660	0.	.0	495.3
1	JAN	1406	127	1.	.1	496.0	*	1	JAN	1833	394	1.	.1	495.8	*	1	JAN	2300	661	0.	.0	495.3
1	JAN	1407	128	1.	.1	496.0	*	1	JAN	1834	395	1.	.1	495.8	*	1	JAN	2301	662	0.	.0	495.3
1	JAN	1408	129	1.	.1	496.0	*	1	JAN	1835	396	1.	.1	495.8	*	1	JAN	2302	663	0.	.0	495.3
1	JAN	1409	130	1.	.1	496.0	*	1	JAN	1836	397	1.	.1	495.7	*	1	JAN	2303	664	0.	.0	495.3
1	JAN	1410	131	1.	.1	496.0	*	1	JAN	1837	398	1.	.1	495.7	*	1	JAN	2304	665	0.	.0	495.3
1	JAN	1411	132	1.	.1	496.0	*	1	JAN	1838	399	1.	.1	495.7	*	1	JAN	2305	666	0.	.0	495.3
1	JAN	1412	133	1.	.1	496.0	*	1	JAN	1839	400	1.	.1	495.7	*	1	JAN	2306	667	0.	.0	495.3
1	JAN	1413	134	1.	.1	496.0	*	1	JAN	1840	401	1.	.1	495.7	*	1	JAN	2307	668	0.	.0	495.3
1	JAN	1414	135	1.	.1	496.0	*	1	JAN	1841	402	1.	.1	495.7	*	1	JAN	2308	669	0.	.0	495.3
1	JAN	1415	136	1.	.1	496.1	*	1	JAN	1842	403	1.	.1	495.7	*	1	JAN	2309	670	0.	.0	495.3
1	JAN	1416	137	1.	.1	496.1	*	1	JAN	1843	404	1.	.1	495.7	*	1	JAN	2310	671	0.	.0	495.3
1	JAN	1417	138	1.	.1	496.1	*	1	JAN	1844	405	1.	.1	495.7	*	1	JAN	2311	672	0.	.0	495.3
1	JAN	1418	139	1.	.1	496.1	*	1	JAN	1845	406	1.	.1	495.7	*	1	JAN	2312	673	0.	.0	495.3
1	JAN	1419	140	1.	.1	496.1	*	1	JAN	1846	407	1.	.1	495.7	*	1	JAN	2313	674	0.	.0	495.3
1	JAN	1420	141	1.	.1	496.1	*	1	JAN	1847	408	1.	.1	495.7	*	1	JAN	2314	675	0.	.0	495.3
1	JAN	1421	142	1.	.1	496.1	*	1	JAN	1848	409	1.	.1	495.7	*	1	JAN	2315	676	0.	.0	495.3
1	JAN	1422	143	1.	.1	496.1	*	1	JAN	1849	410	1.	.1	495.7	*	1	JAN	2316	677	0.	.0	495.3
1	JAN	1423	144	1.	.1	496.1	*	1	JAN	1850	411	1.	.1	495.7	*	1	JAN	2317	678	0.	.0	495.3
1	JAN	1424	145	2.	.1	496.1	*	1	JAN	1851	412	1.	.1	495.7	*	1	JAN	2318	679	0.	.0	495.3
1	JAN	1425	146	2.	.1	496.1	*	1	JAN	1852	413	1.	.1	495.6	*	1	JAN	2319	680	0.	.0	495.3
1	JAN	1426	147	2.	.1	496.1	*	1	JAN	1853	414	1.	.1	495.6	*	1	JAN	2320	681	0.	.0	495.3
1	JAN	1427	148	2.	.1	496.1	*	1	JAN	1854	415	1.	.1	495.6	*	1	JAN	2321	682	0.	.0	495.3
1	JAN	1428	149	2.	.1	496.2	*	1	JAN	1855	416	1.	.1	495.6	*	1	JAN	2322	683	0.	.0	495.3
1	JAN	1429	150	2.	.1	496.2	*	1	JAN	1856	417	0.	.1	495.6	*	1	JAN	2323	684	0.	.0	495.3
1	JAN	1430	151	2.	.1	496.2	*	1	JAN	1857	418	0.	.1	495.6	*	1	JAN	2324	685	0.	.0	495.3
1	JAN	1431	152	2.	.1	496.2	*	1	JAN	1858	419	0.	.1	495.6	*	1	JAN	2325	686	0.	.0	495.3
1	JAN	1432	153	2.	.1	496.2	*	1	JAN	1859	420	0.	.1	495.6	*	1	JAN	2326	687	0.	.0	495.3
1	JAN	1433	154	2.	.1	496.2	*	1	JAN	1900	421	0.	.1	495.6	*	1	JAN	2327	688	0.	.0	495.3
1	JAN	1434	155	2.	.1	496.2	*	1	JAN	1901	422	0.	.1	495.6	*	1	JAN	2328	689	0.	.0	495.3
1	JAN	1435	156	2.	.1	496.2	*	1	JAN	1902	423	0.	.1	495.6	*	1	JAN	2329	690	0.	.0	495.3
1	JAN	1436	157	2.	.1	496.2	*	1	JAN	1903	424	0.	.1	495.6	*	1	JAN	2330	691	0.	.0	495.3
1	JAN	1437	158	2.	.1	496.2	*	1	JAN	1904	425	0.	.1	495.6	*	1	JAN	2331	692	0.	.0	495.3
1	JAN	1438	159	2.	.1	496.3	*	1	JAN	1905	426	0.	.0	495.6	*	1	JAN	2332	693	0.	.0	495.3
1	JAN	1439	160	2.	.1	496.3	*	1	JAN	1906	427	0.	.0	495.6	*	1	JAN	2333	694	0.	.0	495.3
1	JAN	1440	161	2.	.1	496.3	*	1	JAN	1907	428	0.	.0	495.6	*	1	JAN	2334	695	0.	.0	495.3
1	JAN	1441	162	2.	.1	496.3	*	1	JAN	1908	429	0.	.0	495.6	*	1	JAN	2335	696	0.	.0	495.3
1	JAN	1442	163	2.	.1	496.3	*	1	JAN	1909	430	0.	.0	495.6	*	1	JAN	2336	697	0.	.0	495.3
1	JAN	1443	164	2.	.1	496.3	*	1	JAN	1910	431	0.	.0	495.6	*	1	JAN	2337	698	0.	.0	495.3
1	JAN	1444	165	2.	.1	496.3	*	1	JAN	1911	432	0.	.0	495.6	*	1	JAN	2338	699	0.	.0	495.3
1	JAN	1445	166	2.	.2	496.3	*	1	JAN	1912	433	0.	.0	495.6	*	1	JAN	2339	700	0.	.0	495.3
1	JAN	1446	167	2.	.2	496.4	*	1	JAN	1913	434	0.	.0	495.6	*	1	JAN	2340	701	0.	.0	495.3
1	JAN	1447	168	2.	.2	496.4	*	1	JAN	1914	435	0.	.0	495.5	*	1	JAN	2341	702	0.	.0	495.3
1	JAN	1448	169	2.	.2	496.4	*	1	JAN	1915	436	0.	.0	495.5	*	1	JAN	2342	703	0.	.0	495.3
1	JAN	1449	170	2.	.2	496.4	*	1	JAN	1916	437	0.	.0	495.5	*	1	JAN	2343	704	0.	.0	495.3
1	JAN	1450	171	2.	.2	496.4	*	1	JAN	1917	438	0.	.0	495.5	*	1	JAN	2344	705	0.	.0	495.3
1	JAN	1451	172	2.	.2	496.4	*	1	JAN	1918	439	0.	.0	495.5	*	1	JAN	2345	706	0.	.0	495.3
1	JAN	1452	173	2.	.2	496.5	*	1	JAN	1919	440	0.	.0	495.5	*	1	JAN	2346	707	0.	.0	495.3
1	JAN	1453	174	2.	.2	496.5	*	1	JAN	1920	441	0.	.0	495.5	*	1	JAN	2347	708	0.	.0	495.3
1	JAN	1454	175	3.	.2	496.5	*	1	JAN	1921	442	0.	.0	495.5	*	1	JAN	2348	709	0.	.0	495.3
1	JAN	1455	176	3.	.2	496.5	*	1	JAN	1922	443	0.	.0	495.5	*	1	JAN	2349	710	0.	.0	495.3
1	JAN	1456	177	3.	.2	496.6	*	1	JAN	1923	444	0.	.0	495.5	*	1	JAN	2350	711	0.	.0	495.3

1	JAN	1457	178	3.	.2	496.6	*	1	JAN	1924	445	0.	.0	495.5	*	1	JAN	2351	712	0.	.0	495.3
1	JAN	1458	179	3.	.2	496.7	*	1	JAN	1925	446	0.	.0	495.5	*	1	JAN	2352	713	0.	.0	495.3
1	JAN	1459	180	3.	.2	496.7	*	1	JAN	1926	447	0.	.0	495.5	*	1	JAN	2353	714	0.	.0	495.3
1	JAN	1500	181	4.	.2	496.8	*	1	JAN	1927	448	0.	.0	495.5	*	1	JAN	2354	715	0.	.0	495.3
1	JAN	1501	182	4.	.2	496.9	*	1	JAN	1928	449	0.	.0	495.5	*	1	JAN	2355	716	0.	.0	495.3
1	JAN	1502	183	4.	.2	497.1	*	1	JAN	1929	450	0.	.0	495.5	*	1	JAN	2356	717	0.	.0	495.3
1	JAN	1503	184	4.	.3	497.2	*	1	JAN	1930	451	0.	.0	495.5	*	1	JAN	2357	718	0.	.0	495.3
1	JAN	1504	185	5.	.3	497.3	*	1	JAN	1931	452	0.	.0	495.5	*	1	JAN	2358	719	0.	.0	495.3
1	JAN	1505	186	5.	.3	497.5	*	1	JAN	1932	453	0.	.0	495.5	*	1	JAN	2359	720	0.	.0	495.2
1	JAN	1506	187	5.	.3	497.7	*	1	JAN	1933	454	0.	.0	495.5	*	2	JAN	0000	721	0.	.0	495.2
1	JAN	1507	188	5.	.3	497.8	*	1	JAN	1934	455	0.	.0	495.5	*	2	JAN	0001	722	0.	.0	495.2
1	JAN	1508	189	5.	.4	497.9	*	1	JAN	1935	456	0.	.0	495.5	*	2	JAN	0002	723	0.	.0	495.2
1	JAN	1509	190	6.	.4	498.1	*	1	JAN	1936	457	0.	.0	495.5	*	2	JAN	0003	724	0.	.0	495.2
1	JAN	1510	191	6.	.4	498.2	*	1	JAN	1937	458	0.	.0	495.5	*	2	JAN	0004	725	0.	.0	495.2
1	JAN	1511	192	6.	.4	498.3	*	1	JAN	1938	459	0.	.0	495.5	*	2	JAN	0005	726	0.	.0	495.2
1	JAN	1512	193	6.	.4	498.4	*	1	JAN	1939	460	0.	.0	495.5	*	2	JAN	0006	727	0.	.0	495.2
1	JAN	1513	194	6.	.4	498.4	*	1	JAN	1940	461	0.	.0	495.5	*	2	JAN	0007	728	0.	.0	495.2
1	JAN	1514	195	6.	.4	498.5	*	1	JAN	1941	462	0.	.0	495.5	*	2	JAN	0008	729	0.	.0	495.2
1	JAN	1515	196	6.	.5	498.6	*	1	JAN	1942	463	0.	.0	495.5	*	2	JAN	0009	730	0.	.0	495.2
1	JAN	1516	197	6.	.5	498.6	*	1	JAN	1943	464	0.	.0	495.5	*	2	JAN	0010	731	0.	.0	495.2
1	JAN	1517	198	6.	.5	498.6	*	1	JAN	1944	465	0.	.0	495.5	*	2	JAN	0011	732	0.	.0	495.2
1	JAN	1518	199	6.	.5	498.7	*	1	JAN	1945	466	0.	.0	495.5	*	2	JAN	0012	733	0.	.0	495.2
1	JAN	1519	200	6.	.5	498.7	*	1	JAN	1946	467	0.	.0	495.5	*	2	JAN	0013	734	0.	.0	495.2
1	JAN	1520	201	6.	.5	498.7	*	1	JAN	1947	468	0.	.0	495.5	*	2	JAN	0014	735	0.	.0	495.2
1	JAN	1521	202	6.	.5	498.7	*	1	JAN	1948	469	0.	.0	495.5	*	2	JAN	0015	736	0.	.0	495.2
1	JAN	1522	203	6.	.5	498.7	*	1	JAN	1949	470	0.	.0	495.4	*	2	JAN	0016	737	0.	.0	495.2
1	JAN	1523	204	6.	.5	498.7	*	1	JAN	1950	471	0.	.0	495.4	*	2	JAN	0017	738	0.	.0	495.2
1	JAN	1524	205	6.	.5	498.7	*	1	JAN	1951	472	0.	.0	495.4	*	2	JAN	0018	739	0.	.0	495.2
1	JAN	1525	206	6.	.5	498.7	*	1	JAN	1952	473	0.	.0	495.4	*	2	JAN	0019	740	0.	.0	495.2
1	JAN	1526	207	6.	.5	498.7	*	1	JAN	1953	474	0.	.0	495.4	*	2	JAN	0020	741	0.	.0	495.2
1	JAN	1527	208	6.	.5	498.6	*	1	JAN	1954	475	0.	.0	495.4	*	2	JAN	0021	742	0.	.0	495.2
1	JAN	1528	209	6.	.5	498.6	*	1	JAN	1955	476	0.	.0	495.4	*	2	JAN	0022	743	0.	.0	495.2
1	JAN	1529	210	6.	.5	498.6	*	1	JAN	1956	477	0.	.0	495.4	*	2	JAN	0023	744	0.	.0	495.2
1	JAN	1530	211	6.	.5	498.6	*	1	JAN	1957	478	0.	.0	495.4	*	2	JAN	0024	745	0.	.0	495.2
1	JAN	1531	212	6.	.4	498.5	*	1	JAN	1958	479	0.	.0	495.4	*	2	JAN	0025	746	0.	.0	495.2
1	JAN	1532	213	6.	.4	498.5	*	1	JAN	1959	480	0.	.0	495.4	*	2	JAN	0026	747	0.	.0	495.2
1	JAN	1533	214	6.	.4	498.5	*	1	JAN	2000	481	0.	.0	495.4	*	2	JAN	0027	748	0.	.0	495.2
1	JAN	1534	215	6.	.4	498.4	*	1	JAN	2001	482	0.	.0	495.4	*	2	JAN	0028	749	0.	.0	495.2
1	JAN	1535	216	6.	.4	498.4	*	1	JAN	2002	483	0.	.0	495.4	*	2	JAN	0029	750	0.	.0	495.2
1	JAN	1536	217	6.	.4	498.4	*	1	JAN	2003	484	0.	.0	495.4	*	2	JAN	0030	751	0.	.0	495.2
1	JAN	1537	218	6.	.4	498.3	*	1	JAN	2004	485	0.	.0	495.4	*	2	JAN	0031	752	0.	.0	495.2
1	JAN	1538	219	6.	.4	498.3	*	1	JAN	2005	486	0.	.0	495.4	*	2	JAN	0032	753	0.	.0	495.2
1	JAN	1539	220	6.	.4	498.3	*	1	JAN	2006	487	0.	.0	495.4	*	2	JAN	0033	754	0.	.0	495.2
1	JAN	1540	221	6.	.4	498.2	*	1	JAN	2007	488	0.	.0	495.4	*	2	JAN	0034	755	0.	.0	495.2
1	JAN	1541	222	6.	.4	498.2	*	1	JAN	2008	489	0.	.0	495.4	*	2	JAN	0035	756	0.	.0	495.2
1	JAN	1542	223	6.	.4	498.2	*	1	JAN	2009	490	0.	.0	495.4	*	2	JAN	0036	757	0.	.0	495.2
1	JAN	1543	224	6.	.4	498.2	*	1	JAN	2010	491	0.	.0	495.4	*	2	JAN	0037	758	0.	.0	495.2
1	JAN	1544	225	6.	.4	498.1	*	1	JAN	2011	492	0.	.0	495.4	*	2	JAN	0038	759	0.	.0	495.2
1	JAN	1545	226	6.	.4	498.1	*	1	JAN	2012	493	0.	.0	495.4	*	2	JAN	0039	760	0.	.0	495.2
1	JAN	1546	227	6.	.4	498.1	*	1	JAN	2013	494	0.	.0	495.4	*	2	JAN	0040	761	0.	.0	495.2
1	JAN	1547	228	6.	.4	498.0	*	1	JAN	2014	495	0.	.0	495.4	*	2	JAN	0041	762	0.	.0	495.2
1	JAN	1548	229	6.	.4	498.0	*	1	JAN	2015	496	0.	.0	495.4	*	2	JAN	0042	763	0.	.0	495.2
1	JAN	1549	230	5.	.4	498.0	*	1	JAN	2016	497	0.	.0	495.4	*	2	JAN	0043	764	0.	.0	495.2
1	JAN	1550	231	5.	.4	497.9	*	1	JAN	2017	498	0.	.0	495.4	*	2	JAN	0044	765	0.	.0	495.2
1	JAN	1551	232	5.	.4	497.9	*	1	JAN	2018	499	0.	.0	495.4	*	2	JAN	0045	766	0.	.0	495.2
1	JAN	1552	233	5.	.4	497.9	*	1	JAN	2019	500	0.	.0	495.4	*	2	JAN	0046	767	0.	.0	495.2
1	JAN	1553	234	5.	.4	497.8	*	1	JAN	2020	501	0.	.0	495.4	*	2	JAN	0047	768	0.	.0	495.2
1	JAN	1554	235	5.	.3	497.8	*	1	JAN	2021	502	0.	.0	495.4	*	2	JAN	0048	769	0.	.0	495.2
1	JAN	1555	236	5.	.3	497.8	*	1	JAN	2022	503	0.	.0	495.4	*	2	JAN	0049	770	0.	.0	495.2
1	JAN	1556	237	5.	.3	497.7	*	1	JAN	2023	504	0.	.0	495.4	*	2	JAN	0050	771	0.	.0	495.2
1	JAN	1557	238	5.	.3	497.7	*	1	JAN	2024	505	0.	.0	495.4	*	2	JAN	0051	772	0.	.0	495.2
1	JAN	1558	239	5.	.3	497.7	*	1	JAN	2025	506	0.	.0	495.4	*	2	JAN	0052	773	0.	.0	495.2
1	JAN	1559	240	5.	.3	497.6	*	1	JAN	2026	507	0.	.0	495.4	*	2	JAN	0053	774	0.	.0	495.2
1	JAN	1600	241	5.	.3	497.6	*	1	JAN	2027	508	0.	.0	495.4	*	2	JAN	0054	775	0.	.0	495.2
1	JAN	1601	242	5.	.3	497.6	*	1	JAN	2028	509	0.	.0	495.4	*	2	JAN	0055	776	0.	.0	495.2
1	JAN	1602	243	5.	.3	497.5	*	1	JAN	2029	510	0.	.0	495.4	*	2	JAN	0056	777	0.	.0	495.2
1	JAN	1603	244	5.	.3	497.5	*	1	JAN	2030	511	0.	.0	495.4	*	2	JAN	0057	778	0.	.0	495.2
1	JAN	1604	245	5.	.3	497.5	*	1	JAN	2031	512	0.	.0	495.4	*	2	JAN	0058	779	0.	.0	495.2
1	JAN	1605	246	5.	.3	497.5	*	1	JAN	2032	513	0.	.0	495.4	*	2	JAN	0059	780	0.	.0	495.2
1	JAN	1606	247	5.	.3	497.4	*	1	JAN	2033	514	0.	.0	495.4	*	2	JAN	0100	781	0.	.0	495.2
1	JAN	1607	248	5.	.3	497.4	*	1	JAN	2034	515	0.	.0	495.4	*	2	JAN	0101	782	0.	.0	495.2
1	JAN	1608	249	5.	.3	497.4	*	1	JAN	2035	516	0.	.0	495.4	*	2	JAN	0102	783	0.	.0	495.2
1	JAN	1609	250	5.	.3	497.3	*	1	JAN	2036	517	0.	.0	495.4	*	2	JAN	0103	784	0.	.0	495.2
1	JAN	1610	251	5.	.3	497.3	*	1	JAN	2037	518	0.	.0	495.4	*	2	JAN	0104	785	0.	.0	495.2
1	JAN	1611	252	5.	.3	497.3	*	1	JAN	2038	519	0.	.0	495.4	*	2	JAN	0105	786	0.	.0	495.2
1	JAN	1612	253	4.	.3	497.2	*	1	JAN	2039	520	0.	.0	495.4	*	2	JAN	0106	787	0.	.0	495.2
1	JAN	1613	254	4.	.3	497.2	*	1	JAN	2040	521	0.	.0	495.4	*	2	JAN	0107	788	0.	.0	495.2
1	JAN	1614	255	4.	.3	497.2	*	1	JAN	2041	522	0.	.0	495.4	*	2	JAN	0108	789	0.	.0	495.2
1	JAN	1615	256	4.	.3	497.2	*	1	JAN	2042	523	0.	.0	495.4	*	2	JAN	0109	790	0.	.0	495.2
1	JAN	1616	257	4.	.3	497.1	*	1	JAN	2043	524	0.	.0	495.4	*	2	JAN	0110	791	0.	.0	495.2
1	JAN	1617	258	4.	.3	497.1	*	1	JAN	2044	525	0.	.0	495.4	*	2	JAN	0111	792	0.	.0	495.2
1	JAN	1618	259	4.	.3	497.1	*	1	JAN	2045	526	0.	.0	495.4	*	2	JAN	0112	793	0.	.0	495.2
1	JAN	1619	260	4.	.2	497.1	*	1	JAN	2046	527	0.	.0	495.4	*	2	JAN	0113	794	0.	.0	495.2
1	JAN	1620	261	4.	.2	497.0	*	1	JAN	2047	528	0.	.0	495.4	*	2	JAN	0114	795	0.	.0	495.2
1	JAN	1621	262	4.	.2	497.0	*	1	JAN	2048	529	0.	.0	495.4	*	2	JAN	0115	796	0.	.0	495.2
1	JAN	1622	263	4.	.2	497.0	*	1	JAN	2049	530	0.	.0	495.4	*	2	JAN	0116	797	0.	.0	495.2
1	JAN	1623	264	4.	.2	497.0	*	1	JAN	2050	531	0.	.0	495.4	*	2	JAN	0117	798	0.	.0	495.2
1	JAN	1624	265	4.	.2	496.9	*	1	JAN	2051	532	0.	.0	495.4	*	2	JAN	0118	799	0.	.0	495.2
1	JAN	1625	266	4.	.2	496.9	*	1	JAN	2052	533	0.	.0	495.4	*	2	JAN	0119	800	0.	.0	495.2
1	JAN	1626	267	4.	.2	496.9	*	1	JAN	2053	534	0.	.0	495.4	*							

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	13.32-HR	
(CFS)	(HR)					
6.	3.35	(CFS) 2.	1.	1.	1.	
		(INCHES) 1.185	1.251	1.251	1.251	
		(AC-FT) 1.	1.	1.	1.	

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	13.32-HR
(AC-FT)	(HR)				
0.	3.35	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	13.32-HR
(FEET)	(HR)				
498.72	3.37	496.50	495.86	495.86	495.86

CUMULATIVE AREA = .02 SQ MI

1 STATION DETAIN

(I) INFLOW, (O) OUTFLOW

0. 4. 8. 12. 16. 20. 24. 0. 0. 0. 0. 0. 0.

(S) STORAGE

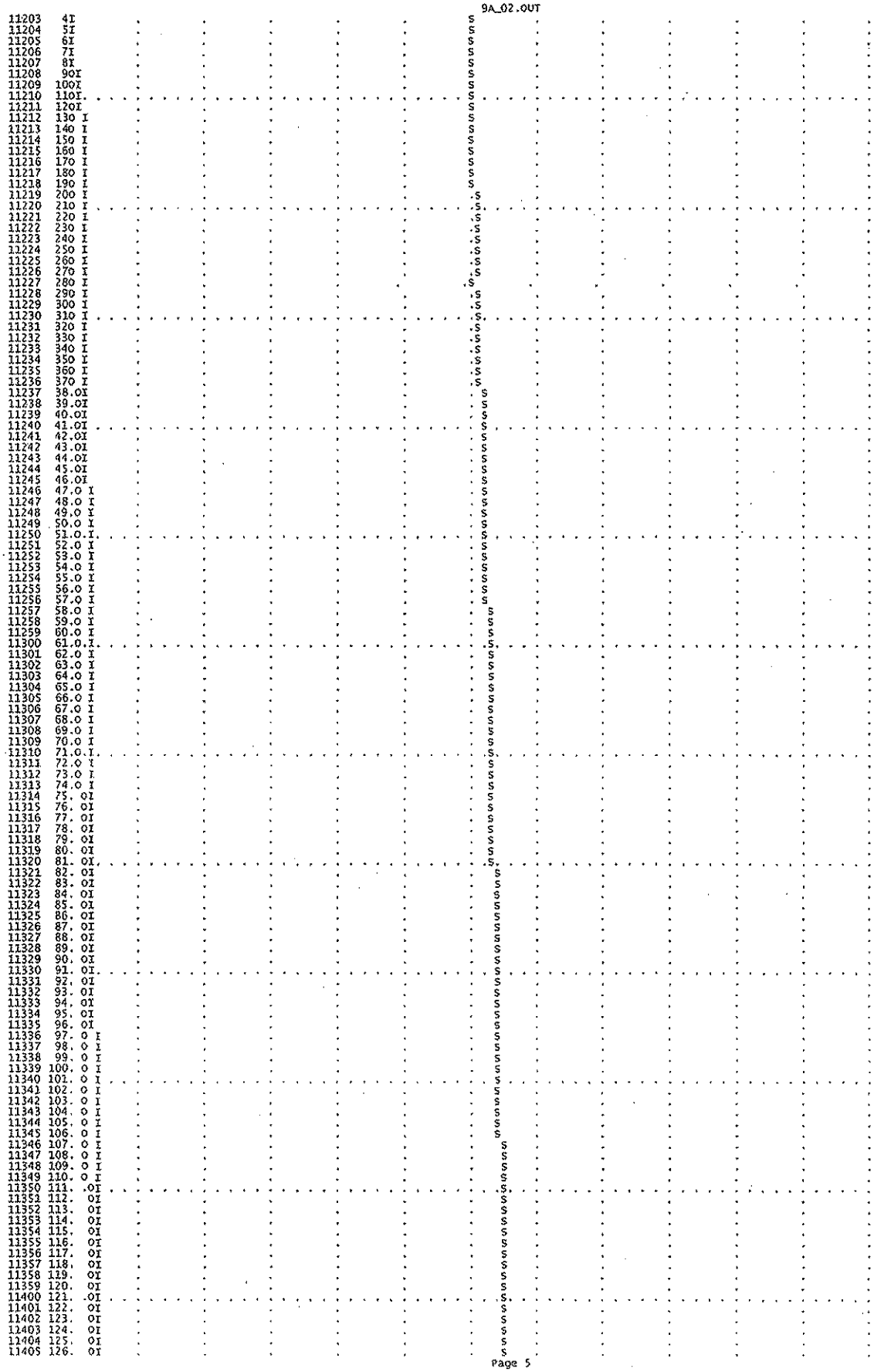
.0 .0 .0 .0 .0 .0 .0 .2 .4 .6 .0 .0 .0

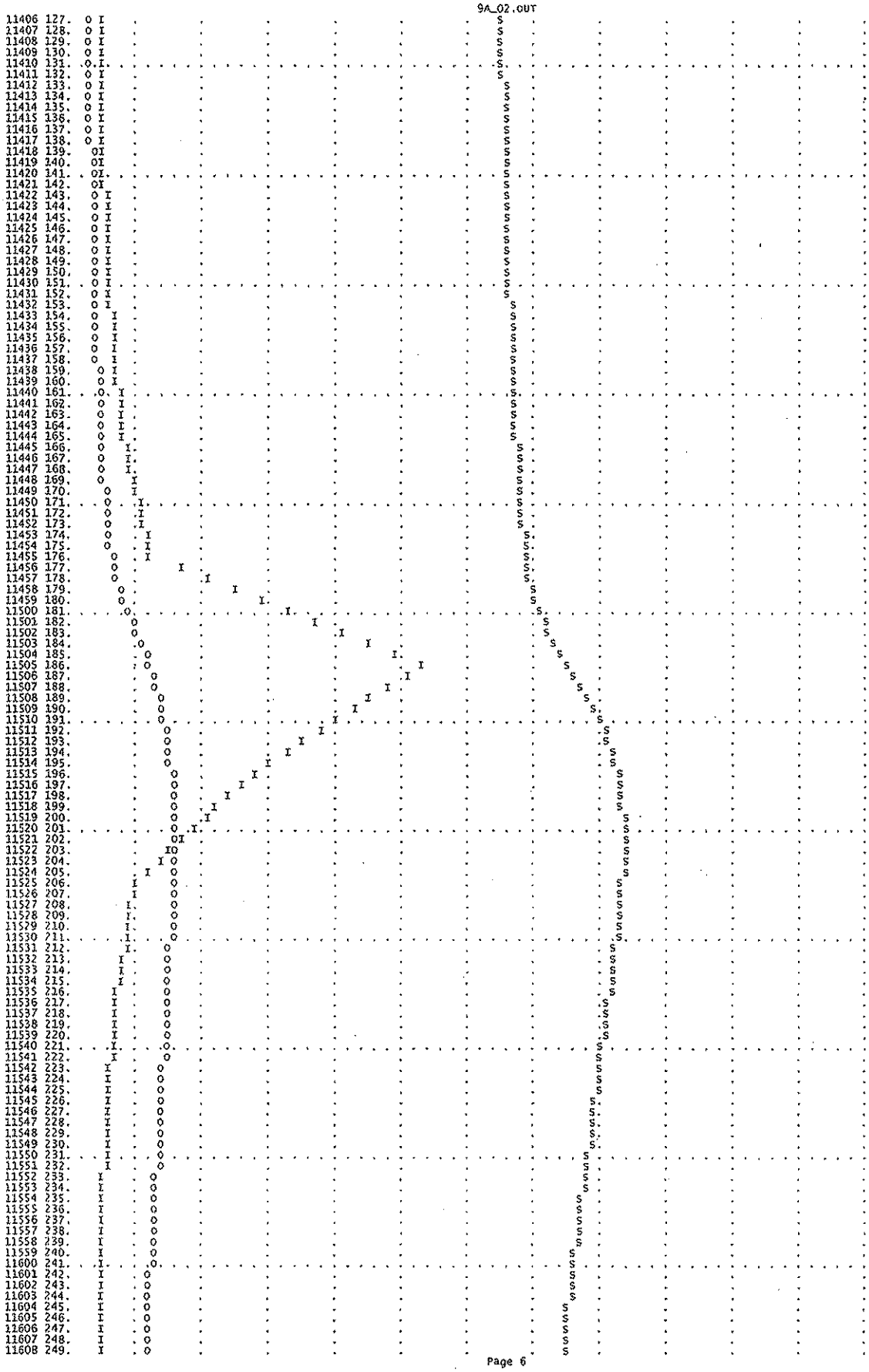
DAHRMN PER

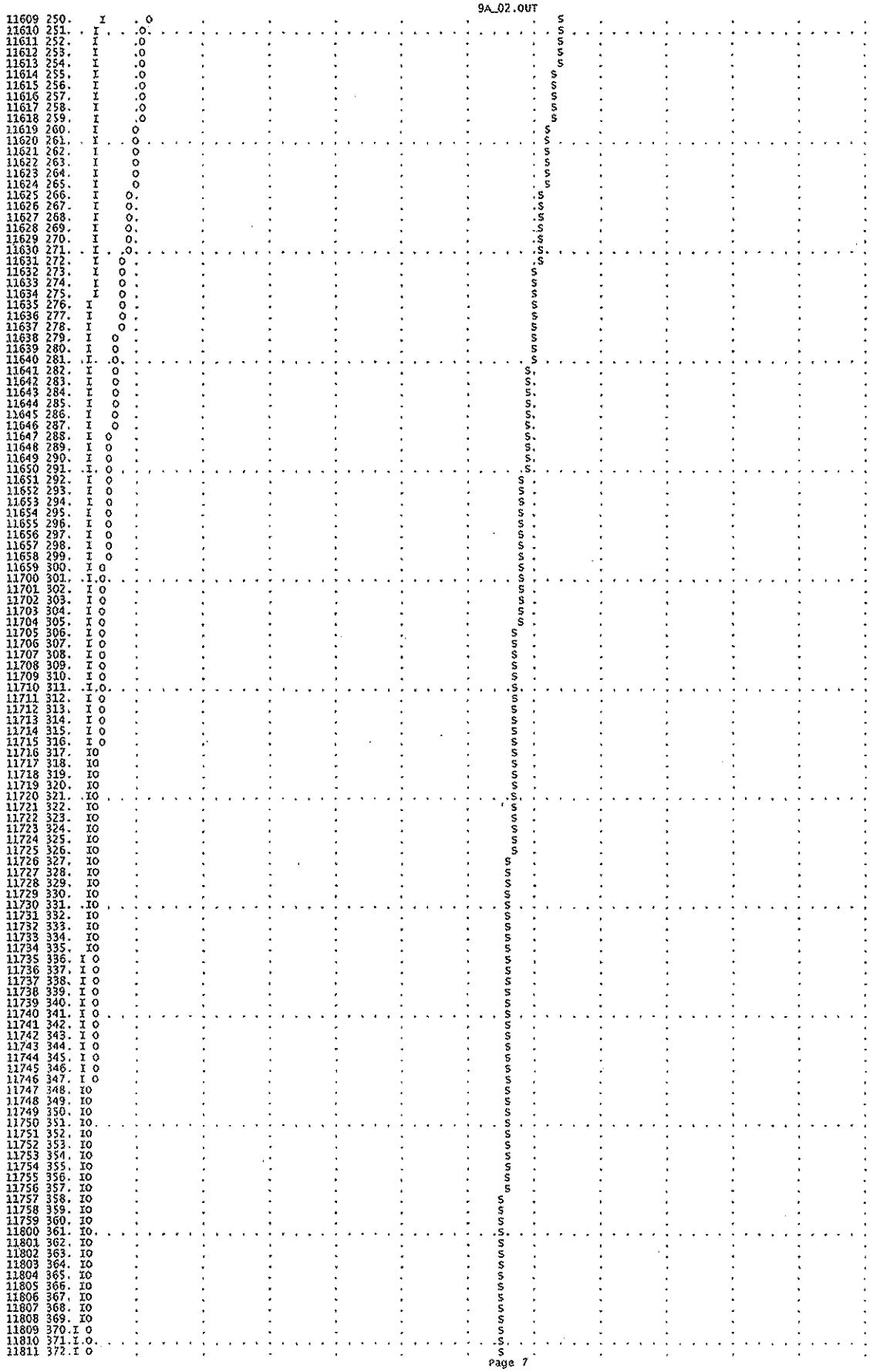
11200 1I----------.----------.----------.----------.----------.----------S----------.----------.----------.----------.----------.----------.

11201 2I . . . . . S . . . . . .

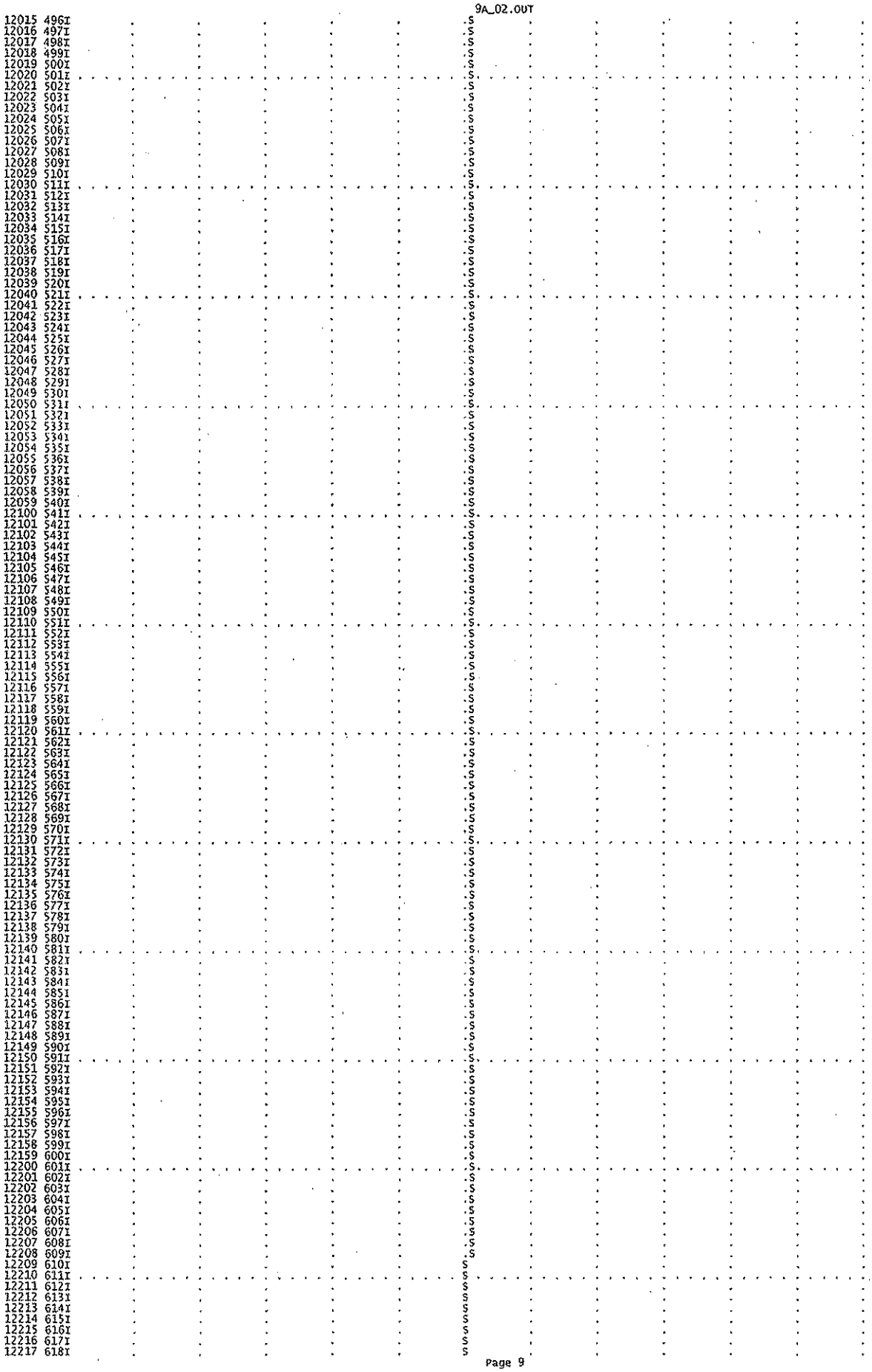
11202 3I . . . . . S . . . . . .

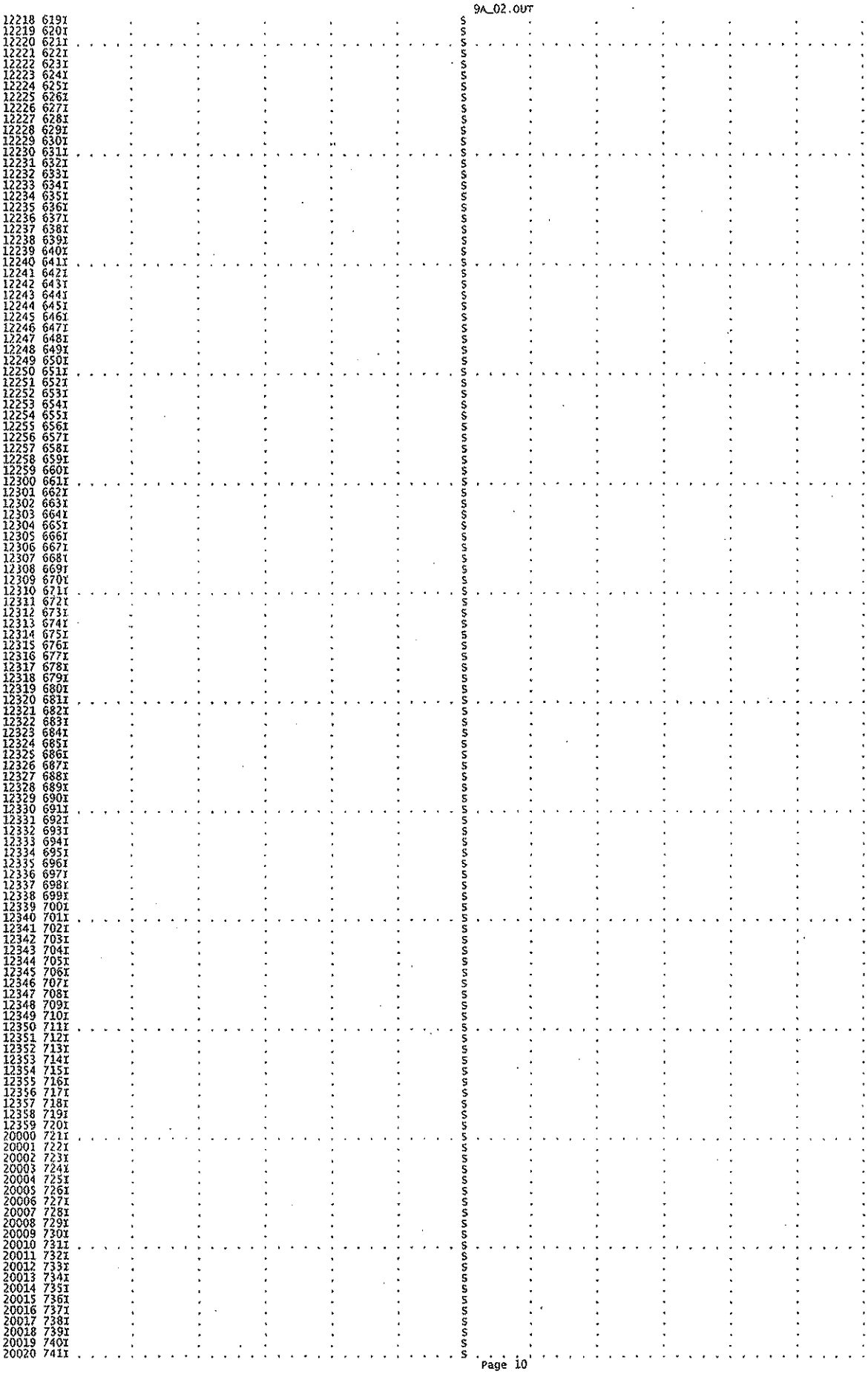


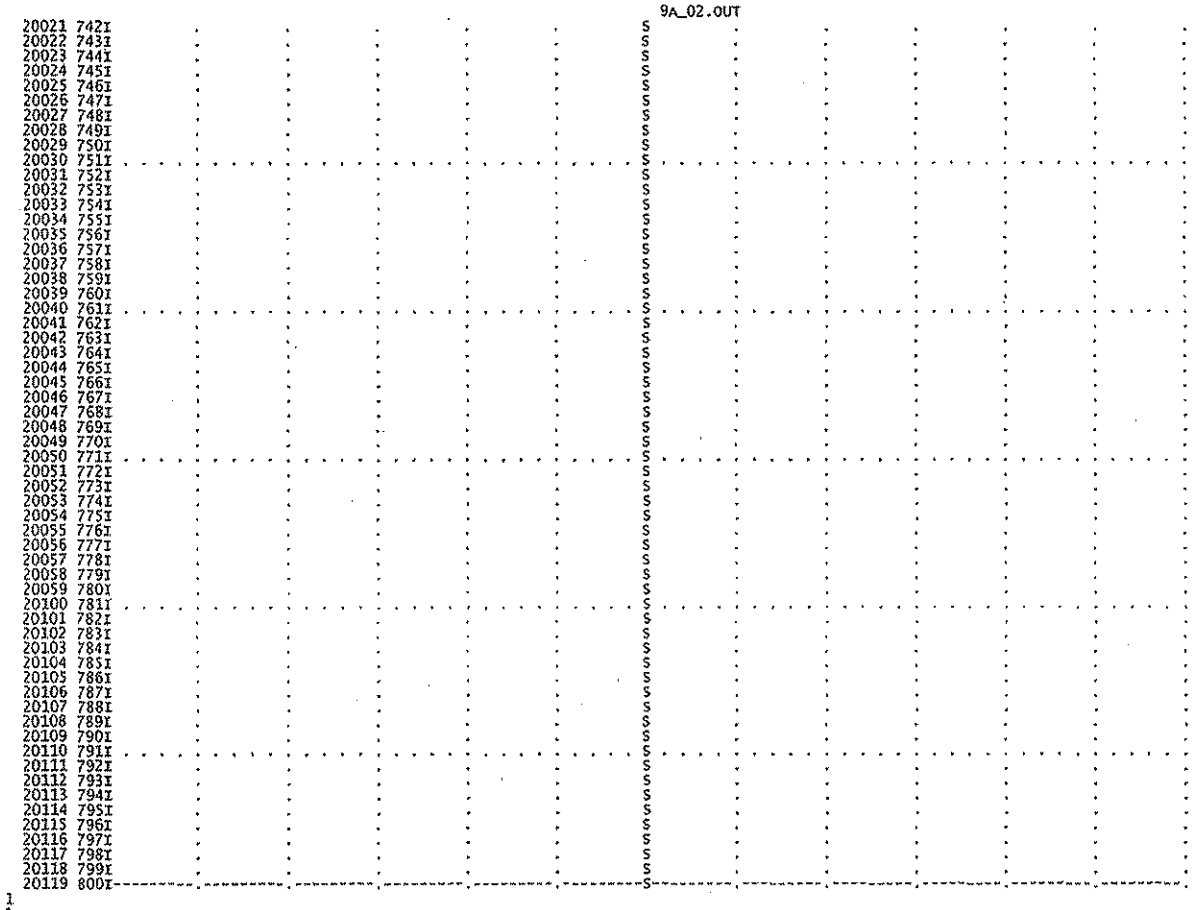




```
11812 373.I O                                                                  S
11813 374I  O                                                                  S
11814 375I  O                                                                  S
11815 376I  O                                                                  S
11816 377I  O                                                                  S
11817 378I  O                                                                  S
11818 379I O                                                                   S
11819 380I O                                                                   S
11820 381I O                                                                   S
11821 382I O                                                                   S
11822 383I O                                                                   S
11823 384I O                                                                   S
11824 385I O                                                                   S
11825 386I O                                                                   S
11826 387I O                                                                   S
11827 388I O                                                                   S
11828 389I O                                                                   S
11829 390I O                                                                   S
11830 391I O                                                                   S
11831 392I O                                                                   S
11832 393I O                                                                   S
11833 394I O                                                                   S
11834 395I O                                                                   S
11835 396I O                                                                   S
11836 397I O                                                                   S
11837 398I O                                                                   S
11838 399I O                                                                   S
11839 400I O                                                                   S
11840 401I O                                                                   S
11841 402I O                                                                   S
11842 403I O                                                                   S
11843 404I O                                                                   S
11844 405I O                                                                   S
11845 406IO                                                                    S
11846 407IO                                                                    S
11847 408IO                                                                    S
11848 409IO                                                                    S
11849 410IO                                                                    S
11850 411IO                                                                    S
11851 412IO                                                                    S
11852 413IO                                                                    S
11853 414IO                                                                    S
11854 415IO                                                                    S
11855 416IO                                                                    S
11856 417IO                                                                    S
11857 418IO                                                                    S
11858 419IO                                                                    S
11859 420IO                                                                    S
11900 421IO                                                                    S
11901 422IO                                                                    S
11902 423IO                                                                    S
11903 424IO                                                                    S
11904 425IO                                                                    S
11905 426IO                                                                     S
11906 427IO                                                                     S
11907 428IO                                                                     S
11908 429IO                                                                     S
11909 430IO                                                                     S
11910 431IO                                                                     S
11911 432IO                                                                     S
11912 433IO                                                                     S
11913 434IO                                                                     S
11914 435IO                                                                     S
11915 436IO                                                                     S
11916 437IO                                                                     S
11917 438IO                                                                     S
11918 439IO                                                                     S
11919 440IO                                                                     S
11920 441IO                                                                     S
11921 442IO                                                                     S
11922 443IO                                                                     S
11923 444IO                                                                     S
11924 445IO                                                                     S
11925 446IO                                                                     S
11926 447IO                                                                     S
11927 448IO                                                                     S
11928 449IO                                                                     S
11929 450IO                                                                     S
11930 451IO                                                                     S
11931 452IO                                                                     S
11932 453IO                                                                     S
11933 454IO                                                                     S
11934 455IO                                                                     S
11935 456IO                                                                     S
11936 457IO                                                                     S
11937 458IO                                                                     S
11938 459IO                                                                      S
11939 460IO                                                                      S
11940 461IO                                                                      S
11941 462IO                                                                      S
11942 463IO                                                                      S
11943 464IO                                                                      S
11944 465IO                                                                      S
11945 466IO                                                                      S
11946 467IO                                                                      S
11947 468IO                                                                      S
11948 469IO                                                                      S
11949 470IO                                                                      S
11950 471IO                                                                      S
11951 472IO                                                                      S
11952 473I                                                                       S
11953 474I                                                                       S
11954 475I                                                                       S
11955 476I                                                                       S
11956 477I                                                                       S
11957 478I                                                                       S
11958 479I                                                                       S
11959 480I                                                                       S
12000 481I                                                                       S
12001 482I                                                                       S
12002 483I                                                                       S
12003 484I                                                                       S
12004 485I                                                                       S
12005 486I                                                                       S
12006 487I                                                                       S
12007 488I                                                                       S
12008 489I                                                                       S
12009 490I                                                                       S
12010 491I                                                                       S
12011 492I                                                                       S
12012 493I                                                                       S
12013 494I                                                                       S
12014 495I                                                                       S
```







RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	9A_02	21.	3.08	2.	1.	1.	.02		
ROUTED TO	DETAIN	6.	3.35	2.	1.	1.	.02	498.72	3.37

*** NORMAL END OF HEC-1 ***

10- YEAR


```
!*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   02JUL14  TIME  12:42:01   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X    X XXXXXXX  XXXXX          X
X    X X       X     X        XX
X    X X       X              X
XXXXXXX XXXX   X        XXXXX  X
X    X X       X              X
X    X X       X  X           X
X    X XXXXXXX  XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
                        *DIAGRAM
*** FREE ***
               1        ID   BMR NVE UNIT 14
               2        ID   UNDERGROUND DETENTION BASIN 9A
               3        ID   15009_H
               4        IT       1 01JAN90    1200     800
               5        IO       5       0

               6        KK   9A_10
               7        KM   RATIONAL METHOD HYDROGRAPH PROGRAM
               8        KM   COPYRIGHT 1992, RICK ENGINEERING COMPANY
               9        KM   6HR RAINFALL IS  2  INCHES
              10        KM   RATIONAL METHOD RUNOFF COEFFICIENT IS  .9
              11        KM   RATIONAL METHOD TIME OF CONCENTRATION IS  10  MIN.
              12        KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
              13        KM   IT 2 01JAN90 1200 200
              14        BA   .0186
              15        IN       10 01JAN90    1155
              16        QI        0       0     1.3     1.4     1.4     1.5     1.5     1.6     1.7     1.8
              17        QI        2     2.1     2.3     2.5     2.8     3.2     3.8     4.9     7.1    29.9
              18        QI     16.3     5.7     4.3     3.5       3     2.7     2.4     2.2       2     1.9
              19        QI      1.8     1.7     1.6     1.5     1.4     1.4     1.3     1.3       0       0
              20        QI        0       0       0       0       0       0       0       0

              21        KK   DETAIN
              22        KO        2       2       0       0      21
              23        RS        1    STOR      -1
              24        SV        0   0.135   0.271   0.406   0.541   0.677   0.767
              25        SE   495.22  496.22  497.22  498.22  499.22  500.22  500.89
              26        SQ        0    0.16    0.81    1.73    2.87    4.13    4.76    5.32    5.82    6.40
              27        SQ     6.93    7.88    8.77    9.41   10.00   10.37
              28        SE   495.22  495.42  495.82  496.22  496.62  497.02  497.42  497.82  498.22  498.72
              29        SE   499.02  499.42  499.82  500.22  500.62  500.89
              30        ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    6       9A_10
             V
             V
   21      DETAIN
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1
!***
*   *
*   FLOOD HYDROGRAPH PACKAGE (HEC-1)   *
*   JUN 1998   *
*   VERSION 4.1   *
*   *
* RUN DATE   02JUL14 TIME 12:42:01   *
*   *
****

****
*   *
*   U.S. ARMY CORPS OF ENGINEERS   *
*   HYDROLOGIC ENGINEERING CENTER   *
*   609 SECOND STREET   *
*   DAVIS, CALIFORNIA 95616   *
*   (916) 756-1104   *
*   *
****

BMR NVE UNIT 14
UNDERGROUND DETENTION BASIN 9A
15009_H

```
  5 IO          OUTPUT CONTROL VARIABLES
                      IPRNT         5  PRINT CONTROL
                      IPLOT         0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN          1  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1JAN90  STARTING DATE
                     ITIME        1200  STARTING TIME
                        NQ         800  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     2JAN90  ENDING DATE
                     NDTIME        0119  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL      .02 HOURS
                      TOTAL TIME BASE   13.32 HOURS

          ENGLISH UNITS
               DRAINAGE AREA        SQUARE MILES
               PRECIPITATION DEPTH  INCHES
```

LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

21 KK **DETAIN**

22 KO OUTPUT CONTROL VARIABLES

IPRNT	2	PRINT CONTROL
IPLOT	2	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	800	LAST ORDINATE PUNCHED OR SAVED
TIMINT	.017	TIME INTERVAL IN HOURS

HYDROGRAPH ROUTING DATA

23 RS STORAGE ROUTING

NSTPS	1	NUMBER OF SUBREACHES
ITYP	STOR	TYPE OF INITIAL CONDITION
RSVRIC	-1.00	INITIAL CONDITION
X	.00	WORKING R AND D COEFFICIENT

24 SV	STORAGE	.0	.1	.3	.4	.5	.7	.8			
25 SE	ELEVATION	495.22	496.22	497.22	498.22	499.22	500.22	500.89			
26 SQ	DISCHARGE	0. 7.	0. 8.	1. 9.	2. 9.	3. 10.	4. 10.	5.	5.	6.	6.
28 SE	ELEVATION	495.22 499.02	495.42 499.42	495.82 499.82	496.22 500.22	496.62 500.62	497.02 500.89	497.42	497.82	498.22	498.72

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	.03	.08	.14	.19	.24	.27	.30	.35	.41
OUTFLOW	.00	.16	.81	1.73	2.87	4.13	4.45	4.76	5.32	5.82
ELEVATION	495.22	495.42	495.82	496.22	496.62	497.02	497.22	497.42	497.82	498.22
STORAGE	.47	.51	.54	.57	.62	.68	.73	.77		
OUTFLOW	6.40	6.93	7.40	7.88	8.77	9.41	10.00	10.37		
ELEVATION	498.72	499.02	499.22	499.42	499.82	500.22	500.62	500.89		

HYDROGRAPH AT STATION DETAIN

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JAN	1200	1	0.	.0	495.2	1	JAN	1627	268	$.	.3	497.8	1	JAN	2054	535	0.	.0	495.4
1	JAN	1201	2	0.	.0	495.2	1	JAN	1628	269	$.	.3	497.8	1	JAN	2055	536	0.	.0	495.4
1	JAN	1202	3	0.	.0	495.2	1	JAN	1629	270	$.	.3	497.7	1	JAN	2056	537	0.	.0	495.4
1	JAN	1203	4	0.	.0	495.2	1	JAN	1630	271	$.	.3	497.7	1	JAN	2057	538	0.	.0	495.4
1	JAN	1204	5	0.	.0	495.2	1	JAN	1631	272	$.	.3	497.7	1	JAN	2058	539	0.	.0	495.4
1	JAN	1205	6	0.	.0	495.2	1	JAN	1632	273	$.	.3	497.6	1	JAN	2059	540	0.	.0	495.4
1	JAN	1206	7	0.	.0	495.2	1	JAN	1633	274	$.	.3	497.6	1	JAN	2100	541	0.	.0	495.4
1	JAN	1207	8	0.	.0	495.2	1	JAN	1634	275	$.	.3	497.6	1	JAN	2101	542	0.	.0	495.4
1	JAN	1208	9	0.	.0	495.2	1	JAN	1635	276	$.	.3	497.5	1	JAN	2102	543	0.	.0	495.4
1	JAN	1209	10	0.	.0	495.2	1	JAN	1636	277	$.	.3	497.5	1	JAN	2103	544	0.	.0	495.4
1	JAN	1210	11	0.	.0	495.2	1	JAN	1637	278	$.	.3	497.5	1	JAN	2104	545	0.	.0	495.4
1	JAN	1211	12	0.	.0	495.2	1	JAN	1638	279	$.	.3	497.4	1	JAN	2105	546	0.	.0	495.4
1	JAN	1212	13	0.	.0	495.3	1	JAN	1639	280	$.	.3	497.4	1	JAN	2106	547	0.	.0	495.4
1	JAN	1213	14	0.	.0	495.3	1	JAN	1640	281	$.	.3	497.4	1	JAN	2107	548	0.	.0	495.4
1	JAN	1214	15	0.	.0	495.3	1	JAN	1641	282	$.	.3	497.4	1	JAN	2108	549	0.	.0	495.4
1	JAN	1215	16	0.	.0	495.3	1	JAN	1642	283	$.	.3	497.3	1	JAN	2109	550	0.	.0	495.4
1	JAN	1216	17	0.	.0	495.3	1	JAN	1643	284	$.	.3	497.3	1	JAN	2110	551	0.	.0	495.4
1	JAN	1217	18	0.	.0	495.3	1	JAN	1644	285	$.	.3	497.3	1	JAN	2111	552	0.	.0	495.4
1	JAN	1218	19	0.	.0	495.3	1	JAN	1645	286	4.	.3	497.3	1	JAN	2112	553	0.	.0	495.4
1	JAN	1219	20	0.	.0	495.3	1	JAN	1646	287	4.	.3	497.2	1	JAN	2113	554	0.	.0	495.3
1	JAN	1220	21	0.	.0	495.3	1	JAN	1647	288	4.	.3	497.2	1	JAN	2114	555	0.	.0	495.3
1	JAN	1221	22	0.	.0	495.4	1	JAN	1648	289	4.	.3	497.2	1	JAN	2115	556	0.	.0	495.3
1	JAN	1222	23	0.	.0	495.4	1	JAN	1649	290	4.	.3	497.2	1	JAN	2116	557	0.	.0	495.3
1	JAN	1223	24	0.	.0	495.4	1	JAN	1650	291	4.	.3	497.1	1	JAN	2117	558	0.	.0	495.3
1	JAN	1224	25	0.	.0	495.4	1	JAN	1651	292	4.	.3	497.1	1	JAN	2118	559	0.	.0	495.3
1	JAN	1225	26	0.	.0	495.4	1	JAN	1652	293	4.	.3	497.1	1	JAN	2119	560	0.	.0	495.3
1	JAN	1226	27	0.	.0	495.4	1	JAN	1653	294	4.	.2	497.1	1	JAN	2120	561	0.	.0	495.3
1	JAN	1227	28	0.	.0	495.4	1	JAN	1654	295	4.	.2	497.0	1	JAN	2121	562	0.	.0	495.3
1	JAN	1228	29	0.	.0	495.4	1	JAN	1655	296	4.	.2	497.0	1	JAN	2122	563	0.	.0	495.3
1	JAN	1229	30	0.	.0	495.5	1	JAN	1656	297	4.	.2	497.0	1	JAN	2123	564	0.	.0	495.3
1	JAN	1230	31	0.	.0	495.5	1	JAN	1657	298	4.	.2	497.0	1	JAN	2124	565	0.	.0	495.3
1	JAN	1231	32	0.	.0	495.5	1	JAN	1658	299	4.	.2	496.9	1	JAN	2125	566	0.	.0	495.3
1	JAN	1232	33	0.	.0	495.5	1	JAN	1659	300	4.	.2	496.9	1	JAN	2126	567	0.	.0	495.3
1	JAN	1233	34	0.	.0	495.5	1	JAN	1700	301	4.	.2	496.9	1	JAN	2127	568	0.	.0	495.3
1	JAN	1234	35	0.	.0	495.5	1	JAN	1701	302	4.	.2	496.9	1	JAN	2128	569	0.	.0	495.3
1	JAN	1235	36	0.	.0	495.5	1	JAN	1702	303	4.	.2	496.9	1	JAN	2129	570	0.	.0	495.3
1	JAN	1236	37	0.	.0	495.5	1	JAN	1703	304	4.	.2	496.8	1	JAN	2130	571	0.	.0	495.3
1	JAN	1237	38	0.	.0	495.6	1	JAN	1704	305	4.	.2	496.8	1	JAN	2131	572	0.	.0	495.3
1	JAN	1238	39	0.	.0	495.6	1	JAN	1705	306	3.	.2	496.8	1	JAN	2132	573	0.	.0	495.3
1	JAN	1239	40	0.	.0	495.6	1	JAN	1706	307	3.	.2	496.8	1	JAN	2133	574	0.	.0	495.3
1	JAN	1240	41	0.	.0	495.6	1	JAN	1707	308	3.	.2	496.8	1	JAN	2134	575	0.	.0	495.3
1	JAN	1241	42	0.	.1	495.6	1	JAN	1708	309	3.	.2	496.8	1	JAN	2135	576	0.	.0	495.3
1	JAN	1242	43	0.	.1	495.6	1	JAN	1709	310	3.	.2	496.7	1	JAN	2136	577	0.	.0	495.3
1	JAN	1243	44	0.	.1	495.6	1	JAN	1710	311	3.	.2	496.7	1	JAN	2137	578	0.	.0	495.3
1	JAN	1244	45	0.	.1	495.6	1	JAN	1711	312	3.	.2	496.7	1	JAN	2138	579	0.	.0	495.3
1	JAN	1245	46	1.	.1	495.6	1	JAN	1712	313	3.	.2	496.7	1	JAN	2139	580	0.	.0	495.3
1	JAN	1246	47	1.	.1	495.6	1	JAN	1713	314	3.	.2	496.7	1	JAN	2140	581	0.	.0	495.3
1	JAN	1247	48	1.	.1	495.7	1	JAN	1714	315	3.	.2	496.7	1	JAN	2141	582	0.	.0	495.3
1	JAN	1248	49	1.	.1	495.7	1	JAN	1715	316	3.	.2	496.6	1	JAN	2142	583	0.	.0	495.3
1	JAN	1249	50	1.	.1	495.7	1	JAN	1716	317	3.	.2	496.6	1	JAN	2143	584	0.	.0	495.3
1	JAN	1250	51	1.	.1	495.7	1	JAN	1717	318	3.	.2	496.6	1	JAN	2144	585	0.	.0	495.3
1	JAN	1251	52	1.	.1	495.7	1	JAN	1718	319	3.	.2	496.6	1	JAN	2145	586	0.	.0	495.3
1	JAN	1252	53	1.	.1	495.7	1	JAN	1719	320	3.	.2	496.6	1	JAN	2146	587	0.	.0	495.3
1	JAN	1253	54	1.	.1	495.7	1	JAN	1720	321	3.	.2	496.6	1	JAN	2147	588	0.	.0	495.3
1	JAN	1254	55	1.	.1	495.7	1	JAN	1721	322	3.	.2	496.6	1	JAN	2148	589	0.	.0	495.3
1	JAN	1255	56	1.	.1	495.7	1	JAN	1722	323	3.	.2	496.6	1	JAN	2149	590	0.	.0	495.3
1	JAN	1256	57	1.	.1	495.7	1	JAN	1723	324	3.	.2	496.5	1	JAN	2150	591	0.	.0	495.3

1	JAN	1257	58	1.	.1	495.7	*	1	JAN	1724	325	3.	.2	496.5	*	1	JAN	2151	592	0.	.0	495.3
1	JAN	1258	59	1.	.1	495.8	*	1	JAN	1725	326	3.	.2	496.5	*	1	JAN	2152	593	0.	.0	495.3
1	JAN	1259	60	1.	.1	495.8	*	1	JAN	1726	327	3.	.2	496.5	*	1	JAN	2153	594	0.	.0	495.3
1	JAN	1300	61	1.	.1	495.8	*	1	JAN	1727	328	3.	.2	496.5	*	1	JAN	2154	595	0.	.0	495.3
1	JAN	1301	62	1.	.1	495.8	*	1	JAN	1728	329	3.	.2	496.5	*	1	JAN	2155	596	0.	.0	495.3
1	JAN	1302	63	1.	.1	495.8	*	1	JAN	1729	330	2.	.2	496.5	*	1	JAN	2156	597	0.	.0	495.3
1	JAN	1303	64	1.	.1	495.8	*	1	JAN	1730	331	2.	.2	496.5	*	1	JAN	2157	598	0.	.0	495.3
1	JAN	1304	65	1.	.1	495.8	*	1	JAN	1731	332	2.	.2	496.5	*	1	JAN	2158	599	0.	.0	495.3
1	JAN	1305	66	1.	.1	495.8	*	1	JAN	1732	333	2.	.2	496.5	*	1	JAN	2159	600	0.	.0	495.3
1	JAN	1306	67	1.	.1	495.8	*	1	JAN	1733	334	2.	.2	496.4	*	1	JAN	2200	601	0.	.0	495.3
1	JAN	1307	68	1.	.1	495.8	*	1	JAN	1734	335	2.	.2	496.4	*	1	JAN	2201	602	0.	.0	495.3
1	JAN	1308	69	1.	.1	495.8	*	1	JAN	1735	336	2.	.2	496.4	*	1	JAN	2202	603	0.	.0	495.3
1	JAN	1309	70	1.	.1	495.8	*	1	JAN	1736	337	2.	.2	496.4	*	1	JAN	2203	604	0.	.0	495.3
1	JAN	1310	71	1.	.1	495.9	*	1	JAN	1737	338	2.	.2	496.4	*	1	JAN	2204	605	0.	.0	495.3
1	JAN	1311	72	1.	.1	495.9	*	1	JAN	1738	339	2.	.2	496.4	*	1	JAN	2205	606	0.	.0	495.3
1	JAN	1312	73	1.	.1	495.9	*	1	JAN	1739	340	2.	.2	496.4	*	1	JAN	2206	607	0.	.0	495.3
1	JAN	1313	74	1.	.1	495.9	*	1	JAN	1740	341	2.	.2	496.4	*	1	JAN	2207	608	0.	.0	495.3
1	JAN	1314	75	1.	.1	495.9	*	1	JAN	1741	342	2.	.2	496.4	*	1	JAN	2208	609	0.	.0	495.3
1	JAN	1315	76	1.	.1	495.9	*	1	JAN	1742	343	2.	.2	496.4	*	1	JAN	2209	610	0.	.0	495.3
1	JAN	1316	77	1.	.1	495.9	*	1	JAN	1743	344	2.	.2	496.4	*	1	JAN	2210	611	0.	.0	495.3
1	JAN	1317	78	1.	.1	495.9	*	1	JAN	1744	345	2.	.2	496.3	*	1	JAN	2211	612	0.	.0	495.3
1	JAN	1318	79	1.	.1	495.9	*	1	JAN	1745	346	2.	.2	496.3	*	1	JAN	2212	613	0.	.0	495.3
1	JAN	1319	80	1.	.1	495.9	*	1	JAN	1746	347	2.	.2	496.3	*	1	JAN	2213	614	0.	.0	495.3
1	JAN	1320	81	1.	.1	495.9	*	1	JAN	1747	348	2.	.1	496.3	*	1	JAN	2214	615	0.	.0	495.3
1	JAN	1321	82	1.	.1	495.9	*	1	JAN	1748	349	2.	.1	496.3	*	1	JAN	2215	616	0.	.0	495.3
1	JAN	1322	83	1.	.1	495.9	*	1	JAN	1749	350	2.	.1	496.3	*	1	JAN	2216	617	0.	.0	495.3
1	JAN	1323	84	1.	.1	495.9	*	1	JAN	1750	351	2.	.1	496.3	*	1	JAN	2217	618	0.	.0	495.3
1	JAN	1324	85	1.	.1	496.0	*	1	JAN	1751	352	2.	.1	496.3	*	1	JAN	2218	619	0.	.0	495.3
1	JAN	1325	86	1.	.1	496.0	*	1	JAN	1752	353	2.	.1	496.3	*	1	JAN	2219	620	0.	.0	495.3
1	JAN	1326	87	1.	.1	496.0	*	1	JAN	1753	354	2.	.1	496.3	*	1	JAN	2220	621	0.	.0	495.3
1	JAN	1327	88	1.	.1	496.0	*	1	JAN	1754	355	2.	.1	496.3	*	1	JAN	2221	622	0.	.0	495.3
1	JAN	1328	89	1.	.1	496.0	*	1	JAN	1755	356	2.	.1	496.3	*	1	JAN	2222	623	0.	.0	495.3
1	JAN	1329	90	1.	.1	496.0	*	1	JAN	1756	357	2.	.1	496.3	*	1	JAN	2223	624	0.	.0	495.3
1	JAN	1330	91	1.	.1	496.0	*	1	JAN	1757	358	2.	.1	496.3	*	1	JAN	2224	625	0.	.0	495.3
1	JAN	1331	92	1.	.1	496.0	*	1	JAN	1758	359	2.	.1	496.3	*	1	JAN	2225	626	0.	.0	495.3
1	JAN	1332	93	1.	.1	496.0	*	1	JAN	1759	360	2.	.1	496.3	*	1	JAN	2226	627	0.	.0	495.3
1	JAN	1333	94	1.	.1	496.0	*	1	JAN	1800	361	2.	.1	496.3	*	1	JAN	2227	628	0.	.0	495.3
1	JAN	1334	95	1.	.1	496.0	*	1	JAN	1801	362	2.	.1	496.2	*	1	JAN	2228	629	0.	.0	495.3
1	JAN	1335	96	1.	.1	496.0	*	1	JAN	1802	363	2.	.1	496.2	*	1	JAN	2229	630	0.	.0	495.3
1	JAN	1336	97	1.	.1	496.0	*	1	JAN	1803	364	2.	.1	496.2	*	1	JAN	2230	631	0.	.0	495.3
1	JAN	1337	98	1.	.1	496.0	*	1	JAN	1804	365	2.	.1	496.2	*	1	JAN	2231	632	0.	.0	495.3
1	JAN	1338	99	1.	.1	496.1	*	1	JAN	1805	366	2.	.1	496.2	*	1	JAN	2232	633	0.	.0	495.3
1	JAN	1339	100	1.	.1	496.1	*	1	JAN	1806	367	2.	.1	496.2	*	1	JAN	2233	634	0.	.0	495.3
1	JAN	1340	101	1.	.1	496.1	*	1	JAN	1807	368	2.	.1	496.2	*	1	JAN	2234	635	0.	.0	495.3
1	JAN	1341	102	1.	.1	496.1	*	1	JAN	1808	369	2.	.1	496.2	*	1	JAN	2235	636	0.	.0	495.3
1	JAN	1342	103	1.	.1	496.1	*	1	JAN	1809	370	2.	.1	496.2	*	1	JAN	2236	637	0.	.0	495.3
1	JAN	1343	104	1.	.1	496.1	*	1	JAN	1810	371	2.	.1	496.2	*	1	JAN	2237	638	0.	.0	495.3
1	JAN	1344	105	1.	.1	496.1	*	1	JAN	1811	372	2.	.1	496.2	*	1	JAN	2238	639	0.	.0	495.3
1	JAN	1345	106	1.	.1	496.1	*	1	JAN	1812	373	2.	.1	496.2	*	1	JAN	2239	640	0.	.0	495.3
1	JAN	1346	107	1.	.1	496.1	*	1	JAN	1813	374	2.	.1	496.2	*	1	JAN	2240	641	0.	.0	495.3
1	JAN	1347	108	1.	.1	496.1	*	1	JAN	1814	375	2.	.1	496.1	*	1	JAN	2241	642	0.	.0	495.3
1	JAN	1348	109	1.	.1	496.1	*	1	JAN	1815	376	2.	.1	496.1	*	1	JAN	2242	643	0.	.0	495.3
1	JAN	1349	110	2.	.1	496.1	*	1	JAN	1816	377	1.	.1	496.1	*	1	JAN	2243	644	0.	.0	495.3
1	JAN	1350	111	2.	.1	496.1	*	1	JAN	1817	378	1.	.1	496.1	*	1	JAN	2244	645	0.	.0	495.3
1	JAN	1351	112	2.	.1	496.1	*	1	JAN	1818	379	1.	.1	496.1	*	1	JAN	2245	646	0.	.0	495.3
1	JAN	1352	113	2.	.1	496.1	*	1	JAN	1819	380	1.	.1	496.1	*	1	JAN	2246	647	0.	.0	495.3
1	JAN	1353	114	2.	.1	496.2	*	1	JAN	1820	381	1.	.1	496.1	*	1	JAN	2247	648	0.	.0	495.3
1	JAN	1354	115	2.	.1	496.2	*	1	JAN	1821	382	1.	.1	496.0	*	1	JAN	2248	649	0.	.0	495.3
1	JAN	1355	116	2.	.1	496.2	*	1	JAN	1822	383	1.	.1	496.0	*	1	JAN	2249	650	0.	.0	495.3
1	JAN	1356	117	2.	.1	496.2	*	1	JAN	1823	384	1.	.1	496.0	*	1	JAN	2250	651	0.	.0	495.3
1	JAN	1357	118	2.	.1	496.2	*	1	JAN	1824	385	1.	.1	496.0	*	1	JAN	2251	652	0.	.0	495.3
1	JAN	1358	119	2.	.1	496.2	*	1	JAN	1825	386	1.	.1	496.0	*	1	JAN	2252	653	0.	.0	495.3
1	JAN	1359	120	2.	.1	496.2	*	1	JAN	1826	387	1.	.1	496.0	*	1	JAN	2253	654	0.	.0	495.3
1	JAN	1400	121	2.	.1	496.2	*	1	JAN	1827	388	1.	.1	496.0	*	1	JAN	2254	655	0.	.0	495.3
1	JAN	1401	122	2.	.1	496.2	*	1	JAN	1828	389	1.	.1	496.0	*	1	JAN	2255	656	0.	.0	495.3
1	JAN	1402	123	2.	.1	496.2	*	1	JAN	1829	390	1.	.1	495.9	*	1	JAN	2256	657	0.	.0	495.3
1	JAN	1403	124	2.	.1	496.2	*	1	JAN	1830	391	1.	.1	495.9	*	1	JAN	2257	658	0.	.0	495.3
1	JAN	1404	125	2.	.1	496.2	*	1	JAN	1831	392	1.	.1	495.9	*	1	JAN	2258	659	0.	.0	495.3
1	JAN	1405	126	2.	.1	496.2	*	1	JAN	1832	393	1.	.1	495.9	*	1	JAN	2259	660	0.	.0	495.3
1	JAN	1406	127	2.	.1	496.2	*	1	JAN	1833	394	1.	.1	495.9	*	1	JAN	2300	661	0.	.0	495.3
1	JAN	1407	128	2.	.1	496.3	*	1	JAN	1834	395	1.	.1	495.9	*	1	JAN	2301	662	0.	.0	495.3
1	JAN	1408	129	2.	.1	496.3	*	1	JAN	1835	396	1.	.1	495.9	*	1	JAN	2302	663	0.	.0	495.3
1	JAN	1409	130	2.	.1	496.3	*	1	JAN	1836	397	1.	.1	495.9	*	1	JAN	2303	664	0.	.0	495.3
1	JAN	1410	131	2.	.1	496.3	*	1	JAN	1837	398	1.	.1	495.9	*	1	JAN	2304	665	0.	.0	495.3
1	JAN	1411	132	2.	.1	496.3	*	1	JAN	1838	399	1.	.1	495.9	*	1	JAN	2305	666	0.	.0	495.3
1	JAN	1412	133	2.	.1	496.3	*	1	JAN	1839	400	1.	.1	495.8	*	1	JAN	2306	667	0.	.0	495.3
1	JAN	1413	134	2.	.1	496.3	*	1	JAN	1840	401	1.	.1	495.8	*	1	JAN	2307	668	0.	.0	495.3
1	JAN	1414	135	2.	.1	496.3	*	1	JAN	1841	402	1.	.1	495.8	*	1	JAN	2308	669	0.	.0	495.3
1	JAN	1415	136	2.	.1	496.3	*	1	JAN	1842	403	1.	.1	495.8	*	1	JAN	2309	670	0.	.0	495.3
1	JAN	1416	137	2.	.1	496.3	*	1	JAN	1843	404	1.	.1	495.8	*	1	JAN	2310	671	0.	.0	495.3
1	JAN	1417	138	2.	.2	496.3	*	1	JAN	1844	405	1.	.1	495.8	*	1	JAN	2311	672	0.	.0	495.3
1	JAN	1418	139	2.	.2	496.3	*	1	JAN	1845	406	1.	.1	495.8	*	1	JAN	2312	673	0.	.0	495.3
1	JAN	1419	140	2.	.2	496.3	*	1	JAN	1846	407	1.	.1	495.8	*	1	JAN	2313	674	0.	.0	495.3
1	JAN	1420	141	2.	.2	496.4	*	1	JAN	1847	408	1.	.1	495.8	*	1	JAN	2314	675	0.	.0	495.3
1	JAN	1421	142	2.	.2	496.4	*	1	JAN	1848	409	1.	.1	495.8	*	1	JAN	2315	676	0.	.0	495.3
1	JAN	1422	143	2.	.2	496.4	*	1	JAN	1849	410	1.	.1	495.8	*	1	JAN	2316	677	0.	.0	495.3
1	JAN	1423	144	2.	.2	496.4	*	1	JAN	1850	411	1.	.1	495.8	*	1	JAN	2317	678	0.	.0	495.3
1	JAN	1424	145	2.	.2	496.4	*	1	JAN	1851	412	1.	.1	495.7	*	1	JAN	2318	679	0.	.0	495.3
1	JAN	1425	146	2.	.2	496.4	*	1	JAN	1852	413	1.	.1	495.7	*	1	JAN	2319	680	0.	.0	495.3
1	JAN	1426	147	2.	.2	496.4	*	1	JAN	1853	414	1.	.1	495.7	*	1	JAN	2320	681	0.	.0	495.3
1	JAN	1427	148	2.	.2	496.4	*	1	JAN	1854	415	1.	.1	495.7	*	1	JAN	2321	682	0.	.0	495.3
1	JAN	1428	149	2.	.2	496.4	*	1	JAN	1855	416	1.	.1	495.7	*	1	JAN	2322	683	0.	.0	495.3
1	JAN	1429	150	2.	.2	496.4	*	1	JAN	1856	417	1.	.1	495.7	*	1	JAN	2323	684	0.	.0	495.3
1	JAN	1430	151	2.	.2	496.5	*	1	JAN	1857	418	1.	.1	495.7	*	1	JAN	2324	685	0.	.0	495.3
1	JAN	1431	152	2.	.2	496.5	*	1	JAN	1858	419	1.	.1	495.7	*	1	JAN	2325	686	0.	.0	495.3
1	JAN	1432	153	2.	.2	496.5	*	1	JAN	1859	420	1.	.1	495.7	*	1	JAN	2326	687	0.	.0	495.3
1	JAN	1433	154	3.	.2	496.5	*	1	JAN	1900	421	1.	.1	495.7	*	1	JAN	2327	688	0.	.0	495.3
1	JAN	1434	155	3.	.2	496.5	*	1	JAN	1901	422	1.	.1	495.7	*	1	JAN	2328	689	0.	.0	495.3
1	JAN	1435	156	3.	.2	496.5	*	1	JAN	1902	423	1.	.1	495.7	*	1	JAN	2329	690	0.	.0	495.3
1	JAN	1436	157	3.	.2	496.5	*	1	JAN	1903	424	1.	.1	495.7	*	1	JAN	2330	691	0.	.0	495.3
1	JAN	1437	158	3.	.2	496.5	*	1	JAN	1904	425	1.	.1	495.7	*	1	JAN	2331	692	0.	.0	495.3
1	JAN	1438	159	3.	.2	496.6	*	1	JAN	1905	426	1.	.1	495.7	*	1	JAN	2332	693	0.	.0	495.3
1	JAN	1439	160	3.	.2	496.6	*	1	JAN	1906	427	1.	.1	495.7	*	1	JAN	2333	694	0.	.0	495.3
1	JAN	1440	161	3.	.2	496.6	*	1	JAN	1907	428	1.	.1	495.6	*	1	JAN	2334	695	0.	.0	495.3
1	JAN	1441	162	3.	.2	496.6	*	1	JAN	1908	429	1.	.1	495.6	*	1	JAN	2335	696	0.	.0	495.3
1	JAN	1442	163	3.	.2	496.6	*	1	JAN	1909	430	1.	.1	495.6	*	1	JAN	2336	697	0.	.0	495.3
1	JAN	1443	164	3.	.2	496.6	*	1	JAN	1910	431	1.	.1	495.6	*	1	JAN	2337	698	0.	.0	495.3
1	JAN	1444	165	3.	.2	496.7	*	1	JAN	1911	432	0.	.1	495.6	*	1	JAN	2338	699	0.	.0	495.3
1	JAN	1445	166	3.	.2	496.7	*	1	JAN	1912	433	0.	.1	495.6	*	1	JAN	2339	700	0.	.0	495.3
1	JAN	1446	167	3.	.2	496.7	*	1	JAN	1913	434	0.	.1	495.6	*	1	JAN	2340	701	0.	.0	495.3
1	JAN	1447	168	3.	.2	496.7	*	1	JAN	1914	435	0.	.1	495.6	*	1	JAN	2341	702	0.	.0	495.3
1	JAN	1448	169	3.	.2	496.7	*	1	JAN	1915	436	0.	.1	495.6	*	1	JAN	2342	703	0.	.0	495.3
1	JAN	1449	170	3.	.2	496.8	*	1	JAN	1916	437	0.	.1	495.6	*	1	JAN	2343	704	0.	.0	495.3
1	JAN	1450	171	3.	.2	496.8	*	1	JAN	1917	438	0.	.1	495.6	*	1	JAN	2344	705	0.	.0	495.3
1	JAN	1451	172	3.	.2	496.8	*	1	JAN	1918	439	0.	.1	495.6	*	1	JAN	2345	706	0.	.0	495.3
1	JAN	1452	173	4.	.2	496.8	*	1	JAN	1919	440	0.	.0	495.6	*	1	JAN	2346	707	0.	.0	495.3
1	JAN	1453	174	4.	.2	496.9	*	1	JAN	1920	441	0.	.0	495.6	*	1	JAN	2347	708	0.	.0	495.3
1	JAN	1454	175	4.	.2	496.9	*	1	JAN	1921	442	0.	.0	495.6	*	1	JAN	2348	709	0.	.0	495.3
1	JAN	1455	176	4.	.2	496.9	*	1	JAN	1922	443	0.	.0	495.6	*	1	JAN	2349	710	0.	.0	495.3
1	JAN	1456	177	4.	.2	497.0	*	1	JAN	1923	444	0.	.0	495.6	*	1	JAN	2350	711	0.	.0	495.3
1	JAN	1457	178	4.	.2	497.0	*	1	JAN	1924	445	0.	.0	495.6	*	1	JAN	2351	712	0.	.0	495.3
1	JAN	1458	179	4.	.3	497.1	*	1	JAN	1925	446	0.	.0	495.6	*	1	JAN	2352	713	0.	.0	495.3
1	JAN	1459	180	4.	.3	497.2	*	1	JAN	1926	447	0.	.0	495.6	*	1	JAN	2353	714	0.	.0	495.3

1	JAN	1500	181	5.	.3	497.4	*	1	JAN	1927	448	0.	.0	495.6	*	1	JAN	2354	715	0.	.0	495.3
1	JAN	1501	182	5.	.3	497.5	*	1	JAN	1928	449	0.	.0	495.6	*	1	JAN	2355	716	0.	.0	495.3
1	JAN	1502	183	5.	.3	497.7	*	1	JAN	1929	450	0.	.0	495.5	*	1	JAN	2356	717	0.	.0	495.3
1	JAN	1503	184	5.	.4	497.9	*	1	JAN	1930	451	0.	.0	495.5	*	1	JAN	2357	718	0.	.0	495.3
1	JAN	1504	185	6.	.4	498.1	*	1	JAN	1931	452	0.	.0	495.5	*	1	JAN	2358	719	0.	.0	495.3
1	JAN	1505	186	6.	.4	498.3	*	1	JAN	1932	453	0.	.0	495.5	*	1	JAN	2359	720	0.	.0	495.3
1	JAN	1506	187	6.	.5	498.6	*	1	JAN	1933	454	0.	.0	495.5	*	2	JAN	0000	721	0.	.0	495.3
1	JAN	1507	188	7.	.5	498.8	*	1	JAN	1934	455	0.	.0	495.5	*	2	JAN	0001	722	0.	.0	495.3
1	JAN	1508	189	7.	.5	499.0	*	1	JAN	1935	456	0.	.0	495.5	*	2	JAN	0002	723	0.	.0	495.3
1	JAN	1509	190	7.	.5	499.2	*	1	JAN	1936	457	0.	.0	495.5	*	2	JAN	0003	724	0.	.0	495.3
1	JAN	1510	191	8.	.6	499.3	*	1	JAN	1937	458	0.	.0	495.5	*	2	JAN	0004	725	0.	.0	495.3
1	JAN	1511	192	8.	.6	499.5	*	1	JAN	1938	459	0.	.0	495.5	*	2	JAN	0005	726	0.	.0	495.3
1	JAN	1512	193	8.	.6	499.6	*	1	JAN	1939	460	0.	.0	495.5	*	2	JAN	0006	727	0.	.0	495.3
1	JAN	1513	194	9.	.6	499.7	*	1	JAN	1940	461	0.	.0	495.5	*	2	JAN	0007	728	0.	.0	495.3
1	JAN	1514	195	9.	.6	499.8	*	1	JAN	1941	462	0.	.0	495.5	*	2	JAN	0008	729	0.	.0	495.3
1	JAN	1515	196	9.	.6	499.9	*	1	JAN	1942	463	0.	.0	495.5	*	2	JAN	0009	730	0.	.0	495.3
1	JAN	1516	197	9.	.6	500.0	*	1	JAN	1943	464	0.	.0	495.5	*	2	JAN	0010	731	0.	.0	495.3
1	JAN	1517	198	9.	.7	500.0	*	1	JAN	1944	465	0.	.0	495.5	*	2	JAN	0011	732	0.	.0	495.3
1	JAN	1518	199	9.	.7	500.1	*	1	JAN	1945	466	0.	.0	495.5	*	2	JAN	0012	733	0.	.0	495.2
1	JAN	1519	200	9.	.7	500.1	*	1	JAN	1946	467	0.	.0	495.5	*	2	JAN	0013	734	0.	.0	495.2
1	JAN	1520	201	9.	.7	500.1	*	1	JAN	1947	468	0.	.0	495.5	*	2	JAN	0014	735	0.	.0	495.2
1	JAN	1521	202	9.	.7	500.2	*	1	JAN	1948	469	0.	.0	495.5	*	2	JAN	0015	736	0.	.0	495.2
1	JAN	1522	203	9.	.7	500.2	*	1	JAN	1949	470	0.	.0	495.5	*	2	JAN	0016	737	0.	.0	495.2
1	JAN	1523	204	9.	.7	500.1	*	1	JAN	1950	471	0.	.0	495.5	*	2	JAN	0017	738	0.	.0	495.2
1	JAN	1524	205	9.	.7	500.1	*	1	JAN	1951	472	0.	.0	495.5	*	2	JAN	0018	739	0.	.0	495.2
1	JAN	1525	206	9.	.7	500.1	*	1	JAN	1952	473	0.	.0	495.5	*	2	JAN	0019	740	0.	.0	495.2
1	JAN	1526	207	9.	.7	500.1	*	1	JAN	1953	474	0.	.0	495.5	*	2	JAN	0020	741	0.	.0	495.2
1	JAN	1527	208	9.	.7	500.0	*	1	JAN	1954	475	0.	.0	495.5	*	2	JAN	0021	742	0.	.0	495.2
1	JAN	1528	209	9.	.6	500.0	*	1	JAN	1955	476	0.	.0	495.5	*	2	JAN	0022	743	0.	.0	495.2
1	JAN	1529	210	9.	.6	499.9	*	1	JAN	1956	477	0.	.0	495.5	*	2	JAN	0023	744	0.	.0	495.2
1	JAN	1530	211	9.	.6	499.9	*	1	JAN	1957	478	0.	.0	495.5	*	2	JAN	0024	745	0.	.0	495.2
1	JAN	1531	212	9.	.6	499.9	*	1	JAN	1958	479	0.	.0	495.5	*	2	JAN	0025	746	0.	.0	495.2
1	JAN	1532	213	9.	.6	499.8	*	1	JAN	1959	480	0.	.0	495.5	*	2	JAN	0026	747	0.	.0	495.2
1	JAN	1533	214	9.	.6	499.8	*	1	JAN	2000	481	0.	.0	495.5	*	2	JAN	0027	748	0.	.0	495.2
1	JAN	1534	215	9.	.6	499.7	*	1	JAN	2001	482	0.	.0	495.5	*	2	JAN	0028	749	0.	.0	495.2
1	JAN	1535	216	9.	.6	499.7	*	1	JAN	2002	483	0.	.0	495.5	*	2	JAN	0029	750	0.	.0	495.2
1	JAN	1536	217	8.	.6	499.7	*	1	JAN	2003	484	0.	.0	495.5	*	2	JAN	0030	751	0.	.0	495.2
1	JAN	1537	218	8.	.6	499.6	*	1	JAN	2004	485	0.	.0	495.4	*	2	JAN	0031	752	0.	.0	495.2
1	JAN	1538	219	8.	.6	499.6	*	1	JAN	2005	486	0.	.0	495.4	*	2	JAN	0032	753	0.	.0	495.2
1	JAN	1539	220	8.	.6	499.5	*	1	JAN	2006	487	0.	.0	495.4	*	2	JAN	0033	754	0.	.0	495.2
1	JAN	1540	221	8.	.6	499.5	*	1	JAN	2007	488	0.	.0	495.4	*	2	JAN	0034	755	0.	.0	495.2
1	JAN	1541	222	8.	.6	499.4	*	1	JAN	2008	489	0.	.0	495.4	*	2	JAN	0035	756	0.	.0	495.2
1	JAN	1542	223	8.	.6	499.4	*	1	JAN	2009	490	0.	.0	495.4	*	2	JAN	0036	757	0.	.0	495.2
1	JAN	1543	224	8.	.6	499.4	*	1	JAN	2010	491	0.	.0	495.4	*	2	JAN	0037	758	0.	.0	495.2
1	JAN	1544	225	8.	.6	499.3	*	1	JAN	2011	492	0.	.0	495.4	*	2	JAN	0038	759	0.	.0	495.2
1	JAN	1545	226	8.	.5	499.3	*	1	JAN	2012	493	0.	.0	495.4	*	2	JAN	0039	760	0.	.0	495.2
1	JAN	1546	227	7.	.5	499.2	*	1	JAN	2013	494	0.	.0	495.4	*	2	JAN	0040	761	0.	.0	495.2
1	JAN	1547	228	7.	.5	499.2	*	1	JAN	2014	495	0.	.0	495.4	*	2	JAN	0041	762	0.	.0	495.2
1	JAN	1548	229	7.	.5	499.2	*	1	JAN	2015	496	0.	.0	495.4	*	2	JAN	0042	763	0.	.0	495.2
1	JAN	1549	230	7.	.5	499.1	*	1	JAN	2016	497	0.	.0	495.4	*	2	JAN	0043	764	0.	.0	495.2
1	JAN	1550	231	7.	.5	499.1	*	1	JAN	2017	498	0.	.0	495.4	*	2	JAN	0044	765	0.	.0	495.2
1	JAN	1551	232	7.	.5	499.0	*	1	JAN	2018	499	0.	.0	495.4	*	2	JAN	0045	766	0.	.0	495.2
1	JAN	1552	233	7.	.5	499.0	*	1	JAN	2019	500	0.	.0	495.4	*	2	JAN	0046	767	0.	.0	495.2
1	JAN	1553	234	7.	.5	499.0	*	1	JAN	2020	501	0.	.0	495.4	*	2	JAN	0047	768	0.	.0	495.2
1	JAN	1554	235	7.	.5	498.9	*	1	JAN	2021	502	0.	.0	495.4	*	2	JAN	0048	769	0.	.0	495.2
1	JAN	1555	236	7.	.5	498.9	*	1	JAN	2022	503	0.	.0	495.4	*	2	JAN	0049	770	0.	.0	495.2
1	JAN	1556	237	7.	.5	498.9	*	1	JAN	2023	504	0.	.0	495.4	*	2	JAN	0050	771	0.	.0	495.2
1	JAN	1557	238	7.	.5	498.8	*	1	JAN	2024	505	0.	.0	495.4	*	2	JAN	0051	772	0.	.0	495.2
1	JAN	1558	239	7.	.5	498.8	*	1	JAN	2025	506	0.	.0	495.4	*	2	JAN	0052	773	0.	.0	495.2
1	JAN	1559	240	6.	.5	498.7	*	1	JAN	2026	507	0.	.0	495.4	*	2	JAN	0053	774	0.	.0	495.2
1	JAN	1600	241	6.	.5	498.7	*	1	JAN	2027	508	0.	.0	495.4	*	2	JAN	0054	775	0.	.0	495.2
1	JAN	1601	242	6.	.5	498.7	*	1	JAN	2028	509	0.	.0	495.4	*	2	JAN	0055	776	0.	.0	495.2
1	JAN	1602	243	6.	.5	498.6	*	1	JAN	2029	510	0.	.0	495.4	*	2	JAN	0056	777	0.	.0	495.2
1	JAN	1603	244	6.	.5	498.6	*	1	JAN	2030	511	0.	.0	495.4	*	2	JAN	0057	778	0.	.0	495.2
1	JAN	1604	245	6.	.5	498.6	*	1	JAN	2031	512	0.	.0	495.4	*	2	JAN	0058	779	0.	.0	495.2
1	JAN	1605	246	6.	.4	498.5	*	1	JAN	2032	513	0.	.0	495.4	*	2	JAN	0059	780	0.	.0	495.2
1	JAN	1606	247	6.	.4	498.5	*	1	JAN	2033	514	0.	.0	495.4	*	2	JAN	0100	781	0.	.0	495.2
1	JAN	1607	248	6.	.4	498.5	*	1	JAN	2034	515	0.	.0	495.4	*	2	JAN	0101	782	0.	.0	495.2
1	JAN	1608	249	6.	.4	498.4	*	1	JAN	2035	516	0.	.0	495.4	*	2	JAN	0102	783	0.	.0	495.2
1	JAN	1609	250	6.	.4	498.4	*	1	JAN	2036	517	0.	.0	495.4	*	2	JAN	0103	784	0.	.0	495.2
1	JAN	1610	251	6.	.4	498.4	*	1	JAN	2037	518	0.	.0	495.4	*	2	JAN	0104	785	0.	.0	495.2
1	JAN	1611	252	6.	.4	498.3	*	1	JAN	2038	519	0.	.0	495.4	*	2	JAN	0105	786	0.	.0	495.2
1	JAN	1612	253	6.	.4	498.3	*	1	JAN	2039	520	0.	.0	495.4	*	2	JAN	0106	787	0.	.0	495.2
1	JAN	1613	254	6.	.4	498.2	*	1	JAN	2040	521	0.	.0	495.4	*	2	JAN	0107	788	0.	.0	495.2
1	JAN	1614	255	6.	.4	498.2	*	1	JAN	2041	522	0.	.0	495.4	*	2	JAN	0108	789	0.	.0	495.2
1	JAN	1615	256	6.	.4	498.2	*	1	JAN	2042	523	0.	.0	495.4	*	2	JAN	0109	790	0.	.0	495.2
1	JAN	1616	257	6.	.4	498.1	*	1	JAN	2043	524	0.	.0	495.4	*	2	JAN	0110	791	0.	.0	495.2
1	JAN	1617	258	6.	.4	498.1	*	1	JAN	2044	525	0.	.0	495.4	*	2	JAN	0111	792	0.	.0	495.2
1	JAN	1618	259	6.	.4	498.1	*	1	JAN	2045	526	0.	.0	495.4	*	2	JAN	0112	793	0.	.0	495.2
1	JAN	1619	260	6.	.4	498.0	*	1	JAN	2046	527	0.	.0	495.4	*	2	JAN	0113	794	0.	.0	495.2
1	JAN	1620	261	6.	.4	498.0	*	1	JAN	2047	528	0.	.0	495.4	*	2	JAN	0114	795	0.	.0	495.2
1	JAN	1621	262	6.	.4	498.0	*	1	JAN	2048	529	0.	.0	495.4	*	2	JAN	0115	796	0.	.0	495.2
1	JAN	1622	263	5.	.4	497.9	*	1	JAN	2049	530	0.	.0	495.4	*	2	JAN	0116	797	0.	.0	495.2
1	JAN	1623	264	5.	.4	497.9	*	1	JAN	2050	531	0.	.0	495.4	*	2	JAN	0117	798	0.	.0	495.2
1	JAN	1624	265	5.	.4	497.9	*	1	JAN	2051	532	0.	.0	495.4	*	2	JAN	0118	799	0.	.0	495.2
1	JAN	1625	266	5.	.4	497.8	*	1	JAN	2052	533	0.	.0	495.4	*	2	JAN	0119	800	0.	.0	495.2
1	JAN	1626	267	5.	.4	497.8	*	1	JAN	2053	534	0.	.0	495.4	*							

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	13.32-HR	
+ (CFS)	(HR)					
		(CFS)				
+ 9.	3.37	3.	2.	2.	2.	
		(INCHES) 1.701	1.786	1.786	1.786	
		(AC-FT) 2.	2.	2.	2.	

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	13.32-HR	
+ (AC-FT)	(HR)					
1.	3.35	0.	0.	0.	0.	

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	13.32-HR	
+ (FEET)	(HR)					
500.15	3.37	497.01	496.10	496.10	496.10	

CUMULATIVE AREA = .02 SQ MI

1 STATION OETAIN

(I) INFLOW, (O) OUTFLOW

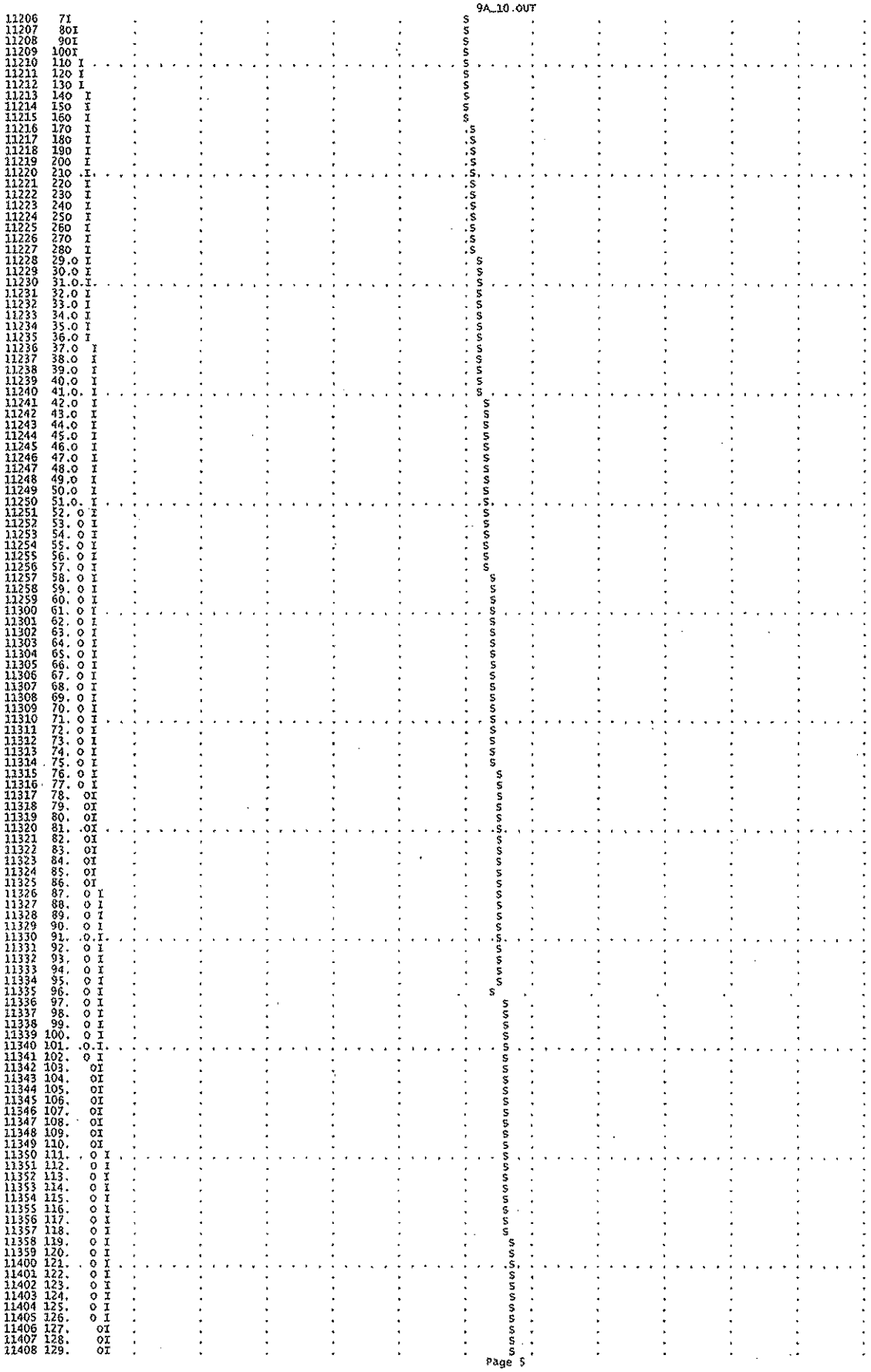
0. 4. 8. 12. 16. 20. 24. 28. 32. 0. 0. 0. 0.

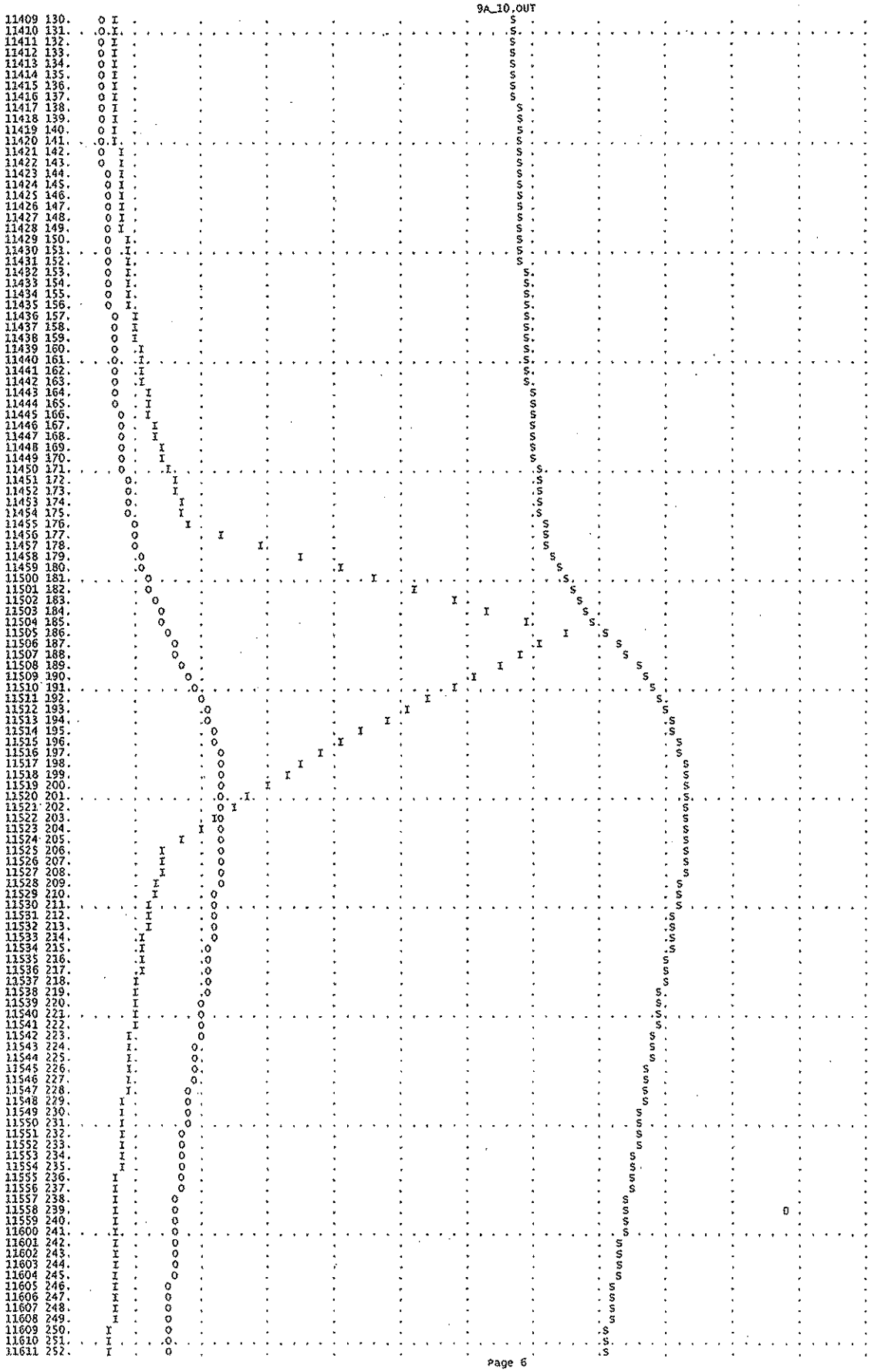
(S) STORAGE

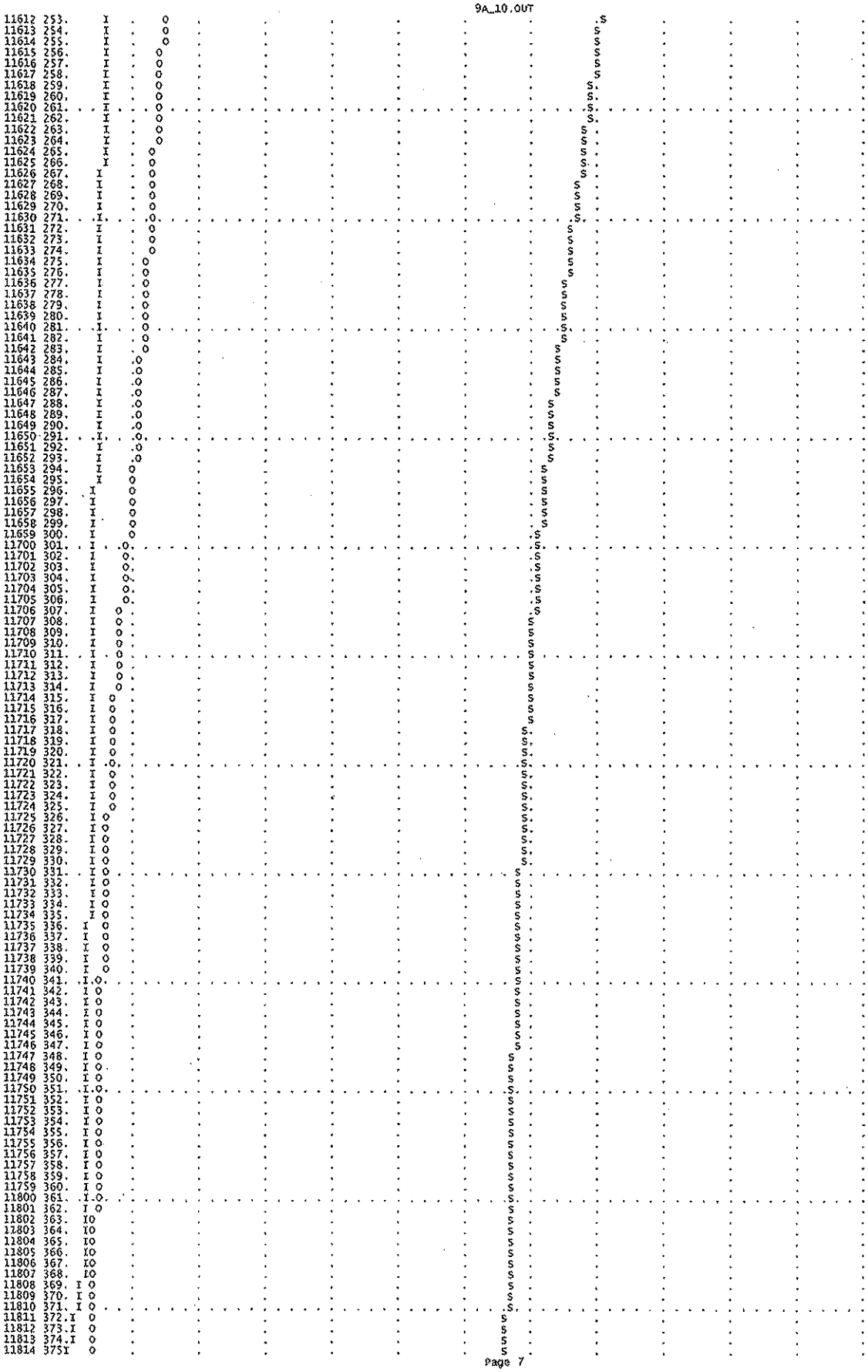
.0 .0 .0 .0 .0 .0 .0 .2 .4 .6 .8 .0 .0

DAHRMN PER

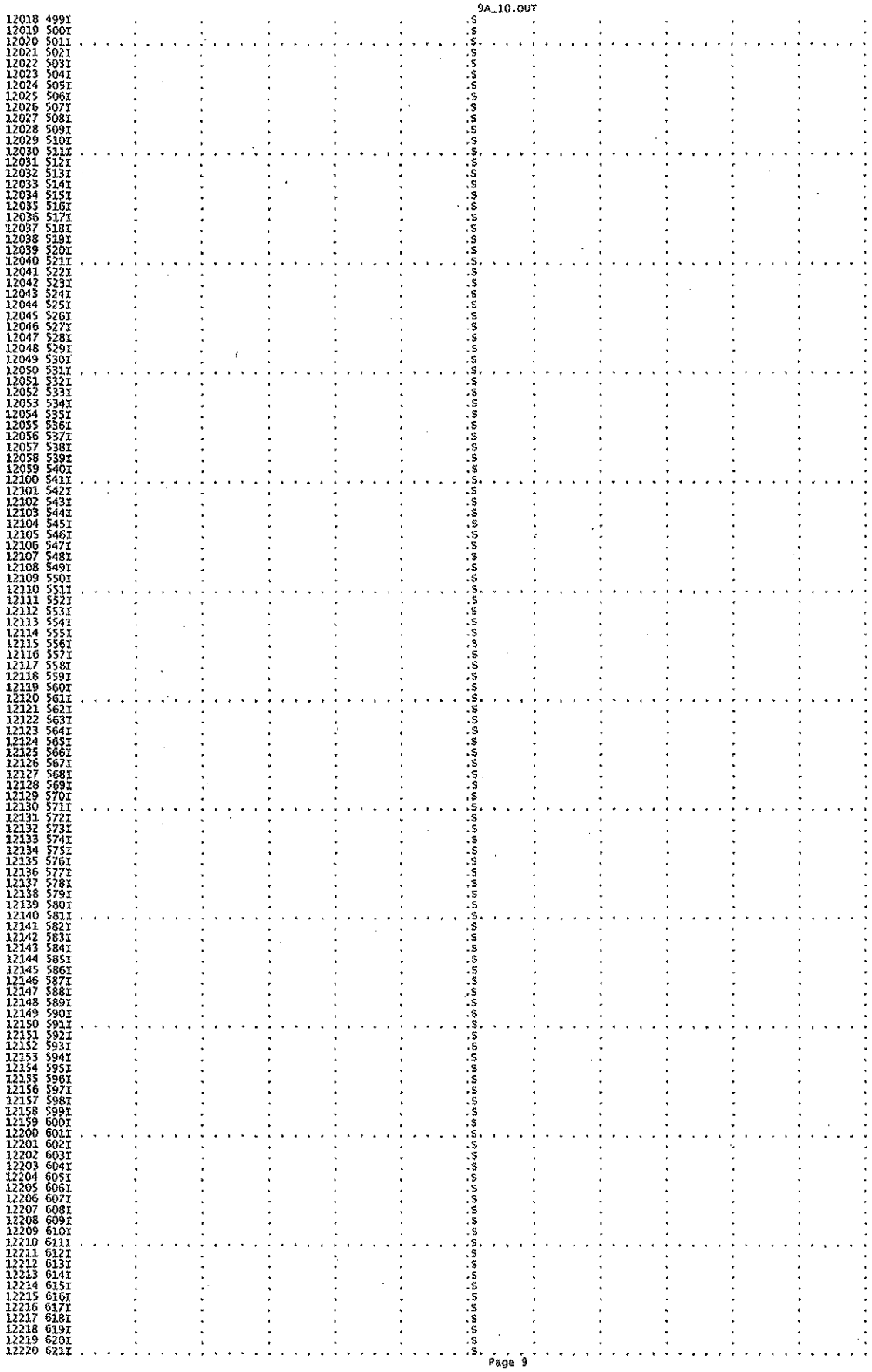
11200 1I----------S----------
11201 2I . . . . . S . . . . . .
11202 3I . . . . . S . . . . . .
11203 4I . . . . . S . . . . . .
11204 5I . . . . . S . . . . . .
11205 6I . . . . . S . . . . . .

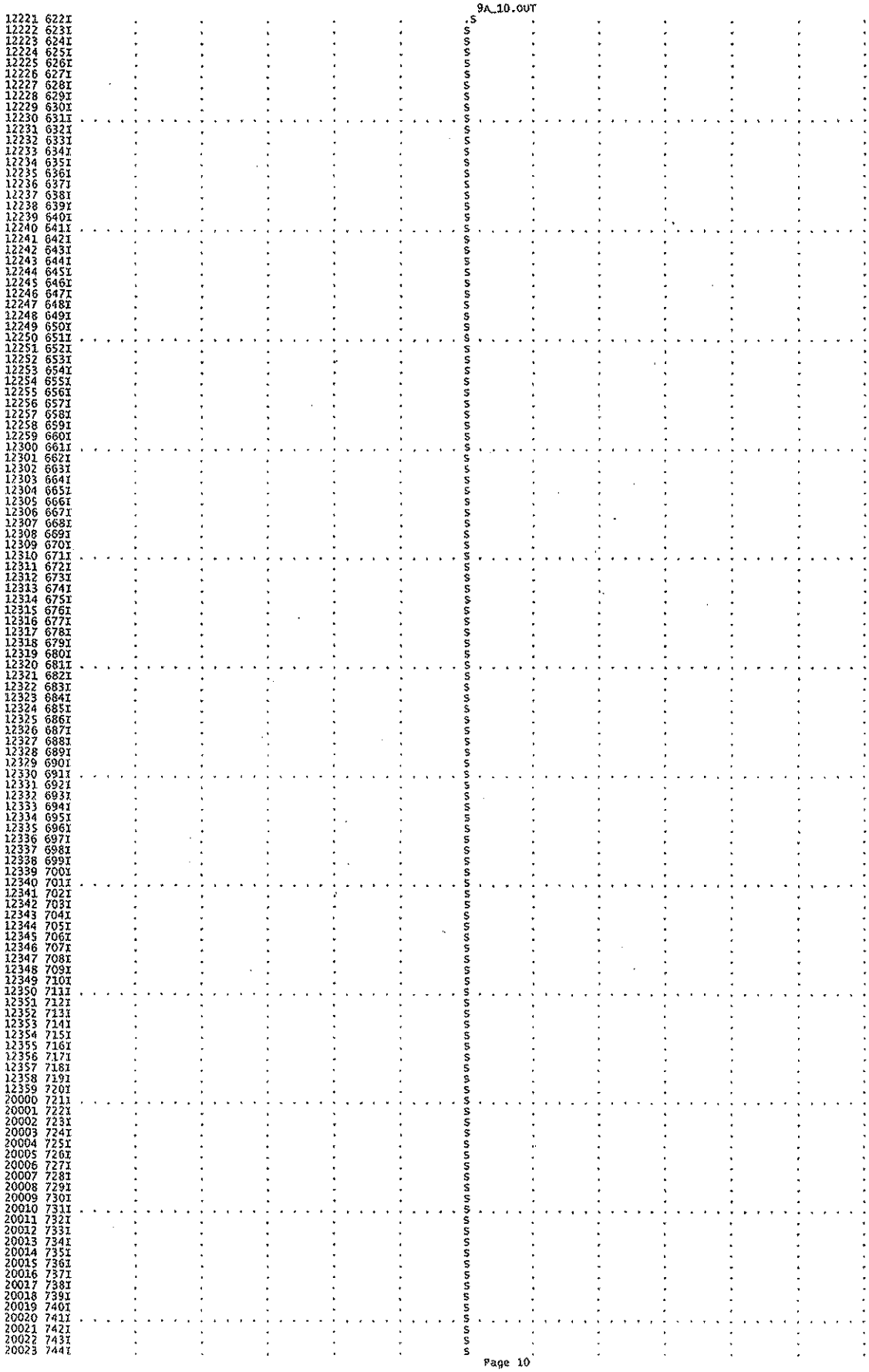


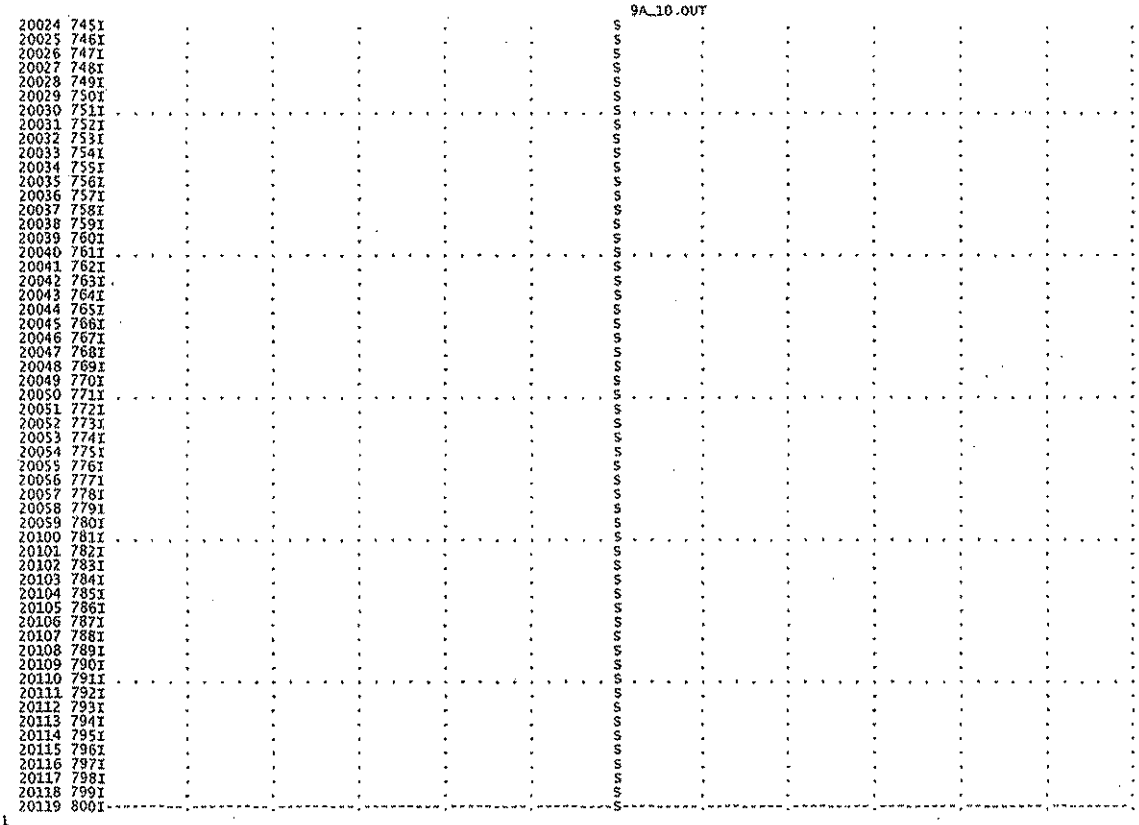




```
11815 376I   O                                                                  S
11816 377I   O                                                                  S
11817 378I   O                                                                  S
11818 379I   O                                                                  S
11819 380I  O                                                                   S
11820 381I  O                                                                   S
11821 382I  O                                                                   S
11822 383I  O                                                                 S
11823 384I  O                                                                 S
11824 385I  O                                                                 S
11825 386I  O                                                                 S
11826 387I  O                                                                 S
11827 388I  O                                                                 S
11828 389I  O                                                                 S
11829 390I  O                                                                 S
11830 391I  O                                                                 S
11831 392I  O                                                                 S
11832 393I  O                                                                 S
11833 394I O                                                                  S
11834 395I O                                                                  S
11835 396I O                                                                S
11836 397I O                                                                S
11837 398I O                                                                S
11838 399I O                                                                S
11839 400I O                                                                S
11840 401I O                                                                S
11841 402I O                                                                S
11842 403I O                                                                S
11843 404I O                                                                S
11844 405I O                                                                S
11845 406I O                                                                S
11846 407I O                                                                S
11847 408I O                                                                S
11848 409I O                                                                S
11849 410I O                                                                S
11850 411I O                                                                S
11851 412I O                                                                S
11852 413I O                                                                S
11853 414I O                                                              S S
11854 415I O                                                              S S
11855 416I O                                                              S S
11856 417I O                                                              S S
11857 418I O                                                              S S
11858 419I O                                                              S S
11859 420I O                                                              S S
11900 421IO                                                               S S
11901 422IO                                                               S S
11902 423IO                                                               S S
11903 424IO                                                               S S
11904 425IO                                                               S S
11905 426IO                                                               S S
11906 427IO                                                               S S
11907 428IO                                                               S S
11908 429IO                                                               S S
11909 430IO                                                               S S
11910 431IO                                                               S S
11911 432IO                                                               S S
11912 433IO                                                               S S
11913 434IO                                                               S S
11914 435IO                                                               S S
11915 436IO                                                               S S
11916 437IO                                                               S S
11917 438IO                                                               S S
11918 439IO                                                               S S
11919 440IO                                                               S S
11920 441IO                                                               S S
11921 442IO                                                               S S
11922 443IO                                                               S S
11923 444IO                                                               S S
11924 445IO                                                               S S
11925 446IO                                                               S S
11926 447IO                                                               S S
11927 448IO                                                               S S
11928 449IO                                                               S S
11929 450IO                                                               S S
11930 451IO                                                               S S
11931 452IO                                                               S S
11932 453IO                                                               S S
11933 454IO                                                               S S
11934 455IO                                                               S S
11935 456IO                                                               S S
11936 457IO                                                               S S
11937 458IO                                                               S S
11938 459IO                                                               S S
11939 460IO                                                               S S
11940 461IO                                                               S S
11941 462IO                                                               S S
11942 463IO                                                               S S
11943 464IO                                                               S S
11944 465IO                                                               S S
11945 466IO                                                               S S
11946 467IO                                                               S S
11947 468IO                                                               S S
11948 469IO                                                               S S
11949 470IO                                                               S S
11950 471IO                                                               S S
11951 472IO                                                               S S
11952 473IO                                                               S S
11953 474IO                                                               S S
11954 475IO                                                               S S
11955 476IO                                                               S S
11956 477IO                                                               S S
11957 478IO                                                               S S
11958 479IO                                                               S S
11959 480IO                                                               S S
12000 481IO                                                               S S
12001 482IO                                                               S S
12002 483IO                                                               S S
12003 484IO                                                               S S
12004 485IO                                                               S S
12005 486IO                                                               S S
12006 487I                                                                S S
12007 488I                                                              S   S
12008 489I                                                              S   S
12009 490I                                                              S   S
12010 491I                                                              S   S
12011 492I                                                              S   S
12012 493I                                                              S   S
12013 494I                                                              S   S
12014 495I                                                              S   S
12015 496I                                                              S   S
12016 497I                                                              S   S
12017 498I                                                              S   S
```







RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	9A_10	30.	3.08	4.	2.	2.	.02		
+	ROUTED TO	DETAIN	9.	3.37	3.	2.	2.	.02	500.15	3.37

*** NORMAL END OF HEC-1 ***

25 - YEAR


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   02JUL14  TIME  12:56:55   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```

```
X    X  XXXXXXX  XXXXX          X
X    X  X      X     X        XX
X    X  X      X              X
XXXXXX  XXXX   X        XXXXX  X
X    X  X      X              X
X    X  X      X     X        X
X    X  XXXXXXX  XXXXX        XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

                        *DIAGRAM
*** FREE ***
               1        ID   BMR NVE UNIT 14
               2        ID   UNDERGROUND DETENTION BASIN 9A
               3        ID   15009_H
               4        IT       1 01JAN90    1200     800
               5        IO       5        0

               6        KK   9A_25
               7        KM   RATIONAL METHOD HYDROGRAPH PROGRAM
               8        KM   COPYRIGHT 1992, RICK ENGINEERING COMPANY
               9        KM   6HR RAINFALL IS  2.3  INCHES
              10        KM   RATIONAL METHOD RUNOFF COEFFICIENT IS  .9
              11        KM   RATIONAL METHOD TIME OF CONCENTRATION IS  10  MIN.
              12        KM   FOR THIS DATA TO RUN PROPERLY THIS IT CARD MUST BE ADDED TO YOUR HEC-1
              13        KM   IT 2 01JAN90 1200 200
              14        BA   .0186
              15        IN      10 01JAN90    1155
              16        QI       0        0      1.5      1.6      1.6      1.7      1.8      1.9        2      2.1
              17        QI     2.2      2.4      2.6      2.9      3.2      3.7      4.4      5.6      8.2    34.89
              18        QI    18.2      6.6      4.9        4      3.5      3.1      2.8      2.5      2.3      2.2
              19        QI       2      1.9      1.8      1.7      1.7      1.6      1.5      1.5        0        0
              20        QI       0        0        0        0        0        0        0        0

              21        KK  DETAIN
              22        KO       2        2        0        0       21
              23        RS       1     STOR       -1
              24        SV       0    0.135    0.271    0.406    0.541    0.677    0.767
              25        SE  495.22   496.22   497.22   498.22   499.22   500.22   500.89
              26        SQ       0     0.16     0.81     1.73     2.87     4.13     4.76     5.32     5.82     6.40
              27        SQ    6.93     7.88     8.77     9.31    10.42     11.2
              28        SE  495.22   495.42   495.82   496.22   496.62   497.02   497.42   497.82   498.22   498.72
              29        SE  499.02   499.42   499.82   500.15   500.62   500.89
              30        ZZ
```

1 SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    6       9A_25
            V
            V
   21      DETAIN

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   02JUL14  TIME  12:56:55   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```


BMR NVE UNIT 14
UNDERGROUND DETENTION BASIN 9A
15009_H

```
  5 IO          OUTPUT CONTROL VARIABLES
                     IPRNT         5  PRINT CONTROL
                     IPLOT         0  PLOT CONTROL
                     QSCAL        0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                     NMIN          1  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1JAN90  STARTING DATE
                    ITIME        1200  STARTING TIME
                       NQ         800  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     2JAN90  ENDING DATE
                    NDTIME        0119  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL      .02 HOURS
                      TOTAL TIME BASE   13.32 HOURS

        ENGLISH UNITS
             DRAINAGE AREA        SQUARE MILES
             PRECIPITATION DEPTH  INCHES
```

LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-FEET
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

```
21 KK      ***************
           *             *
           *   DETAIN    *
           *             *
           ***************

22 KO          OUTPUT CONTROL VARIABLES
                     IPRNT         2  PRINT CONTROL
                     IPLOT         2  PLOT CONTROL
                     QSCAL        0.  HYDROGRAPH PLOT SCALE
                     IPNCH         0  PUNCH COMPUTED HYDROGRAPH
                      IOUT        21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1         1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2       800  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT      .017  TIME INTERVAL IN HOURS

               HYDROGRAPH ROUTING DATA

23 RS          STORAGE ROUTING
                     NSTPS         1  NUMBER OF SUBREACHES
                      ITYP      STOR  TYPE OF INITIAL CONDITION
                    RSVRIC     -1.00  INITIAL CONDITION
                         X       .00 WORKING R AND D COEFFICIENT

24 SV            STORAGE          .0       .1       .3       .4       .5       .7       .8

25 SE            ELEVATION     495.22   496.22   497.22   498.22   499.22   500.22   500.89

26 SQ            DISCHARGE         0.       0.       1.       2.       3.       4.       5.       5.       6.       6.
                                   7.       8.       9.       9.      10.      11.

28 SE            ELEVATION     495.22   495.42   495.82   496.22   496.62   497.02   497.42   497.82   498.22   498.72
                               499.02   499.42   499.82   500.15   500.62   500.89
                                                          ***
                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

              STORAGE          .00      .03      .08      .14      .19      .24      .27      .30      .35      .41
              OUTFLOW          .00      .16      .81     1.73     2.87     4.13     4.45     4.76     5.32     5.82
            ELEVATION       495.22   495.42   495.82   496.22   496.62   497.02   497.22   497.42   497.82   498.22

              STORAGE          .47      .51      .54      .57      .62      .67      .68      .73      .77
              OUTFLOW         6.40     6.93     7.40     7.88     8.77     9.31     9.48    10.42    11.20
            ELEVATION       498.72   499.02   499.22   499.42   499.82   500.15   500.22   500.62   500.89
```

HYDROGRAPH AT STATION DETAIN

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1	JAN	1200	1	0.	.0	495.2	1	JAN	1627	268	6.	.4	498.2	1	JAN	2054	535	0.	.0	495.4
1	JAN	1201	2	0.	.0	495.2	1	JAN	1628	269	6.	.4	498.1	1	JAN	2055	536	0.	.0	495.4
1	JAN	1202	3	0.	.0	495.2	1	JAN	1629	270	6.	.4	498.1	1	JAN	2056	537	0.	.0	495.4
1	JAN	1203	4	0.	.0	495.2	1	JAN	1630	271	6.	.4	498.1	1	JAN	2057	538	0.	.0	495.4
1	JAN	1204	5	0.	.0	495.2	1	JAN	1631	272	6.	.4	498.0	1	JAN	2058	539	0.	.0	495.4
1	JAN	1205	6	0.	.0	495.2	1	JAN	1632	273	6.	.4	498.0	1	JAN	2059	540	0.	.0	495.4
1	JAN	1206	7	0.	.0	495.2	1	JAN	1633	274	6.	.4	498.0	1	JAN	2100	541	0.	.0	495.4
1	JAN	1207	8	0.	.0	495.2	1	JAN	1634	275	5.	.4	498.0	1	JAN	2101	542	0.	.0	495.4
1	JAN	1208	9	0.	.0	495.2	1	JAN	1635	276	5.	.4	497.9	1	JAN	2102	543	0.	.0	495.4
1	JAN	1209	10	0.	.0	495.2	1	JAN	1636	277	5.	.4	497.9	1	JAN	2103	544	0.	.0	495.4
1	JAN	1210	11	0.	.0	495.2	1	JAN	1637	278	5.	.4	497.9	1	JAN	2104	545	0.	.0	495.4
1	JAN	1211	12	0.	.0	495.2	1	JAN	1638	279	5.	.4	497.8	1	JAN	2105	546	0.	.0	495.4
1	JAN	1212	13	0.	.0	495.3	1	JAN	1639	280	5.	.3	497.8	1	JAN	2106	547	0.	.0	495.4
1	JAN	1213	14	0.	.0	495.3	1	JAN	1640	281	5.	.3	497.8	1	JAN	2107	548	0.	.0	495.4
1	JAN	1214	15	0.	.0	495.3	1	JAN	1641	282	5.	.3	497.7	1	JAN	2108	549	0.	.0	495.4
1	JAN	1215	16	0.	.0	495.3	1	JAN	1642	283	5.	.3	497.7	1	JAN	2109	550	0.	.0	495.4
1	JAN	1216	17	0.	.0	495.3	1	JAN	1643	284	5.	.3	497.7	1	JAN	2110	551	0.	.0	495.4
1	JAN	1217	18	0.	.0	495.3	1	JAN	1644	285	5.	.3	497.6	1	JAN	2111	552	0.	.0	495.4
1	JAN	1218	19	0.	.0	495.4	1	JAN	1645	286	5.	.3	497.6	1	JAN	2112	553	0.	.0	495.4
1	JAN	1219	20	0.	.0	495.4	1	JAN	1646	287	5.	.3	497.6	1	JAN	2113	554	0.	.0	495.4
1	JAN	1220	21	0.	.0	495.4	1	JAN	1647	288	5.	.3	497.6	1	JAN	2114	555	0.	.0	495.4
1	JAN	1221	22	0.	.0	495.4	1	JAN	1648	289	5.	.3	497.5	1	JAN	2115	556	0.	.0	495.4
1	JAN	1222	23	0.	.0	495.4	1	JAN	1649	290	5.	.3	497.5	1	JAN	2116	557	0.	.0	495.4
1	JAN	1223	24	0.	.0	495.4	1	JAN	1650	291	5.	.3	497.5	1	JAN	2117	558	0.	.0	495.4
1	JAN	1224	25	0.	.0	495.4	1	JAN	1651	292	5.	.3	497.4	1	JAN	2118	559	0.	.0	495.3
1	JAN	1225	26	0.	.0	495.4	1	JAN	1652	293	5.	.3	497.4	1	JAN	2119	560	0.	.0	495.3
1	JAN	1226	27	0.	.0	495.5	1	JAN	1653	294	5.	.3	497.4	1	JAN	2120	561	0.	.0	495.3
1	JAN	1227	28	0.	.0	495.5	1	JAN	1654	295	5.	.3	497.4	1	JAN	2121	562	0.	.0	495.3
1	JAN	1228	29	0.	.0	495.5	1	JAN	1655	296	5.	.3	497.3	1	JAN	2122	563	0.	.0	495.3
1	JAN	1229	30	0.	.0	495.5	1	JAN	1656	297	5.	.3	497.3	1	JAN	2123	564	0.	.0	495.3
1	JAN	1230	31	0.	.0	495.5	1	JAN	1657	298	5.	.3	497.3	1	JAN	2124	565	0.	.0	495.3
1	JAN	1231	32	0.	.0	495.5	1	JAN	1658	299	5.	.3	497.3	1	JAN	2125	566	0.	.0	495.3
1	JAN	1232	33	0.	.0	495.5	1	JAN	1659	300	4.	.3	497.2	1	JAN	2126	567	0.	.0	495.3
1	JAN	1233	34	0.	.0	495.5	1	JAN	1700	301	4.	.3	497.2	1	JAN	2127	568	0.	.0	495.3
1	JAN	1234	35	0.	.0	495.6	1	JAN	1701	302	4.	.3	497.2	1	JAN	2128	569	0.	.0	495.3
1	JAN	1235	36	0.	.0	495.6	1	JAN	1702	303	4.	.3	497.2	1	JAN	2129	570	0.	.0	495.3
1	JAN	1236	37	0.	.0	495.6	1	JAN	1703	304	4.	.3	497.1	1	JAN	2130	571	0.	.0	495.3
1	JAN	1237	38	0.	.1	495.6	1	JAN	1704	305	4.	.3	497.1	1	JAN	2131	572	0.	.0	495.3
1	JAN	1238	39	0.	.1	495.6	1	JAN	1705	306	4.	.3	497.1	1	JAN	2132	573	0.	.0	495.3
1	JAN	1239	40	0.	.1	495.6	1	JAN	1706	307	4.	.2	497.1	1	JAN	2133	574	0.	.0	495.3
1	JAN	1240	41	1.	.1	495.6	1	JAN	1707	308	4.	.2	497.0	1	JAN	2134	575	0.	.0	495.3
1	JAN	1241	42	1.	.1	495.6	1	JAN	1708	309	4.	.2	497.0	1	JAN	2135	576	0.	.0	495.3
1	JAN	1242	43	1.	.1	495.7	1	JAN	1709	310	4.	.2	497.0	1	JAN	2136	577	0.	.0	495.3
1	JAN	1243	44	1.	.1	495.7	1	JAN	1710	311	4.	.2	497.0	1	JAN	2137	578	0.	.0	495.3
1	JAN	1244	45	1.	.1	495.7	1	JAN	1711	312	4.	.2	496.9	1	JAN	2138	579	0.	.0	495.3
1	JAN	1245	46	1.	.1	495.7	1	JAN	1712	313	4.	.2	496.9	1	JAN	2139	580	0.	.0	495.3
1	JAN	1246	47	1.	.1	495.7	1	JAN	1713	314	4.	.2	496.9	1	JAN	2140	581	0.	.0	495.3
1	JAN	1247	48	1.	.1	495.7	1	JAN	1714	315	4.	.2	496.9	1	JAN	2141	582	0.	.0	495.3
1	JAN	1248	49	1.	.1	495.7	1	JAN	1715	316	4.	.2	496.9	1	JAN	2142	583	0.	.0	495.3
1	JAN	1249	50	1.	.1	495.7	1	JAN	1716	317	4.	.2	496.9	1	JAN	2143	584	0.	.0	495.3
1	JAN	1250	51	1.	.1	495.7	1	JAN	1717	318	4.	.2	496.8	1	JAN	2144	585	0.	.0	495.3
1	JAN	1251	52	1.	.1	495.8	1	JAN	1718	319	3.	.2	496.8	1	JAN	2145	586	0.	.0	495.3
1	JAN	1252	53	1.	.1	495.8	1	JAN	1719	320	3.	.2	496.8	1	JAN	2146	587	0.	.0	495.3
1	JAN	1253	54	1.	.1	495.8	1	JAN	1720	321	3.	.2	496.8	1	JAN	2147	588	0.	.0	495.3
1	JAN	1254	55	1.	.1	495.8	1	JAN	1721	322	3.	.2	496.8	1	JAN	2148	589	0.	.0	495.3
1	JAN	1255	56	1.	.1	495.8	1	JAN	1722	323	3.	.2	496.7	1	JAN	2149	590	0.	.0	495.3
1	JAN	1256	57	1.	.1	495.8	1	JAN	1723	324	3.	.2	496.7	1	JAN	2150	591	0.	.0	495.3

1 JAN 1257	58	1.	.1	495.8 *	1 JAN 1724	325	3.	.2	496.7 *	1 JAN 2151	592	0.	.0	495.3
1 JAN 1258	59	1.	.1	495.8 *	1 JAN 1725	326	3.	.2	496.7 *	1 JAN 2152	593	0.	.0	495.3
1 JAN 1259	60	1.	.1	495.8 *	1 JAN 1726	327	3.	.2	496.7 *	1 JAN 2153	594	0.	.0	495.3
1 JAN 1300	61	1.	.1	495.8 *	1 JAN 1727	328	3.	.2	496.7 *	1 JAN 2154	595	0.	.0	495.3
1 JAN 1301	62	1.	.1	495.9 *	1 JAN 1728	329	3.	.2	496.7 *	1 JAN 2155	596	0.	.0	495.3
1 JAN 1302	63	1.	.1	495.9 *	1 JAN 1729	330	3.	.2	496.6 *	1 JAN 2156	597	0.	.0	495.3
1 JAN 1303	64	1.	.1	495.9 *	1 JAN 1730	331	3.	.2	496.6 *	1 JAN 2157	598	0.	.0	495.3
1 JAN 1304	65	1.	.1	495.9 *	1 JAN 1731	332	3.	.2	496.6 *	1 JAN 2158	599	0.	.0	495.3
1 JAN 1305	66	1.	.1	495.9 *	1 JAN 1732	333	3.	.2	496.6 *	1 JAN 2159	600	0.	.0	495.3
1 JAN 1306	67	1.	.1	495.9 *	1 JAN 1733	334	3.	.2	496.6 *	1 JAN 2200	601	0.	.0	495.3
1 JAN 1307	68	1.	.1	495.9 *	1 JAN 1734	335	3.	.2	496.6 *	1 JAN 2201	602	0.	.0	495.3
1 JAN 1308	69	1.	.1	495.9 *	1 JAN 1735	336	3.	.2	496.6 *	1 JAN 2202	603	0.	.0	495.3
1 JAN 1309	70	1.	.1	495.9 *	1 JAN 1736	337	3.	.2	496.6 *	1 JAN 2203	604	0.	.0	495.3
1 JAN 1310	71	1.	.1	495.9 *	1 JAN 1737	338	3.	.2	496.6 *	1 JAN 2204	605	0.	.0	495.3
1 JAN 1311	72	1.	.1	496.0 *	1 JAN 1738	339	3.	.2	496.5 *	1 JAN 2205	606	0.	.0	495.3
1 JAN 1312	73	1.	.1	496.0 *	1 JAN 1739	340	3.	.2	496.5 *	1 JAN 2206	607	0.	.0	495.3
1 JAN 1313	74	1.	.1	496.0 *	1 JAN 1740	341	3.	.2	496.5 *	1 JAN 2207	608	0.	.0	495.3
1 JAN 1314	75	1.	.1	496.0 *	1 JAN 1741	342	3.	.2	496.5 *	1 JAN 2208	609	0.	.0	495.3
1 JAN 1315	76	1.	.1	496.0 *	1 JAN 1742	343	3.	.2	496.5 *	1 JAN 2209	610	0.	.0	495.3
1 JAN 1316	77	1.	.1	496.0 *	1 JAN 1743	344	3.	.2	496.5 *	1 JAN 2210	611	0.	.0	495.3
1 JAN 1317	78	1.	.1	496.0 *	1 JAN 1744	345	3.	.2	496.5 *	1 JAN 2211	612	0.	.0	495.3
1 JAN 1318	79	1.	.1	496.0 *	1 JAN 1745	346	2.	.2	496.5 *	1 JAN 2212	613	0.	.0	495.3
1 JAN 1319	80	1.	.1	496.0 *	1 JAN 1746	347	2.	.2	496.5 *	1 JAN 2213	614	0.	.0	495.3
1 JAN 1320	81	1.	.1	496.0 *	1 JAN 1747	348	2.	.2	496.5 *	1 JAN 2214	615	0.	.0	495.3
1 JAN 1321	82	1.	.1	496.0 *	1 JAN 1748	349	2.	.2	496.5 *	1 JAN 2215	616	0.	.0	495.3
1 JAN 1322	83	1.	.1	496.0 *	1 JAN 1749	350	2.	.2	496.4 *	1 JAN 2216	617	0.	.0	495.3
1 JAN 1323	84	1.	.1	496.0 *	1 JAN 1750	351	2.	.2	496.4 *	1 JAN 2217	618	0.	.0	495.3
1 JAN 1324	85	1.	.1	496.1 *	1 JAN 1751	352	2.	.2	496.4 *	1 JAN 2218	619	0.	.0	495.3
1 JAN 1325	86	1.	.1	496.1 *	1 JAN 1752	353	2.	.2	496.4 *	1 JAN 2219	620	0.	.0	495.3
1 JAN 1326	87	1.	.1	496.1 *	1 JAN 1753	354	2.	.2	496.4 *	1 JAN 2220	621	0.	.0	495.3
1 JAN 1327	88	1.	.1	496.1 *	1 JAN 1754	355	2.	.2	496.4 *	1 JAN 2221	622	0.	.0	495.3
1 JAN 1328	89	1.	.1	496.1 *	1 JAN 1755	356	2.	.2	496.4 *	1 JAN 2222	623	0.	.0	495.3
1 JAN 1329	90	1.	.1	496.1 *	1 JAN 1756	357	2.	.2	496.4 *	1 JAN 2223	624	0.	.0	495.3
1 JAN 1330	91	1.	.1	496.1 *	1 JAN 1757	358	2.	.2	496.4 *	1 JAN 2224	625	0.	.0	495.3
1 JAN 1331	92	1.	.1	496.1 *	1 JAN 1758	359	2.	.2	496.4 *	1 JAN 2225	626	0.	.0	495.3
1 JAN 1332	93	1.	.1	496.1 *	1 JAN 1759	360	2.	.2	496.4 *	1 JAN 2226	627	0.	.0	495.3
1 JAN 1333	94	2.	.1	496.1 *	1 JAN 1800	361	2.	.2	496.4 *	1 JAN 2227	628	0.	.0	495.3
1 JAN 1334	95	2.	.1	496.1 *	1 JAN 1801	362	2.	.2	496.4 *	1 JAN 2228	629	0.	.0	495.3
1 JAN 1335	96	2.	.1	496.1 *	1 JAN 1802	363	2.	.2	496.4 *	1 JAN 2229	630	0.	.0	495.3
1 JAN 1336	97	2.	.1	496.1 *	1 JAN 1803	364	2.	.2	496.3 *	1 JAN 2230	631	0.	.0	495.3
1 JAN 1337	98	2.	.1	496.1 *	1 JAN 1804	365	2.	.2	496.3 *	1 JAN 2231	632	0.	.0	495.3
1 JAN 1338	99	2.	.1	496.2 *	1 JAN 1805	366	2.	.2	496.3 *	1 JAN 2232	633	0.	.0	495.3
1 JAN 1339	100	2.	.1	496.2 *	1 JAN 1806	367	2.	.1	496.3 *	1 JAN 2233	634	0.	.0	495.3
1 JAN 1340	101	2.	.1	496.2 *	1 JAN 1807	368	2.	.1	496.3 *	1 JAN 2234	635	0.	.0	495.3
1 JAN 1341	102	2.	.1	496.2 *	1 JAN 1808	369	2.	.1	496.3 *	1 JAN 2235	636	0.	.0	495.3
1 JAN 1342	103	2.	.1	496.2 *	1 JAN 1809	370	2.	.1	496.3 *	1 JAN 2236	637	0.	.0	495.3
1 JAN 1343	104	2.	.1	496.2 *	1 JAN 1810	371	2.	.1	496.3 *	1 JAN 2237	638	0.	.0	495.3
1 JAN 1344	105	2.	.1	496.2 *	1 JAN 1811	372	2.	.1	496.3 *	1 JAN 2238	639	0.	.0	495.3
1 JAN 1345	106	2.	.1	496.2 *	1 JAN 1812	373	2.	.1	496.3 *	1 JAN 2239	640	0.	.0	495.3
1 JAN 1346	107	2.	.1	496.2 *	1 JAN 1813	374	2.	.1	496.2 *	1 JAN 2240	641	0.	.0	495.3
1 JAN 1347	108	2.	.1	496.2 *	1 JAN 1814	375	2.	.1	496.2 *	1 JAN 2241	642	0.	.0	495.3
1 JAN 1348	109	2.	.1	496.2 *	1 JAN 1815	376	2.	.1	496.2 *	1 JAN 2242	643	0.	.0	495.3
1 JAN 1349	110	2.	.1	496.2 *	1 JAN 1816	377	2.	.1	496.2 *	1 JAN 2243	644	0.	.0	495.3
1 JAN 1350	111	2.	.1	496.2 *	1 JAN 1817	378	2.	.1	496.2 *	1 JAN 2244	645	0.	.0	495.3
1 JAN 1351	112	2.	.1	496.2 *	1 JAN 1818	379	2.	.1	496.2 *	1 JAN 2245	646	0.	.0	495.3
1 JAN 1352	113	2.	.1	496.3 *	1 JAN 1819	380	2.	.1	496.1 *	1 JAN 2246	647	0.	.0	495.3
1 JAN 1353	114	2.	.1	496.3 *	1 JAN 1820	381	2.	.1	496.1 *	1 JAN 2247	648	0.	.0	495.3
1 JAN 1354	115	2.	.1	496.3 *	1 JAN 1821	382	1.	.1	496.1 *	1 JAN 2248	649	0.	.0	495.3
1 JAN 1355	116	2.	.1	496.3 *	1 JAN 1822	383	1.	.1	496.1 *	1 JAN 2249	650	0.	.0	495.3
1 JAN 1356	117	2.	.1	496.3 *	1 JAN 1823	384	1.	.1	496.1 *	1 JAN 2250	651	0.	.0	495.3
1 JAN 1357	118	2.	.1	496.3 *	1 JAN 1824	385	1.	.1	496.1 *	1 JAN 2251	652	0.	.0	495.3
1 JAN 1358	119	2.	.1	496.3 *	1 JAN 1825	386	1.	.1	496.1 *	1 JAN 2252	653	0.	.0	495.3
1 JAN 1359	120	2.	.1	496.3 *	1 JAN 1826	387	1.	.1	496.0 *	1 JAN 2253	654	0.	.0	495.3
1 JAN 1400	121	2.	.1	496.3 *	1 JAN 1827	388	1.	.1	496.0 *	1 JAN 2254	655	0.	.0	495.3
1 JAN 1401	122	2.	.1	496.3 *	1 JAN 1828	389	1.	.1	496.0 *	1 JAN 2255	656	0.	.0	495.3
1 JAN 1402	123	2.	.1	496.3 *	1 JAN 1829	390	1.	.1	496.0 *	1 JAN 2256	657	0.	.0	495.3
1 JAN 1403	124	2.	.2	496.3 *	1 JAN 1830	391	1.	.1	496.0 *	1 JAN 2257	658	0.	.0	495.3
1 JAN 1404	125	2.	.2	496.3 *	1 JAN 1831	392	1.	.1	496.0 *	1 JAN 2258	659	0.	.0	495.3
1 JAN 1405	126	2.	.2	496.4 *	1 JAN 1832	393	1.	.1	496.0 *	1 JAN 2259	660	0.	.0	495.3
1 JAN 1406	127	2.	.2	496.4 *	1 JAN 1833	394	1.	.1	496.0 *	1 JAN 2300	661	0.	.0	495.3
1 JAN 1407	128	2.	.2	496.4 *	1 JAN 1834	395	1.	.1	495.9 *	1 JAN 2301	662	0.	.0	495.3
1 JAN 1408	129	2.	.2	496.4 *	1 JAN 1835	396	1.	.1	495.9 *	1 JAN 2302	663	0.	.0	495.3
1 JAN 1409	130	2.	.2	496.4 *	1 JAN 1836	397	1.	.1	495.9 *	1 JAN 2303	664	0.	.0	495.3
1 JAN 1410	131	2.	.2	496.4 *	1 JAN 1837	398	1.	.1	495.9 *	1 JAN 2304	665	0.	.0	495.3
1 JAN 1411	132	2.	.2	496.4 *	1 JAN 1838	399	1.	.1	495.9 *	1 JAN 2305	666	0.	.0	495.3
1 JAN 1412	133	2.	.2	496.4 *	1 JAN 1839	400	1.	.1	495.9 *	1 JAN 2306	667	0.	.0	495.3
1 JAN 1413	134	2.	.2	496.4 *	1 JAN 1840	401	1.	.1	495.9 *	1 JAN 2307	668	0.	.0	495.3
1 JAN 1414	135	2.	.2	496.4 *	1 JAN 1841	402	1.	.1	495.9 *	1 JAN 2308	669	0.	.0	495.3
1 JAN 1415	136	2.	.2	496.4 *	1 JAN 1842	403	1.	.1	495.9 *	1 JAN 2309	670	0.	.0	495.3
1 JAN 1416	137	2.	.2	496.4 *	1 JAN 1843	404	1.	.1	495.9 *	1 JAN 2310	671	0.	.0	495.3
1 JAN 1417	138	2.	.2	496.5 *	1 JAN 1844	405	1.	.1	495.8 *	1 JAN 2311	672	0.	.0	495.3
1 JAN 1418	139	2.	.2	496.5 *	1 JAN 1845	406	1.	.1	495.8 *	1 JAN 2312	673	0.	.0	495.3
1 JAN 1419	140	2.	.2	496.5 *	1 JAN 1846	407	1.	.1	495.8 *	1 JAN 2313	674	0.	.0	495.3
1 JAN 1420	141	2.	.2	496.5 *	1 JAN 1847	408	1.	.1	495.8 *	1 JAN 2314	675	0.	.0	495.3
1 JAN 1421	142	3.	.2	496.5 *	1 JAN 1848	409	1.	.1	495.8 *	1 JAN 2315	676	0.	.0	495.3
1 JAN 1422	143	3.	.2	496.5 *	1 JAN 1849	410	1.	.1	495.8 *	1 JAN 2316	677	0.	.0	495.3
1 JAN 1423	144	3.	.2	496.5 *	1 JAN 1850	411	1.	.1	495.8 *	1 JAN 2317	678	0.	.0	495.3
1 JAN 1424	145	3.	.2	496.5 *	1 JAN 1851	412	1.	.1	495.8 *	1 JAN 2318	679	0.	.0	495.3
1 JAN 1425	146	3.	.2	496.5 *	1 JAN 1852	413	1.	.1	495.8 *	1 JAN 2319	680	0.	.0	495.3
1 JAN 1426	147	3.	.2	496.5 *	1 JAN 1853	414	1.	.1	495.8 *	1 JAN 2320	681	0.	.0	495.3
1 JAN 1427	148	3.	.2	496.6 *	1 JAN 1854	415	1.	.1	495.8 *	1 JAN 2321	682	0.	.0	495.3
1 JAN 1428	149	3.	.2	496.6 *	1 JAN 1855	416	1.	.1	495.8 *	1 JAN 2322	683	0.	.0	495.3
1 JAN 1429	150	3.	.2	496.6 *	1 JAN 1856	417	1.	.1	495.8 *	1 JAN 2323	684	0.	.0	495.3
1 JAN 1430	151	3.	.2	496.6 *	1 JAN 1857	418	1.	.1	495.7 *	1 JAN 2324	685	0.	.0	495.3
1 JAN 1431	152	3.	.2	496.6 *	1 JAN 1858	419	1.	.1	495.7 *	1 JAN 2325	686	0.	.0	495.3
1 JAN 1432	153	3.	.2	496.6 *	1 JAN 1859	420	1.	.1	495.7 *	1 JAN 2326	687	0.	.0	495.3
1 JAN 1433	154	3.	.2	496.6 *	1 JAN 1900	421	1.	.1	495.7 *	1 JAN 2327	688	0.	.0	495.3
1 JAN 1434	155	3.	.2	496.6 *	1 JAN 1901	422	1.	.1	495.7 *	1 JAN 2328	689	0.	.0	495.3
1 JAN 1435	156	3.	.2	496.7 *	1 JAN 1902	423	1.	.1	495.7 *	1 JAN 2329	690	0.	.0	495.3
1 JAN 1436	157	3.	.2	496.7 *	1 JAN 1903	424	1.	.1	495.7 *	1 JAN 2330	691	0.	.0	495.3
1 JAN 1437	158	3.	.2	496.7 *	1 JAN 1904	425	1.	.1	495.7 *	1 JAN 2331	692	0.	.0	495.3
1 JAN 1438	159	3.	.2	496.7 *	1 JAN 1905	426	1.	.1	495.7 *	1 JAN 2332	693	0.	.0	495.3
1 JAN 1439	160	3.	.2	496.7 *	1 JAN 1906	427	1.	.1	495.7 *	1 JAN 2333	694	0.	.0	495.3
1 JAN 1440	161	3.	.2	496.7 *	1 JAN 1907	428	1.	.1	495.7 *	1 JAN 2334	695	0.	.0	495.3
1 JAN 1441	162	3.	.2	496.8 *	1 JAN 1908	429	1.	.1	495.7 *	1 JAN 2335	696	0.	.0	495.3
1 JAN 1442	163	3.	.2	496.8 *	1 JAN 1909	430	1.	.1	495.7 *	1 JAN 2336	697	0.	.0	495.3
1 JAN 1443	164	3.	.2	496.8 *	1 JAN 1910	431	1.	.1	495.7 *	1 JAN 2337	698	0.	.0	495.3
1 JAN 1444	165	3.	.2	496.8 *	1 JAN 1911	432	1.	.1	495.7 *	1 JAN 2338	699	0.	.0	495.3
1 JAN 1445	166	4.	.2	496.8 *	1 JAN 1912	433	1.	.1	495.7 *	1 JAN 2339	700	0.	.0	495.3
1 JAN 1446	167	4.	.2	496.9 *	1 JAN 1913	434	1.	.1	495.6 *	1 JAN 2340	701	0.	.0	495.3
1 JAN 1447	168	4.	.2	496.9 *	1 JAN 1914	435	1.	.1	495.6 *	1 JAN 2341	702	0.	.0	495.3
1 JAN 1448	169	4.	.2	496.9 *	1 JAN 1915	436	1.	.1	495.6 *	1 JAN 2342	703	0.	.0	495.3
1 JAN 1449	170	4.	.2	496.9 *	1 JAN 1916	437	1.	.1	495.6 *	1 JAN 2343	704	0.	.0	495.3
1 JAN 1450	171	4.	.2	497.0 *	1 JAN 1917	438	0.	.1	495.6 *	1 JAN 2344	705	0.	.0	495.3
1 JAN 1451	172	4.	.2	497.0 *	1 JAN 1918	439	0.	.1	495.6 *	1 JAN 2345	706	0.	.0	495.3
1 JAN 1452	173	4.	.2	497.0 *	1 JAN 1919	440	0.	.1	495.6 *	1 JAN 2346	707	0.	.0	495.3
1 JAN 1453	174	4.	.2	497.1 *	1 JAN 1920	441	0.	.1	495.6 *	1 JAN 2347	708	0.	.0	495.3
1 JAN 1454	175	4.	.3	497.1 *	1 JAN 1921	442	0.	.1	495.6 *	1 JAN 2348	709	0.	.0	495.3
1 JAN 1455	176	4.	.3	497.1 *	1 JAN 1922	443	0.	.1	495.6 *	1 JAN 2349	710	0.	.0	495.3
1 JAN 1456	177	4.	.3	497.2 *	1 JAN 1923	444	0.	.1	495.6 *	1 JAN 2350	711	0.	.0	495.3
1 JAN 1457	178	5.	.3	497.3 *	1 JAN 1924	445	0.	.1	495.6 *	1 JAN 2351	712	0.	.0	495.3
1 JAN 1458	179	5.	.3	497.4 *	1 JAN 1925	446	0.	.0	495.6 *	1 JAN 2352	713	0.	.0	495.3
1 JAN 1459	180	5.	.3	497.5 *	1 JAN 1926	447	0.	.0	495.6 *	1 JAN 2353	714	0.	.0	495.3

1	JAN	1500	181	5.	.3	497.7	*	1	JAN	1927	448	0.	.0	495.6	*	1	JAN	2354	715	0.	.0	495.3
1	JAN	1501	182	5.	.4	497.8	*	1	JAN	1928	449	0.	.0	495.6	*	1	JAN	2355	716	0.	.0	495.3
1	JAN	1502	183	6.	.4	498.0	*	1	JAN	1929	450	0.	.0	495.6	*	1	JAN	2356	717	0.	.0	495.3
1	JAN	1503	184	6.	.4	498.3	*	1	JAN	1930	451	0.	.0	495.6	*	1	JAN	2357	718	0.	.0	495.3
1	JAN	1504	185	6.	.4	498.5	*	1	JAN	1931	452	0.	.0	495.6	*	1	JAN	2358	719	0.	.0	495.3
1	JAN	1505	186	7.	.5	498.8	*	1	JAN	1932	453	0.	.0	495.6	*	1	JAN	2359	720	0.	.0	495.3
1	JAN	1506	187	7.	.5	499.1	*	1	JAN	1933	454	0.	.0	495.6	*	2	JAN	0000	721	0.	.0	495.3
1	JAN	1507	188	8.	.6	499.3	*	1	JAN	1934	455	0.	.0	495.6	*	2	JAN	0001	722	0.	.0	495.3
1	JAN	1508	189	8.	.6	499.6	*	1	JAN	1935	456	0.	.0	495.5	*	2	JAN	0002	723	0.	.0	495.3
1	JAN	1509	190	9.	.6	499.8	*	1	JAN	1936	457	0.	.0	495.5	*	2	JAN	0003	724	0.	.0	495.3
1	JAN	1510	191	9.	.6	500.0	*	1	JAN	1937	458	0.	.0	495.5	*	2	JAN	0004	725	0.	.0	495.3
1	JAN	1511	192	9.	.7	500.1	*	1	JAN	1938	459	0.	.0	495.5	*	2	JAN	0005	726	0.	.0	495.3
1	JAN	1512	193	10.	.7	500.3	*	1	JAN	1939	460	0.	.0	495.5	*	2	JAN	0006	727	0.	.0	495.3
1	JAN	1513	194	10.	.7	500.4	*	1	JAN	1940	461	0.	.0	495.5	*	2	JAN	0007	728	0.	.0	495.3
1	JAN	1514	195	10.	.7	500.5	*	1	JAN	1941	462	0.	.0	495.5	*	2	JAN	0008	729	0.	.0	495.3
1	JAN	1515	196	10.	.7	500.6	*	1	JAN	1942	463	0.	.0	495.5	*	2	JAN	0009	730	0.	.0	495.3
1	JAN	1516	197	11.	.7	500.7	*	1	JAN	1943	464	0.	.0	495.5	*	2	JAN	0010	731	0.	.0	495.3
1	JAN	1517	198	11.	.7	500.7	*	1	JAN	1944	465	0.	.0	495.5	*	2	JAN	0011	732	0.	.0	495.3
1	JAN	1518	199	11.	.8	500.8	*	1	JAN	1945	466	0.	.0	495.5	*	2	JAN	0012	733	0.	.0	495.3
1	JAN	1519	200	11.	.8	500.8	*	1	JAN	1946	467	0.	.0	495.5	*	2	JAN	0013	734	0.	.0	495.3
1	JAN	1520	201	11.	.8	500.8	*	1	JAN	1947	468	0.	.0	495.5	*	2	JAN	0014	735	0.	.0	495.3
1	JAN	1521	202	11.	.8	500.8	*	1	JAN	1948	469	0.	.0	495.5	*	2	JAN	0015	736	0.	.0	495.3
1	JAN	1522	203	11.	.8	500.8	*	1	JAN	1949	470	0.	.0	495.5	*	2	JAN	0016	737	0.	.0	495.3
1	JAN	1523	204	11.	.8	500.8	*	1	JAN	1950	471	0.	.0	495.5	*	2	JAN	0017	738	0.	.0	495.3
1	JAN	1524	205	11.	.8	500.8	*	1	JAN	1951	472	0.	.0	495.5	*	2	JAN	0018	739	0.	.0	495.2
1	JAN	1525	206	11.	.7	500.8	*	1	JAN	1952	473	0.	.0	495.5	*	2	JAN	0019	740	0.	.0	495.2
1	JAN	1526	207	11.	.7	500.7	*	1	JAN	1953	474	0.	.0	495.5	*	2	JAN	0020	741	0.	.0	495.2
1	JAN	1527	208	11.	.7	500.7	*	1	JAN	1954	475	0.	.0	495.5	*	2	JAN	0021	742	0.	.0	495.2
1	JAN	1528	209	10.	.7	500.6	*	1	JAN	1955	476	0.	.0	495.5	*	2	JAN	0022	743	0.	.0	495.2
1	JAN	1529	210	10.	.7	500.6	*	1	JAN	1956	477	0.	.0	495.5	*	2	JAN	0023	744	0.	.0	495.2
1	JAN	1530	211	10.	.7	500.5	*	1	JAN	1957	478	0.	.0	495.5	*	2	JAN	0024	745	0.	.0	495.2
1	JAN	1531	212	10.	.7	500.5	*	1	JAN	1958	479	0.	.0	495.5	*	2	JAN	0025	746	0.	.0	495.2
1	JAN	1532	213	10.	.7	500.4	*	1	JAN	1959	480	0.	.0	495.5	*	2	JAN	0026	747	0.	.0	495.2
1	JAN	1533	214	10.	.7	500.4	*	1	JAN	2000	481	0.	.0	495.5	*	2	JAN	0027	748	0.	.0	495.2
1	JAN	1534	215	10.	.7	500.4	*	1	JAN	2001	482	0.	.0	495.5	*	2	JAN	0028	749	0.	.0	495.2
1	JAN	1535	216	10.	.7	500.3	*	1	JAN	2002	483	0.	.0	495.5	*	2	JAN	0029	750	0.	.0	495.2
1	JAN	1536	217	10.	.7	500.3	*	1	JAN	2003	484	0.	.0	495.5	*	2	JAN	0030	751	0.	.0	495.2
1	JAN	1537	218	9.	.7	500.2	*	1	JAN	2004	485	0.	.0	495.5	*	2	JAN	0031	752	0.	.0	495.2
1	JAN	1538	219	9.	.7	500.2	*	1	JAN	2005	486	0.	.0	495.5	*	2	JAN	0032	753	0.	.0	495.2
1	JAN	1539	220	9.	.7	500.1	*	1	JAN	2006	487	0.	.0	495.5	*	2	JAN	0033	754	0.	.0	495.2
1	JAN	1540	221	9.	.7	500.1	*	1	JAN	2007	488	0.	.0	495.5	*	2	JAN	0034	755	0.	.0	495.2
1	JAN	1541	222	9.	.6	500.0	*	1	JAN	2008	489	0.	.0	495.5	*	2	JAN	0035	756	0.	.0	495.2
1	JAN	1542	223	9.	.6	500.0	*	1	JAN	2009	490	0.	.0	495.4	*	2	JAN	0036	757	0.	.0	495.2
1	JAN	1543	224	9.	.6	499.9	*	1	JAN	2010	491	0.	.0	495.4	*	2	JAN	0037	758	0.	.0	495.2
1	JAN	1544	225	9.	.6	499.9	*	1	JAN	2011	492	0.	.0	495.4	*	2	JAN	0038	759	0.	.0	495.2
1	JAN	1545	226	9.	.6	499.8	*	1	JAN	2012	493	0.	.0	495.4	*	2	JAN	0039	760	0.	.0	495.2
1	JAN	1546	227	9.	.6	499.8	*	1	JAN	2013	494	0.	.0	495.4	*	2	JAN	0040	761	0.	.0	495.2
1	JAN	1547	228	9.	.6	499.7	*	1	JAN	2014	495	0.	.0	495.4	*	2	JAN	0041	762	0.	.0	495.2
1	JAN	1548	229	8.	.6	499.7	*	1	JAN	2015	496	0.	.0	495.4	*	2	JAN	0042	763	0.	.0	495.2
1	JAN	1549	230	8.	.6	499.6	*	1	JAN	2016	497	0.	.0	495.4	*	2	JAN	0043	764	0.	.0	495.2
1	JAN	1550	231	8.	.6	499.6	*	1	JAN	2017	498	0.	.0	495.4	*	2	JAN	0044	765	0.	.0	495.2
1	JAN	1551	232	8.	.6	499.5	*	1	JAN	2018	499	0.	.0	495.4	*	2	JAN	0045	766	0.	.0	495.2
1	JAN	1552	233	8.	.6	499.5	*	1	JAN	2019	500	0.	.0	495.4	*	2	JAN	0046	767	0.	.0	495.2
1	JAN	1553	234	8.	.6	499.5	*	1	JAN	2020	501	0.	.0	495.4	*	2	JAN	0047	768	0.	.0	495.2
1	JAN	1554	235	8.	.6	499.4	*	1	JAN	2021	502	0.	.0	495.4	*	2	JAN	0048	769	0.	.0	495.2
1	JAN	1555	236	8.	.6	499.4	*	1	JAN	2022	503	0.	.0	495.4	*	2	JAN	0049	770	0.	.0	495.2
1	JAN	1556	237	8.	.6	499.3	*	1	JAN	2023	504	0.	.0	495.4	*	2	JAN	0050	771	0.	.0	495.2
1	JAN	1557	238	8.	.5	499.3	*	1	JAN	2024	505	0.	.0	495.4	*	2	JAN	0051	772	0.	.0	495.2
1	JAN	1558	239	7.	.5	499.2	*	1	JAN	2025	506	0.	.0	495.4	*	2	JAN	0052	773	0.	.0	495.2
1	JAN	1559	240	7.	.5	499.2	*	1	JAN	2026	507	0.	.0	495.4	*	2	JAN	0053	774	0.	.0	495.2
1	JAN	1600	241	7.	.5	499.2	*	1	JAN	2027	508	0.	.0	495.4	*	2	JAN	0054	775	0.	.0	495.2
1	JAN	1601	242	7.	.5	499.1	*	1	JAN	2028	509	0.	.0	495.4	*	2	JAN	0055	776	0.	.0	495.2
1	JAN	1602	243	7.	.5	499.1	*	1	JAN	2029	510	0.	.0	495.4	*	2	JAN	0056	777	0.	.0	495.2
1	JAN	1603	244	7.	.5	499.0	*	1	JAN	2030	511	0.	.0	495.4	*	2	JAN	0057	778	0.	.0	495.2
1	JAN	1604	245	7.	.5	499.0	*	1	JAN	2031	512	0.	.0	495.4	*	2	JAN	0058	779	0.	.0	495.2
1	JAN	1605	246	7.	.5	499.0	*	1	JAN	2032	513	0.	.0	495.4	*	2	JAN	0059	780	0.	.0	495.2
1	JAN	1606	247	7.	.5	498.9	*	1	JAN	2033	514	0.	.0	495.4	*	2	JAN	0100	781	0.	.0	495.2
1	JAN	1607	248	7.	.5	498.9	*	1	JAN	2034	515	0.	.0	495.4	*	2	JAN	0101	782	0.	.0	495.2
1	JAN	1608	249	7.	.5	498.8	*	1	JAN	2035	516	0.	.0	495.4	*	2	JAN	0102	783	0.	.0	495.2
1	JAN	1609	250	7.	.5	498.8	*	1	JAN	2036	517	0.	.0	495.4	*	2	JAN	0103	784	0.	.0	495.2
1	JAN	1610	251	6.	.5	498.8	*	1	JAN	2037	518	0.	.0	495.4	*	2	JAN	0104	785	0.	.0	495.2
1	JAN	1611	252	6.	.5	498.7	*	1	JAN	2038	519	0.	.0	495.4	*	2	JAN	0105	786	0.	.0	495.2
1	JAN	1612	253	6.	.5	498.7	*	1	JAN	2039	520	0.	.0	495.4	*	2	JAN	0106	787	0.	.0	495.2
1	JAN	1613	254	6.	.5	498.7	*	1	JAN	2040	521	0.	.0	495.4	*	2	JAN	0107	788	0.	.0	495.2
1	JAN	1614	255	6.	.5	498.6	*	1	JAN	2041	522	0.	.0	495.4	*	2	JAN	0108	789	0.	.0	495.2
1	JAN	1615	256	6.	.5	498.6	*	1	JAN	2042	523	0.	.0	495.4	*	2	JAN	0109	790	0.	.0	495.2
1	JAN	1616	257	6.	.5	498.6	*	1	JAN	2043	524	0.	.0	495.4	*	2	JAN	0110	791	0.	.0	495.2
1	JAN	1617	258	6.	.4	498.5	*	1	JAN	2044	525	0.	.0	495.4	*	2	JAN	0111	792	0.	.0	495.2
1	JAN	1618	259	6.	.4	498.5	*	1	JAN	2045	526	0.	.0	495.4	*	2	JAN	0112	793	0.	.0	495.2
1	JAN	1619	260	6.	.4	498.5	*	1	JAN	2046	527	0.	.0	495.4	*	2	JAN	0113	794	0.	.0	495.2
1	JAN	1620	261	6.	.4	498.4	*	1	JAN	2047	528	0.	.0	495.4	*	2	JAN	0114	795	0.	.0	495.2
1	JAN	1621	262	6.	.4	498.4	*	1	JAN	2048	529	0.	.0	495.4	*	2	JAN	0115	796	0.	.0	495.2
1	JAN	1622	263	6.	.4	498.4	*	1	JAN	2049	530	0.	.0	495.4	*	2	JAN	0116	797	0.	.0	495.2
1	JAN	1623	264	6.	.4	498.3	*	1	JAN	2050	531	0.	.0	495.4	*	2	JAN	0117	798	0.	.0	495.2
1	JAN	1624	265	6.	.4	498.3	*	1	JAN	2051	532	0.	.0	495.4	*	2	JAN	0118	799	0.	.0	495.2
1	JAN	1625	266	6.	.4	498.3	*	1	JAN	2052	533	0.	.0	495.4	*	2	JAN	0119	800	0.	.0	495.2
1	JAN	1626	267	6.	.4	498.2	*	1	JAN	2053	534	0.	.0	495.4	*							

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	13.32-HR	
+ (CFS)	(HR)					
		(CFS)				
+ 11.	3.35	4.	2.	2.	2.	
		(INCHES) 1.960	2.054	2.054	2.054	
		(AC-FT) 2.	2.	2.	2.	

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	13.32-HR
+ (AC-FT)	(HR)				
1.	3.35	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	13.32-HR
+ (FEET)	(HR)				
500.85	3.35	497.25	496.22	496.22	496.22

CUMULATIVE AREA = .02 SQ MI

1 STATION DETAIN

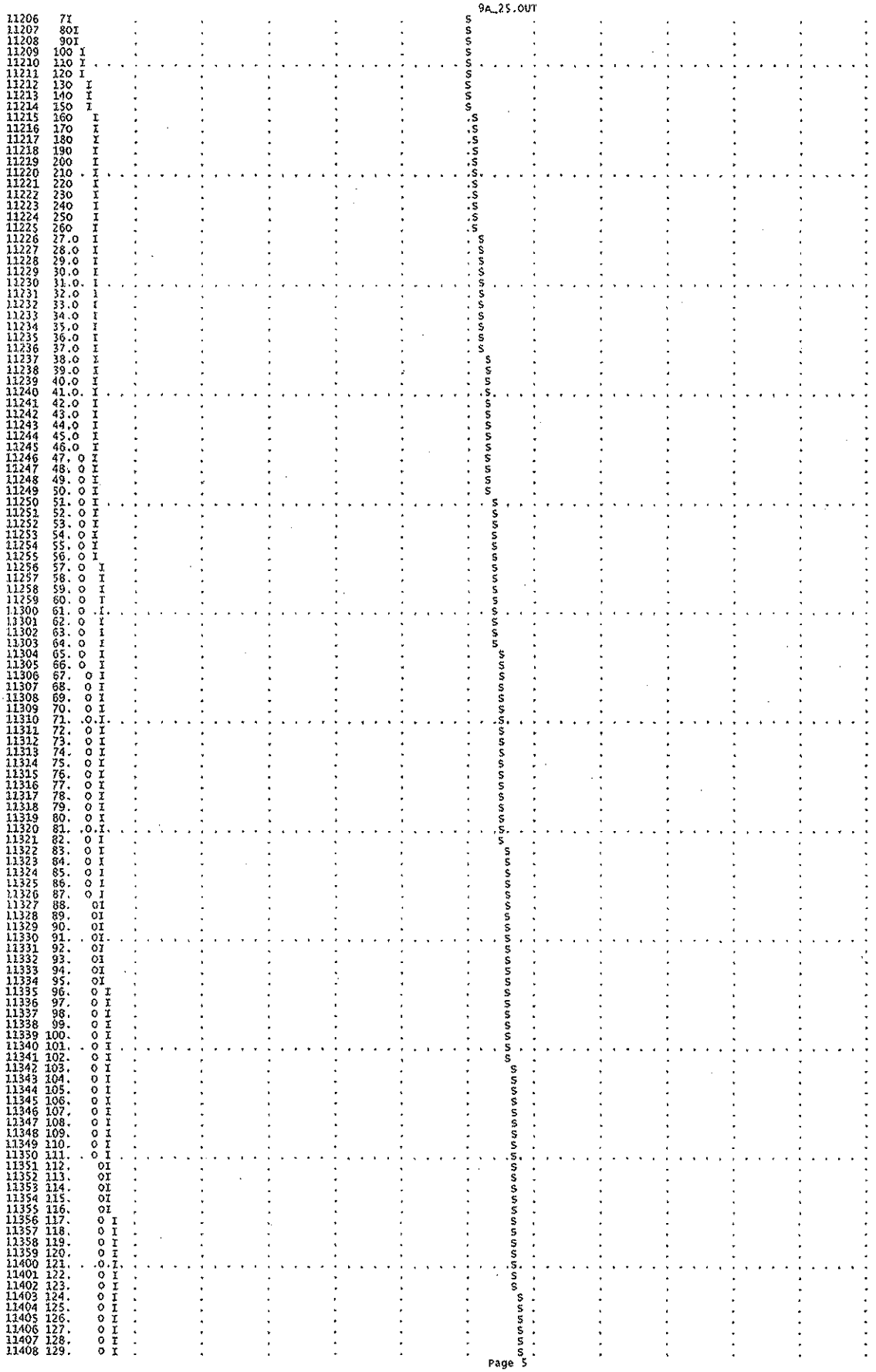
(I) INFLOW, (O) OUTFLOW

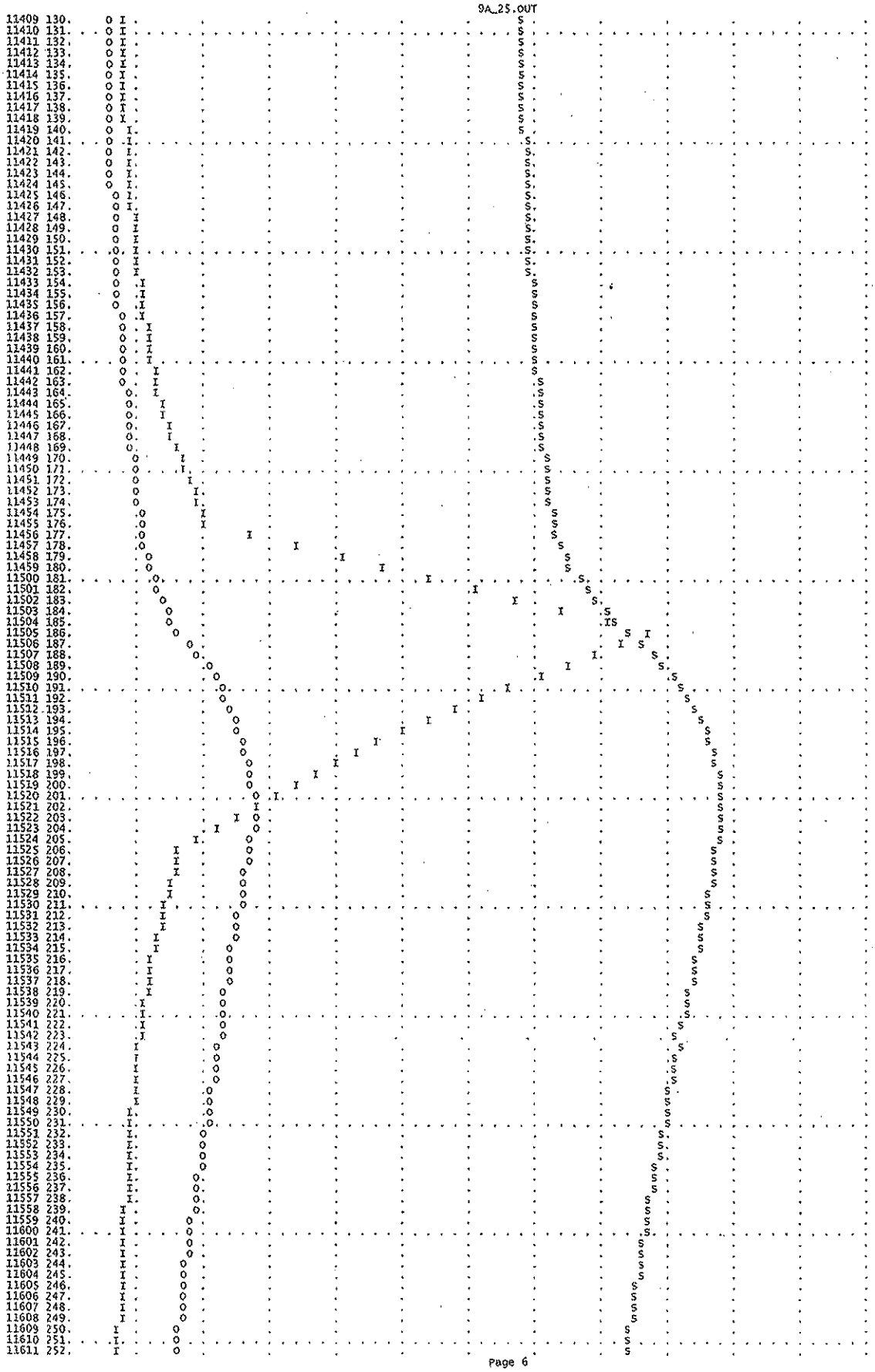
0. 4. 8. 12. 16. 20. 24. 28. 32. 36. 0. 0. 0.

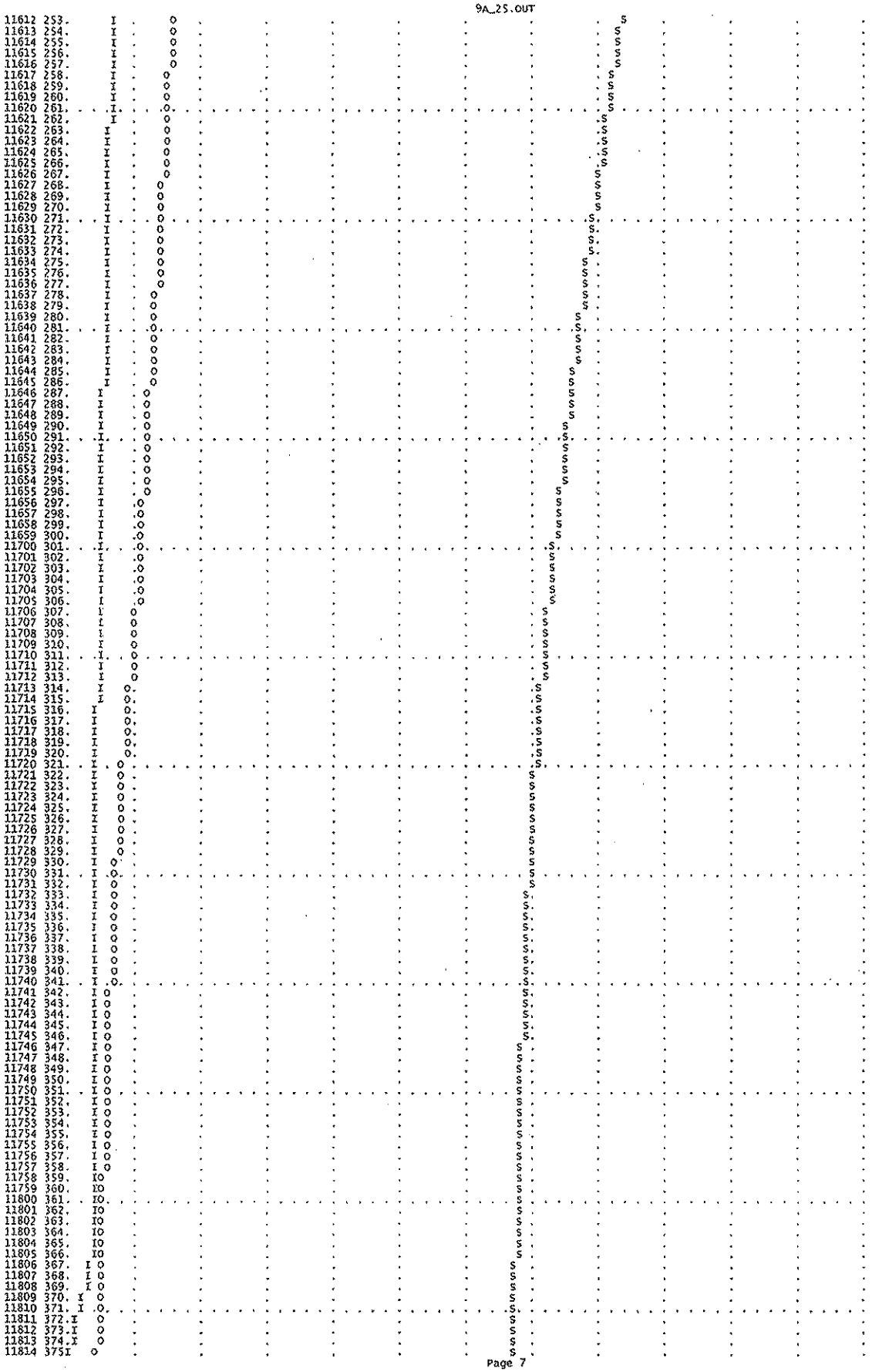
(S) STORAGE

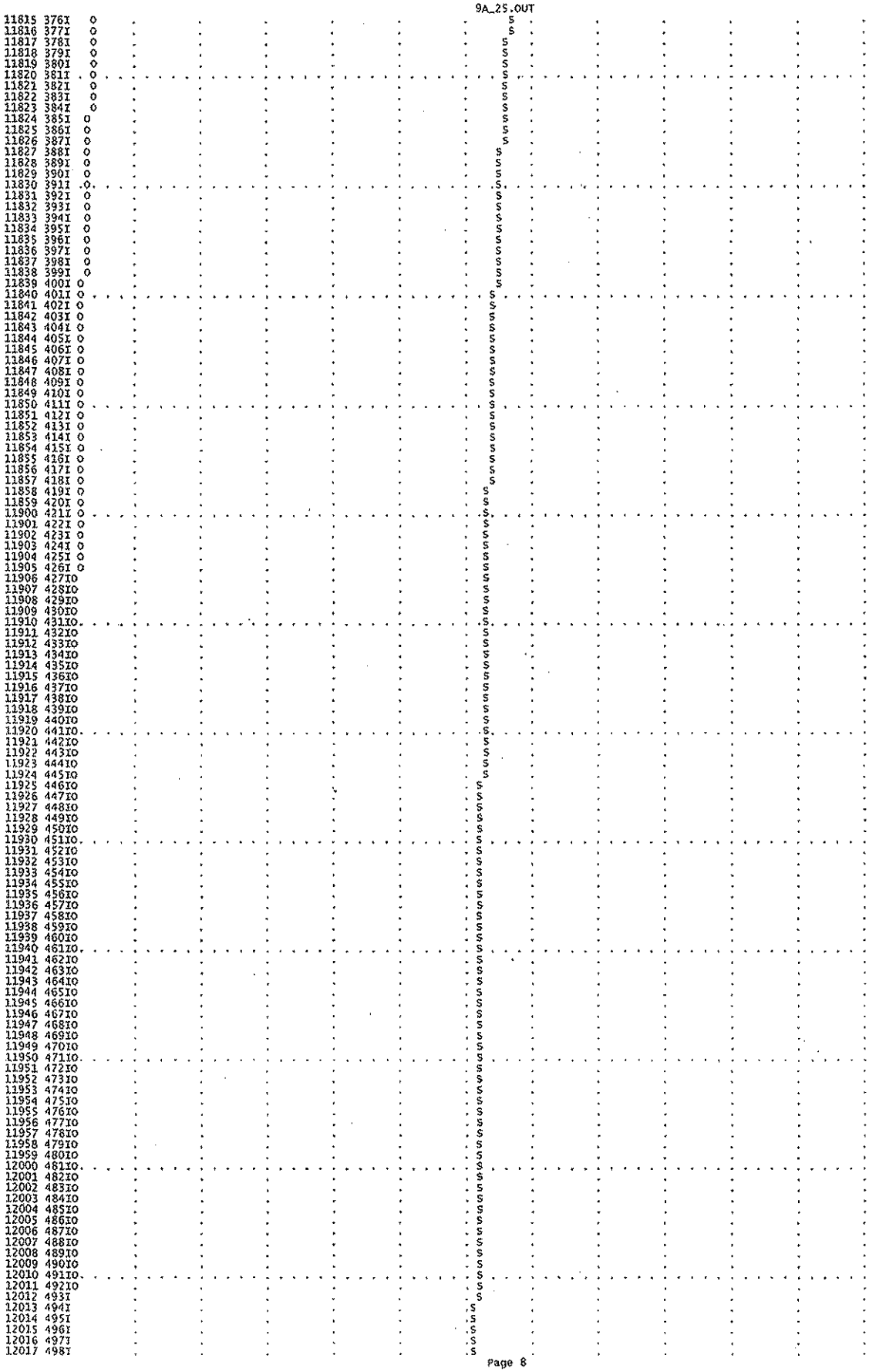
.0 .0 .0 .0 .0 .0 .0 .2 .4 .6 .8 .0 .0

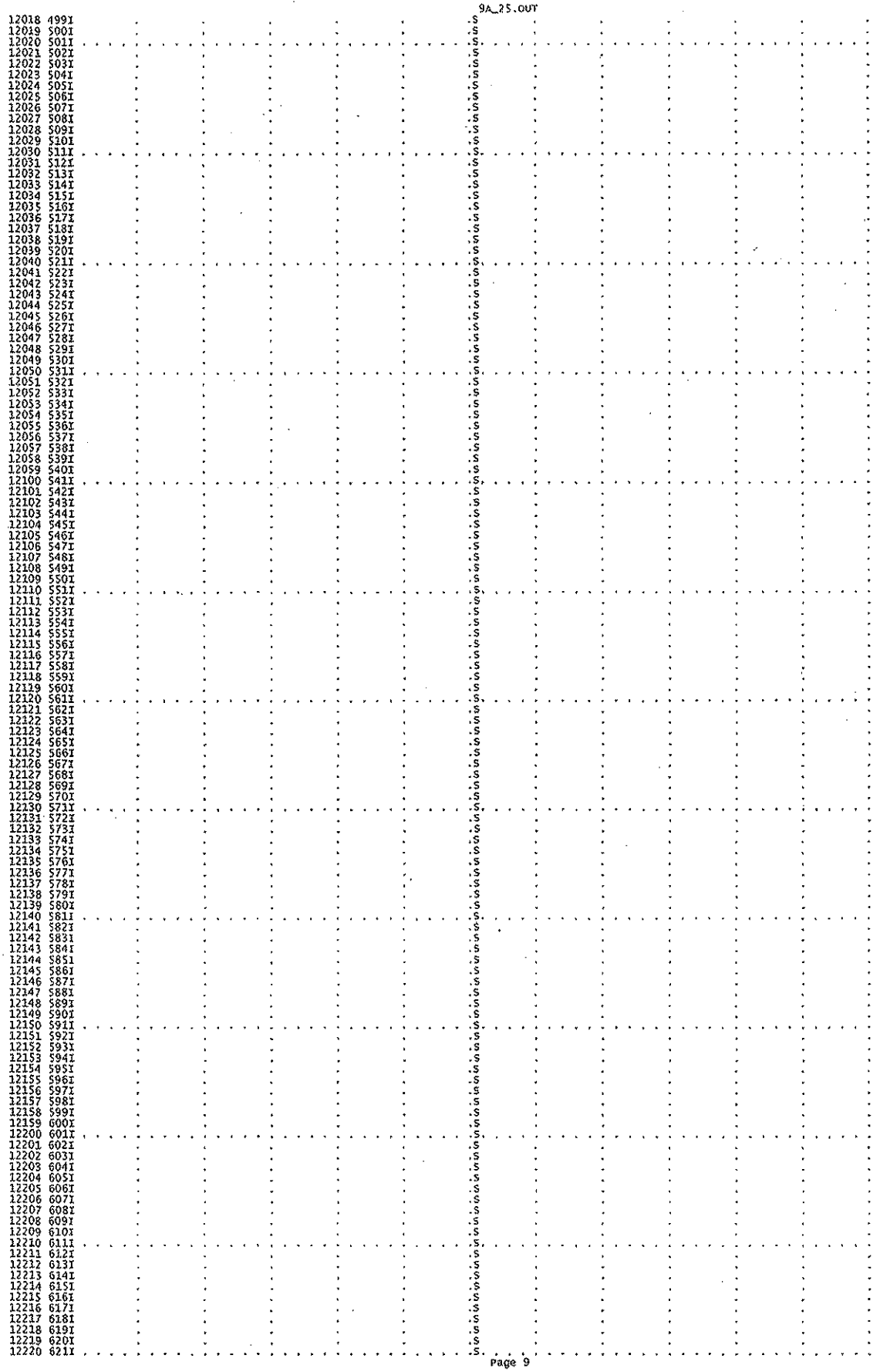
DAHRMN	PER													
11200	1I						S							
11201	2I	.	.	.	.	.	S	.	.	.	.	.	.	.
11202	3I	.	.	.	.	.	S	.	.	.	.	.	.	.
11203	4I	.	.	.	.	.	S	.	.	.	.	.	.	.
11204	5I	.	.	.	.	.	S	.	.	.	.	.	.	.
11205	6I	.	.	.	.	.	S	.	.	.	.	.	.	.

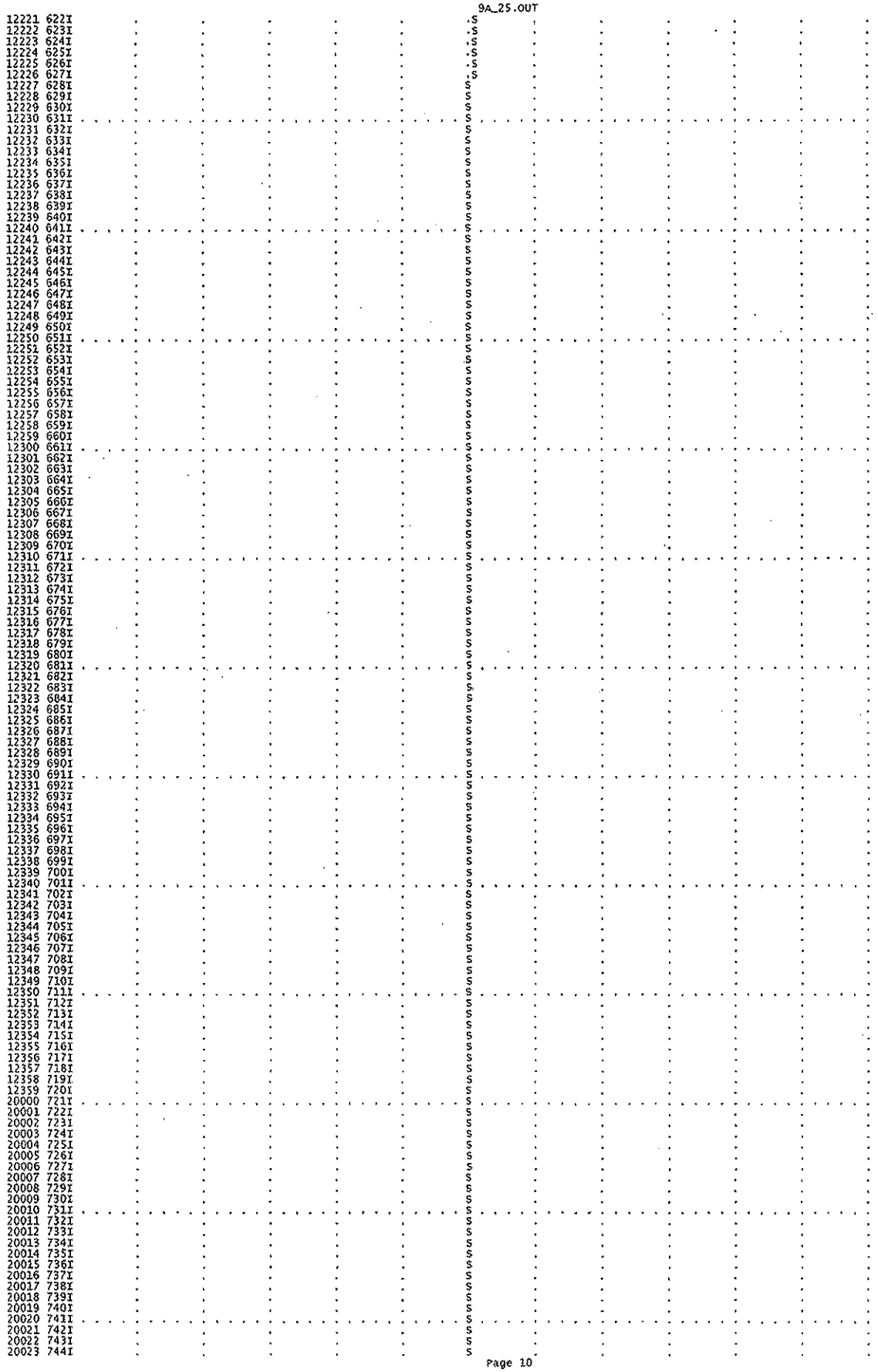


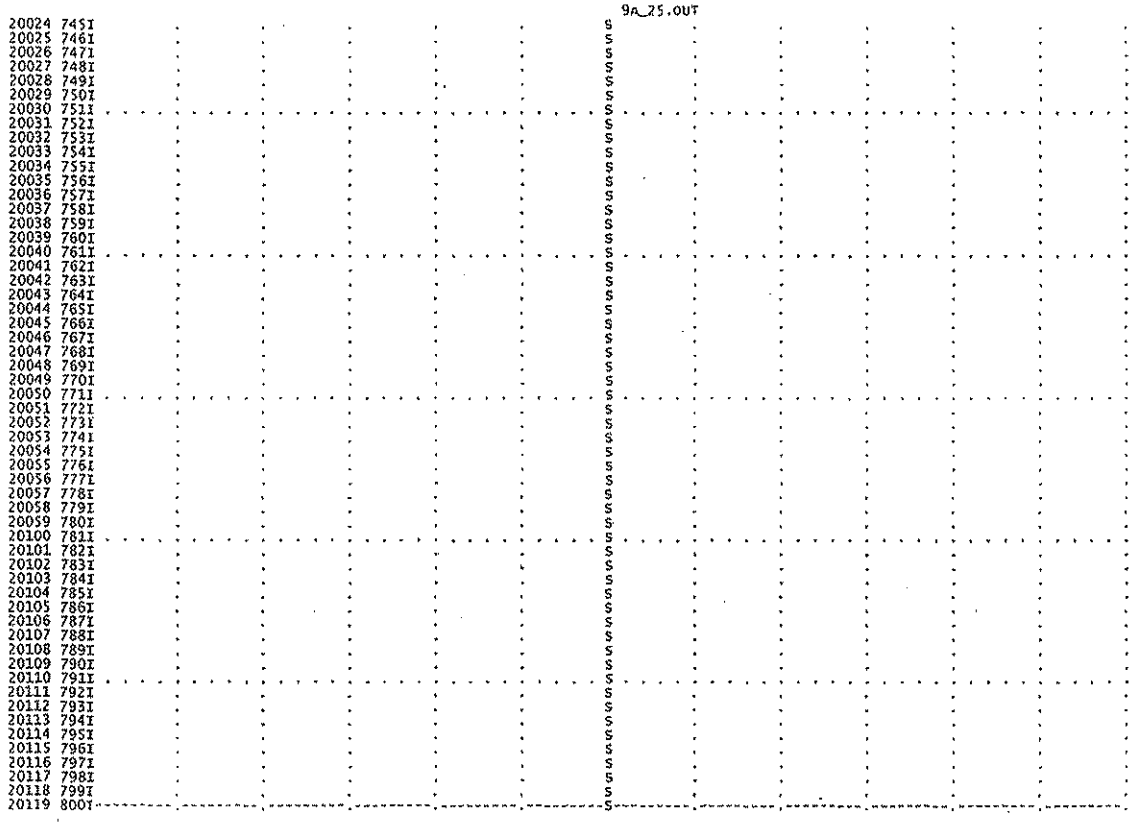












RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	9A_25	35.	3.08	4.	2.	2.	.02		
+	ROUTED TO	DETAIN	11.	3.35	4.	2.	2.	.02	500.85	3.35

*** NORMAL END OF HEC-1 ***

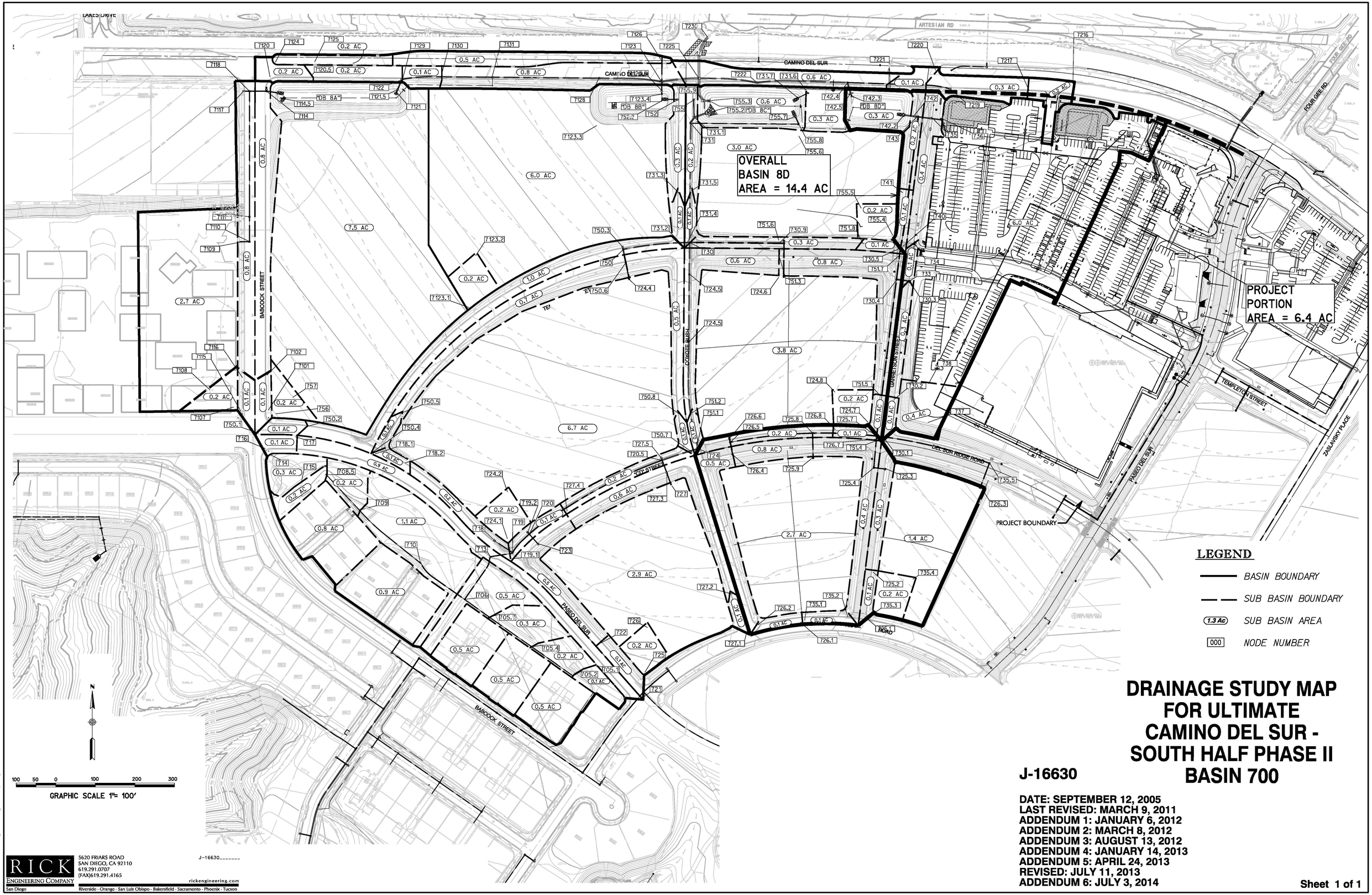
MAP POCKET 5

Drainage Study Map

For

Camino Del Sur South Half Phase II Basin 700

[Ultimate Condition]



LEGEND

- BASIN BOUNDARY
- SUB BASIN BOUNDARY
- (1.3 Ac) SUB BASIN AREA
- [000] NODE NUMBER

DRAINAGE STUDY MAP FOR ULTIMATE CAMINO DEL SUR - SOUTH HALF PHASE II BASIN 700

J-16630

DATE: SEPTEMBER 12, 2005
LAST REVISED: MARCH 9, 2011
ADDENDUM 1: JANUARY 6, 2012
ADDENDUM 2: MARCH 8, 2012
ADDENDUM 3: AUGUST 13, 2012
ADDENDUM 4: JANUARY 14, 2013
ADDENDUM 5: APRIL 24, 2013
REVISED: JULY 11, 2013
ADDENDUM 6: JULY 3, 2014

Sheet 1 of 1

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
rickengineering.com
Riverside - Orange - San Luis Obispo - Bakersfield - Sacramento - Phoenix - Tucson

J-16630_____

© 2014 Rick Engineering Company

N:\16630\Word\...\Camino Del Sur Phase II\Drainage Study\Exhibits\Basin 700.dgn
03-JUL-2014 12:05

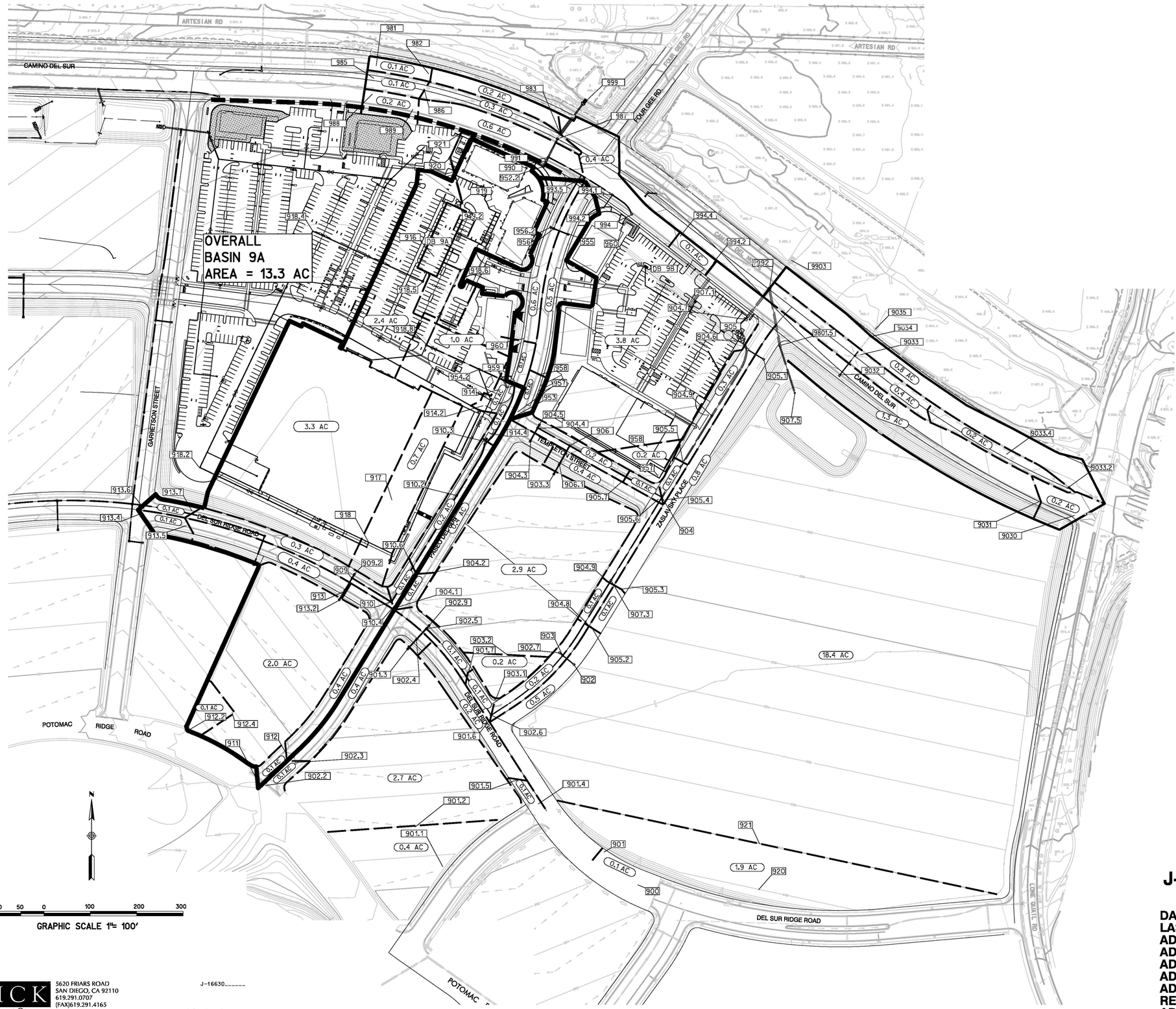
MAP POCKET 6

Drainage Study Map

For

Camino Del Sur South Half Phase II Basin 900

[Ultimate Condition]



LEGEND

- BASIN BOUNDARY
- SUB BASIN BOUNDARY
- (1.3 AC) SUB BASIN AREA
- [000] NODE NUMBER

DRAINAGE STUDY MAP FOR ULTIMATE CAMINO DEL SUR - SOUTH HALF PHASE II BASIN 900

J-16630

DATE: SEPTEMBER 12, 2005
LAST REVISED: MARCH 9, 2011
ADDENDUM 1: JANUARY 6, 2012
ADDENDUM 2: MARCH 8, 2012
ADDENDUM 3: AUGUST 13, 2012
ADDENDUM 4: JANUARY 14, 2013
ADDENDUM 5: APRIL 24, 2013
REVISED: JULY 11, 2013
ADDENDUM 6: JULY 3, 2014

Sheet 1 of 1

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
rickengineering.com
Riverside - Orange - San Luis Obispo - Bakersfield - Sacramento - Phoenix - Tucson

J-16630_____

© 2014 Rick Engineering Company

W:\16630\Hydro\...Const Change\16630Hist06.ut1+_Condo\Sur_atlas1+_Ph1 | _Basin900.dgn
W:\16630\Hydro\...Const Change\SD V7_5Yr6..dwr1.prt
03-JUL-2014 12:06

ATTACHMENT E

CAMINO DEL SUR

POC 1
Q_{100} =9.6 cfs
V_{100} =14.8 ps

S80°27'54"E 600.69'

L=66.20' R=40.00'
Δ=94°49'53"

S87°56'42"W 171.61'

S2°46'35"W 169.34'

TC FLOW PATH L=535 LF

Ⓐ
6.53 ACRES

S10°02'53"E 187.20'

S0°11'18"W 343.48'

N00°13'37"E 410.05'

N10°38'41"W 139.57'

L=519.26' R=970.00'
Δ=30°40'15"

COYOTE BUSH DRIVE

TEMPLETON STREET

STOP

10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00

(490) (500) (510)

30 15 0 30 60 90

SCALE: 1" = 30'

PLANS PREPARED BY:
SPEAR & ASSOCIATES, INC.
CIVIL ENGINEERING & LAND SURVEYING
475 PRODUCTION STREET, SAN MARCOS, CA 92078
PHONE (760) 736-2040 FAX (760) 736-4866
WWW.SPEARINC.NET

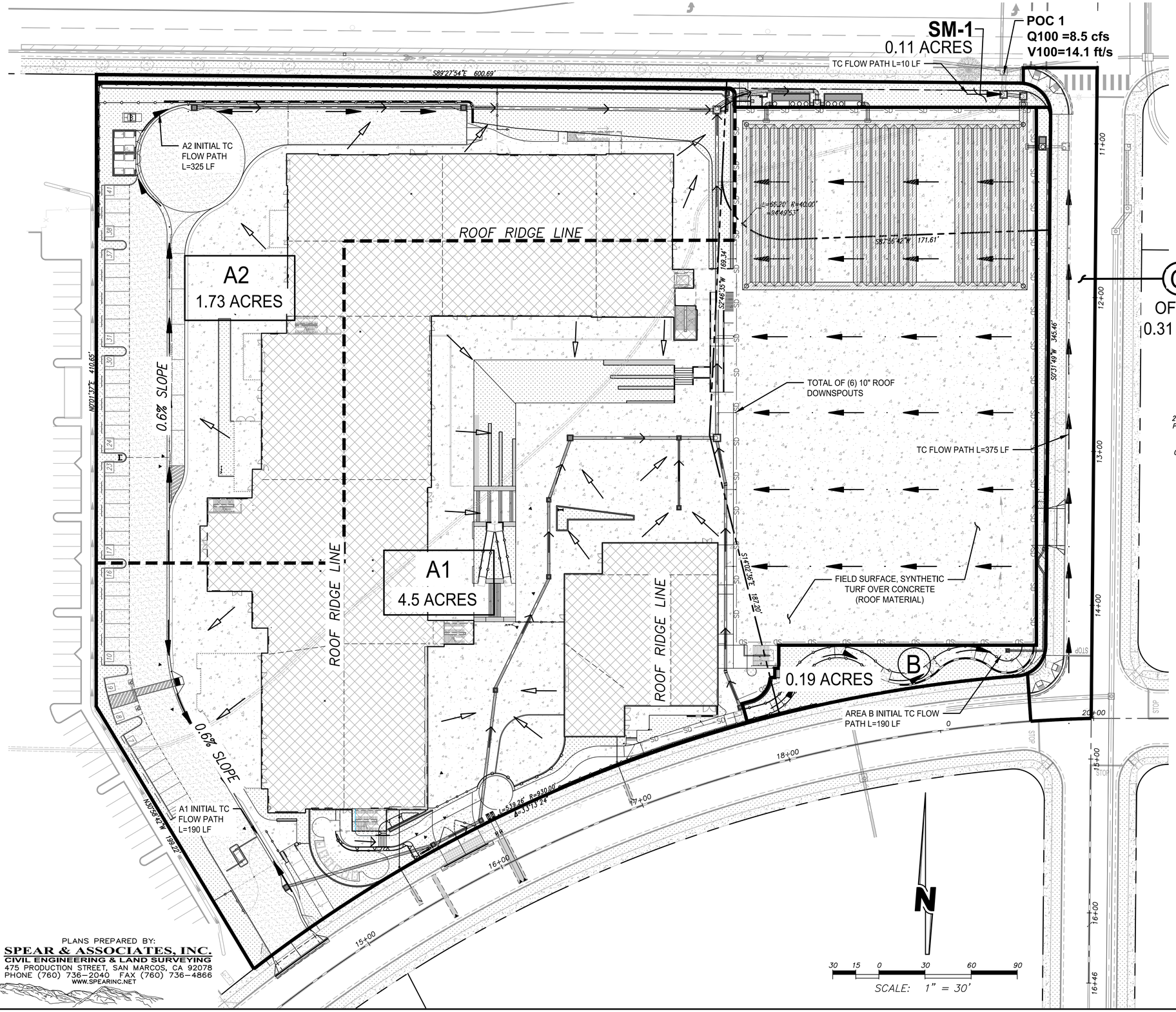
PRE-DEVELOPMENT DRAINAGE MANAGEMENT AREA FOR:

THE CAMBRIDGE SCHOOL

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 1 OF 1 SHEETS

PROJECT NO._____

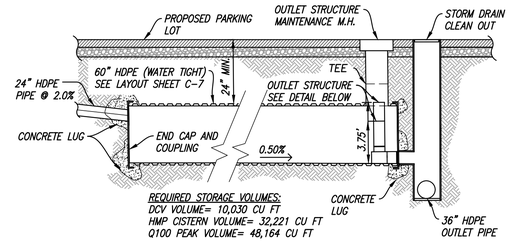
PLOT DATE: 8/12/2025 6:37 AM P:\JOBS\2023\23-121 CAMBRIDGE SCHOOL - TEMPLETON ST, SD - CAMBRIDGE SCHOOL\CAD\DMA\23-121 Pre Dev.dwg



DRAINAGE MANAGEMENT AREA TABLE						
SYMBOL	PROPOSED SURFACE	SOIL TYPE	DMA A	DMA B	SM-1	"O" OFFSITE COYOTE BUSH DR.
	ROOFTOPS	"C"	76,096 SF	0 SF	0 SF	0 SF
	NEW PAVEMENT (IMPERVIOUS)	"C"	28,576 SF	0 SF	0 SF	0 SF
	EX. PAVEMENT (IMPERVIOUS)	"C"	0 SF	0 SF	0 SF	10,768 SF
	CONCRETE WALKWAYS, HARDSCAPE, ETC.	"C"	104,845 SF	1,840 SF	0 SF	0 SF
	PROPOSED LANDSCAPING	"C"	61,737 SF	6,281 SF	4,917 SF	0 SF
	EX. LANDSCAPING	"C"	0 SF	0 SF	0 SF	2,300 SF
			271,254 SF	8,121 SF	4,917 SF	13,068 SF
			TOTAL ONSITE DMA SIZE: 284,292 SF			
			TOTAL ONSITE & OFFSITE DMA SIZE:			297,360 SF

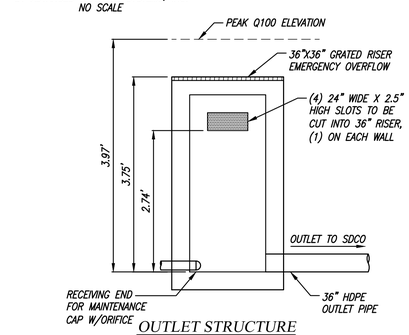
LEGEND OF SYMBOLS

- PROPERTY LINE
- DIRECTION OF DRAINAGE
- STORM DRAIN DIRECTION OF FLOW
- PROPOSED STORM DRAIN & CATCH BASIN (PVT)
- (A) DRAINAGE MANAGEMENT AREA DESIGNATION
- DRAINAGE AREA
- SUB-DRAINAGE AREA



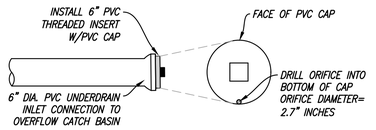
UNDERGROUND DETENTION

DETAIL FOR DETENTION PIPE SYSTEM BY ADVANCED DRAINAGE SYSTEMS, INC. NO SCALE



OUTLET STRUCTURE

INSIDE UNDERGROUND DETENTION NO SCALE



MAINTENANCE CAP DETAIL

ATTACH TO INTERIOR INLET PIPE OF THE OVERFLOW CATCH BASIN

PLANS PREPARED BY:
SPEAR & ASSOCIATES, INC.
CIVIL ENGINEERING & LAND SURVEYING
475 PRODUCTION STREET, SAN MARCOS, CA 92078
PHONE (760) 736-2040 FAX (760) 736-4866
WWW.SPEARINC.NET

POST DEVELOPMENT HYDROLOGY DRAINAGE MANAGEMENT AREA FOR:

THE CAMBRIDGE SCHOOL

"HYDROLOGY STUDY"

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 1 OF 1 SHEETS

PROJECT NO.

PLOT DATE: 2/24/2024 4:58 PM P:\JOBS\2023\23-121 CAMBRIDGE SCHOOL - TEMPLETON ST. SD - CAMBRIDGE SCHOOL\CAD\DMA\23-121 Post Dev-.dwg