Costa Verde Center Revitalization Project
Environmental Impact Report
SCH No. 2016071031; Project No. 477943

Appendix G1

Drainage Study

March 2020

Preliminary Drainage Study

COSTA VERDE CENTER

San Diego, Ca

Prepared for:

Regency Centers

COSTA VERDE CENTER

Preliminary Drainage Study

P.T.S. No. 477943
Drawing No. _____
IO No. _____

October 2019

Prepared for:

Regency Centers
420 Stevens Avenue, Suite 320
Solana Beach, CA 92075

Tom Eagling R.C.E. 75897

Contents

1 Introduction....1

2 Design Criteria and Methodology....1

3 Existing Conditions....1

4 Proposed Conditions....2

5 Conclusion....3

6 References....4

Tables

Table 3–1 Existing Conditions Peak Runoff....2

Table 4–1 Proposed Conditions Peak Runoff....3

Table 4–2 Underground Detention Basin Results Summary (POC 1)....3

Exhibits

Exhibit A Vicinity Map

Exhibit B Existing Drainage Exhibit

Exhibit C Proposed Drainage Exhibit

Appendices

Appendix A Hydrology Reference Material

Appendix B AES Hydrology Calculation Results

Appendix C Hydraflow Results

1 INTRODUCTION

The proposed Costa Verde Center project (herein referred to as "Project") is located at northwest corner of the intersection of Genesee Avenue and Nobel Drive in the City of San Diego. The Project has been previously developed as a commercial shopping center and will be redeveloped with retail, office space, and a hotel. Genesee Avenue improvements (including the addition of the Trolley as a part of the Midcoast Project) are also proposed and are planned to be interwoven into the proposed design for the Costa Verde Center, although not a part of this project.

The Project consists of a 13.86-acre property to be redeveloped as a commercial center. See **Exhibit A**, Vicinity Map.

2 DESIGN CRITERIA AND METHODOLOGY

Runoff calculations are based on the requirements outlined in the City of San Diego Hydrology Manual. The proposed pipes have been designed to accommodate a 50-year storm event. A runoff coefficient of 0.82 was utilized for this site, based on **Table 3-1**, Runoff Coefficients for Urban Areas, per the City of San Diego County Hydrology Manual. Copies of all reference material are included with this report. See **Appendix A** – Hydrology Reference Material.

Runoff calculations for both the proposed and existing conditions were performed using the Rational Method Computer Program Package, Advanced Engineering Software (AES), 2006 version. The method calculates times of concentration and runoff volumes using the criteria specified in the San Diego County Hydrology Manual. Copies of all runoff calculations made are included with this report. See **Appendix B** – AES Hydrology Calculation Results.

3 EXISTING CONDITIONS

The existing site has been developed as a commercial shopping center with several multi-level buildings and a large underground parking structure per the Costa Verde Improvement and Grading Plans, City of San Diego Drawing Number 22969-D, dated June 27, 1995. The existing storm drain within the right-of-way that serves the Project was constructed per the same set of plans. The total project site consists of two lots (lot 13 & 14), with lot 13 north of Esplanade Court and lot 14 to the south. These two lots form two separate hydrological basins with 2 separate discharge locations. Lot 13 as it exists today, consists of one commercial building with its associated parking lot. Surface runoff drains from east to west where it enters a grated inlet and is conveyed by an 18" RCP storm drain (POC 2) which leads to the storm drain system along La Jolla Village Drive to the mprth. Runoff from Esplanade Court and its tributary area is captured by curb inlets prior to exiting the property (POC 3). The collected runoff is conveyed to the existing storm drain in Genesee Avenue. The existing topography of the south lot (Lot 14) slopes generally from North to South. Drainage contributes to the existing private onsite storm drain system through both grated and curb inlets (as well as on-structure grated inlets because of the large underground parking structure), which is routed south across Nobel Drive (POC 1) and outlets to the

existing natural Rose Canyon Channel, to the south. The channel accepts site flow, as well as runoff from adjacent parcels and adjacent public roadway segments. See **Exhibit B** for **Existing Drainage Exhibit**.

Table 3.1 summarizes the peak runoff for the underground detention basin for both the existing, ultimate and detained conditions.

Table 3–1 Existing Conditions Peak Runoff

	Area (ac)	50 Year Storm Event (cfs)	100 Year Storm Event (cfs)
$Q_{Existing}$ (POC 1)	10.80	44.36	51.34
$Q_{Existing}$ (POC 2)	0.90	3.72	4.27
$Q_{Existing}$ (POC 3)	1.60	6.64	7.80

4 PROPOSED CONDITIONS

The total disturbed area consists of 11.92 acres. A portion of the site adjacent to the improvements (0.66 acres) includes perimeter landscaping that drains to adjacent streets (Genesee Avenue and Nobel Drive). Another portion of the property that is included in the hydrology calculations is the existing McDonalds and Chevron (2.24 acres). Both will remain unchanged by this project.

Stormwater runoff onsite will be collected by inlets and catch basins, which will then be routed through proprietary biofiltration systems and into the storm drain system located within the underground parking structure (storm drain system within the parking structure will be designed by others). Stormwater will then be conveyed to the underground detention basin. The underground basin is sized appropriately to detain the increase in runoff generated by the proposed improvements or the required hydromodification volume. Mitigated runoff will exit the basin and flow into the existing 24” RCP storm drain (POC 1) that connects to the Nobel Drive storm drain system and enters the existing Rose Canyon channel as was done in the existing condition. See **Exhibit C** for **Proposed Drainage Exhibit**.

AES was used to determine the peak flows for the proposed condition. Per the City of San Diego 2017 Drainage Design Manual, the 50-year storm event was used to determine minimum pipe sizes for the site. A minimum size of 6” was used in the AES model for storm drain lines onsite. The 100-year rain event was used to determine the minimum volume required for the detention volume for the underground detention basin. See **Table 4-1** for onsite peak runoff rates that are conveyed to the existing storm drain.

Table 4–1 Proposed Conditions Peak Runoff

	Area (ac)	50 Year Storm Event (cfs)	100 Year Storm Event (cfs)
$Q_{Proposed}$ **(POC 1)**	13.50	58.38	63.53
$Q_{Proposed}$ **(POC 2)**	N/A	N/A	N/A
$Q_{Proposed}$ **(POC 3)**	N/A	N/A	N/A

As discussed above, the underground detention basin is sized to accommodate the increase in runoff generated by the proposed improvements and the required hydromodification volume. Since the hydromodification volume is larger than the differential volume between existing and proposed peak flows, the hydromodification volume governed. The 100-year peak flow and time of concentration were entered into RickRat Hydro to generate a hydrograph for the proposed conditions. The hydrograph was exported into Hydraflow to route flows through the detention basin with hydromodification control. See **Table 4-2** for a summary and **Appendix C** for results. Hydrographs were not generated for POC's 2 and 3 because they will not be used for discharge in the proposed condition.

Table 4–2 Underground Detention Basin Results Summary (POC 1)

	Proposed Basin Inflow (cfs)	Proposed Basin Outflow (cfs)	Allowable Discharge (cfs)
100-Year	65.53	17.53	44.36

As mentioned previously, the proposed project discharges into a storm drain system that is owned and operated by the City of San Diego. The City of San Diego falls within the R9-2013-0001 National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the Municipal Separate Storm Sewer System (MS4s) draining the watersheds within the San Diego region. A storm water quality management plan was prepared for the project to demonstrate permit compliance.

A 401 Certification and 404 permit is not required for the project. 401 certifications are required for projects that discharge into navigateable waters. The 404 permit regulates the discharge of dredge or fill material into waters of the United States. This project will not discharge to navigateable water or discharge dredge fill material into waters of the US.

5 CONCLUSION

Costa Verde Center preliminary drainage study provides analysis showing that the proposed onsite storm drain system accounts for the proposed Project runoff on both lots. Runoff generated from this proposed project will not negatively affect neighboring properties and/or projects. All drainage design and flow patterns proposed herein are in accordance with requirements outlined in the City of San Diego Drainage Design Manual.

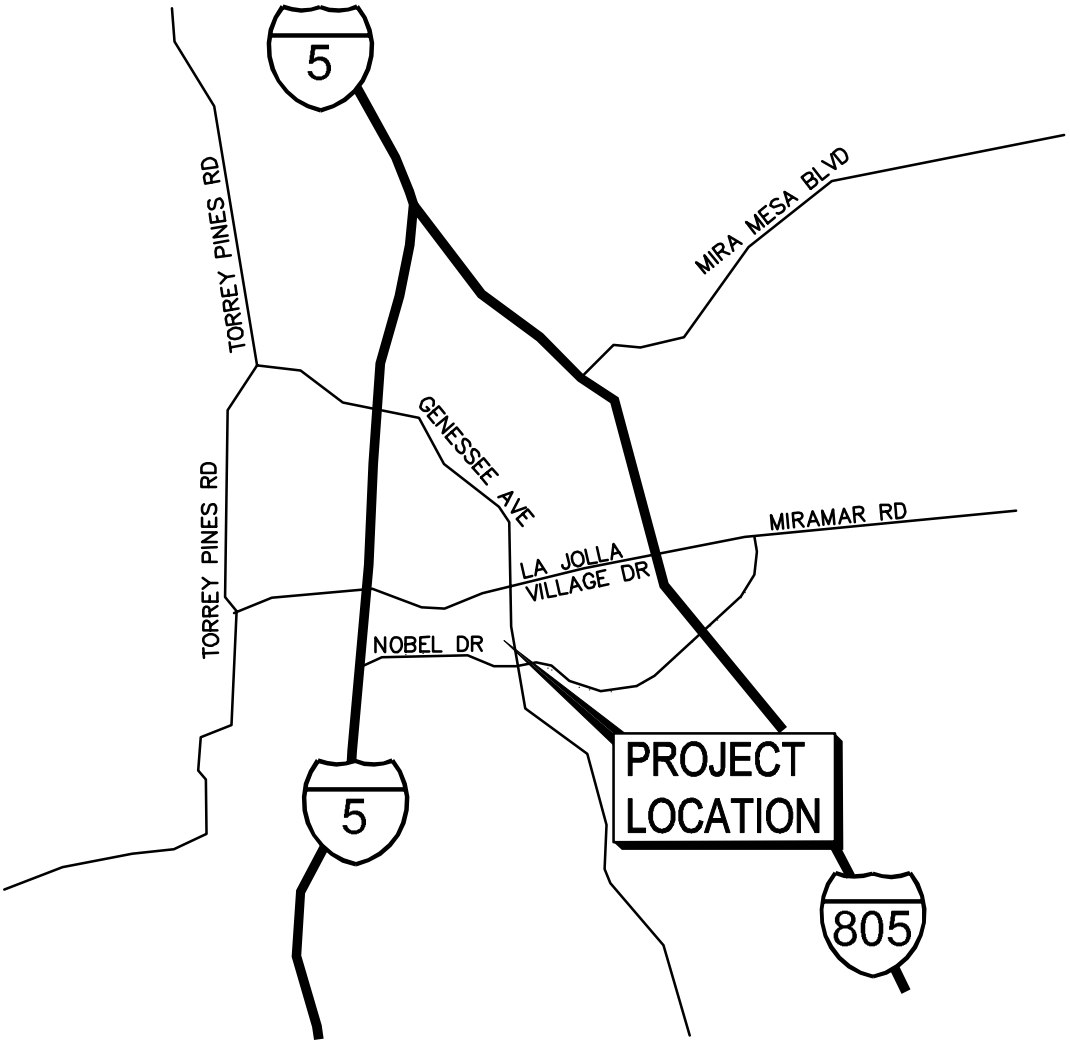
6 REFERENCES

This Drainage Study incorporates, by reference, the appropriate elements of the following documents and plans required by local; State or Federal agencies.

1. City of San Diego Drainage Design Manual
2. City of San Diego Stormwater Standards Manual

EXHIBIT A

VICINITY MAP



NORTH

NTS

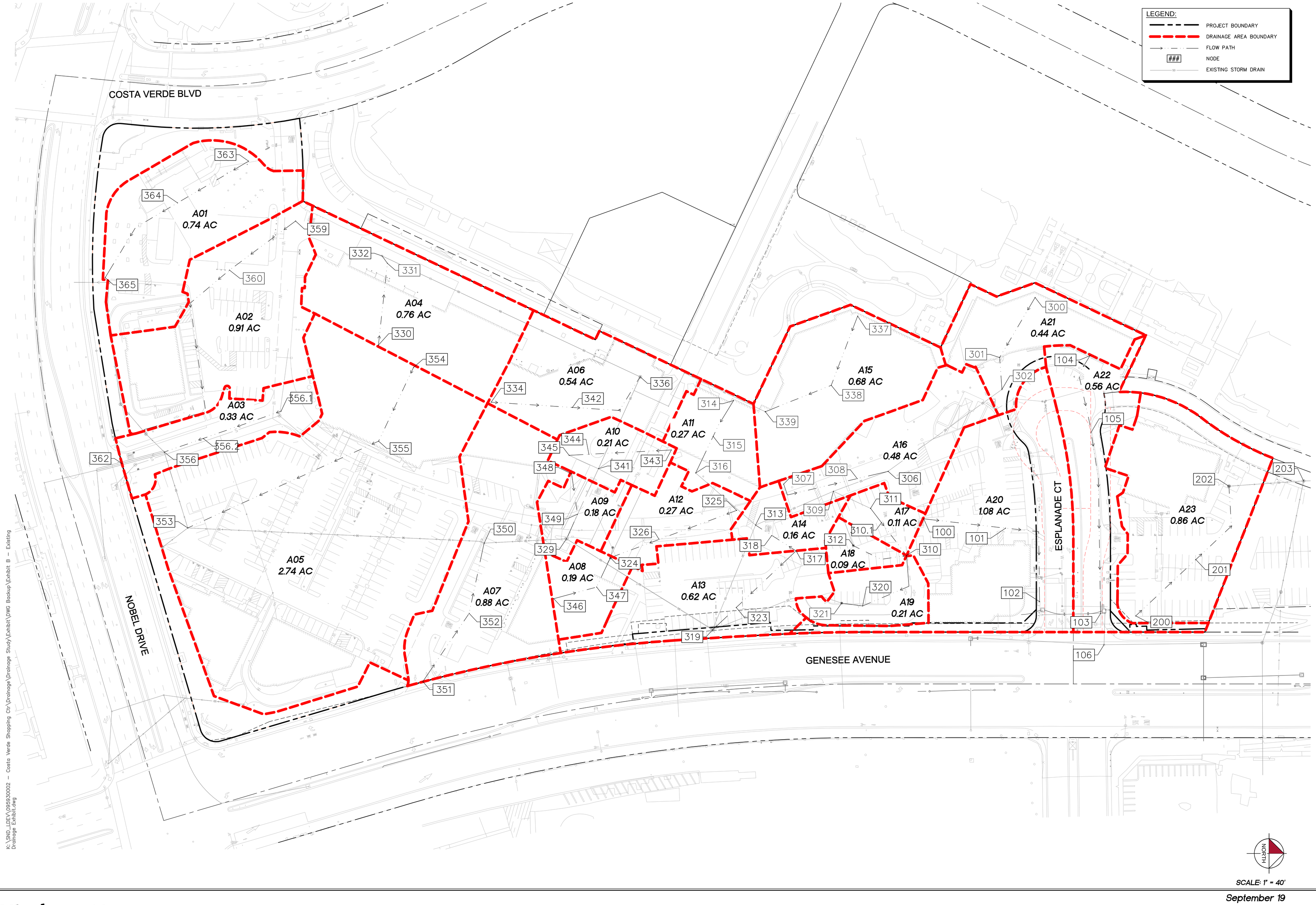
Kimley»Horn

Costa Verde Center
VICINITY MAP

K:\SND_LDEV\095930002 - Costa Verde Shopping Ctr\Drainage\Drainage Study\Exhibit\Vicinity Map.dwg 11-17-15-3:27 PM

EXHIBIT B

EXISTING DRAINAGE EXHIBIT



K:\SND_LDEV\095930002 - Costa Verde Shopping Ctr\Drainage\Drainage Study\Exhibit\DWG Backup\Exhibit B - Existing Drainage Exhibit.dwg

Kimley»Horn

September 19

Costa Verde Center - Existing Drainage

EXHIBIT 'B'

EXHIBIT C

PROPOSED DRAINAGE EXHIBIT

LEGEND:
- PROJECT BOUNDARY
- DRAINAGE AREA BOUNDARY
- FLOW PATH
- ### NODE
- SD STORM DRAIN

COSTA VERDE BLVD

A13
0.76 AC

A14
1.12 AC

A10
1.67 AC

A05
0.50 AC

A04
0.30 AC

A03
0.50 AC

A02
0.48 AC

A01
0.98 AC

A02.1
0.70 AC

A06.1
1.47 AC

A06
1.59 AC

A08
1.78 AC

A07
0.24 AC

A11
0.20 AC

A12
0.93 AC

A09
0.29 AC

POC1
Q_50EX=44.36 CFS
Q_50PR=58.38 CFS
Q_100EX=51.39 CFS
Q_100PR=63.53 CFS
Q_100MIT=17.53X CFS

Q_50EX=3.72 CFS
Q_50PR=0 CFS

UNDERGROUND BASIN FOR HYDROMODIFICATION CONTROL

NOBEL DRIVE

ESPLANADE CT

GENESEE AVENUE

SCALE: 1" = 40'

NORTH

9/25/19

Kimley»Horn

Costa Verde Center - Proposed Drainage

EXHIBIT 'C'

I:\SND_LJST\068330002 - Costa Verde Shopping Ctr\Drainage\Drainage Study\Exhibit\VWO Backup\Exhibit C - Proposed Drainage Exhibit.dwg

APPENDIX A

HYDROLOGY REFERENCE MATERIAL

$USER
$TIME
$DATE
$IP-SHORT-PEN-TABLE
$REQUEST

PARSONS BRINCKERHOFF
401 B STREET, SUITE 1650 SAN DIEGO, CA 92101
TEL (619) 338-9376 FAX (619) 338-8123

RELATIVE BORDER SCALE IS IN INCHES 0 1 2

MID-COAST CORRIDOR TRANSIT PROJECT

DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
SANDAG	

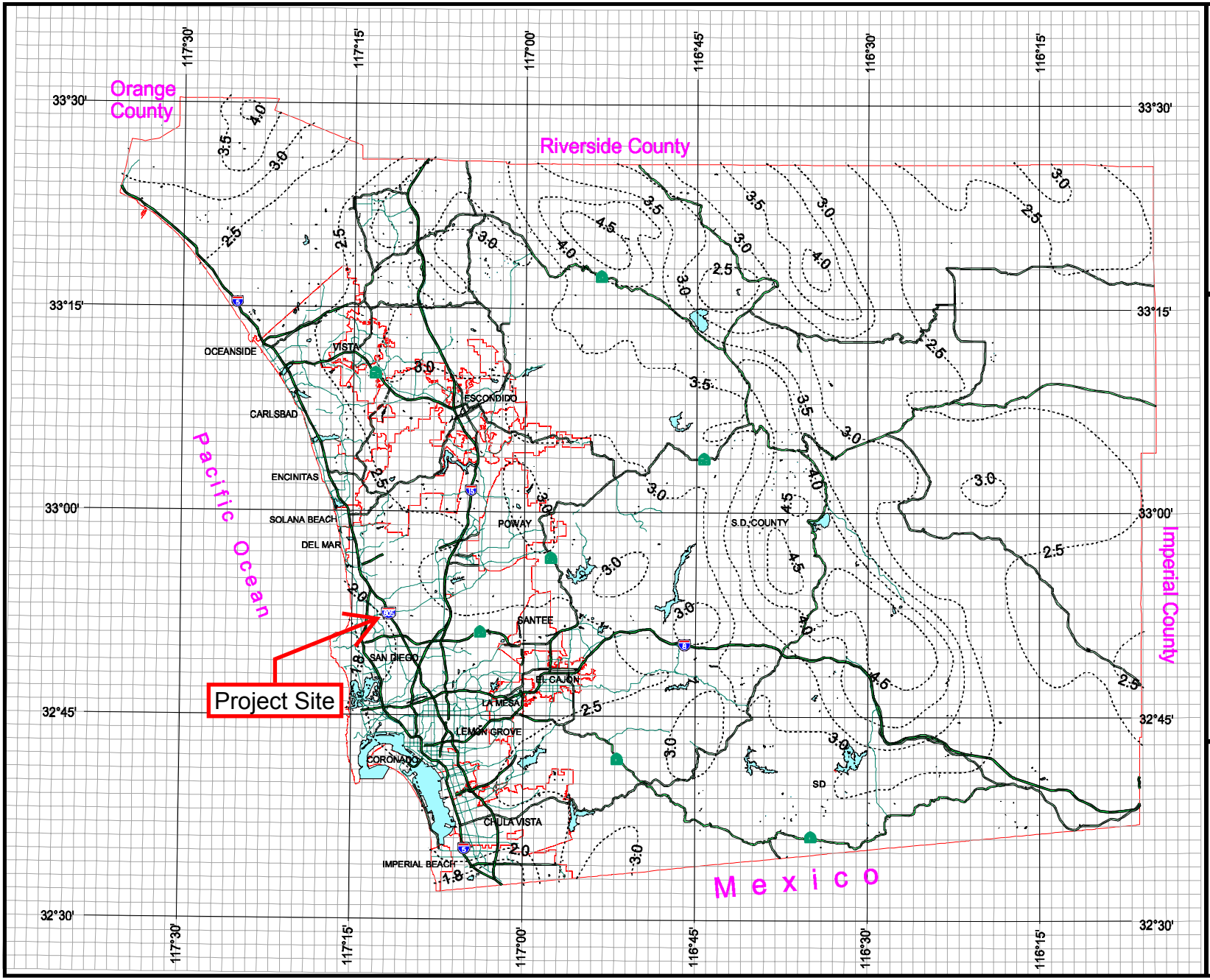
SANDAG
San Diego Association of Governments
401 B STREET, SUITE 800, SAN DIEGO, CA 92101-4231(619) 699-1900

MID-COAST CORRIDOR TRANSIT PROJECT
ALTERNATIVE TYPE
HYDROMODIFICATION MANAGEMENT PLAN
GENESEE Ave (Rose Creek)

SCALE	HORIZ: 1"=500'
SANDAG CONTRACT NO.	5001904
DRAWING NO.	SHEET NO. 2

County of San Diego Hydrology Manual

Rainfall Isopluvials



50 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

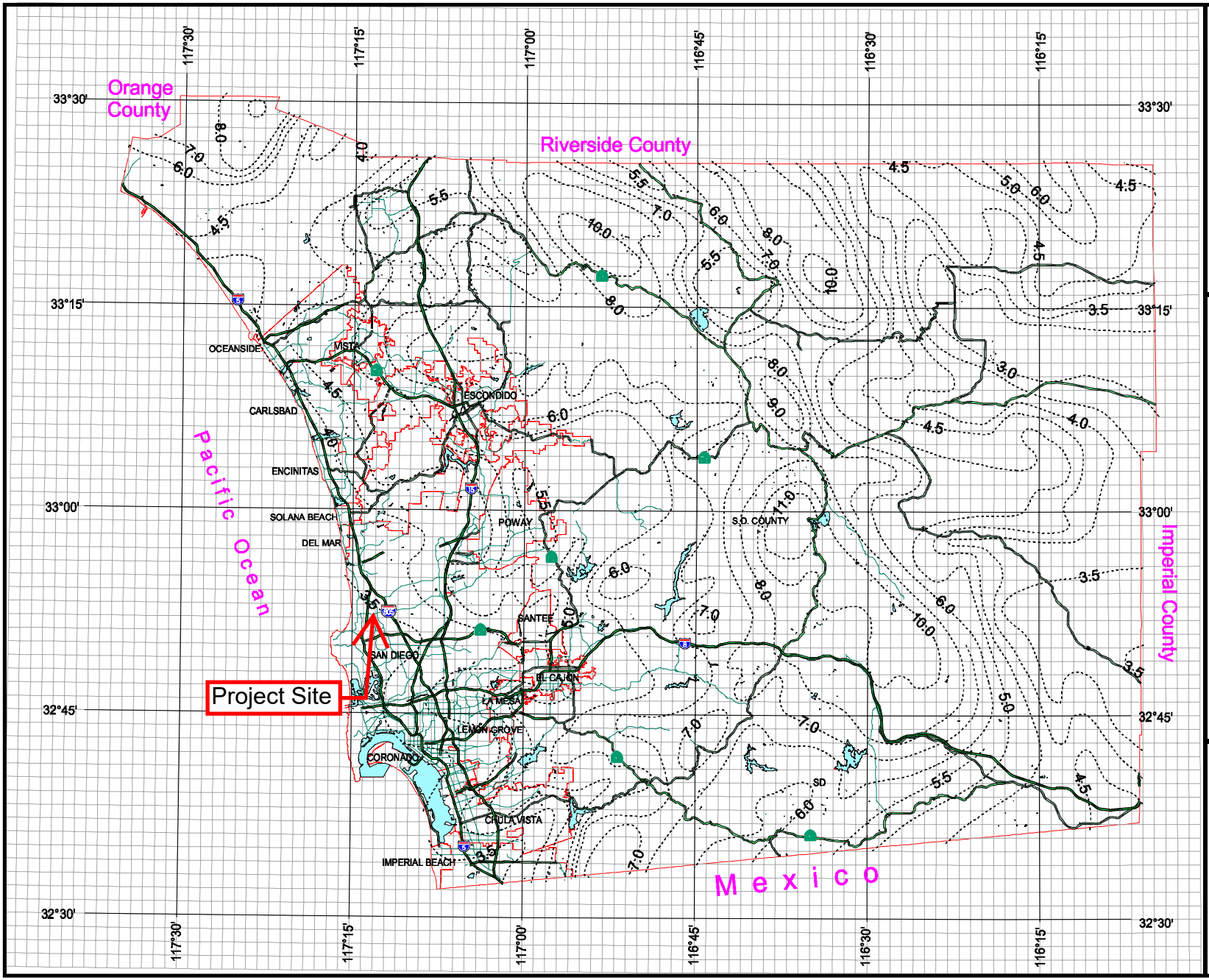
This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)



DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

3 0 3 Miles

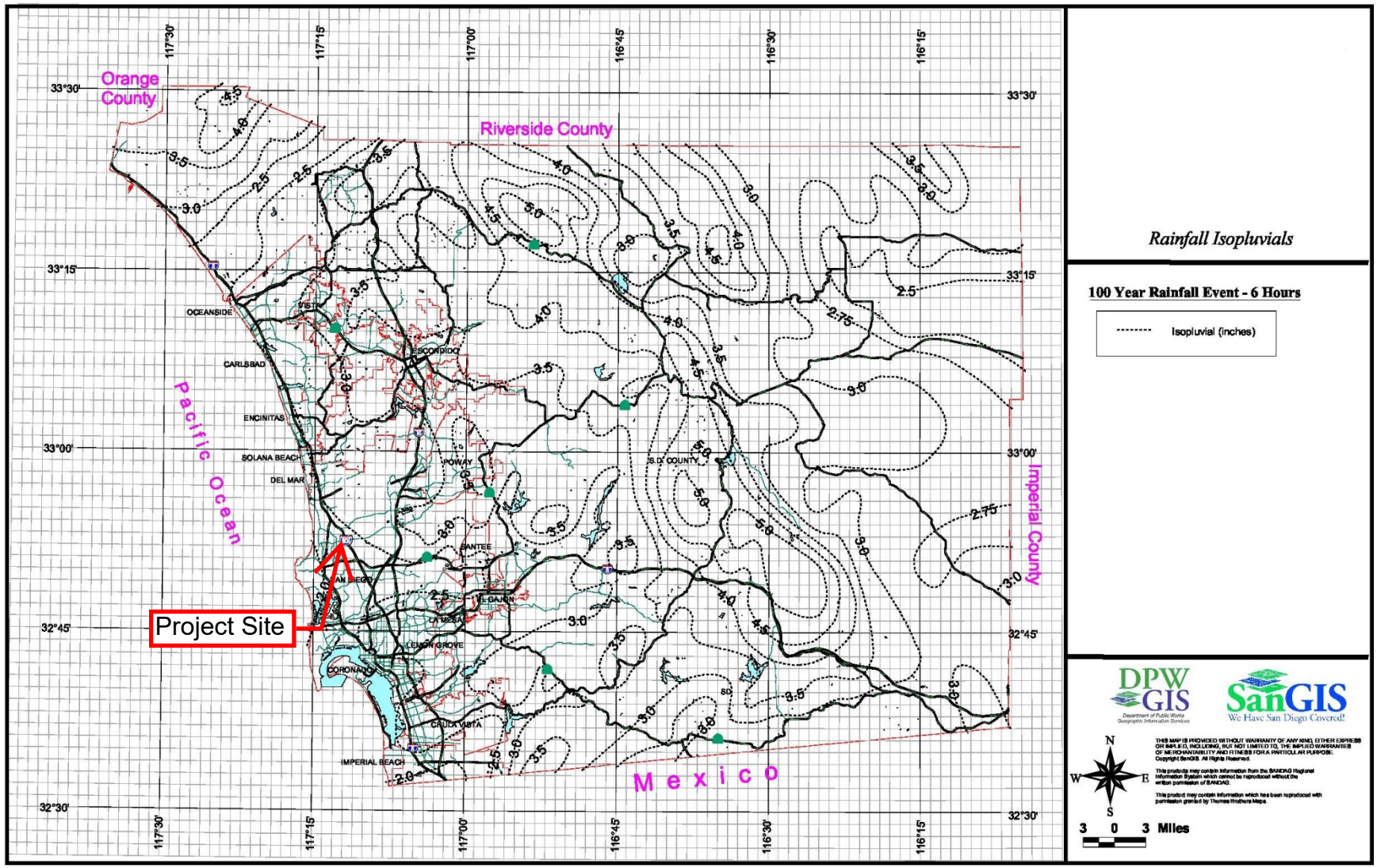
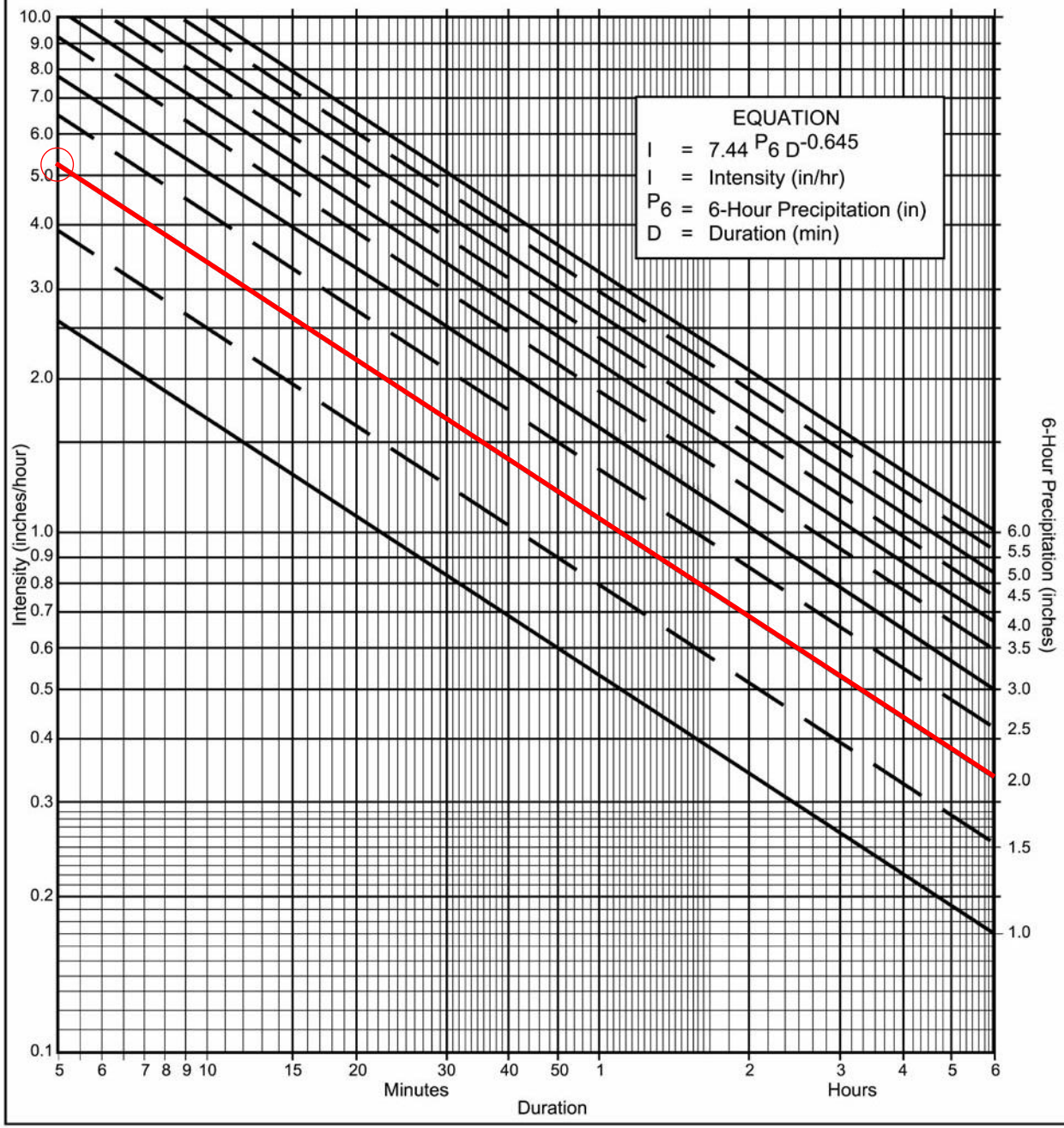


Figure B-2. 100-Year 6-Hour Isopluvials.



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 50 year

(b) P_6 = 2 in., P_{24} = 3.5, $\frac{P_6}{P_{24}}$ = 0.57 %(2)

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

(d) t_x = 5 min.

(e) I = 5.3 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

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

APPENDIX B

AES HYDROLOGY CALCULATION RESULTS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:



 ************************** DESCRIPTION OF STUDY **************************
* EXSITING DRAINAGE - 50 YEAR - COSTA VERDE CENTER                        *
* KIMLEY-HORN & ASSOCIATES                                                *
* JUNE 2019 - MJS                                                         *
 **************************************************************************

  FILE NAME: CVC50E.DAT
  TIME/DATE OF STUDY: 16:56 06/09/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.49
  DOWNSTREAM ELEVATION(FEET) =    362.68
  ELEVATION DIFFERENCE(FEET) =      0.81
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.053
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.20
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    362.68  DOWNSTREAM(FEET) =    358.76
  CHANNEL LENGTH THRU SUBAREA(FEET) =   126.00   CHANNEL SLOPE =  0.0311
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.78
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    4.81
  SUBAREA AREA(ACRES) =     0.98       SUBAREA RUNOFF(CFS) =    4.23
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       4.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   3.02
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     226.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.33  DOWNSTREAM(FEET) =   349.58
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.57
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.67
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     306.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    5.01
  RAINFALL INTENSITY(INCH/HR) =   5.26
  TOTAL STREAM AREA(ACRES) =     1.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.67

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.97
  DOWNSTREAM ELEVATION(FEET) =    361.28
  ELEVATION DIFFERENCE(FEET) =      2.69
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.280
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    81.90
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
```

```
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    361.28  DOWNSTREAM(FEET) =    358.84
 CHANNEL LENGTH THRU SUBAREA(FEET) =   220.00   CHANNEL SLOPE =  0.0111
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.857
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.35
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   2.39
 Tc(MIN.) =    5.67
 SUBAREA AREA(ACRES) =     0.46       SUBAREA RUNOFF(CFS) =    1.83
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
 TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.23

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   1.81
 LONGEST FLOWPATH FROM NODE    104.00 TO NODE    103.00 =     320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    5.67
 RAINFALL INTENSITY(INCH/HR) =   4.86
 TOTAL STREAM AREA(ACRES) =     0.56
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.23

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.67     5.01        5.261          1.08
     2        2.23     5.67        4.857          0.56

 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        6.64     5.01       5.261
     2        6.54     5.67       4.857

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.64   Tc(MIN.) =    5.01
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE    104.00 TO NODE    103.00 =     320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   349.58  DOWNSTREAM(FEET) =   346.83
```

```
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.19
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.64
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    5.05
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     358.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    361.38
  DOWNSTREAM ELEVATION(FEET) =    359.33
  ELEVATION DIFFERENCE(FEET) =      2.05
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.447
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    75.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    359.33  DOWNSTREAM(FEET) =    358.11
  CHANNEL LENGTH THRU SUBAREA(FEET) =   109.00   CHANNEL SLOPE =  0.0112
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.74
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =    4.49
  SUBAREA AREA(ACRES) =     0.76       SUBAREA RUNOFF(CFS) =    3.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       3.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.08
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     209.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.97  DOWNSTREAM(FEET) =   343.19
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.72
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    4.74
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     300.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    373.75
  DOWNSTREAM ELEVATION(FEET) =    364.05
  ELEVATION DIFFERENCE(FEET) =      9.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.157
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.73  DOWNSTREAM(FEET) =    363.69
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.0010
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.60
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   1.11
  Tc(MIN.) =    3.27
  SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    1.47
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    306.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.00  DOWNSTREAM(FEET) =   359.31
  FLOW LENGTH(FEET) =   169.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    3.79
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =     294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 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.) =    3.79
```

```
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    308.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    374.08
  DOWNSTREAM ELEVATION(FEET) =    363.95
  ELEVATION DIFFERENCE(FEET) =     10.13
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    306.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.95  DOWNSTREAM(FEET) =    362.69
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.0315
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.35
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.28
  Tc(MIN.) =    2.62
  SUBAREA AREA(ACRES) =     0.38       SUBAREA RUNOFF(CFS) =    1.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.66
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    306.00 =     140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 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.) =    2.62
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.90     3.79        5.269          0.44
      2        2.07     2.62        5.269          0.48

  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     2.62       5.269
      2        3.98     3.79       5.269

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.98   Tc(MIN.) =    3.79
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =     294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    309.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   359.31  DOWNSTREAM(FEET) =   358.60
  FLOW LENGTH(FEET) =    71.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.39
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.98
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.89
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    309.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    309.00 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.) =    3.89
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.98

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    363.63
  DOWNSTREAM ELEVATION(FEET) =    363.28
  ELEVATION DIFFERENCE(FEET) =      0.35
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.014
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    310.10 TO NODE    311.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.28  DOWNSTREAM(FEET) =    362.58
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.19
  Tc(MIN.) =    4.20
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.04
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.88
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    311.00 =      70.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    309.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.09  DOWNSTREAM(FEET) =   358.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.48
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.33
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    309.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    309.00 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.) =    4.33
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    312.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    363.63
  DOWNSTREAM ELEVATION(FEET) =    362.55
  ELEVATION DIFFERENCE(FEET) =      1.08
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.431
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    309.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.50  DOWNSTREAM(FEET) =   358.60
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.43
```

```
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    3.63
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    309.00 =     135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    309.00 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.) =    3.63
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.43

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.98     3.89        5.269          0.92
      2        0.48     4.33        5.269          0.11
      3        0.43     3.63        5.269          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        4.81     3.63       5.269
      2        4.83     3.89       5.269
      3        4.88     4.33       5.269

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.88   Tc(MIN.) =    4.33
  TOTAL AREA(ACRES) =        1.1
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    309.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    313.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   358.60  DOWNSTREAM(FEET) =   357.57
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.88
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    4.61
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    313.00 =     468.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 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.) =    4.61
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.88

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    373.56
  DOWNSTREAM ELEVATION(FEET) =    373.06
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.564
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    373.06  DOWNSTREAM(FEET) =    363.48
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.1916
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.38
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.19
  Tc(MIN.) =    3.75
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   4.61
  LONGEST FLOWPATH FROM NODE    314.00 TO NODE    316.00 =     100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    313.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.98  DOWNSTREAM(FEET) =   361.02
  FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.72
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    4.09
  LONGEST FLOWPATH FROM NODE    314.00 TO NODE    313.00 =     196.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 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.) =    4.09
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    318.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    26.00
  UPSTREAM ELEVATION(FEET) =    363.41
  DOWNSTREAM ELEVATION(FEET) =    363.08
  ELEVATION DIFFERENCE(FEET) =      0.33
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.374
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

******************************************************************************
  FLOW PROCESS FROM NODE    318.00 TO NODE    313.00 IS CODE =  51
------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.08  DOWNSTREAM(FEET) =    362.36
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.00   CHANNEL SLOPE =  0.0360
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.19
  Tc(MIN.) =    2.56
  SUBAREA AREA(ACRES) =     0.06       SUBAREA RUNOFF(CFS) =    0.26
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.06
  LONGEST FLOWPATH FROM NODE    317.00 TO NODE    313.00 =      46.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 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.) =    2.56
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.69

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.88     4.61        5.269          1.13
      2        1.17     4.09        5.269          0.27
      3        0.69     2.56        5.269          0.16

  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        6.30     2.56       5.269
      2        6.74     4.09       5.269
      3        6.74     4.61       5.269
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.74   Tc(MIN.) =    4.61
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    313.00 =     468.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    319.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.02  DOWNSTREAM(FEET) =   358.30
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.58
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.74
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    4.87
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    319.00 =     606.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 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.) =    4.87
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.74

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.63
  DOWNSTREAM ELEVATION(FEET) =    362.92
  ELEVATION DIFFERENCE(FEET) =      0.71
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.159
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    54.20
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    362.92  DOWNSTREAM(FEET) =    362.45
  CHANNEL LENGTH THRU SUBAREA(FEET) =    34.00   CHANNEL SLOPE =  0.0138
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.32
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.43
  Tc(MIN.) =    4.59
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.48
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    321.00 =     134.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    319.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.36  DOWNSTREAM(FEET) =   358.30
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.91
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    5.14
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    319.00 =     294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 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.) =    5.14
  RAINFALL INTENSITY(INCH/HR) =   5.17
  TOTAL STREAM AREA(ACRES) =     0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    323.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.41
  DOWNSTREAM ELEVATION(FEET) =    362.41
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.904
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    319.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    362.41  DOWNSTREAM(FEET) =    361.96
  CHANNEL LENGTH THRU SUBAREA(FEET) =    39.00   CHANNEL SLOPE =  0.0115
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.69
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.38
  Tc(MIN.) =    4.29
  SUBAREA AREA(ACRES) =     0.52       SUBAREA RUNOFF(CFS) =    2.25
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   1.90
  LONGEST FLOWPATH FROM NODE    317.00 TO NODE    319.00 =     139.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 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.) =    4.29
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.68

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.74     4.87        5.269         1.56
      2        0.91     5.14        5.175         0.21
      3        2.68     4.29        5.269         0.62

  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       10.18     4.29       5.269
      2       10.28     4.87       5.269
      3       10.16     5.14       5.175

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.28   Tc(MIN.) =    4.87
  TOTAL AREA(ACRES) =        2.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    319.00 =     606.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    329.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.96  DOWNSTREAM(FEET) =   340.75
  FLOW LENGTH(FEET) =   209.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.47
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.28
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.05
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    362.81
  DOWNSTREAM ELEVATION(FEET) =    352.23
  ELEVATION DIFFERENCE(FEET) =     10.58
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    324.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    352.23  DOWNSTREAM(FEET) =    349.25
  CHANNEL LENGTH THRU SUBAREA(FEET) =    57.00   CHANNEL SLOPE =  0.0523
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.39
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =    2.74
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.72
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    324.00 =     157.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 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.) =    2.74
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE    346.00 TO NODE    347.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    53.00
  UPSTREAM ELEVATION(FEET) =    373.73
  DOWNSTREAM ELEVATION(FEET) =    373.20
  ELEVATION DIFFERENCE(FEET) =      0.53
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.669
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    347.00 TO NODE    324.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    373.20  DOWNSTREAM(FEET) =    363.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.2500
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.76
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.18
  Tc(MIN.) =    3.85
  SUBAREA AREA(ACRES) =     0.09       SUBAREA RUNOFF(CFS) =    0.39
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   4.50
  LONGEST FLOWPATH FROM NODE    346.00 TO NODE    324.00 =      93.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 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.) =    3.85
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.17     2.74        5.269          0.27
      2        0.82     3.85        5.269          0.19

  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        1.75     2.74       5.269
      2        1.99     3.85       5.269

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.99   Tc(MIN.) =    3.85
  TOTAL AREA(ACRES) =        0.5
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    324.00 =     157.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    329.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.12  DOWNSTREAM(FEET) =   345.60
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.76
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.99
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.90
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    329.00 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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        1.99     3.90       5.269        0.46
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    329.00 =     215.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.28     5.05       5.234        2.39
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.92       3.90        5.269
      2      12.25       5.05        5.234

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.25   Tc(MIN.) =    5.05
  TOTAL AREA(ACRES) =        2.8

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    373.96
  DOWNSTREAM ELEVATION(FEET) =    372.96
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.821
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.67
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.96  DOWNSTREAM(FEET) =    363.92
  CHANNEL LENGTH THRU SUBAREA(FEET) =    86.00   CHANNEL SLOPE =  0.1051
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.93
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    4.19
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    2.51
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       2.94

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   4.52
  LONGEST FLOWPATH FROM NODE    337.00 TO NODE    339.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    336.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   362.42  DOWNSTREAM(FEET) =   361.33
  FLOW LENGTH(FEET) =   109.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.94
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    4.49
  LONGEST FLOWPATH FROM NODE    337.00 TO NODE    336.00 =     285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =    4.49
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.94

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    342.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    370.00
  DOWNSTREAM ELEVATION(FEET) =    369.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.904
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
```

```
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    342.00 TO NODE    336.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    369.00  DOWNSTREAM(FEET) =    363.42
  CHANNEL LENGTH THRU SUBAREA(FEET) =   104.00   CHANNEL SLOPE =  0.0537
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.73
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.63
  Tc(MIN.) =    4.54
  SUBAREA AREA(ACRES) =     0.44       SUBAREA RUNOFF(CFS) =    1.90
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   3.13
  LONGEST FLOWPATH FROM NODE    334.00 TO NODE    336.00 =     204.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =    4.54
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    360.00
  DOWNSTREAM ELEVATION(FEET) =    345.54
  ELEVATION DIFFERENCE(FEET) =     14.46
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.54  DOWNSTREAM(FEET) =    345.37
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =    11.00   CHANNEL SLOPE =  0.0155
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.02
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.09
  Tc(MIN.) =    2.43
  SUBAREA AREA(ACRES) =     0.66       SUBAREA RUNOFF(CFS) =    2.85
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    332.00 =     111.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    336.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.87  DOWNSTREAM(FEET) =   341.72
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.28
  PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =    3.67
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    336.00 =     476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =    3.67
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.94     4.49        5.269          0.68
      2        2.33     4.54        5.269          0.54
      3        3.28     3.67        5.269          0.76

  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        7.58     3.67       5.269
      2        8.53     4.49       5.269
      3        8.56     4.54       5.269

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.56   Tc(MIN.) =    4.54
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    336.00 =     476.00 FEET.

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

```
 FLOW PROCESS FROM NODE    336.00 TO NODE    341.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   341.72  DOWNSTREAM(FEET) =   341.11
 FLOW LENGTH(FEET) =   122.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN  42.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.79
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.56
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    4.89
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    341.00 =     598.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    341.00 TO NODE    341.00 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.) =    4.89
 RAINFALL INTENSITY(INCH/HR) =   5.27
 TOTAL STREAM AREA(ACRES) =     1.98
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.56

****************************************************************************
 FLOW PROCESS FROM NODE    343.00 TO NODE    344.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    364.11
 DOWNSTREAM ELEVATION(FEET) =    351.22
 ELEVATION DIFFERENCE(FEET) =     12.89
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE    344.00 TO NODE    345.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    351.22  DOWNSTREAM(FEET) =    350.28
 CHANNEL LENGTH THRU SUBAREA(FEET) =    24.00   CHANNEL SLOPE =  0.0392
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.14
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.19
 Tc(MIN.) =    2.53
 SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.48
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
 TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.91

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.24
 LONGEST FLOWPATH FROM NODE    343.00 TO NODE    345.00 =     124.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    345.00 TO NODE    341.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   348.78  DOWNSTREAM(FEET) =   341.11
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.27
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.91
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    2.58
  LONGEST FLOWPATH FROM NODE    343.00 TO NODE    341.00 =     163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    341.00 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.) =    2.58
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.91

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.56     4.89        5.269          1.98
      2        0.91     2.58        5.269          0.21

  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        9.46     2.58       5.269
      2        9.46     4.89       5.269

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.46   Tc(MIN.) =    4.89
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    341.00 =     598.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    329.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.11  DOWNSTREAM(FEET) =   340.75
  FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.38
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.46
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    5.19
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    329.00 =     694.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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        9.46     5.19       5.146        2.19
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    329.00 =     694.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       12.25     5.05       5.234        2.85
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      21.47       5.05        5.234
      2      21.51       5.19        5.146

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.51   Tc(MIN.) =    5.19
  TOTAL AREA(ACRES) =        5.0

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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.) =    5.19
  RAINFALL INTENSITY(INCH/HR) =   5.15
  TOTAL STREAM AREA(ACRES) =     5.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.51

****************************************************************************
  FLOW PROCESS FROM NODE    348.00 TO NODE    349.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    49.00
  UPSTREAM ELEVATION(FEET) =    350.39
  DOWNSTREAM ELEVATION(FEET) =    349.03
  ELEVATION DIFFERENCE(FEET) =      1.36
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.511
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    349.00 TO NODE    329.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    349.03  DOWNSTREAM(FEET) =    348.42
  CHANNEL LENGTH THRU SUBAREA(FEET) =    30.00   CHANNEL SLOPE =  0.0203
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.50
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.33
  Tc(MIN.) =    2.84
  SUBAREA AREA(ACRES) =     0.08       SUBAREA RUNOFF(CFS) =    0.35
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.81
  LONGEST FLOWPATH FROM NODE    348.00 TO NODE    329.00 =      79.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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.) =    2.84
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.51     5.19        5.146          5.04
      2        0.78     2.84        5.269          0.18

  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       12.57     2.84       5.269
      2       22.27     5.19       5.146

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.27   Tc(MIN.) =    5.19
  TOTAL AREA(ACRES) =        5.2
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    350.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.80  DOWNSTREAM(FEET) =   338.90
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.45
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.27
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.32
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 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.) =    5.32
  RAINFALL INTENSITY(INCH/HR) =   5.06
  TOTAL STREAM AREA(ACRES) =     5.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.27

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    354.21
  DOWNSTREAM ELEVATION(FEET) =    349.79
  ELEVATION DIFFERENCE(FEET) =      4.42
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.890
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    88.55
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    350.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    349.79  DOWNSTREAM(FEET) =    347.54
  CHANNEL LENGTH THRU SUBAREA(FEET) =    87.00   CHANNEL SLOPE =  0.0259
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.40
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.60
  Tc(MIN.) =    3.49
  SUBAREA AREA(ACRES) =     0.78       SUBAREA RUNOFF(CFS) =    3.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       3.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.79
  LONGEST FLOWPATH FROM NODE    351.00 TO NODE    350.00 =     187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 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.) =    3.49
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.27     5.32        5.062         5.22
      2        3.80     3.49        5.269         0.88

  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       25.19     3.49       5.269
```

```
      2       25.92     5.32       5.062

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.92   Tc(MIN.) =    5.32
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    353.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.80  DOWNSTREAM(FEET) =   333.90
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.38
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.92
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    5.85
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    353.00 =    1275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 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.) =    5.85
  RAINFALL INTENSITY(INCH/HR) =   4.76
  TOTAL STREAM AREA(ACRES) =     6.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.92

****************************************************************************
  FLOW PROCESS FROM NODE    354.00 TO NODE    355.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    370.00
  DOWNSTREAM ELEVATION(FEET) =    349.59
  ELEVATION DIFFERENCE(FEET) =     20.41
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    355.00 TO NODE    353.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    349.59  DOWNSTREAM(FEET) =    344.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   253.00   CHANNEL SLOPE =  0.0205
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.84
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.49
```

```
  Tc(MIN.) =    3.83
  SUBAREA AREA(ACRES) =     2.64       SUBAREA RUNOFF(CFS) =   11.41
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        2.7         PEAK FLOW RATE(CFS) =      11.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   3.39
  LONGEST FLOWPATH FROM NODE    354.00 TO NODE    353.00 =     353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 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.) =    3.83
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     2.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.84

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       25.92     5.85        4.763          6.10
      2       11.84     3.83        5.269          2.74

  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       35.27     3.83       5.269
      2       36.62     5.85       4.763

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.62   Tc(MIN.) =    5.85
  TOTAL AREA(ACRES) =        8.8
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    353.00 =    1275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    356.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   333.90  DOWNSTREAM(FEET) =   332.50
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.00
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.62
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.97
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    356.00 =    1368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.97
  RAINFALL INTENSITY(INCH/HR) =   4.70
  TOTAL STREAM AREA(ACRES) =     8.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.62

****************************************************************************
  FLOW PROCESS FROM NODE    359.00 TO NODE    360.00 IS CODE =  21
```

```
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    360.00
  DOWNSTREAM ELEVATION(FEET) =    348.63
  ELEVATION DIFFERENCE(FEET) =     11.37
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    356.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    348.63  DOWNSTREAM(FEET) =    340.65
  CHANNEL LENGTH THRU SUBAREA(FEET) =   270.00   CHANNEL SLOPE =  0.0296
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.47
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.82
  Tc(MIN.) =    4.16
  SUBAREA AREA(ACRES) =     0.81       SUBAREA RUNOFF(CFS) =    3.50
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       3.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.89
  LONGEST FLOWPATH FROM NODE    359.00 TO NODE    356.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.16
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.93

****************************************************************************
  FLOW PROCESS FROM NODE    363.00 TO NODE    364.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    348.63
  DOWNSTREAM ELEVATION(FEET) =    347.84
  ELEVATION DIFFERENCE(FEET) =      0.79
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.073
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    55.80
```

```
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    364.00 TO NODE    365.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.84  DOWNSTREAM(FEET) =    345.78
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.0158
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.146
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.94
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.11
  Tc(MIN.) =    5.19
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    2.70
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       3.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    363.00 TO NODE    365.00 =     230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    365.00 TO NODE    356.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.88  DOWNSTREAM(FEET) =   332.10
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.12
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE    363.00 TO NODE    356.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     0.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    356.10 TO NODE    356.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    348.64
  DOWNSTREAM ELEVATION(FEET) =    343.68
```

```
  ELEVATION DIFFERENCE(FEET) =      4.96
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.802
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    89.90
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    356.20 TO NODE    356.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    343.68  DOWNSTREAM(FEET) =    340.65
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.77
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =    3.10
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    0.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.82
  LONGEST FLOWPATH FROM NODE    356.10 TO NODE    356.00 =     150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.10
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.43

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       36.62     5.97        4.701          8.84
      2        3.93     4.16        5.269          0.91
      3        3.12     5.49        4.961          0.74
      4        1.43     3.10        5.269          0.33

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       38.79     3.10       5.269
      2       40.39     4.16       5.269
      3       42.87     5.49       4.961
      4       44.36     5.97       4.701

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      44.36   Tc(MIN.) =    5.97
  TOTAL AREA(ACRES) =       10.8
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    356.00 =    1368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    365.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.10  DOWNSTREAM(FEET) =   331.57
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.81
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.36
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.04
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    365.00 =    1421.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.8  TC(MIN.) =      6.04
  PEAK FLOW RATE(CFS)   =      44.36
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
             Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* EXISTING DRAINAGE - 100 YEAR - COSTA VERDE CENTER                        *
* KIMLEY-HORN & ASSOCIATES                                                 *
* JUNE 2019 - MJS                                                          *
 **************************************************************************

  FILE NAME: CVC100E.DAT
  TIME/DATE OF STUDY: 17:10 06/09/2019
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.49
  DOWNSTREAM ELEVATION(FEET) =    362.68
  ELEVATION DIFFERENCE(FEET) =      0.81
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.053
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    56.20
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    362.68  DOWNSTREAM(FEET) =    358.76
  CHANNEL LENGTH THRU SUBAREA(FEET) =   126.00   CHANNEL SLOPE =  0.0311
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.74
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =    4.82
  SUBAREA AREA(ACRES) =     0.98       SUBAREA RUNOFF(CFS) =    4.87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   3.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     226.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.33  DOWNSTREAM(FEET) =   349.58
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.82
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.37
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.02
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     306.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   6.05
  TOTAL STREAM AREA(ACRES) =     1.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.37

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.97
  DOWNSTREAM ELEVATION(FEET) =    361.28
  ELEVATION DIFFERENCE(FEET) =      2.69
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.280
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    81.90
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.50
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
FLOW PROCESS FROM NODE    105.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    361.28  DOWNSTREAM(FEET) =    358.84
CHANNEL LENGTH THRU SUBAREA(FEET) =   220.00   CHANNEL SLOPE =  0.0111
CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.741
GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
SOIL CLASSIFICATION IS "D"
S.C.S. CURVE NUMBER (AMC II) =  95
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.70
AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   2.16
Tc(MIN.) =    5.44
SUBAREA AREA(ACRES) =     0.46       SUBAREA RUNOFF(CFS) =    2.17
AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   1.87
LONGEST FLOWPATH FROM NODE    104.00 TO NODE    103.00 =     320.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =    5.44
RAINFALL INTENSITY(INCH/HR) =   5.74
TOTAL STREAM AREA(ACRES) =     0.56
PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.64

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        5.37     5.02        6.048          1.08
    2        2.64     5.44        5.741          0.56

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        7.80     5.02       6.048
    2        7.73     5.44       5.741

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       7.80   Tc(MIN.) =    5.02
TOTAL AREA(ACRES) =        1.6
LONGEST FLOWPATH FROM NODE    104.00 TO NODE    103.00 =     320.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    103.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   349.58  DOWNSTREAM(FEET) =   346.83
```

```
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.89
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.80
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    5.05
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     358.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    361.38
  DOWNSTREAM ELEVATION(FEET) =    359.33
  ELEVATION DIFFERENCE(FEET) =      2.05
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.447
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    75.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    359.33  DOWNSTREAM(FEET) =    358.11
  CHANNEL LENGTH THRU SUBAREA(FEET) =   109.00   CHANNEL SLOPE =  0.0112
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.75
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =    4.48
  SUBAREA AREA(ACRES) =     0.76       SUBAREA RUNOFF(CFS) =    3.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       4.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.14
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     209.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.97  DOWNSTREAM(FEET) =   343.19
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.27
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    4.73
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     300.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    373.75
  DOWNSTREAM ELEVATION(FEET) =    364.05
  ELEVATION DIFFERENCE(FEET) =      9.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.157
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.73  DOWNSTREAM(FEET) =    363.69
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.0010
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.62
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =    3.23
  SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    1.69
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       2.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    306.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.00  DOWNSTREAM(FEET) =   359.31
  FLOW LENGTH(FEET) =   169.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.19
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    3.68
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =     294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 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.) =    3.68
```

```
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.19

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    308.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    374.08
  DOWNSTREAM ELEVATION(FEET) =    363.95
  ELEVATION DIFFERENCE(FEET) =     10.13
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    306.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.95  DOWNSTREAM(FEET) =    362.69
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.0315
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.32
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   0.29
  Tc(MIN.) =    2.63
  SUBAREA AREA(ACRES) =     0.38       SUBAREA RUNOFF(CFS) =    1.89
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.70
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    306.00 =     140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    306.00 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.) =    2.63
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.39

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.19     3.68        6.060          0.44
      2        2.39     2.63        6.060          0.48

  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        3.95     2.63       6.060
      2        4.57     3.68       6.060

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.57   Tc(MIN.) =    3.68
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    306.00 =     294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    309.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   359.31  DOWNSTREAM(FEET) =   358.60
  FLOW LENGTH(FEET) =    71.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.10
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    309.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    309.00 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.) =    3.77
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.57

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    310.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    363.63
  DOWNSTREAM ELEVATION(FEET) =    363.28
  ELEVATION DIFFERENCE(FEET) =      0.35
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.014
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    310.10 TO NODE    311.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.28  DOWNSTREAM(FEET) =    362.58
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.00   CHANNEL SLOPE =  0.0350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.06
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.16
  Tc(MIN.) =    4.18
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.05
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    311.00 =      70.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    309.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.09  DOWNSTREAM(FEET) =   358.60
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.55
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    4.30
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    309.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    309.00 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.) =    4.30
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    312.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    363.63
  DOWNSTREAM ELEVATION(FEET) =    362.55
  ELEVATION DIFFERENCE(FEET) =      1.08
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.431
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    309.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.50  DOWNSTREAM(FEET) =   358.60
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.50
```

```
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    3.62
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    309.00 =     135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    309.00 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.) =    3.62
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.57     3.77        6.060          0.92
      2        0.55     4.30        6.060          0.11
      3        0.50     3.62        6.060          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        5.53     3.62       6.060
      2        5.55     3.77       6.060
      3        5.62     4.30       6.060

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.62   Tc(MIN.) =    4.30
  TOTAL AREA(ACRES) =        1.1
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    309.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    309.00 TO NODE    313.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   358.60  DOWNSTREAM(FEET) =   357.57
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.15
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.62
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    4.54
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    313.00 =     468.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 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.) =    4.54
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.62

****************************************************************************
  FLOW PROCESS FROM NODE    314.00 TO NODE    315.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    373.56
  DOWNSTREAM ELEVATION(FEET) =    373.06
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.564
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    373.06  DOWNSTREAM(FEET) =    363.48
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.1916
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.93
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.21
  Tc(MIN.) =    3.78
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.34

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   4.28
  LONGEST FLOWPATH FROM NODE    314.00 TO NODE    316.00 =     100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    313.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.98  DOWNSTREAM(FEET) =   361.02
  FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.34
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    4.11
  LONGEST FLOWPATH FROM NODE    314.00 TO NODE    313.00 =     196.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 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.) =    4.11
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    318.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    26.00
  UPSTREAM ELEVATION(FEET) =    363.41
  DOWNSTREAM ELEVATION(FEET) =    363.08
  ELEVATION DIFFERENCE(FEET) =      0.33
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.374
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    318.00 TO NODE    313.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.08  DOWNSTREAM(FEET) =    362.36
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.00   CHANNEL SLOPE =  0.0360
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.06
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.16
  Tc(MIN.) =    2.54
  SUBAREA AREA(ACRES) =     0.06       SUBAREA RUNOFF(CFS) =    0.30
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.97
  LONGEST FLOWPATH FROM NODE    317.00 TO NODE    313.00 =      46.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    313.00 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.) =    2.54
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.62     4.54        6.060          1.13
      2        1.34     4.11        6.060          0.27
      3        0.80     2.54        6.060          0.16

  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        7.24     2.54       6.060
      2        7.75     4.11       6.060
      3        7.75     4.54       6.060
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.75   Tc(MIN.) =    4.54
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    313.00 =     468.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    319.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.02  DOWNSTREAM(FEET) =   358.30
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.87
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.75
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    4.77
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    319.00 =     606.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 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.) =    4.77
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     1.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.75

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.63
  DOWNSTREAM ELEVATION(FEET) =    362.92
  ELEVATION DIFFERENCE(FEET) =      0.71
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.159
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    54.20
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    362.92  DOWNSTREAM(FEET) =    362.45
  CHANNEL LENGTH THRU SUBAREA(FEET) =    34.00   CHANNEL SLOPE =  0.0138
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.44
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.39
  Tc(MIN.) =    4.55
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       1.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.60
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    321.00 =     134.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    319.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   360.36  DOWNSTREAM(FEET) =   358.30
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.04
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    5.08
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    319.00 =     294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 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.) =    5.08
  RAINFALL INTENSITY(INCH/HR) =   6.00
  TOTAL STREAM AREA(ACRES) =     0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.04

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    323.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    363.41
  DOWNSTREAM ELEVATION(FEET) =    362.41
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.904
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    319.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    362.41  DOWNSTREAM(FEET) =    361.96
  CHANNEL LENGTH THRU SUBAREA(FEET) =    39.00   CHANNEL SLOPE =  0.0115
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.67
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.39
  Tc(MIN.) =    4.29
  SUBAREA AREA(ACRES) =     0.52       SUBAREA RUNOFF(CFS) =    2.58
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.93
  LONGEST FLOWPATH FROM NODE    317.00 TO NODE    319.00 =     139.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    319.00 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.) =    4.29
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.08

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.75     4.77        6.060          1.56
      2        1.04     5.08        5.997          0.21
      3        3.08     4.29        6.060          0.62

  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       11.71     4.29       6.060
      2       11.81     4.77       6.060
      3       11.76     5.08       5.997

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.81   Tc(MIN.) =    4.77
  TOTAL AREA(ACRES) =        2.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    319.00 =     606.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    319.00 TO NODE    329.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.96  DOWNSTREAM(FEET) =   340.75
  FLOW LENGTH(FEET) =   209.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.97
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.81
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    4.95
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    325.00 TO NODE    326.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    362.81
  DOWNSTREAM ELEVATION(FEET) =    352.23
  ELEVATION DIFFERENCE(FEET) =     10.58
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    324.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    352.23  DOWNSTREAM(FEET) =    349.25
  CHANNEL LENGTH THRU SUBAREA(FEET) =    57.00   CHANNEL SLOPE =  0.0523
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.74
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.35
  Tc(MIN.) =    2.69
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.34

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.65
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    324.00 =     157.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 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.) =    2.69
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE    346.00 TO NODE    347.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    53.00
  UPSTREAM ELEVATION(FEET) =    373.73
  DOWNSTREAM ELEVATION(FEET) =    373.20
  ELEVATION DIFFERENCE(FEET) =      0.53
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.669
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    347.00 TO NODE    324.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    373.20  DOWNSTREAM(FEET) =    363.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =    40.00   CHANNEL SLOPE =  0.2500
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.33
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.15
  Tc(MIN.) =    3.82
  SUBAREA AREA(ACRES) =     0.09       SUBAREA RUNOFF(CFS) =    0.45
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.94

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   5.18
  LONGEST FLOWPATH FROM NODE    346.00 TO NODE    324.00 =      93.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    324.00 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.) =    3.82
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.34     2.69        6.060          0.27
      2        0.94     3.82        6.060          0.19

  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        2.00     2.69       6.060
      2        2.29     3.82       6.060

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.29   Tc(MIN.) =    3.82
  TOTAL AREA(ACRES) =        0.5
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    324.00 =     157.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    324.00 TO NODE    329.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   361.12  DOWNSTREAM(FEET) =   345.60
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.50
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.88
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    329.00 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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        2.29     3.88       6.060        0.46
  LONGEST FLOWPATH FROM NODE    325.00 TO NODE    329.00 =     215.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       11.81     4.95       6.060        2.39
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      11.54       3.88        6.060
      2      14.10       4.95        6.060

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.10   Tc(MIN.) =    4.95
  TOTAL AREA(ACRES) =        2.8

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    337.00 TO NODE    338.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    373.96
  DOWNSTREAM ELEVATION(FEET) =    372.96
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.821
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    61.67
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    338.00 TO NODE    339.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    372.96  DOWNSTREAM(FEET) =    363.92
  CHANNEL LENGTH THRU SUBAREA(FEET) =    86.00   CHANNEL SLOPE =  0.1051
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.83
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.37
  Tc(MIN.) =    4.20
  SUBAREA AREA(ACRES) =     0.58       SUBAREA RUNOFF(CFS) =    2.88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       3.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   4.53
  LONGEST FLOWPATH FROM NODE    337.00 TO NODE    339.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    339.00 TO NODE    336.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   362.42  DOWNSTREAM(FEET) =   361.33
  FLOW LENGTH(FEET) =   109.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.38
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    4.49
  LONGEST FLOWPATH FROM NODE    337.00 TO NODE    336.00 =     285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =    4.49
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.38

****************************************************************************
  FLOW PROCESS FROM NODE    334.00 TO NODE    342.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    370.00
  DOWNSTREAM ELEVATION(FEET) =    369.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.904
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
```

```
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    342.00 TO NODE    336.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    369.00  DOWNSTREAM(FEET) =    363.42
  CHANNEL LENGTH THRU SUBAREA(FEET) =   104.00   CHANNEL SLOPE =  0.0537
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.98
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.58
  Tc(MIN.) =    4.49
  SUBAREA AREA(ACRES) =     0.44       SUBAREA RUNOFF(CFS) =    2.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       2.68

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   3.45
  LONGEST FLOWPATH FROM NODE    334.00 TO NODE    336.00 =     204.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =    4.49
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.68

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    360.00
  DOWNSTREAM ELEVATION(FEET) =    345.54
  ELEVATION DIFFERENCE(FEET) =     14.46
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    332.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.54  DOWNSTREAM(FEET) =    345.37
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =    11.00   CHANNEL SLOPE =  0.0155
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.00
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.09
  Tc(MIN.) =    2.43
  SUBAREA AREA(ACRES) =     0.66       SUBAREA RUNOFF(CFS) =    3.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.37
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    332.00 =     111.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    332.00 TO NODE    336.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   343.87  DOWNSTREAM(FEET) =   341.72
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.78
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    3.70
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    336.00 =     476.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    336.00 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.) =    3.70
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.38     4.49        6.060          0.68
      2        2.68     4.49        6.060          0.54
      3        3.78     3.70        6.060          0.76

  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        8.77     3.70       6.060
      2        9.84     4.49       6.060
      3        9.84     4.49       6.060

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.84   Tc(MIN.) =    4.49
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    336.00 =     476.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    336.00 TO NODE    341.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.72  DOWNSTREAM(FEET) =   341.11
  FLOW LENGTH(FEET) =   122.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.84
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    4.83
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    341.00 =     598.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    341.00 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.) =    4.83
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     1.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.84

****************************************************************************
  FLOW PROCESS FROM NODE    343.00 TO NODE    344.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    364.11
  DOWNSTREAM ELEVATION(FEET) =    351.22
  ELEVATION DIFFERENCE(FEET) =     12.89
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    344.00 TO NODE    345.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    351.22  DOWNSTREAM(FEET) =    350.28
  CHANNEL LENGTH THRU SUBAREA(FEET) =    24.00   CHANNEL SLOPE =  0.0392
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.30
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.17
  Tc(MIN.) =    2.51
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       1.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.43
```

```
 LONGEST FLOWPATH FROM NODE    343.00 TO NODE    345.00 =     124.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    345.00 TO NODE    341.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   348.78  DOWNSTREAM(FEET) =   341.11
 FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.81
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.04
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    2.56
 LONGEST FLOWPATH FROM NODE    343.00 TO NODE    341.00 =     163.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    341.00 TO NODE    341.00 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.) =    2.56
 RAINFALL INTENSITY(INCH/HR) =   6.06
 TOTAL STREAM AREA(ACRES) =     0.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.04

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        9.84     4.83        6.060          1.98
     2        1.04     2.56        6.060          0.21

 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       10.88     2.56       6.060
     2       10.88     4.83       6.060

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.88   Tc(MIN.) =    4.83
 TOTAL AREA(ACRES) =        2.2
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    341.00 =     598.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    341.00 TO NODE    329.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   341.11  DOWNSTREAM(FEET) =   340.75
 FLOW LENGTH(FEET) =    96.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.88
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.11
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    329.00 =     694.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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       10.88     5.11       5.973        2.19
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    329.00 =     694.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       14.10     4.95       6.060        2.85
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      24.63       4.95        6.060
     2      24.78       5.11        5.973

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      24.78   Tc(MIN.) =    5.11
 TOTAL AREA(ACRES) =        5.0

****************************************************************************
 FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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.) =    5.11
 RAINFALL INTENSITY(INCH/HR) =   5.97
 TOTAL STREAM AREA(ACRES) =     5.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.78

****************************************************************************
 FLOW PROCESS FROM NODE    348.00 TO NODE    349.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    49.00
 UPSTREAM ELEVATION(FEET) =    350.39
 DOWNSTREAM ELEVATION(FEET) =    349.03
 ELEVATION DIFFERENCE(FEET) =      1.36
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.511
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.50
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
 FLOW PROCESS FROM NODE    349.00 TO NODE    329.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    349.03  DOWNSTREAM(FEET) =    348.42
 CHANNEL LENGTH THRU SUBAREA(FEET) =    30.00   CHANNEL SLOPE =  0.0203
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.62
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.31
 Tc(MIN.) =    2.82
```

```
  SUBAREA AREA(ACRES) =     0.08       SUBAREA RUNOFF(CFS) =    0.40
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.77
  LONGEST FLOWPATH FROM NODE    348.00 TO NODE    329.00 =      79.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    329.00 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.) =    2.82
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.78     5.11        5.973         5.04
      2        0.89     2.82        6.060         0.18

  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       14.55     2.82       6.060
      2       25.66     5.11       5.973

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.66   Tc(MIN.) =    5.11
  TOTAL AREA(ACRES) =        5.2
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    329.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    329.00 TO NODE    350.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.80  DOWNSTREAM(FEET) =   338.90
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.96
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.66
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 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.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   5.88
  TOTAL STREAM AREA(ACRES) =     5.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.66

****************************************************************************
  FLOW PROCESS FROM NODE    351.00 TO NODE    352.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    354.21
  DOWNSTREAM ELEVATION(FEET) =    349.79
  ELEVATION DIFFERENCE(FEET) =      4.42
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.890
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    88.55
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    352.00 TO NODE    350.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    349.79  DOWNSTREAM(FEET) =    347.54
  CHANNEL LENGTH THRU SUBAREA(FEET) =    87.00   CHANNEL SLOPE =  0.0259
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.36
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.61
  Tc(MIN.) =    3.50
  SUBAREA AREA(ACRES) =     0.78       SUBAREA RUNOFF(CFS) =    3.88
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       4.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.83
  LONGEST FLOWPATH FROM NODE    351.00 TO NODE    350.00 =     187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    350.00 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.) =    3.50
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.37

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       25.66     5.24        5.878          5.22
      2        4.37     3.50        6.060          0.88

  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       29.26     3.50       6.060
      2       29.90     5.24       5.878

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.90   Tc(MIN.) =    5.24
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    353.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.80  DOWNSTREAM(FEET) =   333.90
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.85
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.90
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    5.75
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    353.00 =    1275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 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.) =    5.75
  RAINFALL INTENSITY(INCH/HR) =   5.54
  TOTAL STREAM AREA(ACRES) =     6.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.90

****************************************************************************
  FLOW PROCESS FROM NODE    354.00 TO NODE    355.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    370.00
  DOWNSTREAM ELEVATION(FEET) =    349.59
  ELEVATION DIFFERENCE(FEET) =     20.41
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    355.00 TO NODE    353.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    349.59  DOWNSTREAM(FEET) =    344.41
  CHANNEL LENGTH THRU SUBAREA(FEET) =   253.00   CHANNEL SLOPE =  0.0205
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.95
```

```
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.43
  Tc(MIN.) =    3.77
  SUBAREA AREA(ACRES) =     2.64       SUBAREA RUNOFF(CFS) =   13.12
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        2.7         PEAK FLOW RATE(CFS) =      13.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   3.60
  LONGEST FLOWPATH FROM NODE    354.00 TO NODE    353.00 =     353.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    353.00 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.) =    3.77
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     2.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       29.90     5.75        5.539          6.10
      2       13.62     3.77        6.060          2.74

  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       40.94     3.77       6.060
      2       42.35     5.75       5.539

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      42.35   Tc(MIN.) =    5.75
  TOTAL AREA(ACRES) =        8.8
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    353.00 =    1275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    353.00 TO NODE    356.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   333.90  DOWNSTREAM(FEET) =   332.50
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.54
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.35
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.86
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    356.00 =    1368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.86
  RAINFALL INTENSITY(INCH/HR) =   5.47
  TOTAL STREAM AREA(ACRES) =     8.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     42.35

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

```
 FLOW PROCESS FROM NODE    359.00 TO NODE    360.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    360.00
 DOWNSTREAM ELEVATION(FEET) =    348.63
 ELEVATION DIFFERENCE(FEET) =     11.37
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.340
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.50
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
 FLOW PROCESS FROM NODE    360.00 TO NODE    356.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    348.63  DOWNSTREAM(FEET) =    340.65
 CHANNEL LENGTH THRU SUBAREA(FEET) =   270.00   CHANNEL SLOPE =  0.0296
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.51
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.73
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.65
 Tc(MIN.) =    3.99
 SUBAREA AREA(ACRES) =     0.81       SUBAREA RUNOFF(CFS) =    4.02
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       4.52

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.93
 LONGEST FLOWPATH FROM NODE    359.00 TO NODE    356.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.99
 RAINFALL INTENSITY(INCH/HR) =   6.06
 TOTAL STREAM AREA(ACRES) =     0.91
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.52

****************************************************************************
 FLOW PROCESS FROM NODE    363.00 TO NODE    364.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  95
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    348.63
 DOWNSTREAM ELEVATION(FEET) =    347.84
 ELEVATION DIFFERENCE(FEET) =      0.79
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.073
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```

```
          THE MAXIMUM OVERLAND FLOW LENGTH =    55.80
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    364.00 TO NODE    365.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    347.84  DOWNSTREAM(FEET) =    345.78
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.0158
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.940
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.00
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.09
  Tc(MIN.) =    5.16
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    3.12
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       3.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.26
  LONGEST FLOWPATH FROM NODE    363.00 TO NODE    365.00 =     230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    365.00 TO NODE    356.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.88  DOWNSTREAM(FEET) =   332.10
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.47
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.60
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.45
  LONGEST FLOWPATH FROM NODE    363.00 TO NODE    356.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.45
  RAINFALL INTENSITY(INCH/HR) =   5.73
  TOTAL STREAM AREA(ACRES) =     0.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.60

****************************************************************************
  FLOW PROCESS FROM NODE    356.10 TO NODE    356.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    348.64
```

```
  DOWNSTREAM ELEVATION(FEET) =    343.68
  ELEVATION DIFFERENCE(FEET) =      4.96
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.802
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    89.90
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    356.20 TO NODE    356.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    343.68  DOWNSTREAM(FEET) =    340.65
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .8200
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.64
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.32
  Tc(MIN.) =    3.12
  SUBAREA AREA(ACRES) =     0.23       SUBAREA RUNOFF(CFS) =    1.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.07
  LONGEST FLOWPATH FROM NODE    356.10 TO NODE    356.00 =     150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    356.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.12
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       42.35     5.86        5.469          8.84
      2        4.52     3.99        6.060          0.91
      3        3.60     5.45        5.733          0.74
      4        1.64     3.12        6.060          0.33

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       45.45     3.12       6.060
      2       47.01     3.99       6.060
      3       49.82     5.45       5.733
      4       51.34     5.86       5.469
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      51.34   Tc(MIN.) =    5.86
  TOTAL AREA(ACRES) =       10.8
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    356.00 =    1368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    356.00 TO NODE    365.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.10  DOWNSTREAM(FEET) =   331.57
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.28
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.34
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.93
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    365.00 =    1421.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.8  TC(MIN.) =      5.93
  PEAK FLOW RATE(CFS)   =      51.34
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
             Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* PROPOSED DRAINAGE - 50 YEAR - COSTA VERDE CENTER                         *
* KIMLEY-HORN & ASSOCIATES                                                 *
* JUNE 2019 - MJS                                                          *
 **************************************************************************

  FILE NAME: CVC50P.DAT
  TIME/DATE OF STUDY: 12:28 06/10/2019
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    361.10
  DOWNSTREAM ELEVATION(FEET) =    360.00
  ELEVATION DIFFERENCE(FEET) =      1.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.740
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    357.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   112.00   CHANNEL SLOPE =  0.0232
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.33
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.18
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.86
  Tc(MIN.) =    3.60
  SUBAREA AREA(ACRES) =     0.88       SUBAREA RUNOFF(CFS) =    3.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       4.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.40  DOWNSTREAM(FEET) =   351.20
  FLOW LENGTH(FEET) =   408.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.23
  PIPE TRAVEL TIME(MIN.) =   1.52    Tc(MIN.) =    5.12
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.192
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.48   SUBAREA RUNOFF(CFS) =    2.04
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       6.22
  TC(MIN.) =    5.12

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.192
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    2.98
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       9.20
  TC(MIN.) =    5.12

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   351.20  DOWNSTREAM(FEET) =   350.90
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        9.20
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.32
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.064
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    2.08
  TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =      11.05
  TC(MIN.) =    5.32

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.90  DOWNSTREAM(FEET) =   349.40
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.05
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.42
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     697.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   349.40  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =   625.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.05
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    6.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1322.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.43
  RAINFALL INTENSITY(INCH/HR) =   4.48
  TOTAL STREAM AREA(ACRES) =     2.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.05

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    346.20
  DOWNSTREAM ELEVATION(FEET) =    345.20
```

```
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.829
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.20  DOWNSTREAM(FEET) =    342.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   114.00   CHANNEL SLOPE =  0.0202
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.20
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.86
  Tc(MIN.) =    3.69
  SUBAREA AREA(ACRES) =     1.57       SUBAREA RUNOFF(CFS) =    6.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       7.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   2.68
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     164.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.90  DOWNSTREAM(FEET) =   335.70
  FLOW LENGTH(FEET) =   401.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.22
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =    4.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    1.47   SUBAREA RUNOFF(CFS) =    6.35
  TOTAL AREA(ACRES) =        3.1   TOTAL RUNOFF(CFS) =      13.57
  TC(MIN.) =    4.81

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    1.59   SUBAREA RUNOFF(CFS) =    6.87
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =      20.44
  TC(MIN.) =    4.81

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   335.70  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.50
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.44
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.84
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    106.00 =     603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.84
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     4.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.44

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    362.40
  DOWNSTREAM ELEVATION(FEET) =    361.40
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.829
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.40  DOWNSTREAM(FEET) =    359.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0197
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.27
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.56
  Tc(MIN.) =    3.39
  SUBAREA AREA(ACRES) =     1.68       SUBAREA RUNOFF(CFS) =    7.26
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       7.69
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   2.67
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     126.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   354.90  DOWNSTREAM(FEET) =   337.40
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.36
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.69
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    3.59
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     313.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.25
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       8.94
  TC(MIN.) =    3.59

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.40  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.90
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.94
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.67
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    106.00 =     381.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.67
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.94

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    364.10
  DOWNSTREAM ELEVATION(FEET) =    363.10
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.829
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.10  DOWNSTREAM(FEET) =    360.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.0200
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.62
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.34
  Tc(MIN.) =    4.17
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   354.60  DOWNSTREAM(FEET) =   354.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.30
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    4.31
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    2.16
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.46
  TC(MIN.) =    4.31

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   354.30  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =   594.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.99
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.46
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    5.42
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    106.00 =     809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.42
  RAINFALL INTENSITY(INCH/HR) =   5.01
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.46

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.05     6.43        4.479          2.66
      2       20.44     4.84        5.269          4.73
      3        8.94     3.67        5.269          2.07
      4        3.46     5.42        5.005          0.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       33.05     3.67       5.269
      2       40.79     4.84       5.269
      3       40.66     5.42       5.005
      4       39.11     6.43       4.479

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.79   Tc(MIN.) =    4.84
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1322.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =       10.5   TOTAL RUNOFF(CFS) =      45.37
  TC(MIN.) =    4.84

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =       10.7   TOTAL RUNOFF(CFS) =      46.23
  TC(MIN.) =    4.84

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

```
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 USER-SPECIFIED RUNOFF COEFFICIENT = .8200
 S.C.S. CURVE NUMBER (AMC II) =  95
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
 SUBAREA AREA(ACRES) =    0.93   SUBAREA RUNOFF(CFS) =    4.02
 TOTAL AREA(ACRES) =       11.6   TOTAL RUNOFF(CFS) =      50.25
 TC(MIN.) =    4.84

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   331.90  DOWNSTREAM(FEET) =   330.30
 FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.38
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      50.25
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    4.90
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    1378.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 USER-SPECIFIED RUNOFF COEFFICIENT = .8200
 S.C.S. CURVE NUMBER (AMC II) =  95
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
 SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    3.28
 TOTAL AREA(ACRES) =       12.4   TOTAL RUNOFF(CFS) =      53.54
 TC(MIN.) =    4.90

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 USER-SPECIFIED RUNOFF COEFFICIENT = .8200
 S.C.S. CURVE NUMBER (AMC II) =  95
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
 SUBAREA AREA(ACRES) =    1.12   SUBAREA RUNOFF(CFS) =    4.84
 TOTAL AREA(ACRES) =       13.5   TOTAL RUNOFF(CFS) =      58.38
 TC(MIN.) =    4.90
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       13.5  TC(MIN.) =      4.90
 PEAK FLOW RATE(CFS)   =      58.38
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
             Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* PROPOSED DRAINAGE - 100 YEAR - COSTA VERDE CENTER                        *
* KIMLEY-HORN & ASSOCIATES                                                 *
* JUNE 2019 - MJS                                                          *
 **************************************************************************

  FILE NAME: CVC100P.DAT
  TIME/DATE OF STUDY: 12:27 06/10/2019
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    361.10
  DOWNSTREAM ELEVATION(FEET) =    360.00
  ELEVATION DIFFERENCE(FEET) =      1.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.740
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.00  DOWNSTREAM(FEET) =    357.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   112.00   CHANNEL SLOPE =  0.0232
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.18
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   0.86
  Tc(MIN.) =    3.60
  SUBAREA AREA(ACRES) =     0.88       SUBAREA RUNOFF(CFS) =    4.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       4.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.50
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.40  DOWNSTREAM(FEET) =   351.20
  FLOW LENGTH(FEET) =   408.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.87
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =    5.10
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.984
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.48   SUBAREA RUNOFF(CFS) =    2.36
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       7.16
  TC(MIN.) =    5.10

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.984
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.70   SUBAREA RUNOFF(CFS) =    3.44
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =      10.60
  TC(MIN.) =    5.10

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   351.20  DOWNSTREAM(FEET) =   350.90
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.60
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.30
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     633.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.839
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    2.39
  TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =      12.74
  TC(MIN.) =    5.30

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   350.90  DOWNSTREAM(FEET) =   349.40
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.74
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     697.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   349.40  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =   625.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.74
  PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =    6.34
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1322.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.34
  RAINFALL INTENSITY(INCH/HR) =   5.20
  TOTAL STREAM AREA(ACRES) =     2.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.74

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    346.20
  DOWNSTREAM ELEVATION(FEET) =    345.20
```

```
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.829
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    345.20  DOWNSTREAM(FEET) =    342.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   114.00   CHANNEL SLOPE =  0.0202
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.46
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.77
  Tc(MIN.) =    3.60
  SUBAREA AREA(ACRES) =     1.57       SUBAREA RUNOFF(CFS) =    7.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       8.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   2.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     164.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   338.90  DOWNSTREAM(FEET) =   335.70
  FLOW LENGTH(FEET) =   401.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.30
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =    4.69
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    1.47   SUBAREA RUNOFF(CFS) =    7.30
  TOTAL AREA(ACRES) =        3.1   TOTAL RUNOFF(CFS) =      15.60
  TC(MIN.) =    4.69

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    1.59   SUBAREA RUNOFF(CFS) =    7.90
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =      23.50
  TC(MIN.) =    4.69

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   335.70  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.50
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.72
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    106.00 =     603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.72
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     4.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.50

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    362.40
  DOWNSTREAM ELEVATION(FEET) =    361.40
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.829
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.40  DOWNSTREAM(FEET) =    359.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0197
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.40
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   0.53
  Tc(MIN.) =    3.36
  SUBAREA AREA(ACRES) =     1.68       SUBAREA RUNOFF(CFS) =    8.35
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       8.85
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.81
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     126.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   354.90  DOWNSTREAM(FEET) =   337.40
  FLOW LENGTH(FEET) =   187.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.81
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.85
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    3.55
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     313.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.44
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =      10.29
  TC(MIN.) =    3.55

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.40  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.12
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.29
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    3.63
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    106.00 =     381.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.63
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.29

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    364.10
  DOWNSTREAM ELEVATION(FEET) =    363.10
  ELEVATION DIFFERENCE(FEET) =      1.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.829
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.50
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.50

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.10  DOWNSTREAM(FEET) =    360.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.0200
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.60
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.35
  Tc(MIN.) =    4.18
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     180.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   354.60  DOWNSTREAM(FEET) =   354.30
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.05
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.49
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    4.33
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    403.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.50   SUBAREA RUNOFF(CFS) =    2.48
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.98
  TC(MIN.) =    4.33

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   354.30  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =   594.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.98
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    5.39
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    106.00 =     809.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.39
  RAINFALL INTENSITY(INCH/HR) =   5.77
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.98

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.74     6.34        5.200          2.66
      2       23.50     4.72        6.060          4.73
      3       10.29     3.63        6.060          2.07
      4        3.98     5.39        5.774          0.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  4 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       38.32     3.63       6.060
      2       46.76     4.72       6.060
      3       47.00     5.39       5.774
      4       45.31     6.34       5.200

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.00   Tc(MIN.) =    5.39
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1322.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.774
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    1.14
  TOTAL AREA(ACRES) =       10.5   TOTAL RUNOFF(CFS) =      49.72
  TC(MIN.) =    5.39

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.774
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.95
  TOTAL AREA(ACRES) =       10.7   TOTAL RUNOFF(CFS) =      50.66
  TC(MIN.) =    5.39

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.774
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.93   SUBAREA RUNOFF(CFS) =    4.40
  TOTAL AREA(ACRES) =       11.6   TOTAL RUNOFF(CFS) =      55.07
  TC(MIN.) =    5.39

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.90  DOWNSTREAM(FEET) =   330.30
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.02
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.07
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.45
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    1378.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.734
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    3.57
  TOTAL AREA(ACRES) =       12.4   TOTAL RUNOFF(CFS) =      58.26
  TC(MIN.) =    5.45

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.734
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =  95
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8200
  SUBAREA AREA(ACRES) =    1.12   SUBAREA RUNOFF(CFS) =    5.27
  TOTAL AREA(ACRES) =       13.5   TOTAL RUNOFF(CFS) =      63.53
  TC(MIN.) =    5.45
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       13.5  TC(MIN.) =      5.45
  PEAK FLOW RATE(CFS)   =      63.53
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

HYDRAFLOW RESULTS

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 6/9/2019
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 11 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 10.8 ACRES
RUNOFF COEFFICIENT 0.82
PEAK DISCHARGE 51.34 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 11	DISCHARGE (CFS) = 1.2
TIME (MIN) = 22	DISCHARGE (CFS) = 1.2
TIME (MIN) = 33	DISCHARGE (CFS) = 1.3
TIME (MIN) = 44	DISCHARGE (CFS) = 1.3
TIME (MIN) = 55	DISCHARGE (CFS) = 1.4
TIME (MIN) = 66	DISCHARGE (CFS) = 1.4
TIME (MIN) = 77	DISCHARGE (CFS) = 1.5
TIME (MIN) = 88	DISCHARGE (CFS) = 1.5
TIME (MIN) = 99	DISCHARGE (CFS) = 1.6
TIME (MIN) = 110	DISCHARGE (CFS) = 1.7
TIME (MIN) = 121	DISCHARGE (CFS) = 1.8
TIME (MIN) = 132	DISCHARGE (CFS) = 1.9
TIME (MIN) = 143	DISCHARGE (CFS) = 2
TIME (MIN) = 154	DISCHARGE (CFS) = 2.1
TIME (MIN) = 165	DISCHARGE (CFS) = 2.4
TIME (MIN) = 176	DISCHARGE (CFS) = 2.5
TIME (MIN) = 187	DISCHARGE (CFS) = 2.9
TIME (MIN) = 198	DISCHARGE (CFS) = 3.1
TIME (MIN) = 209	DISCHARGE (CFS) = 3.8
TIME (MIN) = 220	DISCHARGE (CFS) = 4.4
TIME (MIN) = 231	DISCHARGE (CFS) = 6.4
TIME (MIN) = 242	DISCHARGE (CFS) = -10.1
TIME (MIN) = 253	DISCHARGE (CFS) = 51.34
TIME (MIN) = 264	DISCHARGE (CFS) = 5.1
TIME (MIN) = 275	DISCHARGE (CFS) = 3.4
TIME (MIN) = 286	DISCHARGE (CFS) = 2.7
TIME (MIN) = 297	DISCHARGE (CFS) = 2.2
TIME (MIN) = 308	DISCHARGE (CFS) = 2
TIME (MIN) = 319	DISCHARGE (CFS) = 1.7
TIME (MIN) = 330	DISCHARGE (CFS) = 1.6
TIME (MIN) = 341	DISCHARGE (CFS) = 1.5
TIME (MIN) = 352	DISCHARGE (CFS) = 1.4
TIME (MIN) = 363	DISCHARGE (CFS) = 1.3
TIME (MIN) = 374	DISCHARGE (CFS) = 0

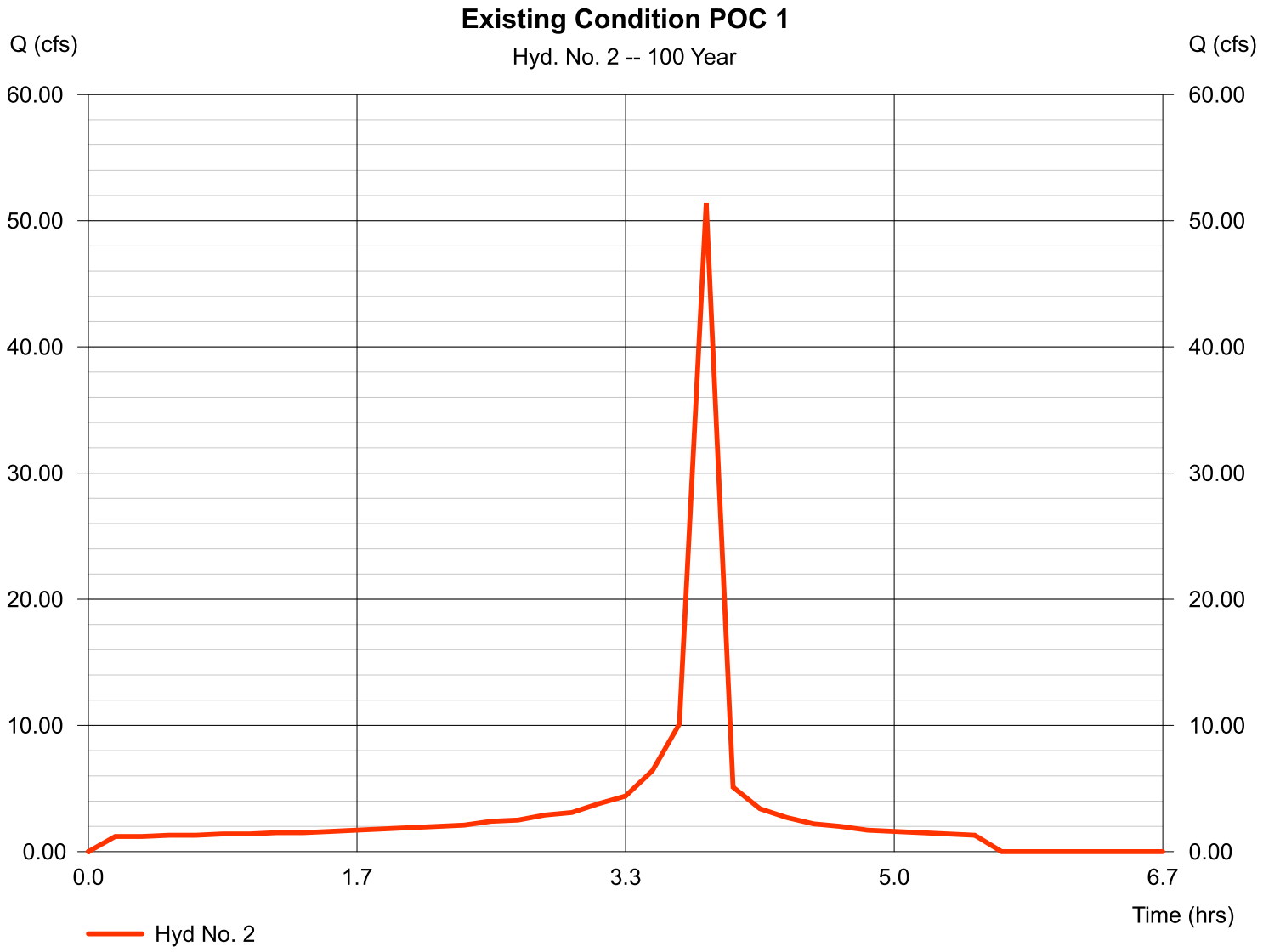
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Sunday, 06 / 9 / 2019

Hyd. No. 2

Existing Condition POC 1

Hydrograph type	= Manual	Peak discharge	= 51.39 cfs
Storm frequency	= 100 yrs	Time to peak	= 3.83 hrs
Time interval	= 10 min	Hyd. volume	= 79,092 cuft



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 6/10/2019
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 13.5 ACRES
RUNOFF COEFFICIENT 0.82
PEAK DISCHARGE 63.53 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 1.5
TIME (MIN) = 10	DISCHARGE (CFS) = 1.5
TIME (MIN) = 15	DISCHARGE (CFS) = 1.6
TIME (MIN) = 20	DISCHARGE (CFS) = 1.6
TIME (MIN) = 25	DISCHARGE (CFS) = 1.6
TIME (MIN) = 30	DISCHARGE (CFS) = 1.6
TIME (MIN) = 35	DISCHARGE (CFS) = 1.7
TIME (MIN) = 40	DISCHARGE (CFS) = 1.7
TIME (MIN) = 45	DISCHARGE (CFS) = 1.7
TIME (MIN) = 50	DISCHARGE (CFS) = 1.7
TIME (MIN) = 55	DISCHARGE (CFS) = 1.8
TIME (MIN) = 60	DISCHARGE (CFS) = 1.8
TIME (MIN) = 65	DISCHARGE (CFS) = 1.8
TIME (MIN) = 70	DISCHARGE (CFS) = 1.9
TIME (MIN) = 75	DISCHARGE (CFS) = 1.9
TIME (MIN) = 80	DISCHARGE (CFS) = 1.9
TIME (MIN) = 85	DISCHARGE (CFS) = 2
TIME (MIN) = 90	DISCHARGE (CFS) = 2
TIME (MIN) = 95	DISCHARGE (CFS) = 2.1
TIME (MIN) = 100	DISCHARGE (CFS) = 2.1
TIME (MIN) = 105	DISCHARGE (CFS) = 2.2
TIME (MIN) = 110	DISCHARGE (CFS) = 2.2
TIME (MIN) = 115	DISCHARGE (CFS) = 2.3
TIME (MIN) = 120	DISCHARGE (CFS) = 2.3
TIME (MIN) = 125	DISCHARGE (CFS) = 2.4
TIME (MIN) = 130	DISCHARGE (CFS) = 2.4
TIME (MIN) = 135	DISCHARGE (CFS) = 2.5
TIME (MIN) = 140	DISCHARGE (CFS) = 2.6
TIME (MIN) = 145	DISCHARGE (CFS) = 2.7
TIME (MIN) = 150	DISCHARGE (CFS) = 2.7
TIME (MIN) = 155	DISCHARGE (CFS) = 2.9
TIME (MIN) = 160	DISCHARGE (CFS) = 2.9
TIME (MIN) = 165	DISCHARGE (CFS) = 3.1
TIME (MIN) = 170	DISCHARGE (CFS) = 3.2
TIME (MIN) = 175	DISCHARGE (CFS) = 3.4
TIME (MIN) = 180	DISCHARGE (CFS) = 3.5
TIME (MIN) = 185	DISCHARGE (CFS) = 3.8
TIME (MIN) = 190	DISCHARGE (CFS) = 3.9
TIME (MIN) = 195	DISCHARGE (CFS) = 4.2
TIME (MIN) = 200	DISCHARGE (CFS) = 4.4
TIME (MIN) = 205	DISCHARGE (CFS) = 4.9
TIME (MIN) = 210	DISCHARGE (CFS) = 5.2
TIME (MIN) = 215	DISCHARGE (CFS) = 6
TIME (MIN) = 220	DISCHARGE (CFS) = 6.5
TIME (MIN) = 225	DISCHARGE (CFS) = 7.9
TIME (MIN) = 230	DISCHARGE (CFS) = 9
TIME (MIN) = 235	DISCHARGE (CFS) = 13.3
TIME (MIN) = 240	DISCHARGE (CFS) = 22.3
TIME (MIN) = 245	DISCHARGE (CFS) = 63.53
TIME (MIN) = 250	DISCHARGE (CFS) = 10.7
TIME (MIN) = 255	DISCHARGE (CFS) = 7.1
TIME (MIN) = 260	DISCHARGE (CFS) = 5.6
TIME (MIN) = 265	DISCHARGE (CFS) = 4.7
TIME (MIN) = 270	DISCHARGE (CFS) = 4.1
TIME (MIN) = 275	DISCHARGE (CFS) = 3.6
TIME (MIN) = 280	DISCHARGE (CFS) = 3.3
TIME (MIN) = 285	DISCHARGE (CFS) = 3
TIME (MIN) = 290	DISCHARGE (CFS) = 2.8
TIME (MIN) = 295	DISCHARGE (CFS) = 2.6
TIME (MIN) = 300	DISCHARGE (CFS) = 2.5
TIME (MIN) = 305	DISCHARGE (CFS) = 2.3
TIME (MIN) = 310	DISCHARGE (CFS) = 2.2
TIME (MIN) = 315	DISCHARGE (CFS) = 2.1
TIME (MIN) = 320	DISCHARGE (CFS) = 2
TIME (MIN) = 325	DISCHARGE (CFS) = 1.9
TIME (MIN) = 330	DISCHARGE (CFS) = 1.9
TIME (MIN) = 335	DISCHARGE (CFS) = 1.8
TIME (MIN) = 340	DISCHARGE (CFS) = 1.7
TIME (MIN) = 345	DISCHARGE (CFS) = 1.7
TIME (MIN) = 350	DISCHARGE (CFS) = 1.6
TIME (MIN) = 355	DISCHARGE (CFS) = 1.6
TIME (MIN) = 360	DISCHARGE (CFS) = 1.5

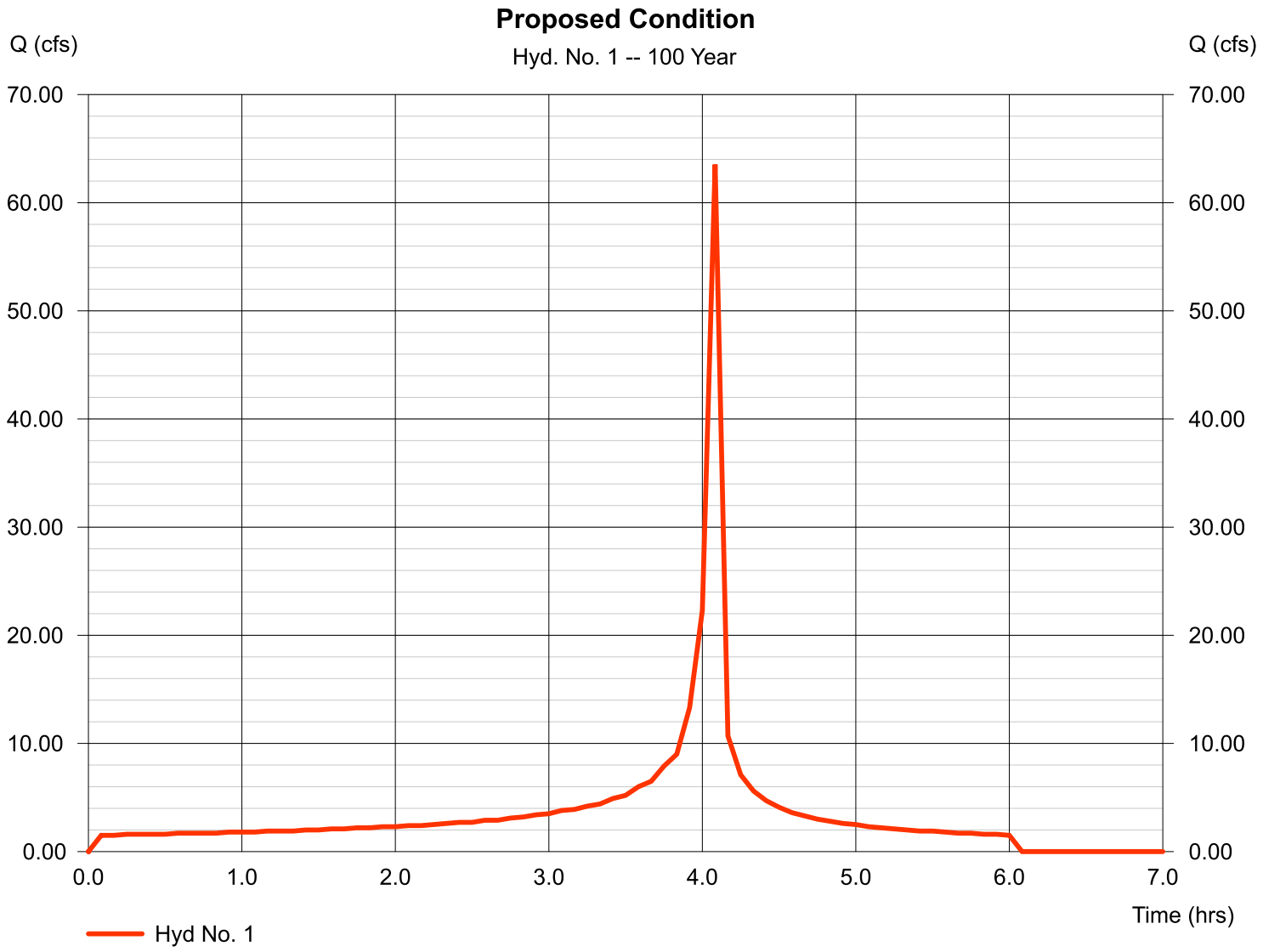
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 06 / 10 / 2019

Hyd. No. 1

Proposed Condition

Hydrograph type	= Manual	Peak discharge	= 63.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 91,809 cuft

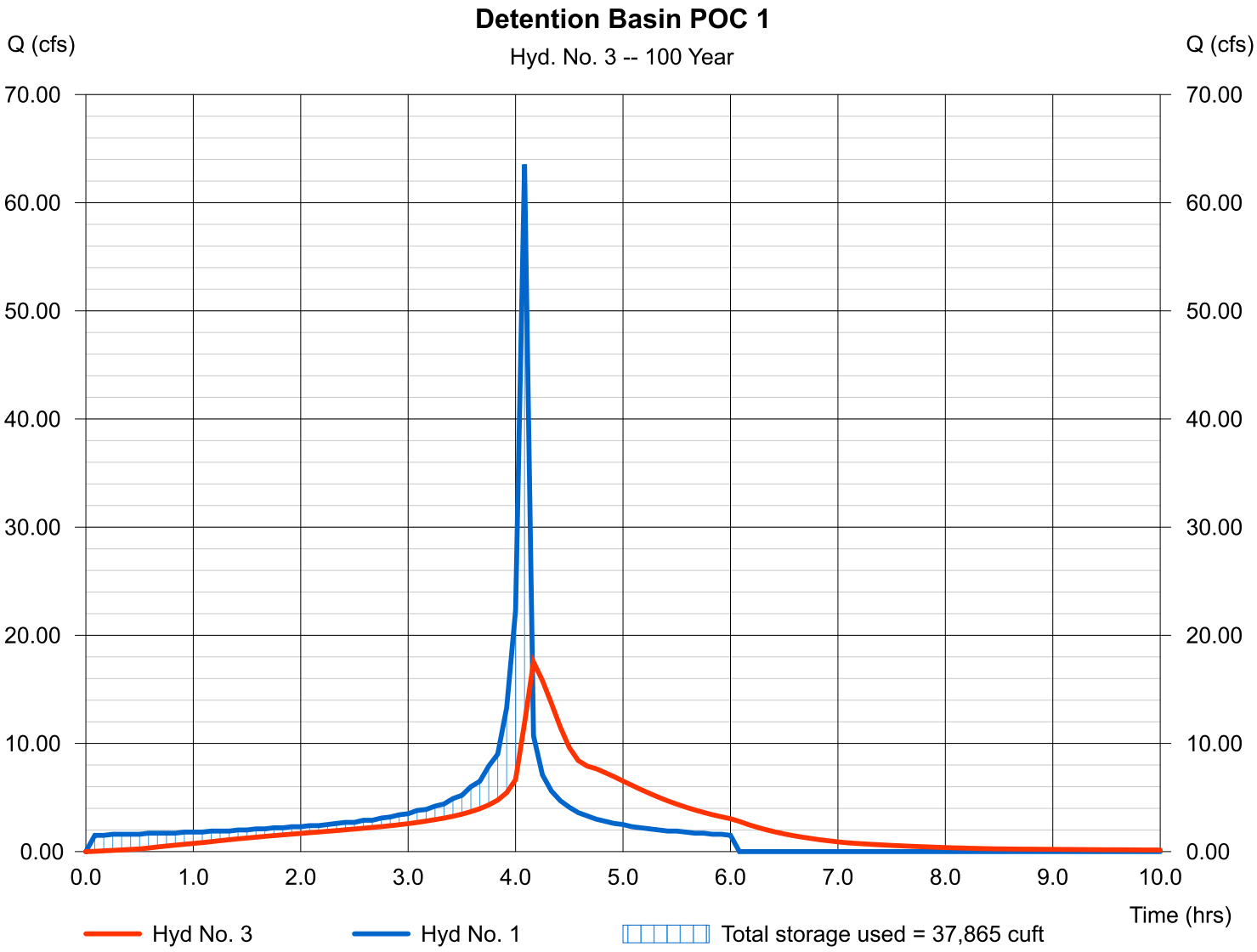


Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Monday, 06 / 10 / 2019

Hyd. No. 3

Detention Basin POC 1

Hydrograph type	=	Reservoir	Peak discharge	=	17.53 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	91,799 cuft
Inflow hyd. No.	=	1 - Proposed Condition	Max. Elevation	=	334.68 ft
Reservoir name	=	Underground Detention Basin	Max. Storage	=	37,865 cuft

Storage Indication method used.