Rancho Springs Medical Center Project

Preliminary Hydrology and Hydraulics Report

APN 912-010-032

25500 Medical Center Drive

Murrieta, CA 92562

Prepared for:

Universal Health Service, Inc.

2192 Carmel Valley Road

Del Mar, CA 91014

Prepared By:

Kimley-Horn and Associates, Inc.

660 South Figueroa Street Suite 2050

Los Angeles, CA 90017

June 2020

INTRODUCTION

The scope of the Project is to complete a preliminary hydrology and hydraulic analysis for the storm drain improvements associated with the proposed Rancho Springs Medical Center project in Murrieta, CA. The Project is located at 22500 Medical Center Drive on the northwest corner of the intersection of Interstate Freeway 215 and Murrieta Hot Springs Road. The Project consist of a 36,100 square foot hospital building expansion to be located centrally on the Rancho Springs Medical Center. Other project activities will also include utility improvements and parking areas and driveways redevelopment. The total project makes up approximately 5.23 acres.

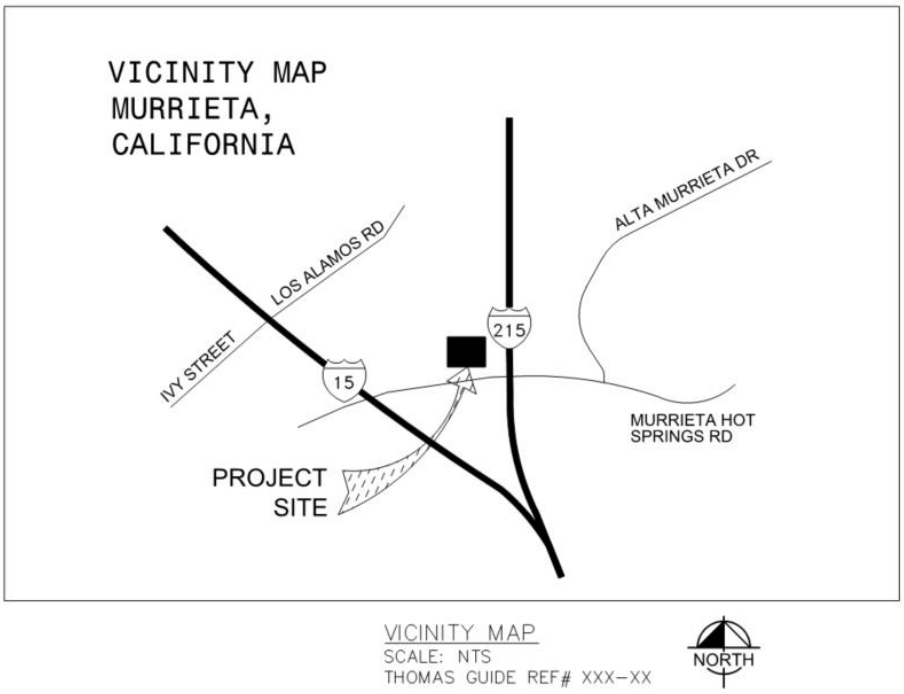


Figure 1: Rancho Springs Medical Center Location

HYDROLOGY

The preliminary hydrology and hydraulic analyses were completed in accordance with the Riverside County Hydrology Manual. A rational method analysis in accordance with the Manual was completed to calculate the peak discharges for existing conditions and project conditions. A review of the Geotechnical Investigation Report dated December 16, 2019 prepared by NOCA Services, Inc found that subsurface soils at the site consisted of silty and clayey sand and sandy silt fill material underlain by medium dense to very dense sandstone. Additionally, preliminary infiltration tests showed that the soils have low infiltration rates. Soil group C is defined as soils having slow infiltration rates (high runoff potential) and was used to calculate the soil loss rates.

Per the Riverside County Hydrology Manual, antecedent moisture condition (AMC) of 2 was used for the 100-year storm event. The land use for the project is commercial which has an impervious range percent between 80-100%. Storm depths from NOAA 14 were used for the analyses. The Advance Engineering Software (AES) Hydrosoft package was used to complete the rational method analysis.

Under existing conditions, the project discharges to multiple storm drain inlets located throughout the project. Runoff is routed through an existing onsite storm drain system that drains to a 60-inch storm drain lateral that ultimately discharges to the public storm drain system.

For proposed conditions, the project area was divided into three drainage areas (A-C). Each drainage area was then subdivided for the rational method calculations. Drainage area A consists of offsite runoff; therefore, it was rerouted to discharge directly into the existing 60-inch storm drain. Drainage area B consists of off-site areas and 0.31 acres from the project limits that cannot be captured in the proposed storm drain system due to grading constraints. Drainage area C consists of run-on areas and the remaining 4.92 acres from the proposed project which will be routed to a proposed detention basin via the proposed onsite storm drain system. The outlet from the detention basin will be limited to existing conditions flow rates or lower via a riser structure prior to discharging into the existing 60-inch storm drain.

Offsite areas from the north will be collected prior to entering the project area and rerouted to the existing 60-inch storm drain located beneath the project area. Offsite areas from the south and east perimeters will be collected in the project's proposed storm drain system and have been included in the proposed rational method and detention calculations. Hydrology maps and results for existing and proposed conditions are included in Appendix A.

HYDRAULICS

Storm Drain and Detention Basin Hydraulic Calculations

Hydraulic calculations for sizing storm drain were completed using Manning's equation. Each proposed storm drain lateral has been sized in AES will be able to convey the 100-year peak flow. Each storm drain line will discharge to a main lateral which will discharge to the onsite detention basin.

The unit hydrograph for the proposed project was completed using the AES software. The basin routing analysis was completed with Bentley PondPack, which uses the Modified-Puls method for flow-through basin analysis. Routing analysis results for the detention basin showed that the maximum water surface depth during the 100-year, 24-hour storm event was 3.75 feet, which would allow for more than 2 feet of freeboard. The total volume detained was 0.513 ac-ft. In addition, the peak outflow from the basin (4.42 cfs) was less than the existing conditions 100-year, 24-hour peak flow (5.07 cfs).

A 10-year, 1-hour storm analysis of the detention system was also calculations. Basin routing analysis for the 10-year, 1-hour storm showed a peak basin outflow discharge of 0.39 cfs, which is less than the unit hydrograph peak undeveloped discharge (0.45 cfs). The total volume detained was 0.865 ac-ft with a maximum water surface depth of 5.68 feet.

The detention basin system will outlet to the existing 60-inch storm drain lateral, matching the existing conditions. The outlet from the detention basin will discharge via a riser with an orifice and rectangular notch weir to limit the flows similar to existing conditions. The storm drain and basin routing calculations are included in Appendix B.

Catch Basin Calculations

Catch basin capacity calculations were completed using Bentley's Flow Master software which uses HEC-22 Urban Drainage Design Manual (FHWA, 2009) methodology. The catch basins were designed for the 100-year 24-hour storm event and to limit the maximum ponding depth at the catch basins below 6 inches. The catch basin capacity calculations are included in Appendix C.

APPENDIX A: HYDROLOGY ANALYSIS

NOAA Atlas 14, Volume 6, Version 2
Location name: Murrieta, California, USA*
Latitude: 33.5589°, Longitude: -117.1837°
Elevation: 1144.08 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.112** (0.094-0.135)	**0.148** (0.124-0.179)	**0.198** (0.166-0.240)	**0.241** (0.199-0.293)	**0.301** (0.240-0.380)	**0.349** (0.273-0.450)	**0.399** (0.304-0.529)	**0.453** (0.335-0.618)	**0.529** (0.374-0.754)	**0.590** (0.402-0.873)
10-min	**0.160** (0.135-0.193)	**0.213** (0.178-0.256)	**0.284** (0.238-0.344)	**0.345** (0.286-0.421)	**0.431** (0.345-0.544)	**0.500** (0.391-0.645)	**0.572** (0.436-0.758)	**0.649** (0.480-0.886)	**0.758** (0.536-1.08)	**0.845** (0.577-1.25)
15-min	**0.194** (0.163-0.234)	**0.257** (0.216-0.310)	**0.344** (0.287-0.416)	**0.417** (0.346-0.509)	**0.521** (0.417-0.658)	**0.604** (0.472-0.780)	**0.692** (0.527-0.917)	**0.785** (0.581-1.07)	**0.916** (0.649-1.31)	**1.02** (0.698-1.51)
30-min	**0.301** (0.253-0.362)	**0.399** (0.335-0.481)	**0.533** (0.446-0.645)	**0.647** (0.536-0.789)	**0.808** (0.646-1.02)	**0.937** (0.733-1.21)	**1.07** (0.818-1.42)	**1.22** (0.901-1.66)	**1.42** (1.01-2.03)	**1.59** (1.08-2.35)
60-min	**0.458** (0.384-0.551)	**0.607** (0.509-0.732)	**0.812** (0.678-0.981)	**0.985** (0.816-1.20)	**1.23** (0.983-1.55)	**1.43** (1.12-1.84)	**1.63** (1.24-2.17)	**1.85** (1.37-2.53)	**2.16** (1.53-3.09)	**2.41** (1.65-3.57)
2-hr	**0.669** (0.561-0.805)	**0.878** (0.736-1.06)	**1.16** (0.971-1.40)	**1.40** (1.16-1.70)	**1.73** (1.38-2.18)	**1.99** (1.56-2.57)	**2.26** (1.72-3.00)	**2.55** (1.88-3.48)	**2.94** (2.08-4.20)	**3.26** (2.22-4.82)
3-hr	**0.829** (0.696-0.997)	**1.09** (0.910-1.31)	**1.43** (1.20-1.73)	**1.72** (1.42-2.09)	**2.12** (1.69-2.67)	**2.43** (1.90-3.14)	**2.75** (2.10-3.65)	**3.09** (2.29-4.22)	**3.56** (2.52-5.08)	**3.93** (2.68-5.81)
6-hr	**1.18** (0.993-1.42)	**1.55** (1.30-1.87)	**2.03** (1.70-2.46)	**2.44** (2.02-2.97)	**2.99** (2.39-3.78)	**3.42** (2.67-4.42)	**3.86** (2.94-5.12)	**4.32** (3.20-5.91)	**4.96** (3.51-7.08)	**5.46** (3.72-8.07)
12-hr	**1.57** (1.32-1.89)	**2.07** (1.73-2.49)	**2.72** (2.28-3.29)	**3.26** (2.70-3.97)	**4.00** (3.19-5.05)	**4.57** (3.57-5.90)	**5.15** (3.92-6.82)	**5.75** (4.25-7.85)	**6.57** (4.65-9.38)	**7.22** (4.92-10.7)
24-hr	**2.03** (1.79-2.34)	**2.71** (2.39-3.13)	**3.60** (3.17-4.17)	**4.33** (3.78-5.06)	**5.33** (4.51-6.43)	**6.10** (5.06-7.51)	**6.90** (5.59-8.68)	**7.71** (6.09-9.98)	**8.83** (6.70-11.9)	**9.71** (7.12-13.5)
2-day	**2.42** (2.14-2.80)	**3.31** (2.92-3.83)	**4.50** (3.96-5.22)	**5.49** (4.80-6.42)	**6.87** (5.82-8.29)	**7.96** (6.60-9.80)	**9.09** (7.37-11.5)	**10.3** (8.11-13.3)	**11.9** (9.05-16.1)	**13.3** (9.72-18.5)
3-day	**2.56** (2.26-2.95)	**3.55** (3.13-4.10)	**4.91** (4.32-5.69)	**6.05** (5.28-7.07)	**7.67** (6.49-9.25)	**8.97** (7.44-11.0)	**10.3** (8.37-13.0)	**11.8** (9.30-15.3)	**13.9** (10.5-18.7)	**15.6** (11.4-21.6)
4-day	**2.76** (2.44-3.19)	**3.87** (3.42-4.48)	**5.40** (4.75-6.26)	**6.70** (5.85-7.82)	**8.55** (7.23-10.3)	**10.0** (8.33-12.4)	**11.6** (9.42-14.6)	**13.3** (10.5-17.3)	**15.8** (12.0-21.3)	**17.8** (13.1-24.8)
7-day	**3.20** (2.83-3.69)	**4.52** (3.99-5.23)	**6.35** (5.59-7.36)	**7.92** (6.92-9.25)	**10.2** (8.61-12.3)	**12.0** (9.96-14.8)	**14.0** (11.3-17.6)	**16.1** (12.7-20.8)	**19.1** (14.5-25.8)	**21.7** (15.9-30.1)
10-day	**3.44** (3.04-3.98)	**4.89** (4.32-5.65)	**6.90** (6.08-8.00)	**8.63** (7.54-10.1)	**11.1** (9.42-13.4)	**13.2** (10.9-16.2)	**15.4** (12.4-19.3)	**17.7** (14.0-22.9)	**21.2** (16.0-28.5)	**24.0** (17.6-33.4)
20-day	**4.25** (3.76-4.91)	**6.11** (5.40-7.07)	**8.73** (7.69-10.1)	**11.0** (9.61-12.9)	**14.3** (12.1-17.3)	**17.0** (14.1-21.0)	**20.0** (16.2-25.2)	**23.2** (18.3-30.0)	**27.9** (21.1-37.5)	**31.8** (23.3-44.2)
30-day	**5.03** (4.44-5.80)	**7.26** (6.41-8.40)	**10.4** (9.18-12.1)	**13.2** (11.5-15.4)	**17.2** (14.6-20.8)	**20.6** (17.1-25.3)	**24.2** (19.6-30.5)	**28.2** (22.2-36.4)	**34.0** (25.7-45.7)	**38.8** (28.5-54.0)
45-day	**5.91** (5.23-6.83)	**8.54** (7.53-9.87)	**12.3** (10.8-14.2)	**15.5** (13.6-18.1)	**20.3** (17.2-24.5)	**24.3** (20.2-30.0)	**28.7** (23.3-36.1)	**33.5** (26.4-43.3)	**40.5** (30.7-54.5)	**46.4** (34.0-64.5)
60-day	**6.85** (6.06-7.91)	**9.84** (8.68-11.4)	**14.1** (12.4-16.3)	**17.8** (15.6-20.8)	**23.4** (19.8-28.2)	**28.0** (23.2-34.4)	**33.0** (26.7-41.6)	**38.5** (30.4-49.9)	**46.7** (35.4-62.8)	**53.5** (39.2-74.5)

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

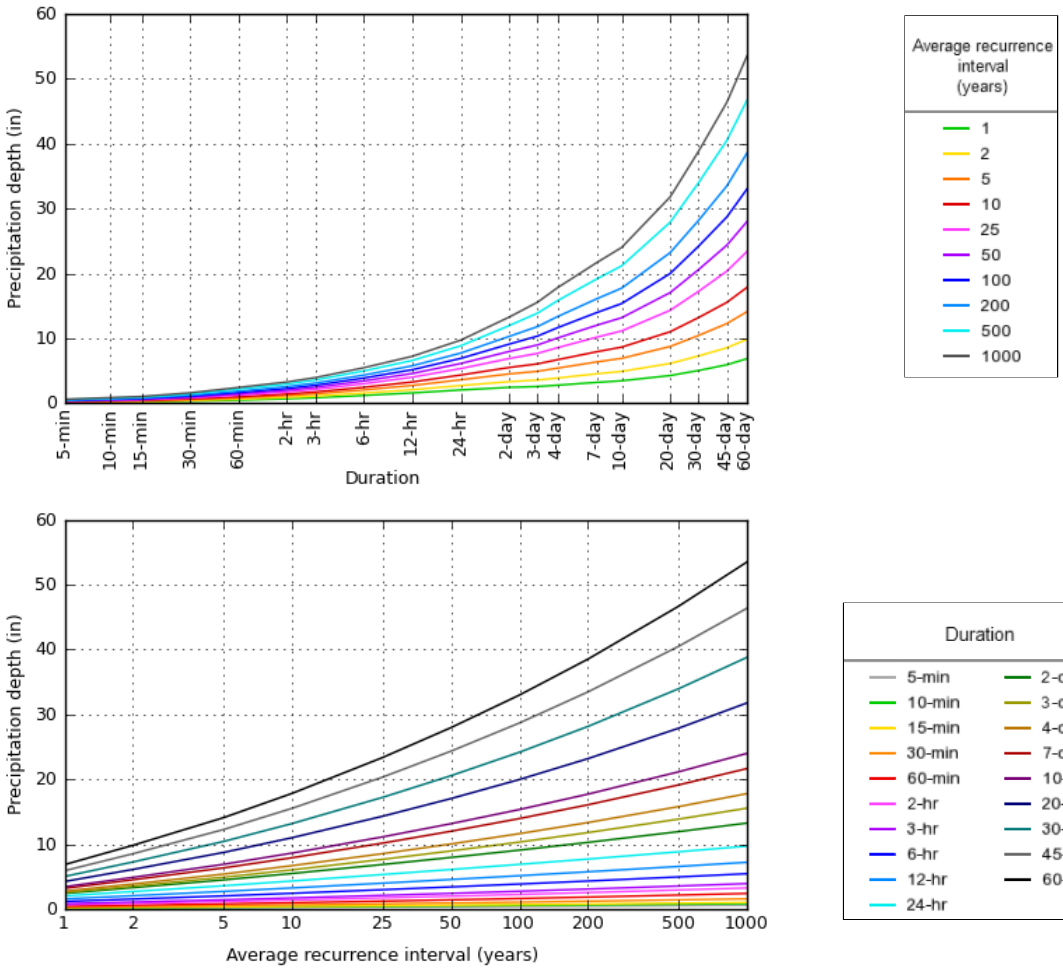
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.5589°, Longitude: -117.1837°



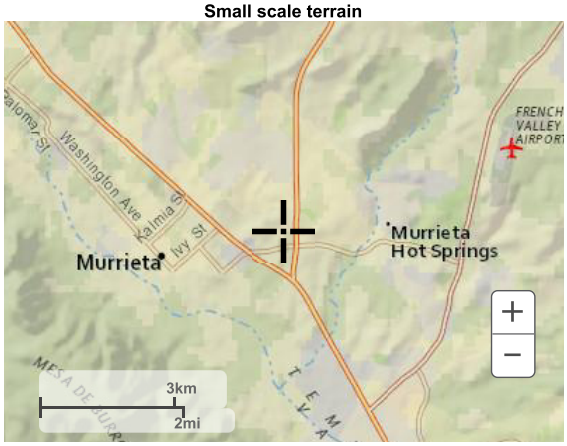
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue May 12 16:45:11 2020

Back to Top

Maps & aerials

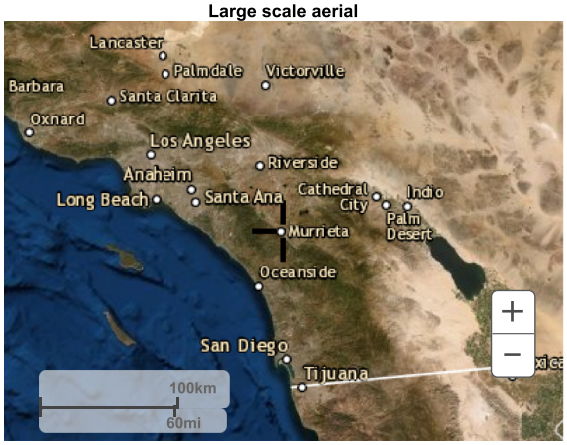
Small scale terrain



Large scale terrain

Large scale map

Large scale aerial



Back to Top

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

Disclaimer

NOAA Atlas 14, Volume 6, Version 2
Location name: Murrieta, California, USA*
Latitude: 33.5589°, Longitude: -117.1837°
Elevation: 1144.08 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**1.34** (1.13-1.62)	**1.78** (1.49-2.15)	**2.38** (1.99-2.88)	**2.89** (2.39-3.52)	**3.61** (2.88-4.56)	**4.19** (3.28-5.40)	**4.79** (3.65-6.35)	**5.44** (4.02-7.42)	**6.35** (4.49-9.05)	**7.08** (4.82-10.5)
10-min	**0.960** (0.810-1.16)	**1.28** (1.07-1.54)	**1.70** (1.43-2.06)	**2.07** (1.72-2.53)	**2.59** (2.07-3.26)	**3.00** (2.35-3.87)	**3.43** (2.62-4.55)	**3.89** (2.88-5.32)	**4.55** (3.22-6.49)	**5.07** (3.46-7.51)
15-min	**0.776** (0.652-0.936)	**1.03** (0.864-1.24)	**1.38** (1.15-1.66)	**1.67** (1.38-2.04)	**2.08** (1.67-2.63)	**2.42** (1.89-3.12)	**2.77** (2.11-3.67)	**3.14** (2.32-4.29)	**3.66** (2.60-5.23)	**4.09** (2.79-6.05)
30-min	**0.602** (0.506-0.724)	**0.798** (0.670-0.962)	**1.07** (0.892-1.29)	**1.29** (1.07-1.58)	**1.62** (1.29-2.04)	**1.87** (1.47-2.42)	**2.15** (1.64-2.85)	**2.44** (1.80-3.33)	**2.84** (2.01-4.06)	**3.17** (2.16-4.69)
60-min	**0.458** (0.384-0.551)	**0.607** (0.509-0.732)	**0.812** (0.678-0.981)	**0.985** (0.816-1.20)	**1.23** (0.983-1.55)	**1.43** (1.12-1.84)	**1.63** (1.24-2.17)	**1.85** (1.37-2.53)	**2.16** (1.53-3.09)	**2.41** (1.65-3.57)
2-hr	**0.334** (0.280-0.402)	**0.439** (0.368-0.529)	**0.580** (0.486-0.702)	**0.699** (0.579-0.852)	**0.864** (0.691-1.09)	**0.995** (0.778-1.29)	**1.13** (0.862-1.50)	**1.27** (0.942-1.74)	**1.47** (1.04-2.10)	**1.63** (1.11-2.41)
3-hr	**0.276** (0.232-0.332)	**0.362** (0.303-0.436)	**0.476** (0.398-0.575)	**0.572** (0.474-0.697)	**0.704** (0.563-0.889)	**0.809** (0.632-1.04)	**0.916** (0.698-1.21)	**1.03** (0.761-1.41)	**1.19** (0.839-1.69)	**1.31** (0.893-1.94)
6-hr	**0.198** (0.166-0.238)	**0.259** (0.217-0.311)	**0.340** (0.284-0.410)	**0.407** (0.337-0.496)	**0.499** (0.399-0.630)	**0.571** (0.447-0.738)	**0.645** (0.491-0.855)	**0.722** (0.534-0.986)	**0.828** (0.586-1.18)	**0.911** (0.622-1.35)
12-hr	**0.130** (0.109-0.157)	**0.171** (0.144-0.207)	**0.226** (0.189-0.273)	**0.270** (0.224-0.330)	**0.332** (0.265-0.419)	**0.379** (0.296-0.489)	**0.427** (0.326-0.566)	**0.477** (0.353-0.652)	**0.546** (0.386-0.779)	**0.599** (0.409-0.886)
24-hr	**0.085** (0.075-0.098)	**0.113** (0.100-0.130)	**0.150** (0.132-0.174)	**0.180** (0.158-0.211)	**0.222** (0.188-0.268)	**0.254** (0.211-0.313)	**0.287** (0.233-0.362)	**0.321** (0.254-0.416)	**0.368** (0.279-0.495)	**0.404** (0.297-0.563)
2-day	**0.050** (0.045-0.058)	**0.069** (0.061-0.080)	**0.094** (0.083-0.109)	**0.114** (0.100-0.134)	**0.143** (0.121-0.173)	**0.166** (0.138-0.204)	**0.189** (0.153-0.239)	**0.214** (0.169-0.277)	**0.249** (0.189-0.335)	**0.276** (0.203-0.384)
3-day	**0.036** (0.031-0.041)	**0.049** (0.044-0.057)	**0.068** (0.060-0.079)	**0.084** (0.073-0.098)	**0.106** (0.090-0.128)	**0.125** (0.103-0.153)	**0.144** (0.116-0.181)	**0.164** (0.129-0.212)	**0.193** (0.146-0.259)	**0.216** (0.158-0.301)
4-day	**0.029** (0.025-0.033)	**0.040** (0.036-0.047)	**0.056** (0.050-0.065)	**0.070** (0.061-0.081)	**0.089** (0.075-0.107)	**0.105** (0.087-0.129)	**0.121** (0.098-0.153)	**0.139** (0.110-0.180)	**0.165** (0.125-0.221)	**0.185** (0.136-0.258)
7-day	**0.019** (0.017-0.022)	**0.027** (0.024-0.031)	**0.038** (0.033-0.044)	**0.047** (0.041-0.055)	**0.061** (0.051-0.073)	**0.071** (0.059-0.088)	**0.083** (0.067-0.105)	**0.096** (0.076-0.124)	**0.114** (0.086-0.153)	**0.129** (0.095-0.179)
10-day	**0.014** (0.013-0.017)	**0.020** (0.018-0.024)	**0.029** (0.025-0.033)	**0.036** (0.031-0.042)	**0.046** (0.039-0.056)	**0.055** (0.046-0.067)	**0.064** (0.052-0.081)	**0.074** (0.058-0.096)	**0.088** (0.067-0.119)	**0.100** (0.073-0.139)
20-day	**0.009** (0.008-0.010)	**0.013** (0.011-0.015)	**0.018** (0.016-0.021)	**0.023** (0.020-0.027)	**0.030** (0.025-0.036)	**0.035** (0.029-0.044)	**0.042** (0.034-0.052)	**0.048** (0.038-0.063)	**0.058** (0.044-0.078)	**0.066** (0.049-0.092)
30-day	**0.007** (0.006-0.008)	**0.010** (0.009-0.012)	**0.014** (0.013-0.017)	**0.018** (0.016-0.021)	**0.024** (0.020-0.029)	**0.029** (0.024-0.035)	**0.034** (0.027-0.042)	**0.039** (0.031-0.051)	**0.047** (0.036-0.063)	**0.054** (0.040-0.075)
45-day	**0.005** (0.005-0.006)	**0.008** (0.007-0.009)	**0.011** (0.010-0.013)	**0.014** (0.013-0.017)	**0.019** (0.016-0.023)	**0.023** (0.019-0.028)	**0.027** (0.022-0.033)	**0.031** (0.024-0.040)	**0.037** (0.028-0.050)	**0.043** (0.031-0.060)
60-day	**0.005** (0.004-0.005)	**0.007** (0.006-0.008)	**0.010** (0.009-0.011)	**0.012** (0.011-0.014)	**0.016** (0.014-0.020)	**0.019** (0.016-0.024)	**0.023** (0.019-0.029)	**0.027** (0.021-0.035)	**0.032** (0.025-0.044)	**0.037** (0.027-0.052)

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

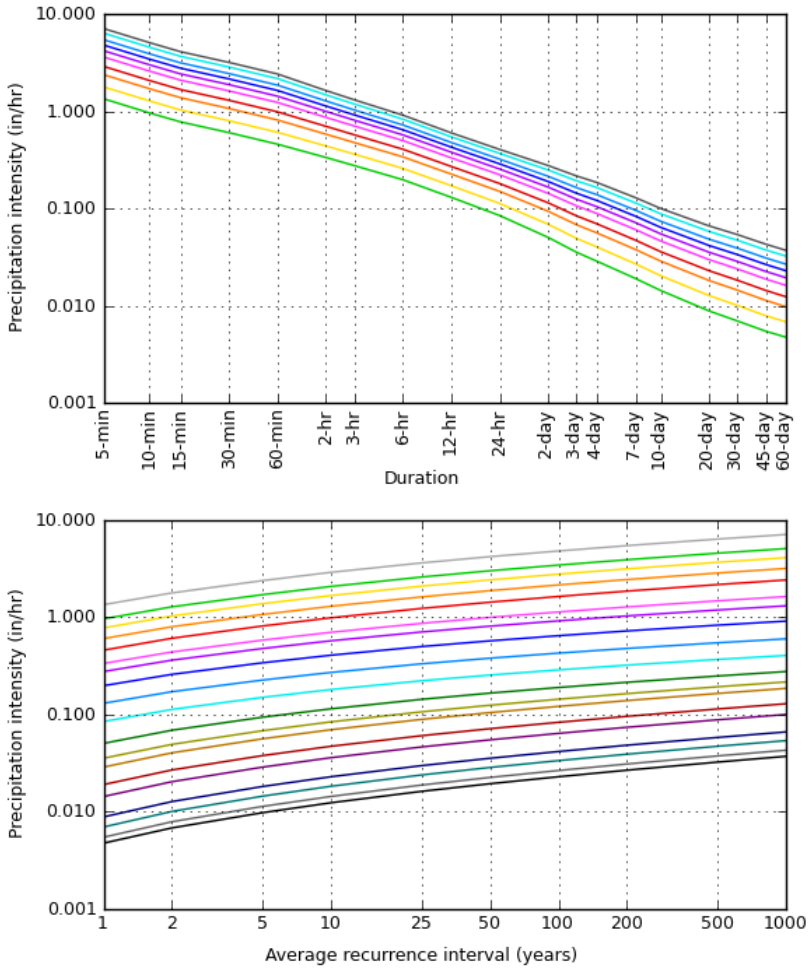
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 33.5589°, Longitude: -117.1837°



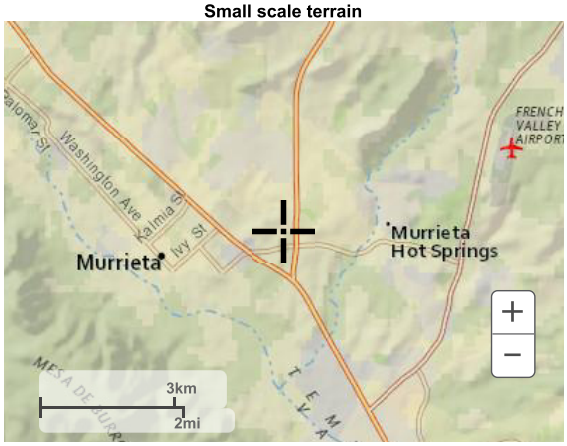
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue May 12 16:47:48 2020

Back to Top

Maps & aerials

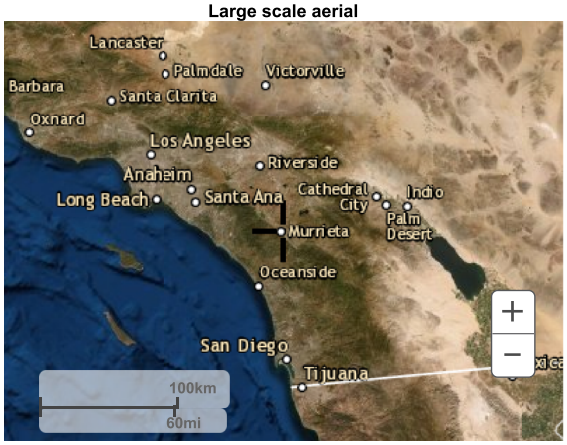
Small scale terrain



Large scale terrain

Large scale map

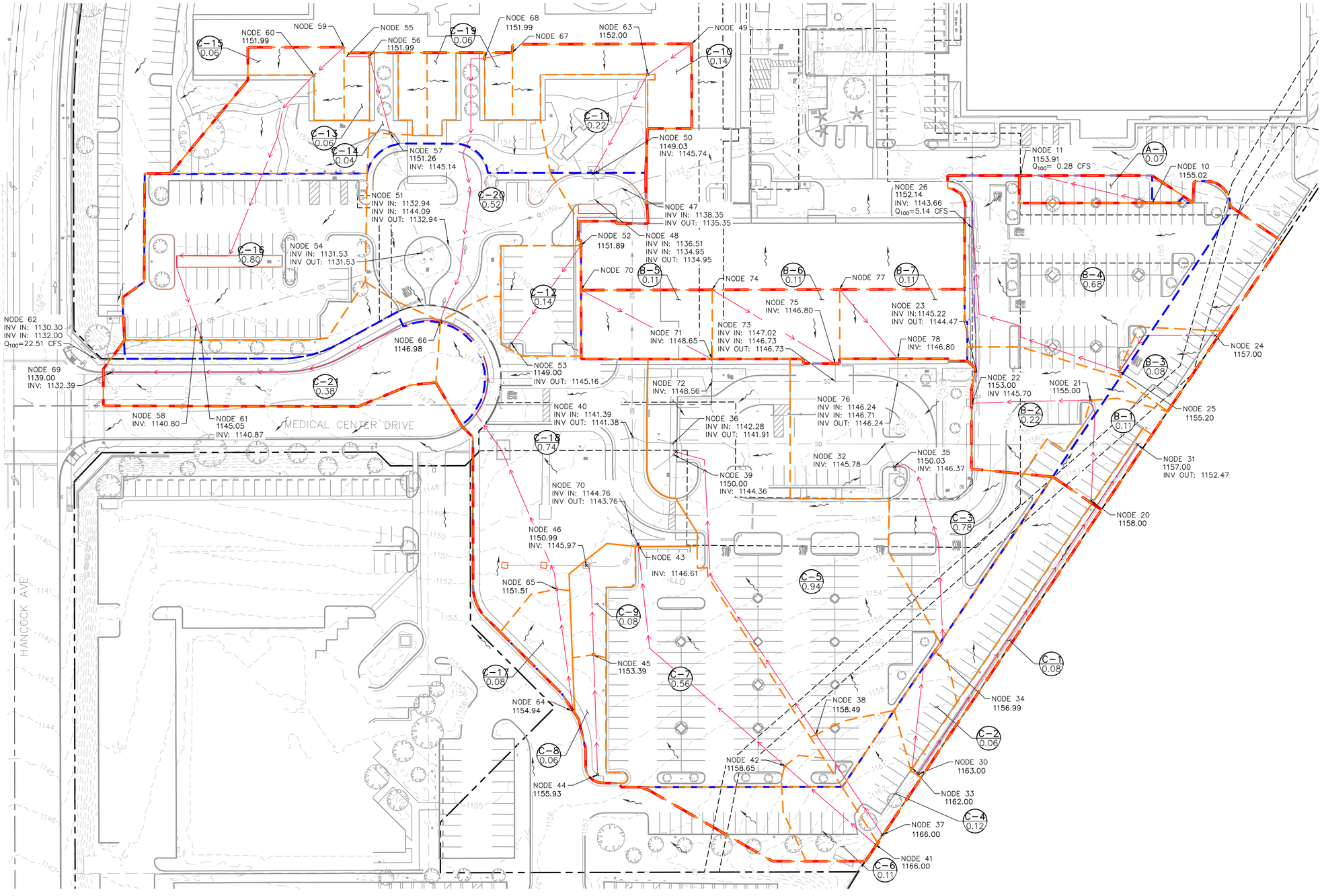
Large scale aerial



Back to Top

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

Disclaimer



LEGEND

- CENTER LINE
- PROPERTY LINE
- RIGHT-OF-WAY LINE / LEASE LINE
- EASEMENT LINE
- PROJECT LIMITS
- SD — EXISTING STORM DRAIN LINE
- LONGEST FLOW PATH
- DENOTES DRAINAGE AREA BOUNDARY
- DENOTES SUB-DRAINAGE AREA BOUNDARY
- A-# / 0.00 — SUBAREA NAME / AREA (AC)
- EXISTING SURFACE FLOW DIRECTION

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

RANCHO SPRINGS MEDICAL CENTER
EXISTING CONDITIONS HYDROLOGY MAP
JUNE 2020

Kimley»Horn

© 2020 KIMLEY-HORN AND ASSOCIATES, INC.
660 S. FIGUEROA ST, SUITE 2050, LOS ANGELES, CA 90017
PHONE: 213-261-4040

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
                      (Rational Tabling Version 18.0)
                  Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:

                       Kimley-Horn and Associates, Inc.
                              765 The City Drive
                                  Suite 200
                               Orange, CA 92868

 ************************ DESCRIPTION OF STUDY ************************
* UHS Rancho Springs                                                     *
* Existing Conditions                                                    *
* 10-year analysis                                                       *
 **************************************************************************

  FILE NAME: RS_E.DAT
  TIME/DATE OF STUDY: 21:12 05/17/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.070
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.985
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.430
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.630
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4144876
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4152232
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.995
  SLOPE OF INTENSITY DURATION CURVE = 0.4145
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     10.00 TO NODE     11.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1155.02
  DOWNSTREAM ELEVATION(FEET) =   1153.91
  ELEVATION DIFFERENCE(FEET) =      1.11
  TC = 0.303*[(  100.00**3)/(     1.11)]**.2 =    4.705
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1158.00
  DOWNSTREAM ELEVATION(FEET) =   1155.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  100.00**3)/(     3.00)]**.2 =    3.856
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1155.00  DOWNSTREAM(FEET) =   1153.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    99.00   CHANNEL SLOPE =  0.0202
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.530
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8828
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.26
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.31
  Tc(MIN.) =    6.31
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     199.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.530
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8828
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.76
  TC(MIN.) =    6.31

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.70  DOWNSTREAM(FEET) =  1144.47
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS   2.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.75
  GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.76
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.39
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.65  DOWNSTREAM(FEET) =  1148.56
  FLOW LENGTH(FEET) =    18.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.04
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.27
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.15
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =   10018.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     73.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.56  DOWNSTREAM(FEET) =  1147.02
```

```
  FLOW LENGTH(FEET) =   102.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.07
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.27
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    5.71
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     73.00 =   10120.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     73.00 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.) =    5.71
  RAINFALL INTENSITY(INCH/HR) =   2.64
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     73.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.80  DOWNSTREAM(FEET) =  1146.73
  FLOW LENGTH(FEET) =    14.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.04
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.27
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.12
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     73.00 =     114.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     73.00 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.) =    5.12
  RAINFALL INTENSITY(INCH/HR) =   2.76
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.27

  ** CONFLUENCE DATA **
```

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.27	5.71	2.638	0.11
2	0.27	5.12	2.759	0.11

**********WARNING**********
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	0.51	5.12	2.759
2	0.53	5.71	2.638

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 0.53 Tc(MIN.) = 5.71
TOTAL AREA(ACRES) = 0.2
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 73.00 = 10120.50 FEET.

****
FLOW PROCESS FROM NODE 73.00 TO NODE 76.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 1146.73 DOWNSTREAM(FEET) = 1146.24
FLOW LENGTH(FEET) = 52.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 3.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.13
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.53
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 5.98
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 76.00 = 10172.50 FEET.

****
FLOW PROCESS FROM NODE 76.00 TO NODE 76.00 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.) = 5.98
RAINFALL INTENSITY(INCH/HR) = 2.59
TOTAL STREAM AREA(ACRES) = 0.22
PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.53

****
FLOW PROCESS FROM NODE 77.00 TO NODE 78.00 IS CODE = 22

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
USER SPECIFIED Tc(MIN.) = 5.000
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.787
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
SOIL CLASSIFICATION IS "C"

```
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     76.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.80  DOWNSTREAM(FEET) =  1146.71
  FLOW LENGTH(FEET) =    18.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.04
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.27
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.15
  LONGEST FLOWPATH FROM NODE     77.00 TO NODE     76.00 =   10018.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     76.00 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.) =    5.15
  RAINFALL INTENSITY(INCH/HR) =   2.75
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.27

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.53     5.98        2.587          0.22
      2        0.27     5.15        2.752          0.11

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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        0.73     5.15       2.752
      2        0.78     5.98       2.587

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.78   Tc(MIN.) =    5.98
  TOTAL AREA(ACRES) =        0.3
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     76.00 =   10172.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1146.24  DOWNSTREAM(FEET) =  1145.22
 FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.12
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.78
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    6.26
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     23.00 =   10240.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 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        0.78     6.26       2.539        0.33
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     23.00 =   10240.50 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        0.76     6.39       2.518        0.33
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     225.00 FEET.

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       1.53       6.26        2.539
     2       1.54       6.39        2.518

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       1.53   Tc(MIN.) =    6.26
 TOTAL AREA(ACRES) =        0.7

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     26.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1144.47  DOWNSTREAM(FEET) =  1143.66
 FLOW LENGTH(FEET) =   120.60   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.55
 GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.53
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    6.82
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     26.00 =   10361.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 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.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   2.45
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.53

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1157.00
  DOWNSTREAM ELEVATION(FEET) =   1155.20
  ELEVATION DIFFERENCE(FEET) =      1.80
  TC = 0.303*[(  100.00**3)/(     1.80)]**.2 =    4.271
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1155.20  DOWNSTREAM(FEET) =   1152.14
  CHANNEL LENGTH THRU SUBAREA(FEET) =   197.00   CHANNEL SLOPE =  0.0155
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.346
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8817
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.27
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   2.58
  Tc(MIN.) =    7.58
  SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    0.70
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     297.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.346
```

```
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8817
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    0.70
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       1.60
 TC(MIN.) =    7.58

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.58
 RAINFALL INTENSITY(INCH/HR) =   2.35
 TOTAL STREAM AREA(ACRES) =     0.76
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.60

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        1.53     6.82        2.450          0.66
     2        1.60     7.58        2.346          0.76

 ***********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************

 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        2.98     6.82       2.450
     2        3.07     7.58       2.346

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.07   Tc(MIN.) =    7.58
 TOTAL AREA(ACRES) =        1.4
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     26.00 =   10361.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1163.00  DOWNSTREAM(FEET) =   1157.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   329.00   CHANNEL SLOPE =  0.0182
 CHANNEL BASE(FEET) =    1.60   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.947
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8788
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.14
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.28
 AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   4.30
 Tc(MIN.) =   11.87
 SUBAREA AREA(ACRES) =     0.08       SUBAREA RUNOFF(CFS) =    0.14
```

```
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       3.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     31.00 =   10690.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1152.57  DOWNSTREAM(FEET) =  1145.78
  FLOW LENGTH(FEET) =   210.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.21
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   12.31
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     32.00 =   10900.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.31
  RAINFALL INTENSITY(INCH/HR) =   1.92
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.21

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1162.00
  DOWNSTREAM ELEVATION(FEET) =   1156.99
  ELEVATION DIFFERENCE(FEET) =      5.01
  TC = 0.303*[(  100.00**3)/(     5.01)]**.2 =    3.480
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1156.99  DOWNSTREAM(FEET) =   1150.03
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0398
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
```

```
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.486
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8825
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.84
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.59
  Tc(MIN.) =    6.59
  SUBAREA AREA(ACRES) =     0.39       SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.98
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     35.00 =     275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.486
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8825
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.39   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       1.86
  TC(MIN.) =    6.59

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.37  DOWNSTREAM(FEET) =  1145.76
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.86
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.65
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     32.00 =     298.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.65
  RAINFALL INTENSITY(INCH/HR) =   2.48
  TOTAL STREAM AREA(ACRES) =     0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.86

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.21    12.31        1.918          1.50
      2        1.86     6.65        2.476          0.84

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
```

```
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        3.59     6.65       2.476
      2        4.65    12.31       1.918

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.65   Tc(MIN.) =   12.31
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     32.00 =   10900.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.75  DOWNSTREAM(FEET) =  1142.04
  FLOW LENGTH(FEET) =   176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.65
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   12.72
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     36.00 =   11076.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.72
  RAINFALL INTENSITY(INCH/HR) =   1.89
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.65

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1158.49
  ELEVATION DIFFERENCE(FEET) =      7.51
  TC = 0.303*[(  100.00**3)/(     7.51)]**.2 =    3.210
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.30
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1158.49  DOWNSTREAM(FEET) =   1150.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   282.00   CHANNEL SLOPE =  0.0301
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.344
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8817
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.81
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   2.59
  Tc(MIN.) =    7.59
  SUBAREA AREA(ACRES) =     0.47       SUBAREA RUNOFF(CFS) =    0.97
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   2.04
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     382.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.344
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8817
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    0.97
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       2.24
  TC(MIN.) =    7.59

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1144.36  DOWNSTREAM(FEET) =  1142.28
  FLOW LENGTH(FEET) =     9.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.85
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.24
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =     391.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.60
  RAINFALL INTENSITY(INCH/HR) =   2.34
  TOTAL STREAM AREA(ACRES) =     1.06
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.24

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.65    12.72        1.893          2.34
     2        2.24     7.60        2.342          1.06

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        5.02     7.60       2.342
     2        6.46    12.72       1.893

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.46   Tc(MIN.) =   12.72
 TOTAL AREA(ACRES) =        3.4
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     36.00 =   11076.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     40.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1141.91  DOWNSTREAM(FEET) =  1141.39
 FLOW LENGTH(FEET) =    33.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.13
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.46
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   12.79
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     40.00 =   11110.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1166.00
 DOWNSTREAM ELEVATION(FEET) =   1158.65
 ELEVATION DIFFERENCE(FEET) =      7.35
 TC = 0.303*[(  100.00**3)/(     7.35)]**.2 =    3.224
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
```

```
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1158.65  DOWNSTREAM(FEET) =   1151.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0324
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.379
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.69
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   2.32
  Tc(MIN.) =    7.32
  SUBAREA AREA(ACRES) =     0.28       SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   2.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     43.00 =     336.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.379
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8819
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.60
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.46
  TC(MIN.) =    7.32

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.61  DOWNSTREAM(FEET) =  1143.76
  FLOW LENGTH(FEET) =     8.30   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO  8.000
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.66
  ESTIMATED PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.46
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.33
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     80.00 =     344.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.33
  RAINFALL INTENSITY(INCH/HR) =   2.38
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.46

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1155.93
  DOWNSTREAM ELEVATION(FEET) =   1153.39
  ELEVATION DIFFERENCE(FEET) =      2.54
  TC = 0.303*[(  100.00**3)/(     2.54)]**.2 =    3.987
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1153.39  DOWNSTREAM(FEET) =   1150.99
  CHANNEL LENGTH THRU SUBAREA(FEET) =    74.30   CHANNEL SLOPE =  0.0323
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.572
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.16
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =    6.07
  SUBAREA AREA(ACRES) =     0.04       SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =     174.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.572
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.04   SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.33
  TC(MIN.) =    6.07
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     80.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.97  DOWNSTREAM(FEET) =  1144.76
  FLOW LENGTH(FEET) =    57.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.33
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    6.33
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     80.00 =     231.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.33
  RAINFALL INTENSITY(INCH/HR) =   2.53
  TOTAL STREAM AREA(ACRES) =     0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.33

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.46     7.33        2.378          0.68
      2        0.33     6.33        2.527          0.14

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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        1.59     6.33       2.527
      2        1.77     7.33       2.378

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.77   Tc(MIN.) =    7.33
  TOTAL AREA(ACRES) =        0.8
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     80.00 =     344.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     40.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1143.76  DOWNSTREAM(FEET) =  1141.39
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.5 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.77
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    7.55
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     40.00 =     425.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 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        1.77     7.55       2.349        0.82
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     40.00 =     425.30 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        6.46    12.79       1.888        3.40
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     40.00 =   11110.30 FEET.

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       5.58       7.55        2.349
     2       7.88      12.79        1.888

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.88   Tc(MIN.) =   12.79
 TOTAL AREA(ACRES) =        4.2

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1141.38  DOWNSTREAM(FEET) =  1138.35
 FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.35
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.88
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   13.27
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     47.00 =   11320.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1135.35  DOWNSTREAM(FEET) =  1134.95
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.89
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.88
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   13.33
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     48.00 =   11345.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 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.) =   13.33
  RAINFALL INTENSITY(INCH/HR) =   1.86
  TOTAL STREAM AREA(ACRES) =     4.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.88

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     63.00 IS CODE =  22
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     50.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1152.00  DOWNSTREAM(FEET) =   1149.03
  CHANNEL LENGTH THRU SUBAREA(FEET) =    94.00   CHANNEL SLOPE =  0.0316
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.576
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.50
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =    6.04
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.78
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     50.00 = 1000094.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.576
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.85
  TC(MIN.) =    6.04

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.74  DOWNSTREAM(FEET) =  1136.51
  FLOW LENGTH(FEET) =    24.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.53
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.85
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.08
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     48.00 = 1000118.31 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.08
  RAINFALL INTENSITY(INCH/HR) =   2.57
  TOTAL STREAM AREA(ACRES) =     0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.85

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.88    13.33        1.856          4.22
      2        0.85     6.08        2.570          0.36

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.44     6.08       2.570
      2        8.49    13.33       1.856

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.49   Tc(MIN.) =   13.33
```

```
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     48.00 = 1000118.31 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     51.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1134.95  DOWNSTREAM(FEET) =  1132.94
  FLOW LENGTH(FEET) =   126.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.49
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   13.63
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     51.00 = 1000244.31 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 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.) =   13.63
  RAINFALL INTENSITY(INCH/HR) =   1.84
  TOTAL STREAM AREA(ACRES) =     4.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.49

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1151.89
  DOWNSTREAM ELEVATION(FEET) =   1149.00
  ELEVATION DIFFERENCE(FEET) =      2.89
  TC = 0.303*[(  100.00**3)/(     2.89)]**.2 =    3.885
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     51.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.16  DOWNSTREAM(FEET) =  1144.09
  FLOW LENGTH(FEET) =    76.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.15
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    5.41
```

 LONGEST FLOWPATH FROM NODE   51.00 TO NODE   51.00 =   176.70 FEET.

****
 FLOW PROCESS FROM NODE   51.00 TO NODE   51.00 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.) =   5.41
 RAINFALL INTENSITY(INCH/HR) =   2.70
 TOTAL STREAM AREA(ACRES) =   0.14
 PEAK FLOW RATE(CFS) AT CONFLUENCE =   0.34

 ** CONFLUENCE DATA **
 STREAM   RUNOFF   Tc   INTENSITY   AREA
 NUMBER   (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1   8.49   13.63   1.839   4.58
     2   0.34   5.41   2.698   0.14

 ********************************WARNING*************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****

 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   3.71   5.41   2.698
     2   8.73   13.63   1.839

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =   8.73   Tc(MIN.) =   13.63
 TOTAL AREA(ACRES) =   4.7
 LONGEST FLOWPATH FROM NODE   49.00 TO NODE   51.00 = 1000244.31 FEET.

****
 FLOW PROCESS FROM NODE   51.00 TO NODE   54.00 IS CODE = 41

 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
 ELEVATION DATA: UPSTREAM(FEET) = 1132.94 DOWNSTREAM(FEET) = 1131.53
 FLOW LENGTH(FEET) =   23.50   MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS   5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.27
 GIVEN PIPE DIAMETER(INCH) = 60.00   NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =   8.73
 PIPE TRAVEL TIME(MIN.) =   0.03   Tc(MIN.) =   13.66
 LONGEST FLOWPATH FROM NODE   49.00 TO NODE   54.00 = 1000267.81 FEET.

****
 FLOW PROCESS FROM NODE   54.00 TO NODE   54.00 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.) =   13.66
  RAINFALL INTENSITY(INCH/HR) =   1.84
  TOTAL STREAM AREA(ACRES) =     4.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.73

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.99  DOWNSTREAM(FEET) =   1151.26
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0122
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.571
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.94
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =    6.07
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.571
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.24
  TC(MIN.) =    6.07

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.14  DOWNSTREAM(FEET) =  1135.70
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  10.0 INCH PIPE IS   1.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.62
 GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.24
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    6.37
 LONGEST FLOWPATH FROM NODE     55.00 TO NODE     54.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.37
 RAINFALL INTENSITY(INCH/HR) =   2.52
 TOTAL STREAM AREA(ACRES) =     0.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.24

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.73    13.66        1.837          4.72
     2        0.24     6.37        2.520          0.10

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        4.31     6.37       2.520
     2        8.90    13.66       1.837

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.90   Tc(MIN.) =   13.66
 TOTAL AREA(ACRES) =        4.8
 LONGEST FLOWPATH FROM NODE     55.00 TO NODE     54.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     58.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1131.53  DOWNSTREAM(FEET) =  1130.68
 FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.90
 PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   14.39
 LONGEST FLOWPATH FROM NODE     55.00 TO NODE     58.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 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.) =   14.39
  RAINFALL INTENSITY(INCH/HR) =   1.80
  TOTAL STREAM AREA(ACRES) =     4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.90

**************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  22
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.15

**************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.99  DOWNSTREAM(FEET) =   1145.05
  CHANNEL LENGTH THRU SUBAREA(FEET) =   285.00   CHANNEL SLOPE =  0.0244
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.307
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8815
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.65
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   2.88
  Tc(MIN.) =    7.88
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.81
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       0.96

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =     319.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.307
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8815
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.81
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       1.77
  TC(MIN.) =    7.88

**************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     58.00 IS CODE =  31
--------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.87  DOWNSTREAM(FEET) =  1140.80
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.40
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.77
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     58.00 =     333.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.95
  RAINFALL INTENSITY(INCH/HR) =   2.30
  TOTAL STREAM AREA(ACRES) =     0.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.77

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.90    14.39        1.798          4.82
      2        1.77     7.95        2.299          0.86

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        6.69     7.95       2.299
      2       10.29    14.39       1.798

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.29   Tc(MIN.) =   14.39
  TOTAL AREA(ACRES) =        5.7
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     58.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     62.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1130.68  DOWNSTREAM(FEET) =  1130.30
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.29
```

```
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   14.69
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     62.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1154.94
  DOWNSTREAM ELEVATION(FEET) =   1151.51
  ELEVATION DIFFERENCE(FEET) =      3.43
  TC = 0.303*[(  100.00**3)/(     3.43)]**.2 =    3.754
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.51  DOWNSTREAM(FEET) =   1146.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0174
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.259
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8811
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.32
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.29
  Tc(MIN.) =    8.29
  SUBAREA AREA(ACRES) =     0.37       SUBAREA RUNOFF(CFS) =    0.74
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       0.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.259
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8811
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.37   SUBAREA RUNOFF(CFS) =    0.74
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       1.67
```

```
  TC(MIN.) =    8.29

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.29
  RAINFALL INTENSITY(INCH/HR) =   2.26
  TOTAL STREAM AREA(ACRES) =     0.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     66.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.99  DOWNSTREAM(FEET) =   1146.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0212
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.295
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8814
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.32
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   2.98
  Tc(MIN.) =    7.98
  SUBAREA AREA(ACRES) =     0.26       SUBAREA RUNOFF(CFS) =    0.53
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.57
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     66.00 =    3636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.295
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8814
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.26   SUBAREA RUNOFF(CFS) =    0.53
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.20
  TC(MIN.) =    7.98
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.98
  RAINFALL INTENSITY(INCH/HR) =   2.30
  TOTAL STREAM AREA(ACRES) =     0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.67     8.29        2.259          0.82
      2        1.20     7.98        2.295          0.58

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        2.81     7.98       2.295
      2        2.85     8.29       2.259

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.85   Tc(MIN.) =    8.29
  TOTAL AREA(ACRES) =        1.4
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     66.00 =    3636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1146.98  DOWNSTREAM(FEET) =   1139.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   281.00   CHANNEL SLOPE =  0.0284
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.073
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8798
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.45
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   1.91
  Tc(MIN.) =   10.20
  SUBAREA AREA(ACRES) =     0.19       SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       3.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   2.59
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =    3917.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.073
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8798
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       3.54
  TC(MIN.) =   10.20

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     62.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1132.39  DOWNSTREAM(FEET) =  1132.00
  FLOW LENGTH(FEET) =    11.40   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.54
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.22
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     62.00 =    3928.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.54    10.22       2.072        1.78
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     62.00 =    3928.40 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.29    14.69       1.782        5.68
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     62.00 = ********** FEET.

 ****************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.70      10.22        2.072
      2      13.34      14.69        1.782

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.34   Tc(MIN.) =   14.69
  TOTAL AREA(ACRES) =        7.5

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

```
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.5  TC(MIN.) =     14.69
  PEAK FLOW RATE(CFS)   =      13.34
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
                      (Rational Tabling Version 18.0)
                  Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:

                       Kimley-Horn and Associates, Inc.
                              765 The City Drive
                                  Suite 200
                               Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* UHS Rancho Springs                                                     *
* Existing Conditions                                                    *
* 100-year analysis                                                      *
 ************************************************************************

  FILE NAME: RS_E.DAT
  TIME/DATE OF STUDY: 21:13 05/17/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.070
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.985
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.430
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.630
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4144876
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4152232
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.630
  SLOPE OF INTENSITY DURATION CURVE = 0.4152
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     10.00 TO NODE     11.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
```

```
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1155.02
  DOWNSTREAM ELEVATION(FEET) =   1153.91
  ELEVATION DIFFERENCE(FEET) =      1.11
  TC = 0.303*[(  100.00**3)/(     1.11)]**.2 =    4.705
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1158.00
  DOWNSTREAM ELEVATION(FEET) =   1155.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  100.00**3)/(     3.00)]**.2 =    3.856
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1155.00  DOWNSTREAM(FEET) =   1153.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    99.00   CHANNEL SLOPE =  0.0202
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.217
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.08
  Tc(MIN.) =    6.08
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.61
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     199.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.217
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.27
  TC(MIN.) =    6.08

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.70  DOWNSTREAM(FEET) =  1144.47
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
  GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.27
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.15
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.65  DOWNSTREAM(FEET) =  1148.56
  FLOW LENGTH(FEET) =    18.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.35
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.13
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =   10018.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     73.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.56  DOWNSTREAM(FEET) =  1147.02
```

```
  FLOW LENGTH(FEET) =   102.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.53
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    5.61
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     73.00 =   10120.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     73.00 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.) =    5.61
  RAINFALL INTENSITY(INCH/HR) =   4.36
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     73.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.80  DOWNSTREAM(FEET) =  1146.73
  FLOW LENGTH(FEET) =    14.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.35
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.10
  LONGEST FLOWPATH FROM NODE     74.00 TO NODE     73.00 =     114.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     73.00 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.) =    5.10
  RAINFALL INTENSITY(INCH/HR) =   4.53
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

  ** CONFLUENCE DATA **
```

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	0.45	5.61	4.359	0.11
2	0.45	5.10	4.535	0.11

**********WARNING**********
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	0.85	5.10	4.535
2	0.88	5.61	4.359

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 0.88 Tc(MIN.) = 5.61
TOTAL AREA(ACRES) = 0.2
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 73.00 = 10120.50 FEET.

****
FLOW PROCESS FROM NODE 73.00 TO NODE 76.00 IS CODE = 41

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 1146.73 DOWNSTREAM(FEET) = 1146.24
FLOW LENGTH(FEET) = 52.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.62
GIVEN PIPE DIAMETER(INCH) = 12.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.88
PIPE TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 5.85
LONGEST FLOWPATH FROM NODE 70.00 TO NODE 76.00 = 10172.50 FEET.

****
FLOW PROCESS FROM NODE 76.00 TO NODE 76.00 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) = 4.28
TOTAL STREAM AREA(ACRES) = 0.22
PEAK FLOW RATE(CFS) AT CONFLUENCE = 0.88

****
FLOW PROCESS FROM NODE 77.00 TO NODE 78.00 IS CODE = 22

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
USER SPECIFIED Tc(MIN.) = 5.000
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.574
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
SOIL CLASSIFICATION IS "C"

```
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     76.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.80  DOWNSTREAM(FEET) =  1146.71
  FLOW LENGTH(FEET) =    18.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.35
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.13
  LONGEST FLOWPATH FROM NODE     77.00 TO NODE     76.00 =   10018.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     76.00 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.) =    5.13
  RAINFALL INTENSITY(INCH/HR) =   4.52
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.88     5.85        4.284          0.22
      2        0.45     5.13        4.524          0.11

 ***********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************

  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        1.22     5.13       4.524
      2        1.30     5.85       4.284

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.30   Tc(MIN.) =    5.85
  TOTAL AREA(ACRES) =        0.3
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     76.00 =   10172.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1146.24  DOWNSTREAM(FEET) =  1145.22
 FLOW LENGTH(FEET) =    68.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.77
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.30
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    6.09
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     23.00 =   10240.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 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        1.30     6.09       4.214        0.33
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     23.00 =   10240.50 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        1.27     6.15       4.198        0.33
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     225.00 FEET.

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       2.56       6.09        4.214
     2       2.57       6.15        4.198

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       2.56   Tc(MIN.) =    6.09
 TOTAL AREA(ACRES) =        0.7

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     26.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1144.47  DOWNSTREAM(FEET) =  1143.66
 FLOW LENGTH(FEET) =   120.60   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS   6.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.12
 GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.56
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    6.58
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     26.00 =   10361.10 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 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.) =    6.58
  RAINFALL INTENSITY(INCH/HR) =   4.08
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.56

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1157.00
  DOWNSTREAM ELEVATION(FEET) =   1155.20
  ELEVATION DIFFERENCE(FEET) =      1.80
  TC = 0.303*[(  100.00**3)/(     1.80)]**.2 =    4.271
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1155.20  DOWNSTREAM(FEET) =   1152.14
  CHANNEL LENGTH THRU SUBAREA(FEET) =   197.00   CHANNEL SLOPE =  0.0155
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.905
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8880
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.42
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   2.32
  Tc(MIN.) =    7.32
  SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    1.18
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.64
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     297.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.905
```

```
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8880
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    1.18
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.68
 TC(MIN.) =    7.32

****************************************************************************
 FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.32
 RAINFALL INTENSITY(INCH/HR) =   3.91
 TOTAL STREAM AREA(ACRES) =     0.76
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.68

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.56     6.58        4.081          0.66
     2        2.68     7.32        3.905          0.76

 ********************************WARNING*************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        4.98     6.58       4.081
     2        5.14     7.32       3.905

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.14   Tc(MIN.) =    7.32
 TOTAL AREA(ACRES) =        1.4
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     26.00 =   10361.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1163.00  DOWNSTREAM(FEET) =   1157.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   329.00   CHANNEL SLOPE =  0.0182
 CHANNEL BASE(FEET) =    1.60   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.272
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8861
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.25
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.41
 AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   3.89
 Tc(MIN.) =   11.20
 SUBAREA AREA(ACRES) =     0.08       SUBAREA RUNOFF(CFS) =    0.23
```

```
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     31.00 =   10690.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1152.57  DOWNSTREAM(FEET) =  1145.78
  FLOW LENGTH(FEET) =   210.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.37
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   11.59
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     32.00 =   10900.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.59
  RAINFALL INTENSITY(INCH/HR) =   3.23
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.37

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1162.00
  DOWNSTREAM ELEVATION(FEET) =   1156.99
  ELEVATION DIFFERENCE(FEET) =      5.01
  TC = 0.303*[(  100.00**3)/(     5.01)]**.2 =    3.480
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1156.99  DOWNSTREAM(FEET) =   1150.03
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0398
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.154
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.24
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.30
 Tc(MIN.) =    6.30
 SUBAREA AREA(ACRES) =     0.39       SUBAREA RUNOFF(CFS) =    1.44
 TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.68

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.26
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     35.00 =     275.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.154
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.39   SUBAREA RUNOFF(CFS) =    1.44
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       3.12
 TC(MIN.) =    6.30

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     32.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1146.37  DOWNSTREAM(FEET) =  1145.76
 FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.12
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.36
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     32.00 =     298.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.36
 RAINFALL INTENSITY(INCH/HR) =   4.14
 TOTAL STREAM AREA(ACRES) =     0.84
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.12

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        5.37    11.59        3.226          1.50
     2        3.12     6.36        4.140          0.84

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
```

```
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        6.07     6.36       4.140
      2        7.80    11.59       3.226

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.80   Tc(MIN.) =   11.59
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     32.00 =   10900.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.75  DOWNSTREAM(FEET) =  1142.04
  FLOW LENGTH(FEET) =   176.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.41
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.80
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     36.00 =   11076.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.94
  RAINFALL INTENSITY(INCH/HR) =   3.19
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.80

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1158.49
  ELEVATION DIFFERENCE(FEET) =      7.51
  TC = 0.303*[(  100.00**3)/(     7.51)]**.2 =    3.210
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1158.49  DOWNSTREAM(FEET) =   1150.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   282.00   CHANNEL SLOPE =  0.0301
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.902
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8880
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.02
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   2.33
  Tc(MIN.) =    7.33
  SUBAREA AREA(ACRES) =     0.47       SUBAREA RUNOFF(CFS) =    1.63
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     382.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.902
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8880
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    1.63
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       3.75
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1144.36  DOWNSTREAM(FEET) =  1142.28
  FLOW LENGTH(FEET) =     9.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.12
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.75
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.34
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     36.00 =     391.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   3.90
  TOTAL STREAM AREA(ACRES) =     1.06
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.75

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.80    11.94        3.186          2.34
     2        3.75     7.34        3.900          1.06

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        8.54     7.34       3.900
     2       10.86    11.94       3.186

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.86   Tc(MIN.) =   11.94
 TOTAL AREA(ACRES) =        3.4
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     36.00 =   11076.60 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     40.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1141.91  DOWNSTREAM(FEET) =  1141.39
 FLOW LENGTH(FEET) =    33.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.86
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   12.01
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     40.00 =   11110.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1166.00
 DOWNSTREAM ELEVATION(FEET) =   1158.65
 ELEVATION DIFFERENCE(FEET) =      7.35
 TC = 0.303*[(  100.00**3)/(     7.35)]**.2 =    3.224
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.45
 TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
 FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1158.65  DOWNSTREAM(FEET) =   1151.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0324
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.950
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8881
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.86
 AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   2.12
 Tc(MIN.) =    7.12
 SUBAREA AREA(ACRES) =     0.28       SUBAREA RUNOFF(CFS) =    0.98
 TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.43

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   2.20
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     43.00 =     336.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.950
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8881
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.01
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.44
 TC(MIN.) =    7.12

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1146.61  DOWNSTREAM(FEET) =  1143.76
 FLOW LENGTH(FEET) =     8.30   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO  8.000
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.08
 ESTIMATED PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.44
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.13
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     80.00 =     344.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.13
  RAINFALL INTENSITY(INCH/HR) =   3.95
  TOTAL STREAM AREA(ACRES) =     0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.44

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1155.93
  DOWNSTREAM ELEVATION(FEET) =   1153.39
  ELEVATION DIFFERENCE(FEET) =      2.54
  TC = 0.303*[(  100.00**3)/(     2.54)]**.2 =    3.987
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1153.39  DOWNSTREAM(FEET) =   1150.99
  CHANNEL LENGTH THRU SUBAREA(FEET) =    74.30   CHANNEL SLOPE =  0.0323
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.268
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8889
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.37
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.91
  Tc(MIN.) =    5.91
  SUBAREA AREA(ACRES) =     0.04       SUBAREA RUNOFF(CFS) =    0.15
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.57
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =     174.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.268
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8889
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.04   SUBAREA RUNOFF(CFS) =    0.15
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.55
  TC(MIN.) =    5.91
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     80.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.97  DOWNSTREAM(FEET) =  1144.76
  FLOW LENGTH(FEET) =    57.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.21
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.55
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    6.13
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     80.00 =     231.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.13
  RAINFALL INTENSITY(INCH/HR) =   4.20
  TOTAL STREAM AREA(ACRES) =     0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.55

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.44     7.13        3.948          0.68
      2        0.55     6.13        4.202          0.14

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        2.65     6.13       4.202
      2        2.95     7.13       3.948

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.95   Tc(MIN.) =    7.13
  TOTAL AREA(ACRES) =        0.8
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     80.00 =     344.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     40.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1143.76  DOWNSTREAM(FEET) =  1141.39
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.5 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.15
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.95
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.32
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     40.00 =     425.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 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        2.95     7.32       3.905        0.82
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     40.00 =     425.30 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       10.86    12.01       3.179        3.40
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     40.00 =   11110.30 FEET.

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       9.57       7.32        3.905
     2      13.27      12.01        3.179

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.27   Tc(MIN.) =   12.01
 TOTAL AREA(ACRES) =        4.2

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1141.38  DOWNSTREAM(FEET) =  1138.35
 FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.27
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   12.43
 LONGEST FLOWPATH FROM NODE     70.00 TO NODE     47.00 =   11320.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1135.35  DOWNSTREAM(FEET) =  1134.95
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.27
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.48
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     48.00 =   11345.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.48
  RAINFALL INTENSITY(INCH/HR) =   3.13
  TOTAL STREAM AREA(ACRES) =     4.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.27

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     63.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     50.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1152.00  DOWNSTREAM(FEET) =   1149.03
  CHANNEL LENGTH THRU SUBAREA(FEET) =    94.00   CHANNEL SLOPE =  0.0316
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.282
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8890
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.82
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.86
  Tc(MIN.) =    5.86
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     50.00 = 1000094.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.282
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8890
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.41
  TC(MIN.) =    5.86

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.74  DOWNSTREAM(FEET) =  1136.51
  FLOW LENGTH(FEET) =    24.30   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.58
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.41
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.89
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     48.00 = 1000118.31 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 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.) =    5.89
  RAINFALL INTENSITY(INCH/HR) =   4.27
  TOTAL STREAM AREA(ACRES) =     0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.41

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.27    12.48        3.129          4.22
      2        1.41     5.89        4.273          0.36

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        7.67     5.89       4.273
      2       14.30    12.48       3.129

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.30   Tc(MIN.) =   12.48
```

```
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     48.00 = 1000118.31 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     51.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1134.95  DOWNSTREAM(FEET) =  1132.94
  FLOW LENGTH(FEET) =   126.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.22
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.30
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   12.73
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     51.00 = 1000244.31 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.73
  RAINFALL INTENSITY(INCH/HR) =   3.10
  TOTAL STREAM AREA(ACRES) =     4.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.30

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1151.89
  DOWNSTREAM ELEVATION(FEET) =   1149.00
  ELEVATION DIFFERENCE(FEET) =      2.89
  TC = 0.303*[(  100.00**3)/(     2.89)]**.2 =    3.885
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     51.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.16  DOWNSTREAM(FEET) =  1144.09
  FLOW LENGTH(FEET) =    76.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.66
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.57
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    5.35
```

 LONGEST FLOWPATH FROM NODE   51.00 TO NODE   51.00 =   176.70 FEET.

****
 FLOW PROCESS FROM NODE   51.00 TO NODE   51.00 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.) =   5.35
 RAINFALL INTENSITY(INCH/HR) =   4.45
 TOTAL STREAM AREA(ACRES) =   0.14
 PEAK FLOW RATE(CFS) AT CONFLUENCE =   0.57

 ** CONFLUENCE DATA **
 STREAM   RUNOFF   Tc   INTENSITY   AREA
 NUMBER   (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1   14.30   12.73   3.103   4.58
     2   0.57   5.35   4.448   0.14

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****

 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   6.58   5.35   4.448
     2   14.69   12.73   3.103

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =   14.69   Tc(MIN.) =   12.73
 TOTAL AREA(ACRES) =   4.7
 LONGEST FLOWPATH FROM NODE   49.00 TO NODE   51.00 = 1000244.31 FEET.

****
 FLOW PROCESS FROM NODE   51.00 TO NODE   54.00 IS CODE = 41

 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==
 ELEVATION DATA: UPSTREAM(FEET) = 1132.94 DOWNSTREAM(FEET) = 1131.53
 FLOW LENGTH(FEET) =   23.50   MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS   6.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.19
 GIVEN PIPE DIAMETER(INCH) = 60.00   NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =   14.69
 PIPE TRAVEL TIME(MIN.) =   0.03   Tc(MIN.) =   12.76
 LONGEST FLOWPATH FROM NODE   49.00 TO NODE   54.00 = 1000267.81 FEET.

****
 FLOW PROCESS FROM NODE   54.00 TO NODE   54.00 IS CODE =   1

 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

```
  TIME OF CONCENTRATION(MIN.) =   12.76
  RAINFALL INTENSITY(INCH/HR) =   3.10
  TOTAL STREAM AREA(ACRES) =     4.72
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.69

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.99  DOWNSTREAM(FEET) =   1151.26
  CHANNEL LENGTH THRU SUBAREA(FEET) =    60.00   CHANNEL SLOPE =  0.0122
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.208
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.90
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.11
  Tc(MIN.) =    6.11
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.07
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     57.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.208
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.07
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.39
  TC(MIN.) =    6.11

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.14  DOWNSTREAM(FEET) =  1135.70
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  10.0 INCH PIPE IS   1.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
 GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.39
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    6.37
 LONGEST FLOWPATH FROM NODE     55.00 TO NODE     54.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.37
 RAINFALL INTENSITY(INCH/HR) =   4.14
 TOTAL STREAM AREA(ACRES) =     0.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.39

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       14.69    12.76        3.100          4.72
     2        0.39     6.37        4.136          0.10

 ***********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************

 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        7.73     6.37       4.136
     2       14.99    12.76       3.100

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      14.99   Tc(MIN.) =   12.76
 TOTAL AREA(ACRES) =        4.8
 LONGEST FLOWPATH FROM NODE     55.00 TO NODE     54.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     58.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1131.53  DOWNSTREAM(FEET) =  1130.68
 FLOW LENGTH(FEET) =   197.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  12.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.99
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   13.39
 LONGEST FLOWPATH FROM NODE     55.00 TO NODE     58.00 = ********** FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 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.) =   13.39
  RAINFALL INTENSITY(INCH/HR) =   3.04
  TOTAL STREAM AREA(ACRES) =     4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.99

**************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  22
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.24

**************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.99  DOWNSTREAM(FEET) =   1145.05
  CHANNEL LENGTH THRU SUBAREA(FEET) =   285.00   CHANNEL SLOPE =  0.0244
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.812
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8878
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.72
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   2.76
  Tc(MIN.) =    7.76
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    1.35
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.05
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =     319.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.812
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8878
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.35
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.95
  TC(MIN.) =    7.76

**************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     58.00 IS CODE =  31
--------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.87  DOWNSTREAM(FEET) =  1140.80
  FLOW LENGTH(FEET) =    14.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.95
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.82
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     58.00 =     333.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.82
  RAINFALL INTENSITY(INCH/HR) =   3.80
  TOTAL STREAM AREA(ACRES) =     0.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.95

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.99    13.39        3.039          4.82
      2        2.95     7.82        3.799          0.86

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.70     7.82       3.799
      2       17.35    13.39       3.039

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.35   Tc(MIN.) =   13.39
  TOTAL AREA(ACRES) =        5.7
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     58.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     62.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1130.68  DOWNSTREAM(FEET) =  1130.30
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.35
```

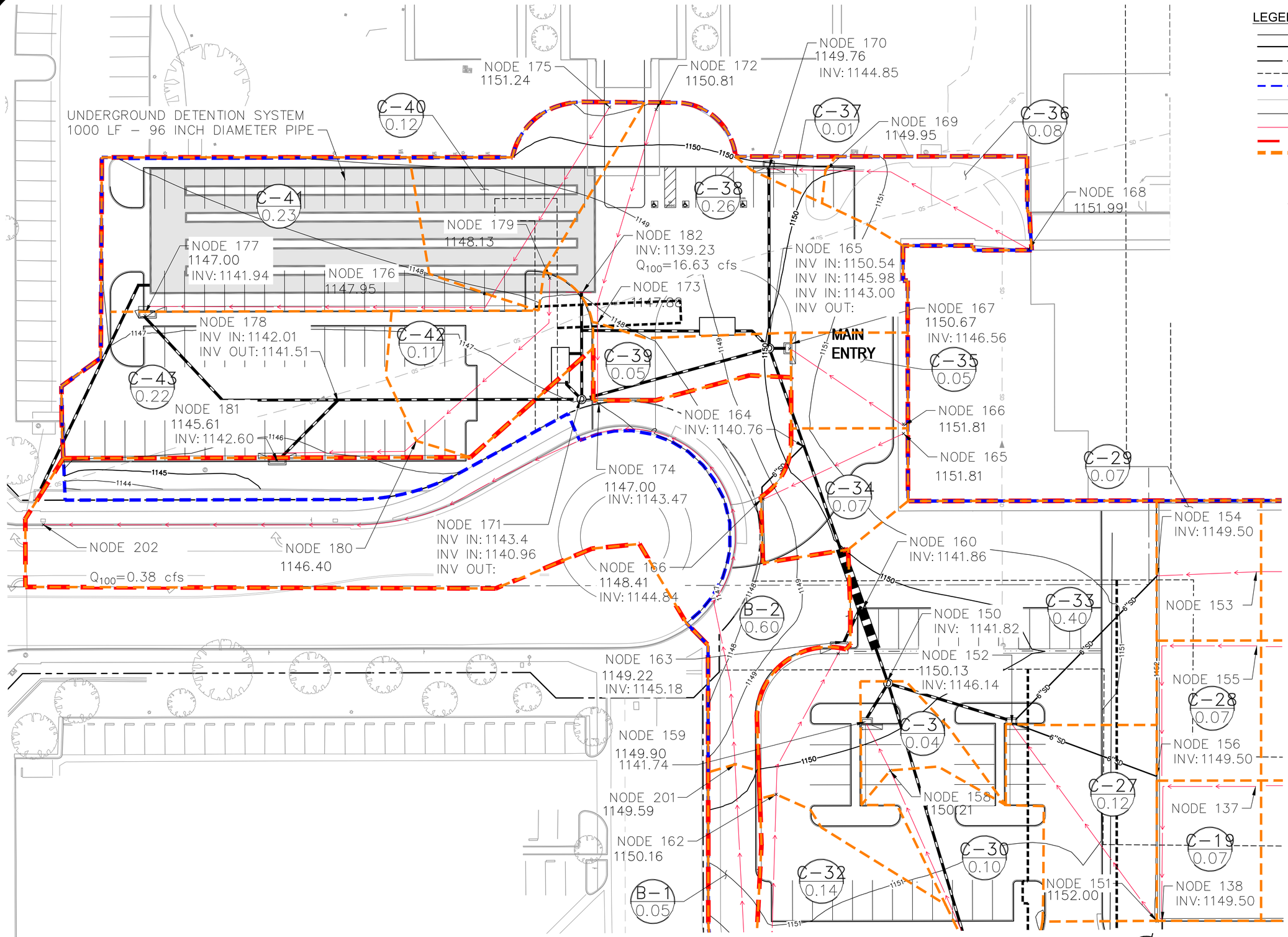
```
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   13.65
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     62.00 = ********** FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1154.94
  DOWNSTREAM ELEVATION(FEET) =   1151.51
  ELEVATION DIFFERENCE(FEET) =      3.43
  TC = 0.303*[(  100.00**3)/(     3.43)]**.2 =    3.754
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.51  DOWNSTREAM(FEET) =   1146.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0174
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.801
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.54
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   2.81
  Tc(MIN.) =    7.81
  SUBAREA AREA(ACRES) =     0.37       SUBAREA RUNOFF(CFS) =    1.25
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.801
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.37   SUBAREA RUNOFF(CFS) =    1.25
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.82
```

```
  TC(MIN.) =    7.81

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.81
  RAINFALL INTENSITY(INCH/HR) =   3.80
  TOTAL STREAM AREA(ACRES) =     0.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.82

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     66.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.99  DOWNSTREAM(FEET) =   1146.98
  CHANNEL LENGTH THRU SUBAREA(FEET) =   236.00   CHANNEL SLOPE =  0.0212
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.876
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8880
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.61
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   2.45
  Tc(MIN.) =    7.45
  SUBAREA AREA(ACRES) =     0.26       SUBAREA RUNOFF(CFS) =    0.89
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     66.00 =    3636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.876
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8880
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.26   SUBAREA RUNOFF(CFS) =    0.89
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.03
  TC(MIN.) =    7.45
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.45
  RAINFALL INTENSITY(INCH/HR) =   3.88
  TOTAL STREAM AREA(ACRES) =     0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.03

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.82     7.81        3.801          0.82
      2        2.03     7.45        3.876          0.58

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.73     7.45       3.876
      2        4.82     7.81       3.801

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.82   Tc(MIN.) =    7.81
  TOTAL AREA(ACRES) =        1.4
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     66.00 =    3636.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1146.98  DOWNSTREAM(FEET) =   1139.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   281.00   CHANNEL SLOPE =  0.0284
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.511
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.86
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =    9.45
  SUBAREA AREA(ACRES) =     0.19       SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       5.41

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.78
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =    3917.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.511
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       6.00
  TC(MIN.) =    9.45

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     62.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1132.39  DOWNSTREAM(FEET) =  1132.00
  FLOW LENGTH(FEET) =    11.40   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.51
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.00
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.47
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     62.00 =    3928.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 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        6.00     9.47       3.508        1.78
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     62.00 =    3928.40 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       17.35    13.65       3.015        5.68
  LONGEST FLOWPATH FROM NODE     55.00 TO NODE     62.00 = ********** FEET.

 ****************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      18.04       9.47        3.508
      2      22.51      13.65        3.015

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.51   Tc(MIN.) =   13.65
  TOTAL AREA(ACRES) =        7.5

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

```
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.5  TC(MIN.) =     13.65
  PEAK FLOW RATE(CFS)   =      22.51
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



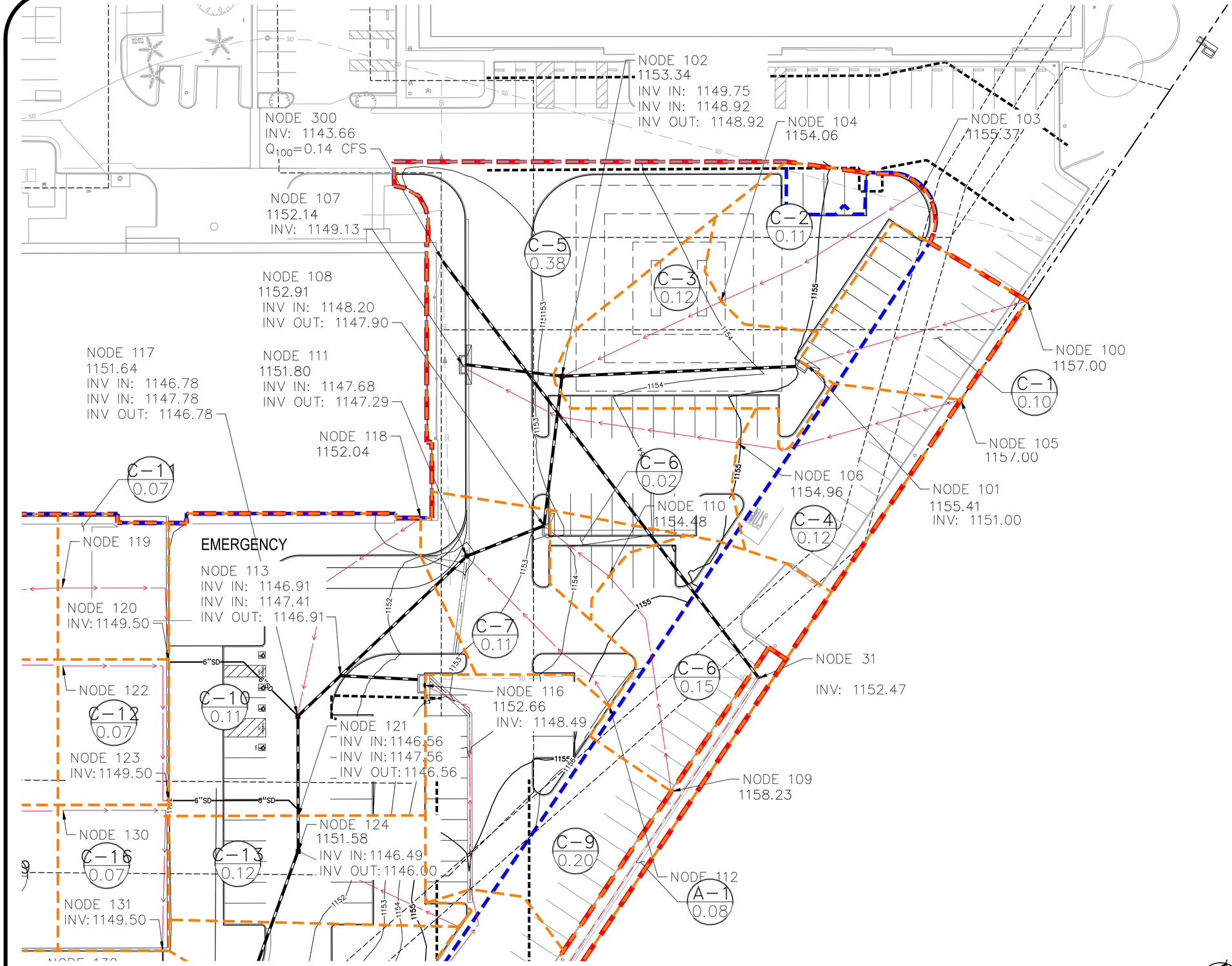
LEGEND

- CENTER LINE
- PROPERTY LINE
- RIGHT–OF–WAY LINE / LEASE LINE
- EASEMENT LINE
- PROJECT LIMITS
- EXISTING STORM DRAIN LINE
- PROPOSED STORM DRAIN LINE
- LONGEST FLOW PATH
- DENOTES DRAINAGE AREA BOUNDARY
- DENOTES SUB–DRAINAGE AREA BOUNDARY
- A–# 0.00 — SUBAREA NAME AREA (AC)
- EXISTING SURFACE FLOW DIRECTION

RANCHO SPRINGS
MEDICAL CENTER
EXISTING CONDITIONS
HYDROLOGY MAP
SHEET 1 OF 3
JUNE 2020

Kimley»Horn

© 2020 KIMLEY–HORN AND ASSOCIATES, INC.
660 S. FIGUEROA ST, SUITE 2050, LOS ANGELES, CA 90017
PHONE: 213–261–4040



LEGEND

- CENTER LINE
- PROPERTY LINE
- RIGHT-OF-WAY LINE / LEASE LINE
- EASEMENT LINE
- PROJECT LIMITS
- SD — EXISTING STORM DRAIN LINE
- SD — PROPOSED STORM DRAIN LINE
- LONGEST FLOW PATH
- DENOTES DRAINAGE AREA BOUNDARY
- DENOTES SUB-DRAINAGE AREA BOUNDARY
- A-# / 0.00 — SUBAREA NAME / AREA (AC)
- EXISTING SURFACE FLOW DIRECTION

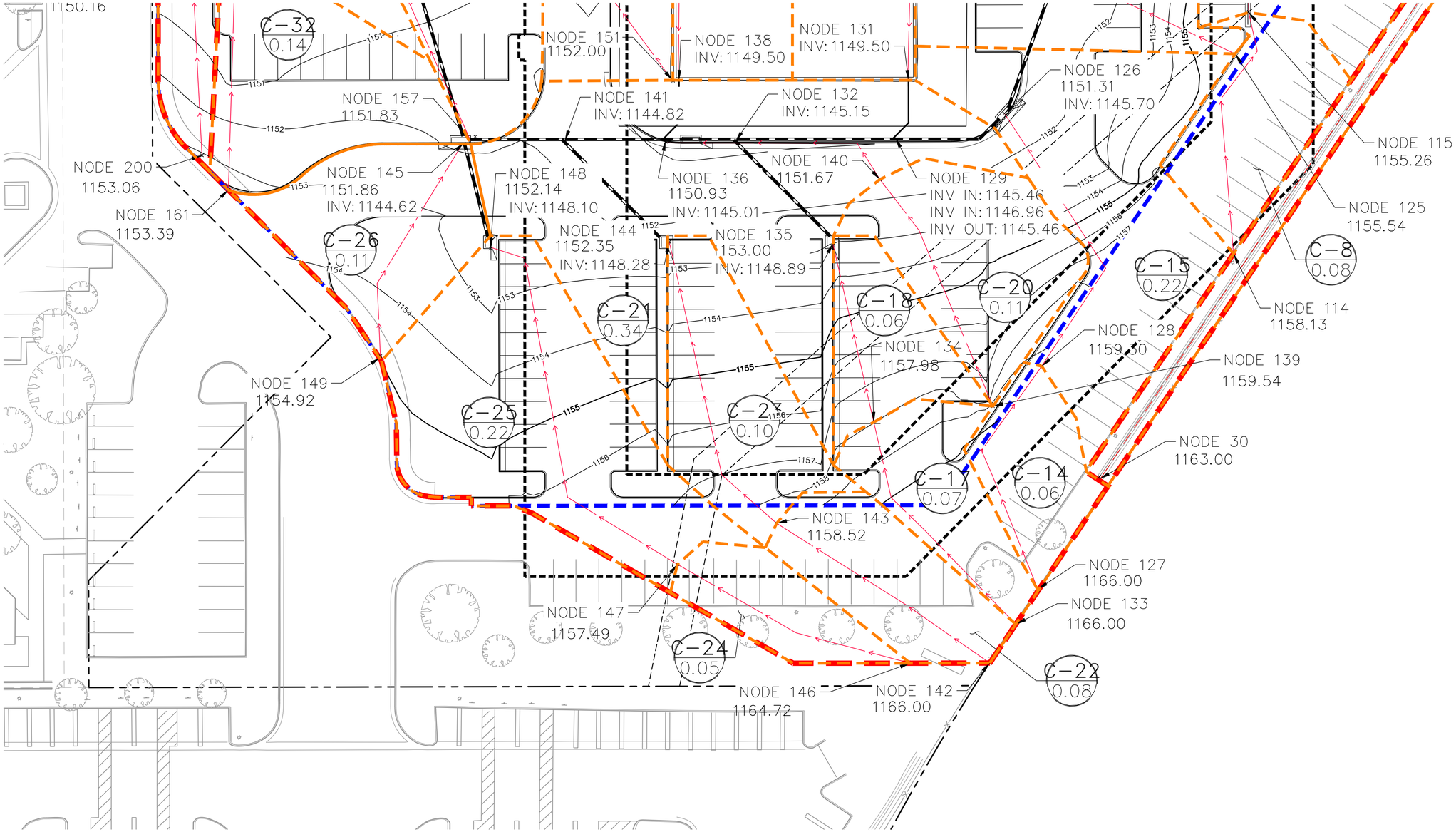
NORTH

GRAPHIC SCALE IN FEET
0 10 20 40

RANCHO SPRINGS
MEDICAL CENTER
EXISTING CONDITIONS
HYDROLOGY MAP
SHEET 2 OF 3
JUNE 2020

Kimley»Horn

© 2020 KIMLEY-HORN AND ASSOCIATES, INC.
660 S. FIGUEROA ST, SUITE 2050, LOS ANGELES, CA 90017
PHONE: 213-261-4040



LEGEND

- CENTER LINE
- PROPERTY LINE
- RIGHT-OF-WAY LINE / LEASE LINE
- EASEMENT LINE
- PROJECT LIMITS
- SD — EXISTING STORM DRAIN LINE
- SD — PROPOSED STORM DRAIN LINE
- LONGEST FLOW PATH
- DENOTES DRAINAGE AREA BOUNDARY
- DENOTES SUB-DRAINAGE AREA BOUNDARY
- A-# / 0.00 — SUBAREA NAME / AREA (AC)
- EXISTING SURFACE FLOW DIRECTION

GRAPHIC SCALE IN FEET
0 10 20 40

NORTH

RANCHO SPRINGS MEDICAL CENTER
EXISTING CONDITIONS HYDROLOGY MAP
SHEET 3 OF 3
JUNE 2020

Kimley»Horn

© 2020 KIMLEY-HORN AND ASSOCIATES, INC.
660 S. FIGUEROA ST, SUITE 2050, LOS ANGELES, CA 90017
PHONE: 213-261-4040

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
                      (Rational Tabling Version 18.0)
                  Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* Rancho Springs Medical Center                                         *
* Proposed Conditions                                                   *
* 10-year analysis                                                      *
 *************************************************************************

  FILE NAME: RS_P.DAT
  TIME/DATE OF STUDY: 07:27 05/18/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.070
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.985
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.430
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.630
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4144876
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4152232
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.995
  SLOPE OF INTENSITY DURATION CURVE = 0.4145
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     30.00 TO NODE     31.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  2.79
```

```
  TOTAL AREA(ACRES) =     0.08   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE    300.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1152.47  DOWNSTREAM(FEET) =  1143.66
  FLOW LENGTH(FEET) =   226.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.53
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.14
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    6.07
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    300.00 =     226.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   102.00
  UPSTREAM ELEVATION(FEET) =   1157.00
  DOWNSTREAM ELEVATION(FEET) =   1155.41
  ELEVATION DIFFERENCE(FEET) =      1.59
  TC = 0.303*[(  102.00**3)/(     1.59)]**.2 =    4.431
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1151.00  DOWNSTREAM(FEET) =  1149.75
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.71
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.25
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    5.64
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     206.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =    5.64
  RAINFALL INTENSITY(INCH/HR) =   2.65
  TOTAL STREAM AREA(ACRES) =     0.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.25
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1155.37
  DOWNSTREAM ELEVATION(FEET) =   1154.06
  ELEVATION DIFFERENCE(FEET) =      1.31
  TC = 0.303*[(  100.00**3)/(     1.31)]**.2 =    4.551
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1154.06  DOWNSTREAM(FEET) =   1153.34
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0095
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.540
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8828
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.01
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.25
  Tc(MIN.) =    6.25
  SUBAREA AREA(ACRES) =     0.06       SUBAREA RUNOFF(CFS) =    0.13
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.41

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE    103.00 TO NODE    102.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.540
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8828
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.13
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.54
  TC(MIN.) =    6.25

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =    6.25
  RAINFALL INTENSITY(INCH/HR) =   2.54
  TOTAL STREAM AREA(ACRES) =     0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.54

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1157.00
  DOWNSTREAM ELEVATION(FEET) =   1154.96
  ELEVATION DIFFERENCE(FEET) =      2.04
  TC = 0.303*[(  100.00**3)/(     2.04)]**.2 =    4.165
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1154.96  DOWNSTREAM(FEET) =   1152.14
  CHANNEL LENGTH THRU SUBAREA(FEET) =   123.00   CHANNEL SLOPE =  0.0229
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.523
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8827
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.35
  Tc(MIN.) =    6.35
  SUBAREA AREA(ACRES) =     0.19       SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     223.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.523
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8827
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.14
  TC(MIN.) =    6.35

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

```
 FLOW PROCESS FROM NODE    107.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1149.13  DOWNSTREAM(FEET) =  1148.92
 FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.05
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.14
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    6.59
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    102.00 =     266.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.59
 RAINFALL INTENSITY(INCH/HR) =   2.49
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.14

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        0.25     5.64        2.651          0.10
     2        0.54     6.25        2.540          0.23
     3        1.14     6.59        2.486          0.50

 **********************************WARNING**********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ***************************************************************************

 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        1.71     5.64       2.651
     2        1.86     6.25       2.540
     3        1.90     6.59       2.486

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       1.90   Tc(MIN.) =    6.59
 TOTAL AREA(ACRES) =        0.8
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    102.00 =     266.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1148.92  DOWNSTREAM(FEET) =  1148.20
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.70
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    6.82
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    108.00 =     331.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   2.45
  TOTAL STREAM AREA(ACRES) =     0.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1158.23
  DOWNSTREAM ELEVATION(FEET) =   1154.48
  ELEVATION DIFFERENCE(FEET) =      3.75
  TC = 0.303*[(  100.00**3)/(     3.75)]**.2 =    3.688
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1154.48  DOWNSTREAM(FEET) =   1152.91
  CHANNEL LENGTH THRU SUBAREA(FEET) =    35.00   CHANNEL SLOPE =  0.0449
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.708
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    5.36
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.02
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    108.00 =     135.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.708
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.02
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.42
  TC(MIN.) =    5.36

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =    5.36
  RAINFALL INTENSITY(INCH/HR) =   2.71
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.90     6.82        2.450          0.83
      2        0.42     5.36        2.708          0.17

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        1.91     5.36       2.708
      2        2.28     6.82       2.450

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.28   Tc(MIN.) =    6.82
  TOTAL AREA(ACRES) =        1.0
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    108.00 =     331.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1147.90  DOWNSTREAM(FEET) =  1147.68
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.87
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.28
```

```
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.97
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    111.00 =     367.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    6.97
 RAINFALL INTENSITY(INCH/HR) =   2.43
 TOTAL STREAM AREA(ACRES) =     1.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.28

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
 UPSTREAM ELEVATION(FEET) =   1156.08
 DOWNSTREAM ELEVATION(FEET) =   1151.80
 ELEVATION DIFFERENCE(FEET) =      4.28
 TC = 0.303*[(   89.00**3)/(     4.28)]**.2 =    3.349
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   2.79
 TOTAL STREAM AREA(ACRES) =     0.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.27

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.28     6.97        2.428          1.00
     2        0.27     5.00        2.787          0.11

 ********************************WARNING*************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 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        1.91     5.00       2.787
      2        2.52     6.97       2.428

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.52   Tc(MIN.) =    6.97
  TOTAL AREA(ACRES) =        1.1
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    111.00 =     367.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1147.29  DOWNSTREAM(FEET) =  1146.91
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.75
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.52
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    7.31
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    113.00 =     442.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.31
  RAINFALL INTENSITY(INCH/HR) =   2.38
  TOTAL STREAM AREA(ACRES) =     1.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.52

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1158.13
  DOWNSTREAM ELEVATION(FEET) =   1155.26
  ELEVATION DIFFERENCE(FEET) =      2.87
  TC = 0.303*[(  100.00**3)/(     2.87)]**.2 =    3.891
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1155.26  DOWNSTREAM(FEET) =   1152.66
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0260
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8828
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.32
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.26
  Tc(MIN.) =    6.26
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    116.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8828
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.65
  TC(MIN.) =    6.26

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.49  DOWNSTREAM(FEET) =  1147.41
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.38
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    113.00 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.65

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

1	2.52	7.31	2.381	1.11
2	0.65	6.38	2.519	0.28

**********WARNING**********
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	2.84	6.38	2.519
2	3.13	7.31	2.381

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 3.13 Tc(MIN.) = 7.31
TOTAL AREA(ACRES) = 1.4
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 113.00 = 442.00 FEET.

****
FLOW PROCESS FROM NODE 113.00 TO NODE 117.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 1146.91 DOWNSTREAM(FEET) = 1146.78
FLOW LENGTH(FEET) = 25.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 9.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.99
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.13
PIPE TRAVEL TIME(MIN.) = 0.10 Tc(MIN.) = 7.41
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 117.00 = 467.00 FEET.

****
FLOW PROCESS FROM NODE 117.00 TO NODE 117.00 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.) = 7.41
RAINFALL INTENSITY(INCH/HR) = 2.37
TOTAL STREAM AREA(ACRES) = 1.39
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.13

****
FLOW PROCESS FROM NODE 118.00 TO NODE 117.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00
UPSTREAM ELEVATION(FEET) = 1152.04
DOWNSTREAM ELEVATION(FEET) = 1151.64
ELEVATION DIFFERENCE(FEET) = 0.40
TC = 0.303*[(100.00**3)/(0.40)]**.2 = 5.770

```
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.626
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8833
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.79
  TOTAL AREA(ACRES) =      0.34   TOTAL RUNOFF(CFS) =      0.79

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    117.00 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.) =    5.77
  RAINFALL INTENSITY(INCH/HR) =   2.63
  TOTAL STREAM AREA(ACRES) =     0.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.79

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    117.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1147.78
  FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.23
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    5.34
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    117.00 =     166.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    117.00 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.) =    5.34
  RAINFALL INTENSITY(INCH/HR) =   2.71
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.17

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

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)	(ACRE)
1	3.13	7.41	2.367	1.39
2	0.79	5.77	2.626	0.34
3	0.17	5.34	2.711	0.07

**********WARNING**********
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	3.16	5.34	2.711
2	3.39	5.77	2.626
3	3.99	7.41	2.367

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 3.99 Tc(MIN.) = 7.41
TOTAL AREA(ACRES) = 1.8
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 117.00 = 467.00 FEET.

****
FLOW PROCESS FROM NODE 117.00 TO NODE 121.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 1146.78 DOWNSTREAM(FEET) = 1146.56
FLOW LENGTH(FEET) = 44.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 15.0 INCH PIPE IS 11.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.10
ESTIMATED PIPE DIAMETER(INCH) = 15.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.99
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 7.59
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 121.00 = 511.00 FEET.

****
FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 7.59
RAINFALL INTENSITY(INCH/HR) = 2.34
TOTAL STREAM AREA(ACRES) = 1.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.99

****
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 22

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
USER SPECIFIED Tc(MIN.) = 5.000
10 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.787
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    121.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1147.56
  FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    122.00 TO NODE    121.00 =     103.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 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.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   2.72
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.99     7.59        2.344          1.80
      2        0.17     5.28        2.724          0.07

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        2.95     5.28       2.724
      2        4.14     7.59       2.344

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.14   Tc(MIN.) =    7.59
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    121.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.56  DOWNSTREAM(FEET) =  1146.49
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.00
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.65
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    124.00 =     526.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.65
  RAINFALL INTENSITY(INCH/HR) =   2.34
  TOTAL STREAM AREA(ACRES) =     1.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.14

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    76.00
  UPSTREAM ELEVATION(FEET) =   1155.54
  DOWNSTREAM ELEVATION(FEET) =   1151.58
  ELEVATION DIFFERENCE(FEET) =      3.96
  TC = 0.303*[(   76.00**3)/(     3.96)]**.2 =    3.094
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 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.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   2.79
  TOTAL STREAM AREA(ACRES) =     0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.30

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.14     7.65        2.336          1.87
      2        0.30     5.00        2.787          0.12

 ********************************WARNING*********************************
```

```
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        3.00     5.00       2.787
      2        4.38     7.65       2.336

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.38   Tc(MIN.) =    7.65
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    124.00 =     526.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.00  DOWNSTREAM(FEET) =  1145.70
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.14
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    7.89
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    126.00 =     586.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.89
  RAINFALL INTENSITY(INCH/HR) =   2.31
  TOTAL STREAM AREA(ACRES) =     1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.38

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1159.30
  ELEVATION DIFFERENCE(FEET) =      6.70
  TC = 0.303*[(  100.00**3)/(     6.70)]**.2 =    3.284
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    126.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1159.30  DOWNSTREAM(FEET) =   1151.31
  CHANNEL LENGTH THRU SUBAREA(FEET) =   118.00   CHANNEL SLOPE =  0.0677
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.548
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8829
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.63
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.20
  Tc(MIN.) =    6.20
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    126.00 =     218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.548
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8829
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.64
  TC(MIN.) =    6.20

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.20
  RAINFALL INTENSITY(INCH/HR) =   2.55
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.38     7.89        2.306          1.99
      2        0.64     6.20        2.548          0.28

 ***********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************
```

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.09     6.20       2.548
      2        4.96     7.89       2.306

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.96   Tc(MIN.) =    7.89
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    126.00 =     586.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.70  DOWNSTREAM(FEET) =  1145.46
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.96
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    129.00 =     634.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.07
  RAINFALL INTENSITY(INCH/HR) =   2.28
  TOTAL STREAM AREA(ACRES) =     2.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.96

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1146.96
```

```
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.08
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    129.00 =      74.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 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.) =    5.08
  RAINFALL INTENSITY(INCH/HR) =   2.77
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.96     8.07        2.285          2.27
      2        0.17     5.08        2.767          0.07

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        3.30     5.08       2.767
      2        5.11     8.07       2.285

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.11   Tc(MIN.) =    8.07
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    129.00 =     634.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.46  DOWNSTREAM(FEET) =  1145.15
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.11
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    8.31
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    132.00 =     697.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.31
  RAINFALL INTENSITY(INCH/HR) =   2.26
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.11

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    134.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1157.98
  ELEVATION DIFFERENCE(FEET) =      8.02
  TC = 0.303*[(  100.00**3)/(     8.02)]**.2 =    3.168
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1157.98  DOWNSTREAM(FEET) =   1153.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0692
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.637
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8833
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.21
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.68
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.71
  Tc(MIN.) =    5.71
  SUBAREA AREA(ACRES) =     0.03       SUBAREA RUNOFF(CFS) =    0.07
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.97
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    135.00 =     172.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    135.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.637
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8833
```

```
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.07
 TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.31
 TC(MIN.) =    5.71

****************************************************************************
 FLOW PROCESS FROM NODE    135.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1148.89  DOWNSTREAM(FEET) =  1146.15
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.78
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.31
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.91
 LONGEST FLOWPATH FROM NODE    133.00 TO NODE    132.00 =     227.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 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.) =    5.91
 RAINFALL INTENSITY(INCH/HR) =   2.60
 TOTAL STREAM AREA(ACRES) =     0.13
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.31

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        5.11     8.31        2.257          2.34
     2        0.31     5.91        2.601          0.13

 ***********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************

 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        3.94     5.91       2.601
     2        5.38     8.31       2.257

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.38   Tc(MIN.) =    8.31
 TOTAL AREA(ACRES) =        2.5
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    132.00 =     697.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    136.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.15  DOWNSTREAM(FEET) =  1145.01
  FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.49
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.38
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.42
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    136.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 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.) =    8.42
  RAINFALL INTENSITY(INCH/HR) =   2.25
  TOTAL STREAM AREA(ACRES) =     2.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.38

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    136.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1147.26
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.90
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.09
  LONGEST FLOWPATH FROM NODE    137.00 TO NODE    136.00 =      54.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 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.) =    5.09
  RAINFALL INTENSITY(INCH/HR) =   2.77
```

```
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1159.54
  DOWNSTREAM ELEVATION(FEET) =   1151.67
  ELEVATION DIFFERENCE(FEET) =      7.87
  TC = 0.303*[(  100.00**3)/(     7.87)]**.2 =    3.180
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    136.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.67  DOWNSTREAM(FEET) =   1150.93
  CHANNEL LENGTH THRU SUBAREA(FEET) =    91.00   CHANNEL SLOPE =  0.0081
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.471
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8824
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.90
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.68
  Tc(MIN.) =    6.68
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    136.00 =     191.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.471
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8824
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.01
  TC(MIN.) =    6.68

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.68
  RAINFALL INTENSITY(INCH/HR) =   2.47
  TOTAL STREAM AREA(ACRES) =     0.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.38     8.42        2.246          2.47
      2        0.17     5.09        2.766          0.07
      3        1.01     6.68        2.471          0.45

 **********************************WARNING**********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ***************************************************************************

  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        4.20     5.09       2.766
      2        5.43     6.68       2.471
      3        6.44     8.42       2.246

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.44   Tc(MIN.) =    8.42
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    136.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    141.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.01  DOWNSTREAM(FEET) =  1144.82
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.44
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.56
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    141.00 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    141.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.56
  RAINFALL INTENSITY(INCH/HR) =   2.23
  TOTAL STREAM AREA(ACRES) =     2.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.44
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1158.52
  ELEVATION DIFFERENCE(FEET) =      7.48
  TC = 0.303*[(  100.00**3)/(     7.48)]**.2 =    3.212
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    144.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1158.52  DOWNSTREAM(FEET) =   1152.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   122.00   CHANNEL SLOPE =  0.0506
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.526
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8827
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.52
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.34
  Tc(MIN.) =    6.34
  SUBAREA AREA(ACRES) =     0.05       SUBAREA RUNOFF(CFS) =    0.11
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    142.00 TO NODE    144.00 =     222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    144.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.526
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8827
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.11
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.42
  TC(MIN.) =    6.34

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    141.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1148.28  DOWNSTREAM(FEET) =  1145.82
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.42
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.52
  LONGEST FLOWPATH FROM NODE    142.00 TO NODE    141.00 =     278.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    141.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.52
  RAINFALL INTENSITY(INCH/HR) =   2.50
  TOTAL STREAM AREA(ACRES) =     0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.42

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.44     8.56        2.229          2.99
      2        0.42     6.52        2.496          0.18

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.32     6.52       2.496
      2        6.81     8.56       2.229

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.81   Tc(MIN.) =    8.56
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    141.00 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1144.82  DOWNSTREAM(FEET) =  1144.62
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.81
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.70
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    145.00 =     804.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    8.70
  RAINFALL INTENSITY(INCH/HR) =   2.21
  TOTAL STREAM AREA(ACRES) =     3.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.81

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    147.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1164.72
  DOWNSTREAM ELEVATION(FEET) =   1157.49
  ELEVATION DIFFERENCE(FEET) =      7.23
  TC = 0.303*[(  100.00**3)/(     7.23)]**.2 =    3.234
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1157.49  DOWNSTREAM(FEET) =   1152.14
  CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0334
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.422
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8822
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.33
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =    7.01
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.53
  LONGEST FLOWPATH FROM NODE    146.00 TO NODE    148.00 =     260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    148.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.422
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8822
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.59
  TC(MIN.) =    7.01

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.10  DOWNSTREAM(FEET) =  1145.62
  FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.27
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.59
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.12
  LONGEST FLOWPATH FROM NODE    146.00 TO NODE    145.00 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    7.12
  RAINFALL INTENSITY(INCH/HR) =   2.41
  TOTAL STREAM AREA(ACRES) =     0.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.59

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
  UPSTREAM ELEVATION(FEET) =   1154.92
  DOWNSTREAM ELEVATION(FEET) =   1151.86
  ELEVATION DIFFERENCE(FEET) =      3.06
  TC = 0.303*[(   94.00**3)/(     3.06)]**.2 =    3.701
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    5.00
```

```
 RAINFALL INTENSITY(INCH/HR) =   2.79
 TOTAL STREAM AREA(ACRES) =     0.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.27

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        6.81     8.70        2.215          3.17
     2        0.59     7.12        2.407          0.27
     3        0.27     5.00        2.787          0.11

 ********************************WARNING*********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

 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        4.60     5.00       2.787
     2        6.40     7.12       2.407
     3        7.57     8.70       2.215

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.57   Tc(MIN.) =    8.70
 TOTAL AREA(ACRES) =        3.6
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    145.00 =     804.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    145.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1144.62  DOWNSTREAM(FEET) =  1141.82
 FLOW LENGTH(FEET) =   136.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.25
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.57
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.98
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    150.00 =     940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1152.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   1150.13
  ELEVATION DIFFERENCE(FEET) =      1.87
  TC = 0.303*[(  100.00**3)/(     1.87)]**.2 =    4.239
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 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.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   2.79
  TOTAL STREAM AREA(ACRES) =     0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    152.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1146.64
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    5.45
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    152.00 =     193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 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.) =    5.45
  RAINFALL INTENSITY(INCH/HR) =   2.69
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.17
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    152.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1146.64
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.31
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    152.00 =     163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 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.) =    5.31
  RAINFALL INTENSITY(INCH/HR) =   2.72
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.30     5.00        2.787          0.12
      2        0.17     5.45        2.689          0.07
      3        0.17     5.31        2.717          0.07

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        0.62     5.00       2.787
     2        0.63     5.31       2.717
     3        0.63     5.45       2.689

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       0.62   Tc(MIN.) =    5.00
  TOTAL AREA(ACRES) =        0.3
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    152.00 =     193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.14  DOWNSTREAM(FEET) =  1142.83
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.62
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.16
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    150.00 =     251.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE = 14.0
----------------------------------------------------------------------------
  >>>>>MEMORY BANK #  1 COPIED ONTO MAIN-STREAM MEMORY<<<<<
============================================================================

  MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
  STREAM    RUNOFF       Tc
  NUMBER     (CFS)     (MIN.)
     1        7.57       8.98
    TOTAL AREA =         3.6

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   2.19
  TOTAL STREAM AREA(ACRES) =     3.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.57

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1151.83
  DOWNSTREAM ELEVATION(FEET) =   1150.21
  ELEVATION DIFFERENCE(FEET) =      1.62
  TC = 0.303*[(  100.00**3)/(     1.62)]**.2 =    4.362
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
```

```
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    159.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1150.21  DOWNSTREAM(FEET) =   1149.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =    23.00   CHANNEL SLOPE =  0.0135
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.708
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.07
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    5.36
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE    157.00 TO NODE    159.00 =     123.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.708
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.34
  TC(MIN.) =    5.36

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1141.90  DOWNSTREAM(FEET) =  1141.82
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.02
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.52
  LONGEST FLOWPATH FROM NODE    157.00 TO NODE    150.00 =     143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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.) =    5.52
  RAINFALL INTENSITY(INCH/HR) =   2.67
  TOTAL STREAM AREA(ACRES) =     0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.34

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.57     8.98        2.186          3.55
      2        0.34     5.52        2.674          0.14

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ******************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.00     5.52       2.674
      2        7.85     8.98       2.186

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.85   Tc(MIN.) =    8.98
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    150.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    160.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1141.82  DOWNSTREAM(FEET) =  1141.64
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.85
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.09
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    160.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.09
  RAINFALL INTENSITY(INCH/HR) =   2.17
  TOTAL STREAM AREA(ACRES) =     3.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.85

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  21
```

```
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1153.39
  DOWNSTREAM ELEVATION(FEET) =   1150.16
  ELEVATION DIFFERENCE(FEET) =      3.23
  TC = 0.303*[(  100.00**3)/(     3.23)]**.2 =    3.800
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.34

**************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    163.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1150.16  DOWNSTREAM(FEET) =   1149.22
  CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0131
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.13
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.06
  Tc(MIN.) =    6.06
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.45
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE    161.00 TO NODE    163.00 =     172.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    163.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.45
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.25
  TC(MIN.) =    6.06

**************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    160.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.18  DOWNSTREAM(FEET) =  1141.94
  FLOW LENGTH(FEET) =    17.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
```

```
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.67
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.25
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.09
 LONGEST FLOWPATH FROM NODE    161.00 TO NODE    160.00 =     189.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.09
 RAINFALL INTENSITY(INCH/HR) =   2.57
 TOTAL STREAM AREA(ACRES) =     0.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.25

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.85     9.09        2.175          3.69
     2        1.25     6.09        2.569          0.54

 ********************************WARNING*************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 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        6.51     6.09       2.569
     2        8.92     9.09       2.175

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.92   Tc(MIN.) =    9.09
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    160.00 =     975.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    160.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1141.78  DOWNSTREAM(FEET) =  1140.76
 FLOW LENGTH(FEET) =    78.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.29
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.92
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.27
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    164.00 =    1053.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.27
  RAINFALL INTENSITY(INCH/HR) =   2.16
  TOTAL STREAM AREA(ACRES) =     4.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.92

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =   1151.81
  DOWNSTREAM ELEVATION(FEET) =   1148.41
  ELEVATION DIFFERENCE(FEET) =      3.40
  TC = 0.303*[(   70.00**3)/(     3.40)]**.2 =    3.036
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1144.84  DOWNSTREAM(FEET) =  1142.76
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.52
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.11
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    164.00 =     101.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 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.) =    5.11
  RAINFALL INTENSITY(INCH/HR) =   2.76
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.92     9.27        2.157          4.23
```

```
     2        0.17     5.11        2.761          0.07

 ********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 **************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.09     5.11       2.761
      2        9.05     9.27       2.157

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.05   Tc(MIN.) =    9.27
  TOTAL AREA(ACRES) =        4.3
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    164.00 =    1053.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.76  DOWNSTREAM(FEET) =  1140.53
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.05
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.43
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    165.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.43
  RAINFALL INTENSITY(INCH/HR) =   2.14
  TOTAL STREAM AREA(ACRES) =     4.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.05

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.00
  UPSTREAM ELEVATION(FEET) =   1151.81
  DOWNSTREAM ELEVATION(FEET) =   1150.67
  ELEVATION DIFFERENCE(FEET) =      1.14
  TC = 0.303*[(   61.00**3)/(     1.14)]**.2 =    3.479
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
```

```
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.56  DOWNSTREAM(FEET) =  1145.98
  FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.12
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
  LONGEST FLOWPATH FROM NODE    166.00 TO NODE    165.00 =      69.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 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.) =    5.03
  RAINFALL INTENSITY(INCH/HR) =   2.78
  TOTAL STREAM AREA(ACRES) =     0.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.12

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    169.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1151.99
  DOWNSTREAM ELEVATION(FEET) =   1149.95
  ELEVATION DIFFERENCE(FEET) =      2.04
  TC = 0.303*[(  100.00**3)/(     2.04)]**.2 =    4.165
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1149.95  DOWNSTREAM(FEET) =   1149.76
  CHANNEL LENGTH THRU SUBAREA(FEET) =    25.00   CHANNEL SLOPE =  0.0076
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
```

```
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.675
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8835
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.20
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.81
 AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.52
 Tc(MIN.) =    5.52
 SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.01
 TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.21

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   0.83
 LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.675
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8835
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.01
 TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.22
 TC(MIN.) =    5.52

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1144.85  DOWNSTREAM(FEET) =  1143.00
 FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.31
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.22
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    5.93
 LONGEST FLOWPATH FROM NODE    168.00 TO NODE    165.00 =     208.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 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.) =    5.93
 RAINFALL INTENSITY(INCH/HR) =   2.60
 TOTAL STREAM AREA(ACRES) =     0.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.22

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        9.05     9.43        2.142          4.30
     2        0.12     5.03        2.779          0.05
     3        0.22     5.93        2.595          0.09
```

```
 ****************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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        5.14     5.03       2.779
      2        6.04     5.93       2.595
      3        9.33     9.43       2.142

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.33   Tc(MIN.) =    9.43
  TOTAL AREA(ACRES) =        4.4
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    165.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.52  DOWNSTREAM(FEET) =  1140.09
  FLOW LENGTH(FEET) =    87.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.08
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.33
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.71
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    171.00 =    1187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    173.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1150.81
  DOWNSTREAM ELEVATION(FEET) =   1147.88
  ELEVATION DIFFERENCE(FEET) =      2.93
  TC = 0.303*[(  100.00**3)/(     2.93)]**.2 =    3.874
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.64

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

```
  FLOW PROCESS FROM NODE    173.00 TO NODE    174.00 IS CODE =  51
----------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1147.88  DOWNSTREAM(FEET) =   1147.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    35.00   CHANNEL SLOPE =  0.0251
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.705
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.58
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.37
  Tc(MIN.) =    5.37
  SUBAREA AREA(ACRES) =     0.03       SUBAREA RUNOFF(CFS) =    0.07
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE    172.00 TO NODE    174.00 =     135.00 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    174.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.705
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.07
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.78
  TC(MIN.) =    5.37

**********************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1143.47  DOWNSTREAM(FEET) =  1143.30
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.78
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.38
  LONGEST FLOWPATH FROM NODE    172.00 TO NODE    171.00 =     140.00 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
======================================================================

**********************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
```

```
       DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1151.24
  DOWNSTREAM ELEVATION(FEET) =   1147.95
  ELEVATION DIFFERENCE(FEET) =      3.29
  TC = 0.303*[(  100.00**3)/(     3.29)]**.2 =    3.786
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    177.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1147.95  DOWNSTREAM(FEET) =   1147.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   158.00   CHANNEL SLOPE =  0.0060
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.269
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8812
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.82
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.21
  Tc(MIN.) =    8.21
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   0.86
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    177.00 =     258.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    177.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.269
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8812
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       0.78
  TC(MIN.) =    8.21

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1141.94  DOWNSTREAM(FEET) =  1141.01
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.39
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.78
```

```
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    8.72
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.72
  RAINFALL INTENSITY(INCH/HR) =   2.21
  TOTAL STREAM AREA(ACRES) =     0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1148.13
  DOWNSTREAM ELEVATION(FEET) =   1146.40
  ELEVATION DIFFERENCE(FEET) =      1.73
  TC = 0.303*[(  100.00**3)/(     1.73)]**.2 =    4.305
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1146.40  DOWNSTREAM(FEET) =   1145.61
  CHANNEL LENGTH THRU SUBAREA(FEET) =    62.00   CHANNEL SLOPE =  0.0127
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.603
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8832
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.16
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.89
  Tc(MIN.) =    5.89
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    181.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    181.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.603
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8832
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       0.77
  TC(MIN.) =    5.89

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1142.60  DOWNSTREAM(FEET) =  1142.01
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.10
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.77
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.05
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    178.00 =     201.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   2.57
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.77

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.78     8.72        2.212          0.36
      2        0.77     6.05        2.575          0.33

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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        1.30     6.05       2.575
      2        1.43     8.72       2.212

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.43   Tc(MIN.) =    8.72
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     363.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1141.01  DOWNSTREAM(FEET) =  1140.96
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.43
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    171.00 =     473.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE = 14.0
----------------------------------------------------------------------------
  >>>>>MEMORY BANK #  2 COPIED ONTO MAIN-STREAM MEMORY<<<<<
============================================================================

  MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
  STREAM    RUNOFF       Tc
  NUMBER     (CFS)     (MIN.)
     1        9.33       9.71
    TOTAL AREA =         4.4

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        9.33     9.71       2.116        4.44
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    171.00 =    1187.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.78     5.38       2.702        0.32
  LONGEST FLOWPATH FROM NODE    172.00 TO NODE    171.00 =     140.00 FEET.

 ****************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.96       5.38        2.702
      2       9.94       9.71        2.116

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.94   Tc(MIN.) =    9.71
  TOTAL AREA(ACRES) =        4.8

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    182.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.09  DOWNSTREAM(FEET) =  1139.23
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.94
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.81
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    182.00 =    1235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1153.06
  DOWNSTREAM ELEVATION(FEET) =   1149.59
  ELEVATION DIFFERENCE(FEET) =      3.47
  TC = 0.303*[(  100.00**3)/(     3.47)]**.2 =    3.746
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.787
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.12
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.12

****************************************************************************
  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) =   1149.59  DOWNSTREAM(FEET) =   1139.16
  CHANNEL LENGTH THRU SUBAREA(FEET) =   454.00   CHANNEL SLOPE =  0.0230
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.987
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8792
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.20
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   6.30
  Tc(MIN.) =   11.30
  SUBAREA AREA(ACRES) =     0.03       SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     554.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.987
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8792
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.05
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.23
  TC(MIN.) =   11.30
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =     11.30
  PEAK FLOW RATE(CFS)   =       0.23
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
                      (Rational Tabling Version 18.0)
                  Release Date: 07/01/2011  License ID 1499

                           Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* Rancho Springs Medical Center                                          *
* Proposed Conditions                                                    *
* 100-year analysis                                                      *
 **************************************************************************

  FILE NAME: RS_P.DAT
  TIME/DATE OF STUDY: 07:28 05/18/2020
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.070
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.985
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.430
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.630
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4144876
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4152232
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.630
  SLOPE OF INTENSITY DURATION CURVE = 0.4152
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *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     30.00 TO NODE     31.00 IS CODE =   7
--------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) =  4.57
```

```
  TOTAL AREA(ACRES) =     0.08   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE    300.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1152.47  DOWNSTREAM(FEET) =  1143.66
  FLOW LENGTH(FEET) =   226.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.53
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.14
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    6.07
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    300.00 =     226.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   102.00
  UPSTREAM ELEVATION(FEET) =   1157.00
  DOWNSTREAM ELEVATION(FEET) =   1155.41
  ELEVATION DIFFERENCE(FEET) =      1.59
  TC = 0.303*[(  102.00**3)/(     1.59)]**.2 =    4.431
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1151.00  DOWNSTREAM(FEET) =  1149.75
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.17
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.41
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    5.55
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     206.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =    5.55
  RAINFALL INTENSITY(INCH/HR) =   4.38
  TOTAL STREAM AREA(ACRES) =     0.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.41
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1155.37
  DOWNSTREAM ELEVATION(FEET) =   1154.06
  ELEVATION DIFFERENCE(FEET) =      1.31
  TC = 0.303*[(  100.00**3)/(     1.31)]**.2 =    4.551
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1154.06  DOWNSTREAM(FEET) =   1153.34
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0095
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.181
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.05
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =    6.21
  SUBAREA AREA(ACRES) =     0.06       SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    103.00 TO NODE    102.00 =     176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.181
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.06   SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.89
  TC(MIN.) =    6.21

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 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.) =    6.21
  RAINFALL INTENSITY(INCH/HR) =   4.18
  TOTAL STREAM AREA(ACRES) =     0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1157.00
  DOWNSTREAM ELEVATION(FEET) =   1154.96
  ELEVATION DIFFERENCE(FEET) =      2.04
  TC = 0.303*[(  100.00**3)/(     2.04)]**.2 =    4.165
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1154.96  DOWNSTREAM(FEET) =   1152.14
  CHANNEL LENGTH THRU SUBAREA(FEET) =   123.00   CHANNEL SLOPE =  0.0229
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.173
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.66
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.24
  Tc(MIN.) =    6.24
  SUBAREA AREA(ACRES) =     0.19       SUBAREA RUNOFF(CFS) =    0.70
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.83
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     223.00 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) =  4.173
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.70
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.90
  TC(MIN.) =    6.24

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

```
 FLOW PROCESS FROM NODE    107.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1149.13  DOWNSTREAM(FEET) =  1148.92
 FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.41
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.90
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    6.45
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    102.00 =     266.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
======================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.45
 RAINFALL INTENSITY(INCH/HR) =   4.12
 TOTAL STREAM AREA(ACRES) =     0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.90

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        0.41     5.55        4.381          0.10
     2        0.89     6.21        4.181          0.23
     3        1.90     6.45        4.116          0.50

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 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        2.84     5.55       4.381
     2        3.11     6.21       4.181
     3        3.16     6.45       4.116

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.16   Tc(MIN.) =    6.45
 TOTAL AREA(ACRES) =        0.8
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    102.00 =     266.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1148.92  DOWNSTREAM(FEET) =  1148.20
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.16
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    6.65
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    108.00 =     331.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =    6.65
  RAINFALL INTENSITY(INCH/HR) =   4.06
  TOTAL STREAM AREA(ACRES) =     0.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1158.23
  DOWNSTREAM ELEVATION(FEET) =   1154.48
  ELEVATION DIFFERENCE(FEET) =      3.75
  TC = 0.303*[(  100.00**3)/(     3.75)]**.2 =    3.688
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1154.48  DOWNSTREAM(FEET) =   1152.91
  CHANNEL LENGTH THRU SUBAREA(FEET) =    35.00   CHANNEL SLOPE =  0.0449
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.468
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.01
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.29
  Tc(MIN.) =    5.29
  SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.04
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.94
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    108.00 =     135.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.468
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.04
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.69
  TC(MIN.) =    5.29

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 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.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   4.47
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.69

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.16     6.65        4.062          0.83
      2        0.69     5.29        4.468          0.17

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        3.20     5.29       4.468
      2        3.79     6.65       4.062

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.79   Tc(MIN.) =    6.65
  TOTAL AREA(ACRES) =        1.0
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    108.00 =     331.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1147.90  DOWNSTREAM(FEET) =  1147.68
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.42
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.79
```

```
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.79
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    111.00 =     367.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    6.79
  RAINFALL INTENSITY(INCH/HR) =   4.03
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.79

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
  UPSTREAM ELEVATION(FEET) =   1156.08
  DOWNSTREAM ELEVATION(FEET) =   1151.80
  ELEVATION DIFFERENCE(FEET) =      4.28
  TC = 0.303*[(   89.00**3)/(     4.28)]**.2 =    3.349
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.79     6.79        4.029          1.00
      2        0.45     5.00        4.574          0.11

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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        3.24     5.00       4.574
      2        4.18     6.79       4.029

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.18   Tc(MIN.) =    6.79
  TOTAL AREA(ACRES) =        1.1
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    111.00 =     367.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1147.29  DOWNSTREAM(FEET) =  1146.91
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.18
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.09
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    113.00 =     442.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.09
  RAINFALL INTENSITY(INCH/HR) =   3.96
  TOTAL STREAM AREA(ACRES) =     1.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.18

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1158.13
  DOWNSTREAM ELEVATION(FEET) =   1155.26
  ELEVATION DIFFERENCE(FEET) =      2.87
  TC = 0.303*[(  100.00**3)/(     2.87)]**.2 =    3.891
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1155.26  DOWNSTREAM(FEET) =   1152.66
  CHANNEL LENGTH THRU SUBAREA(FEET) =   100.00   CHANNEL SLOPE =  0.0260
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.215
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   1.09
  Tc(MIN.) =    6.09
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.63
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    116.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.215
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.07
  TC(MIN.) =    6.09

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.49  DOWNSTREAM(FEET) =  1147.41
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.19
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    113.00 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.19
  RAINFALL INTENSITY(INCH/HR) =   4.19
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1        4.18     7.09        3.957          1.11
     2        1.07     6.19        4.187          0.28

 ********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 **************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.72     6.19       4.187
      2        5.20     7.09       3.957

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.20   Tc(MIN.) =    7.09
  TOTAL AREA(ACRES) =        1.4
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    113.00 =     442.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    117.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.91  DOWNSTREAM(FEET) =  1146.78
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.20
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.18
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    117.00 =     467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    117.00 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.) =    7.18
  RAINFALL INTENSITY(INCH/HR) =   3.94
  TOTAL STREAM AREA(ACRES) =     1.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.20

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1152.04
  DOWNSTREAM ELEVATION(FEET) =   1151.64
  ELEVATION DIFFERENCE(FEET) =      0.40
  TC = 0.303*[(  100.00**3)/(     0.40)]**.2 =    5.770
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.310
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8890
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      1.30
 TOTAL AREA(ACRES) =      0.34   TOTAL RUNOFF(CFS) =      1.30

****************************************************************************
 FLOW PROCESS FROM NODE    117.00 TO NODE    117.00 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.) =    5.77
 RAINFALL INTENSITY(INCH/HR) =   4.31
 TOTAL STREAM AREA(ACRES) =     0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.30

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  22
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 USER SPECIFIED Tc(MIN.) =    5.000
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    117.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1147.78
 FLOW LENGTH(FEET) =    66.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.28
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    117.00 =     166.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    117.00 TO NODE    117.00 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.) =    5.29
 RAINFALL INTENSITY(INCH/HR) =   4.47
 TOTAL STREAM AREA(ACRES) =     0.07
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.28

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

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)	(ACRE)
1	5.20	7.18	3.935	1.39
2	1.30	5.77	4.310	0.34
3	0.28	5.29	4.466	0.07

**********WARNING**********
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	5.31	5.29	4.466
2	5.75	5.77	4.310
3	6.64	7.18	3.935

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 6.64 Tc(MIN.) = 7.18
TOTAL AREA(ACRES) = 1.8
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 117.00 = 467.00 FEET.

****
FLOW PROCESS FROM NODE 117.00 TO NODE 121.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 1146.78 DOWNSTREAM(FEET) = 1146.56
FLOW LENGTH(FEET) = 44.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.65
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.64
PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 7.34
LONGEST FLOWPATH FROM NODE 105.00 TO NODE 121.00 = 511.00 FEET.

****
FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 7.34
RAINFALL INTENSITY(INCH/HR) = 3.90
TOTAL STREAM AREA(ACRES) = 1.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 6.64

****
FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 22

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========
ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
USER SPECIFIED Tc(MIN.) = 5.000
100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 4.574
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    121.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1147.56
  FLOW LENGTH(FEET) =    59.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.09
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE    122.00 TO NODE    121.00 =     103.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 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.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   4.49
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.64     7.34        3.900          1.80
      2        0.28     5.24        4.486          0.07

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.02     5.24       4.486
      2        6.88     7.34       3.900

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.88   Tc(MIN.) =    7.34
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    121.00 =     511.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.56  DOWNSTREAM(FEET) =  1146.49
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.88
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.40
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    124.00 =     526.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.40
  RAINFALL INTENSITY(INCH/HR) =   3.89
  TOTAL STREAM AREA(ACRES) =     1.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.88

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    76.00
  UPSTREAM ELEVATION(FEET) =   1155.54
  DOWNSTREAM ELEVATION(FEET) =   1151.58
  ELEVATION DIFFERENCE(FEET) =      3.96
  TC = 0.303*[(   76.00**3)/(     3.96)]**.2 =    3.094
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 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.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =     0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.88     7.40        3.888          1.87
      2        0.49     5.00        4.574          0.12

 ********************************WARNING*********************************
```

```
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.14     5.00       4.574
      2        7.30     7.40       3.888

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.30   Tc(MIN.) =    7.40
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    124.00 =     526.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.00  DOWNSTREAM(FEET) =  1145.70
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.86
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.30
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    126.00 =     586.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.60
  RAINFALL INTENSITY(INCH/HR) =   3.84
  TOTAL STREAM AREA(ACRES) =     1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.30

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1159.30
  ELEVATION DIFFERENCE(FEET) =      6.70
  TC = 0.303*[(  100.00**3)/(     6.70)]**.2 =    3.284
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
```

```
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    126.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1159.30  DOWNSTREAM(FEET) =   1151.31
  CHANNEL LENGTH THRU SUBAREA(FEET) =   118.00   CHANNEL SLOPE =  0.0677
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.235
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.93
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.02
  Tc(MIN.) =    6.02
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.66

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   2.10
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    126.00 =     218.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.235
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.07
  TC(MIN.) =    6.02

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.02
  RAINFALL INTENSITY(INCH/HR) =   4.23
  TOTAL STREAM AREA(ACRES) =     0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        7.30     7.60        3.844          1.99
      2        1.07     6.02        4.235          0.28

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************
```

```
  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        6.85     6.02       4.235
      2        8.27     7.60       3.844

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.27   Tc(MIN.) =    7.60
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    126.00 =     586.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.70  DOWNSTREAM(FEET) =  1145.46
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.27
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.76
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    129.00 =     634.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.76
  RAINFALL INTENSITY(INCH/HR) =   3.81
  TOTAL STREAM AREA(ACRES) =     2.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.27

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    129.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1146.96
```

```
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    5.07
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    129.00 =      74.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 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.) =    5.07
  RAINFALL INTENSITY(INCH/HR) =   4.55
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.27     7.76        3.811          2.27
      2        0.28     5.07        4.546          0.07

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        5.69     5.07       4.546
      2        8.51     7.76       3.811

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.51   Tc(MIN.) =    7.76
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    129.00 =     634.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.46  DOWNSTREAM(FEET) =  1145.15
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.51
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.97
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    132.00 =     697.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   3.77
  TOTAL STREAM AREA(ACRES) =     2.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.51

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    134.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1157.98
  ELEVATION DIFFERENCE(FEET) =      8.02
  TC = 0.303*[(  100.00**3)/(     8.02)]**.2 =    3.168
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1157.98  DOWNSTREAM(FEET) =   1153.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0692
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.369
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.06
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   0.58
  Tc(MIN.) =    5.58
  SUBAREA AREA(ACRES) =     0.03       SUBAREA RUNOFF(CFS) =    0.12
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.20
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    135.00 =     172.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    135.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.369
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.12
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.52
  TC(MIN.) =    5.58

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.89  DOWNSTREAM(FEET) =  1146.15
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.62
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.52
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.75
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    132.00 =     227.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 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.) =    5.75
  RAINFALL INTENSITY(INCH/HR) =   4.32
  TOTAL STREAM AREA(ACRES) =     0.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.52

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.51     7.97        3.769          2.34
      2        0.52     5.75        4.317          0.13

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        6.65     5.75       4.317
      2        8.96     7.97       3.769

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.96   Tc(MIN.) =    7.97
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    132.00 =     697.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    136.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.15  DOWNSTREAM(FEET) =  1145.01
  FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.96
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    136.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 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.) =    8.06
  RAINFALL INTENSITY(INCH/HR) =   3.75
  TOTAL STREAM AREA(ACRES) =     2.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.96

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    136.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1147.26
  FLOW LENGTH(FEET) =    26.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.72
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.08
  LONGEST FLOWPATH FROM NODE    137.00 TO NODE    136.00 =      54.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 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) =   4.55
```

```
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1159.54
  DOWNSTREAM ELEVATION(FEET) =   1151.67
  ELEVATION DIFFERENCE(FEET) =      7.87
  TC = 0.303*[(  100.00**3)/(     7.87)]**.2 =    3.180
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    136.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1151.67  DOWNSTREAM(FEET) =   1150.93
  CHANNEL LENGTH THRU SUBAREA(FEET) =    91.00   CHANNEL SLOPE =  0.0081
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.104
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8885
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.02
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.49
  Tc(MIN.) =    6.49
  SUBAREA AREA(ACRES) =     0.17       SUBAREA RUNOFF(CFS) =    0.62
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE    139.00 TO NODE    136.00 =     191.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.104
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8885
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.17   SUBAREA RUNOFF(CFS) =    0.62
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.69
  TC(MIN.) =    6.49

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    136.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.49
  RAINFALL INTENSITY(INCH/HR) =   4.10
  TOTAL STREAM AREA(ACRES) =     0.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.69

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.96     8.06        3.751          2.47
      2        0.28     5.08        4.545          0.07
      3        1.69     6.49        4.104          0.45

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        7.25     5.08       4.545
      2        9.16     6.49       4.104
      3       10.74     8.06       3.751

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.74   Tc(MIN.) =    8.06
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    136.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    141.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.01  DOWNSTREAM(FEET) =  1144.82
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.74
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    141.00 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    141.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.19
  RAINFALL INTENSITY(INCH/HR) =   3.73
  TOTAL STREAM AREA(ACRES) =     2.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.74
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1166.00
  DOWNSTREAM ELEVATION(FEET) =   1158.52
  ELEVATION DIFFERENCE(FEET) =      7.48
  TC = 0.303*[(  100.00**3)/(     7.48)]**.2 =    3.212
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    144.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1158.52  DOWNSTREAM(FEET) =   1152.35
  CHANNEL LENGTH THRU SUBAREA(FEET) =   122.00   CHANNEL SLOPE =  0.0506
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.201
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =    6.14
  SUBAREA AREA(ACRES) =     0.05       SUBAREA RUNOFF(CFS) =    0.19
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   2.03
  LONGEST FLOWPATH FROM NODE    142.00 TO NODE    144.00 =     222.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    144.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.201
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8888
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.19
  TOTAL AREA(ACRES) =        0.2   TOTAL RUNOFF(CFS) =       0.70
  TC(MIN.) =    6.14

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    141.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1148.28  DOWNSTREAM(FEET) =  1145.82
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.85
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.70
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE    142.00 TO NODE    141.00 =     278.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    141.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.30
  RAINFALL INTENSITY(INCH/HR) =   4.16
  TOTAL STREAM AREA(ACRES) =     0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.74     8.19        3.726          2.99
      2        0.70     6.30        4.156          0.18

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.96     6.30       4.156
      2       11.37     8.19       3.726

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.37   Tc(MIN.) =    8.19
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    141.00 =     765.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1144.82  DOWNSTREAM(FEET) =  1144.62
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.37
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.31
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    145.00 =     804.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    8.31
  RAINFALL INTENSITY(INCH/HR) =   3.70
  TOTAL STREAM AREA(ACRES) =     3.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.37

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    147.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1164.72
  DOWNSTREAM ELEVATION(FEET) =   1157.49
  ELEVATION DIFFERENCE(FEET) =      7.23
  TC = 0.303*[(  100.00**3)/(     7.23)]**.2 =    3.234
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1157.49  DOWNSTREAM(FEET) =   1152.14
  CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0334
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.057
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.59
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   1.67
  Tc(MIN.) =    6.67
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.79
  LONGEST FLOWPATH FROM NODE    146.00 TO NODE    148.00 =     260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    148.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.057
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.00
  TC(MIN.) =    6.67

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1148.10  DOWNSTREAM(FEET) =  1145.62
  FLOW LENGTH(FEET) =    41.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.77
  LONGEST FLOWPATH FROM NODE    146.00 TO NODE    145.00 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    6.77
  RAINFALL INTENSITY(INCH/HR) =   4.03
  TOTAL STREAM AREA(ACRES) =     0.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    94.00
  UPSTREAM ELEVATION(FEET) =   1154.92
  DOWNSTREAM ELEVATION(FEET) =   1151.86
  ELEVATION DIFFERENCE(FEET) =      3.06
  TC = 0.303*[(   94.00**3)/(     3.06)]**.2 =    3.701
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    145.00 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.) =    5.00
```

```
 RAINFALL INTENSITY(INCH/HR) =   4.57
 TOTAL STREAM AREA(ACRES) =     0.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.45

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       11.37     8.31        3.704          3.17
     2        1.00     6.77        4.034          0.27
     3        0.45     5.00        4.574          0.11

 ********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 **************************************************************************

 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        8.02     5.00       4.574
     2       10.65     6.77       4.034
     3       12.64     8.31       3.704

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.64   Tc(MIN.) =    8.31
 TOTAL AREA(ACRES) =        3.6
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    145.00 =     804.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    145.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1144.62  DOWNSTREAM(FEET) =  1141.82
 FLOW LENGTH(FEET) =   136.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.64
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    8.55
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    150.00 =     940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1152.00
```

```
  DOWNSTREAM ELEVATION(FEET) =   1150.13
  ELEVATION DIFFERENCE(FEET) =      1.87
  TC = 0.303*[(  100.00**3)/(     1.87)]**.2 =    4.239
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 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.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =     0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    152.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1146.64
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.97
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    5.39
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    152.00 =     193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 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.) =    5.39
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.28
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  USER SPECIFIED Tc(MIN.) =    5.000
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    152.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1149.50  DOWNSTREAM(FEET) =  1146.64
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.36
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    5.27
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    152.00 =     163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 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.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   4.48
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.49     5.00        4.574          0.12
      2        0.28     5.39        4.433          0.07
      3        0.28     5.27        4.476          0.07

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  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        1.02     5.00       4.574
     2        1.04     5.27       4.476
     3        1.04     5.39       4.433

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.02   Tc(MIN.) =    5.00
  TOTAL AREA(ACRES) =        0.3
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    152.00 =     193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1146.14  DOWNSTREAM(FEET) =  1142.83
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.02
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.13
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    150.00 =     251.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE = 14.0
----------------------------------------------------------------------------
  >>>>>MEMORY BANK #  1 COPIED ONTO MAIN-STREAM MEMORY<<<<<
============================================================================

  MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
  STREAM    RUNOFF       Tc
  NUMBER     (CFS)     (MIN.)
     1       12.64       8.55
    TOTAL AREA =         3.6

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.55
  RAINFALL INTENSITY(INCH/HR) =   3.66
  TOTAL STREAM AREA(ACRES) =     3.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.64

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1151.83
  DOWNSTREAM ELEVATION(FEET) =   1150.21
  ELEVATION DIFFERENCE(FEET) =      1.62
  TC = 0.303*[(  100.00**3)/(     1.62)]**.2 =    4.362
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.41
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
 FLOW PROCESS FROM NODE    158.00 TO NODE    159.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1150.21  DOWNSTREAM(FEET) =   1149.90
 CHANNEL LENGTH THRU SUBAREA(FEET) =    23.00   CHANNEL SLOPE =  0.0135
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.448
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.10
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.35
 Tc(MIN.) =    5.35
 SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.08
 TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.49

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.20
 LONGEST FLOWPATH FROM NODE    157.00 TO NODE    159.00 =     123.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.448
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.02   SUBAREA RUNOFF(CFS) =    0.08
 TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.57
 TC(MIN.) =    5.35

****************************************************************************
 FLOW PROCESS FROM NODE    159.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1141.90  DOWNSTREAM(FEET) =  1141.82
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.35
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.57
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    5.49
 LONGEST FLOWPATH FROM NODE    157.00 TO NODE    150.00 =     143.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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.) =    5.49
  RAINFALL INTENSITY(INCH/HR) =   4.40
  TOTAL STREAM AREA(ACRES) =     0.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.57

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.64     8.55        3.660          3.55
      2        0.57     5.49        4.400          0.14

 ***********************************WARNING************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ******************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.68     5.49       4.400
      2       13.11     8.55       3.660

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.11   Tc(MIN.) =    8.55
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    150.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    160.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1141.82  DOWNSTREAM(FEET) =  1141.64
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.11
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.66
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    160.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.66
  RAINFALL INTENSITY(INCH/HR) =   3.64
  TOTAL STREAM AREA(ACRES) =     3.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.11

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  21
```

```
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1153.39
  DOWNSTREAM ELEVATION(FEET) =   1150.16
  ELEVATION DIFFERENCE(FEET) =      3.23
  TC = 0.303*[(  100.00**3)/(     3.23)]**.2 =    3.800
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.57

********************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    163.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1150.16  DOWNSTREAM(FEET) =   1149.22
  CHANNEL LENGTH THRU SUBAREA(FEET) =    72.00   CHANNEL SLOPE =  0.0131
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.294
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8890
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.46
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   0.82
  Tc(MIN.) =    5.82
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.76
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.33

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE    161.00 TO NODE    163.00 =     172.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    163.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.294
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8890
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.76
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       2.10
  TC(MIN.) =    5.82

********************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    160.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1145.18  DOWNSTREAM(FEET) =  1141.94
  FLOW LENGTH(FEET) =    17.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
```

```
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.55
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.10
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.84
 LONGEST FLOWPATH FROM NODE    161.00 TO NODE    160.00 =     189.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 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.) =    5.84
 RAINFALL INTENSITY(INCH/HR) =   4.29
 TOTAL STREAM AREA(ACRES) =     0.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.10

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       13.11     8.66        3.642          3.69
     2        2.10     5.84        4.287          0.54

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 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       10.95     5.84       4.287
     2       14.90     8.66       3.642

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      14.90   Tc(MIN.) =    8.66
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    160.00 =     975.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    160.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1141.78  DOWNSTREAM(FEET) =  1140.76
 FLOW LENGTH(FEET) =    78.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.90
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.81
 LONGEST FLOWPATH FROM NODE    105.00 TO NODE    164.00 =    1053.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
```

```
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   3.61
  TOTAL STREAM AREA(ACRES) =     4.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.90

**************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =   1151.81
  DOWNSTREAM ELEVATION(FEET) =   1148.41
  ELEVATION DIFFERENCE(FEET) =      3.40
  TC = 0.303*[(   70.00**3)/(     3.40)]**.2 =    3.036
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.28

**************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    164.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1144.84  DOWNSTREAM(FEET) =  1142.76
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.15
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.10
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    164.00 =     101.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 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.) =    5.10
  RAINFALL INTENSITY(INCH/HR) =   4.54
  TOTAL STREAM AREA(ACRES) =     0.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       14.90     8.81        3.615          4.23
```

```
     2        0.28     5.10        4.536          0.07

 ********************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.90     5.10       4.536
      2       15.12     8.81       3.615

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.12   Tc(MIN.) =    8.81
  TOTAL AREA(ACRES) =        4.3
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    164.00 =    1053.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.76  DOWNSTREAM(FEET) =  1140.53
  FLOW LENGTH(FEET) =    47.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.12
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.95
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    165.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 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.) =    8.95
  RAINFALL INTENSITY(INCH/HR) =   3.59
  TOTAL STREAM AREA(ACRES) =     4.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.12

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    61.00
  UPSTREAM ELEVATION(FEET) =   1151.81
  DOWNSTREAM ELEVATION(FEET) =   1150.67
  ELEVATION DIFFERENCE(FEET) =      1.14
  TC = 0.303*[(   61.00**3)/(     1.14)]**.2 =    3.479
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.20
 TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1146.56  DOWNSTREAM(FEET) =  1145.98
 FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.83
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.20
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.03
 LONGEST FLOWPATH FROM NODE    166.00 TO NODE    165.00 =      69.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 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.) =    5.03
 RAINFALL INTENSITY(INCH/HR) =   4.56
 TOTAL STREAM AREA(ACRES) =     0.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE    168.00 TO NODE    169.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1151.99
 DOWNSTREAM ELEVATION(FEET) =   1149.95
 ELEVATION DIFFERENCE(FEET) =      2.04
 TC = 0.303*[(  100.00**3)/(     2.04)]**.2 =    4.165
 COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1149.95  DOWNSTREAM(FEET) =   1149.76
 CHANNEL LENGTH THRU SUBAREA(FEET) =    25.00   CHANNEL SLOPE =  0.0076
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
```

```
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.396
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8892
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.83
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.50
 Tc(MIN.) =    5.50
 SUBAREA AREA(ACRES) =     0.01       SUBAREA RUNOFF(CFS) =    0.02
 TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.35

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   0.86
 LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.396
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8892
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.01   SUBAREA RUNOFF(CFS) =    0.02
 TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.37
 TC(MIN.) =    5.50

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1144.85  DOWNSTREAM(FEET) =  1143.00
 FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.85
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.37
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    5.86
 LONGEST FLOWPATH FROM NODE    168.00 TO NODE    165.00 =     208.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 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.) =    5.86
 RAINFALL INTENSITY(INCH/HR) =   4.28
 TOTAL STREAM AREA(ACRES) =     0.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.37

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       15.12     8.95        3.591          4.30
     2        0.20     5.03        4.563          0.05
     3        0.37     5.86        4.282          0.09
```

```
 ****************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        9.01     5.03       4.563
      2       10.46     5.86       4.282
      3       15.59     8.95       3.591

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.59   Tc(MIN.) =    8.95
  TOTAL AREA(ACRES) =        4.4
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    165.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.52  DOWNSTREAM(FEET) =  1140.09
  FLOW LENGTH(FEET) =    87.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.83
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.59
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.20
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    171.00 =    1187.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    173.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1150.81
  DOWNSTREAM ELEVATION(FEET) =   1147.88
  ELEVATION DIFFERENCE(FEET) =      2.93
  TC = 0.303*[(  100.00**3)/(     2.93)]**.2 =    3.874
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      1.06

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

```
 FLOW PROCESS FROM NODE    173.00 TO NODE    174.00 IS CODE =  51
----------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1147.88  DOWNSTREAM(FEET) =   1147.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    35.00   CHANNEL SLOPE =  0.0251
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.456
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
 SOIL CLASSIFICATION IS "C"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.80
 AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   0.32
 Tc(MIN.) =    5.32
 SUBAREA AREA(ACRES) =     0.03       SUBAREA RUNOFF(CFS) =    0.12
 TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.18

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.81
 LONGEST FLOWPATH FROM NODE    172.00 TO NODE    174.00 =     135.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    174.00 TO NODE    174.00 IS CODE =  81
----------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.456
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.12
 TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.30
 TC(MIN.) =    5.32

****************************************************************************
 FLOW PROCESS FROM NODE    174.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
======================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1143.47  DOWNSTREAM(FEET) =  1143.30
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.30
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.34
 LONGEST FLOWPATH FROM NODE    172.00 TO NODE    171.00 =     140.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
======================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  21
----------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
```

```
       DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1151.24
  DOWNSTREAM ELEVATION(FEET) =   1147.95
  ELEVATION DIFFERENCE(FEET) =      3.29
  TC = 0.303*[(  100.00**3)/(     3.29)]**.2 =    3.786
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.49
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.49

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    177.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1147.95  DOWNSTREAM(FEET) =   1147.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   158.00   CHANNEL SLOPE =  0.0060
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.794
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.93
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   2.84
  Tc(MIN.) =    7.84
  SUBAREA AREA(ACRES) =     0.12       SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    177.00 =     258.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    177.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.794
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.30
  TC(MIN.) =    7.84

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1141.94  DOWNSTREAM(FEET) =  1141.01
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.92
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.30
```

```
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     363.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.29
  RAINFALL INTENSITY(INCH/HR) =   3.71
  TOTAL STREAM AREA(ACRES) =     0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.30

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1148.13
  DOWNSTREAM ELEVATION(FEET) =   1146.40
  ELEVATION DIFFERENCE(FEET) =      1.73
  TC = 0.303*[(  100.00**3)/(     1.73)]**.2 =    4.305
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1146.40  DOWNSTREAM(FEET) =   1145.61
  CHANNEL LENGTH THRU SUBAREA(FEET) =    62.00   CHANNEL SLOPE =  0.0127
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.282
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8890
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.20
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.86
  Tc(MIN.) =    5.86
  SUBAREA AREA(ACRES) =     0.11       SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    181.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    181.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.282
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8890
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.27
  TC(MIN.) =    5.86

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1142.60  DOWNSTREAM(FEET) =  1142.01
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.74
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.27
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.00
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    178.00 =     201.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.00
  RAINFALL INTENSITY(INCH/HR) =   4.24
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.27

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.30     8.29        3.708          0.36
      2        1.27     6.00        4.241          0.33

 ********************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  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        2.21     6.00       4.241
      2        2.41     8.29       3.708

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.41   Tc(MIN.) =    8.29
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     363.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1141.01  DOWNSTREAM(FEET) =  1140.96
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.49
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.41
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    171.00 =     473.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE = 14.0
----------------------------------------------------------------------------
  >>>>>MEMORY BANK #  2 COPIED ONTO MAIN-STREAM MEMORY<<<<<
============================================================================

  MAIN-STREAM MEMORY DEFINED AS FOLLOWS:
  STREAM    RUNOFF       Tc
  NUMBER     (CFS)     (MIN.)
     1       15.59       9.20
    TOTAL AREA =         4.4

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       15.59     9.20       3.550        4.44
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    171.00 =    1187.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.30     5.34       4.452        0.32
  LONGEST FLOWPATH FROM NODE    172.00 TO NODE    171.00 =     140.00 FEET.

 ****************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      10.34       5.34        4.452
      2      16.63       9.20        3.550

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.63   Tc(MIN.) =    9.20
  TOTAL AREA(ACRES) =        4.8

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    182.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1140.09  DOWNSTREAM(FEET) =  1139.23
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.63
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.29
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    182.00 =    1235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1153.06
  DOWNSTREAM ELEVATION(FEET) =   1149.59
  ELEVATION DIFFERENCE(FEET) =      3.47
  TC = 0.303*[(  100.00**3)/(     3.47)]**.2 =    3.746
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.574
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  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) =   1149.59  DOWNSTREAM(FEET) =   1139.16
  CHANNEL LENGTH THRU SUBAREA(FEET) =   454.00   CHANNEL SLOPE =  0.0230
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.347
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8863
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.35
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   5.61
  Tc(MIN.) =   10.61
  SUBAREA AREA(ACRES) =     0.03       SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.05   FLOW VELOCITY(FEET/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     554.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.347
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8863
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.03   SUBAREA RUNOFF(CFS) =    0.09
  TOTAL AREA(ACRES) =        0.1   TOTAL RUNOFF(CFS) =       0.38
  TC(MIN.) =   10.61
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.1  TC(MIN.) =     10.61
  PEAK FLOW RATE(CFS)   =       0.38
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX B: STORM DRAIN HYDRAULIC ANALYSIS

UHS Rancho Springs Medical Center
Synthetic Unit Hydrograph Method
Loss Rate Estimates
May-20

10-year and 100-year, AMC 2
Existing Conditions

Soil Group	Cover Type	Curve (RI) Number	Pervious Area Infiltration Rate (in/hr)	Land Use	Decimal Percent of Impervious Area	Adj Infiltration Rate (in/hr)	Subarea (acres)	Total Area (acres)	Subarea/Total Area	Avg Adjusted Infiltration Rate (in/hr)*	Min Loss Rate (inch/hr)
C	Commercial Landscaping	69	0.11	Commercial	0.74	0.04	7.5	7.5	1	0.04	0.02

Low Loss Developed Condition = 0.9 - (0.8 x % Impervious) = **0.31** ***(Minimum value in AES is 0.5; therefore, 0.5 was used for the current study)***

10-year and 100-year, AMC 2
Project Conditions

Soil Group	Cover Type	Curve (RI) Number	Pervious Area Infiltration Rate (in/hr)	Land Use	Decimal Percent of Impervious Area	Adj Infiltration Rate (in/hr)	Subarea (acres)	Total Area (acres)	Subarea/Total Area	Avg Adjusted Infiltration Rate (in/hr)*	Min Loss Rate (inch/hr)
C	Commercial Landscaping	69	0.11	Commercial	0.85	0.03	5.9	5.9	1	0.03	0.01

Low Loss Developed Condition = 0.9 - (0.8 x % Impervious) = **0.22** ***(Minimum value in AES is 0.5; therefore, 0.5 was used for the current study)***

Lag Time Calculations

	Tc (Min)	Tc (Hour)	Lag (Hour)
Existing DA C (100-year)	14	0.23	0.18
Existing DA C (10-year)	15	0.25	0.20
Project (100-year)	5	0.08	0.07
Project (10-year)	5	0.08	0.07

1. Lag time taken as 0.8(Tc), where Tc is time of concentration from rational method results.
2. Tc from rational method results was used for existing conditions while a Tc of 5 was conservatively selected for the proposed conditions.
3. Minimum lag time of 0.1 hr was used for analysis of proposed conditions.

*Minimum value in AES is 0.05; therefore, 0.05 was used for the study.

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

             F L O O D    R O U T I N G    A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2011 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 18.0)
                 Release Date: 05/01/2011  License ID 1499

                           Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* UHS Rancho Springs Unit Hydrograph                                     *
* Proposed Conditions, 10-yr, 1-hr                                       *
*                                                                        *
 **************************************************************************

  FILE NAME: RS_UNIT.DAT
  TIME/DATE OF STUDY: 13:31 05/12/2020


**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       5.900 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.050
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.500
         USER-ENTERED RAINFALL =  0.99 INCHES
         RCFC&WCD 1-Hour Storm (5-Minute period) SELECTED
         (SLOPE OF INTENSITY-DURATION CURVE = 0.41)
         RCFC&WCD DEPTH-AREA ADJUSTMENT FACTOR(PLATE E-5.8) = 1.0000


         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  83.333



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	13.994	9.985
2	59.664	32.587
3	78.792	13.649
4	86.766	5.689
5	91.428	3.326
6	94.514	2.202
7	96.650	1.524
8	98.044	0.995
9	98.699	0.467
10	99.289	0.421
11	99.716	0.304
12	99.929	0.152
13	100.000	0.051

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0493	0.0042	0.0452
2	0.0517	0.0042	0.0475
3	0.0545	0.0042	0.0503
4	0.0593	0.0042	0.0551
5	0.0621	0.0042	0.0579
6	0.0694	0.0042	0.0652
7	0.0796	0.0042	0.0754
8	0.0864	0.0042	0.0822
9	0.1227	0.0042	0.1185
10	0.2220	0.0042	0.2178
11	0.0743	0.0042	0.0702
12	0.0537	0.0042	0.0495

TOTAL STORM RAINFALL(INCHES) = 0.99
TOTAL SOIL-LOSS(INCHES) = 0.05
TOTAL EFFECTIVE RAINFALL(INCHES) = 0.94

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.0246
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.4595

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

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

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 5.0 10.0 15.0 20.0
0.083	0.0031	0.45	Q . . . .
0.167	0.0165	1.95	.V Q . . . .
0.250	0.0349	2.67	. V Q . . . .
0.333	0.0562	3.10	. V Q . . . .
0.417	0.0802	3.48	. Q . . . .
0.500	0.1066	3.83	. Q V. . . .
0.583	0.1364	4.32	. Q .V . . .
0.667	0.1702	4.91	. Q. V . . .

0.750	0.2096	5.72	. .Q V . . .
0.833	0.2654	8.11	. . Q . V . .
0.917	0.3376	10.48	. . Q V. .
1.000	0.3865	7.09	. . Q . . V .
1.083	0.4184	4.64	. Q. . . V .
1.167	0.4346	2.34	. Q . . . V .
1.250	0.4439	1.35	. Q . . . V .
1.333	0.4499	0.87	.Q . . . V.
1.417	0.4537	0.56	.Q . . . V.
1.500	0.4560	0.34	Q . . . V.
1.583	0.4576	0.23	Q . . . V.
1.667	0.4586	0.14	Q . . . V.
1.750	0.4591	0.08	Q . . . V.
1.833	0.4594	0.04	Q . . . V.
1.917	0.4595	0.01	Q . . . V.
2.000	0.4595	0.00	Q . . . V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	120.0
10%	70.0
20%	60.0
30%	45.0
40%	35.0
50%	20.0
60%	15.0
70%	10.0
80%	5.0
90%	5.0

==========

END OF FLOODSCx ROUTING ANALYSIS

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Project Summary	
Title	UHS Rancho Springs_10 yr, 1 hr
Engineer	Nikki Kerry, P.E.
Company	Kimley-Horn and Associates, Inc.
Date	5/12/2020

Notes	1. Inflow hydrograph (10-year, 1 hr) calculated based on Synthetic Unit Hydrograph Method from Riverside County Flood Control and Water Conservation District Hydrology Manual (April 1978) using AES software. 2. Flow-through basin analysis completed using modfified Pul's (storage indication routing).

Table of Contents

	User Notifications	2
	Master Network Summary	3
Unit Hydrograph (Onsite Runoff)	Read Hydrograph	4
Outfall (POC)	Addition Summary	5
Onsite Detention Basin (OUT)	Time vs. Elevation	6
Onsite Detention Basin	Time vs. Volume	9
Onsite Detention Basin	Pipe Volume	12
Composite Outlet Structure - 1		
	Outlet Input Data	14
	Individual Outlet Curves	17
	Composite Rating Curve	20
Onsite Detention Basin		
	Elevation-Volume-Flow Table (Pond)	21
Onsite Detention Basin (IN)		
	Level Pool Pond Routing Summary	22
Onsite Detention Basin (OUT)		
	Pond Routed Hydrograph (total out)	23
Onsite Detention Basin (IN)		
	Pond Inflow Summary	26
Outlet-1		
	Diverted Hydrograph	27

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: User Notifications

User Notifications

Message Id	17
Scenario	Base
Element Type	Composite Outlet Structure
Element Id	21
Label	Composite Outlet Structure - 1
Time	(N/A)
Message	Riser orifice equation controls at one or more headwater elevations for outlet structure.
Source	Information
Message Id	48
Scenario	Base
Element Type	Pond
Element Id	16
Label	Onsite Detention Basin
Time	(N/A)
Message	Outflow hydrograph never crested (last ordinate = max outflow).
Source	Warning

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Unit Hydrograph (Onsite Runoff)	Base	0	0.459	50.000	10.48

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Outfall (POC)	Base	0	0.367	1,440.000	0.39

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Onsite Detention Basin (IN)	Base	0	1.226	51.000	9.80	(N/A)	(N/A)
Onsite Detention Basin (OUT)	Base	0	0.367	1,440.000	0.39	5.68	0.860

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Read Hydrograph

Label: Unit Hydrograph (Onsite Runoff)

Peak Discharge	10.48 ft³/s
Time to Peak	50.000 min
Hydrograph Volume	0.459 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 5.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.45	1.95	2.67	3.10	3.48
25.000	3.83	4.32	4.91	5.72	8.11
50.000	10.48	7.09	4.64	2.34	1.35
75.000	0.87	0.56	0.34	0.23	0.14
100.000	0.08	0.04	0.01	0.00	0.42

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Addition Summary

Label: Outfall (POC)

Summary for Hydrograph Addition at 'Outfall (POC)'

Upstream Link	Upstream Node
Outlet-1	Onsite Detention Basin

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	0.367	1,440.000	0.39
Flow (In)	Outfall (POC)	0.367	1,440.000	0.39

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Time vs. Elevation

Label: Onsite Detention Basin (OUT)

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.00	0.08	0.24	0.45	0.59
15.000	0.71	0.84	0.98	1.10	1.23
30.000	1.36	1.50	1.63	1.78	1.94
45.000	2.13	2.36	2.59	2.80	2.96
60.000	3.08	3.17	3.23	3.27	3.30
75.000	3.32	3.33	3.34	3.35	3.35
90.000	3.36	3.36	3.36	3.36	3.36
105.000	3.35	3.35	3.35	3.35	3.34
120.000	3.35	3.35	3.36	3.37	3.37
135.000	3.38	3.39	3.39	3.40	3.40
150.000	3.41	3.42	3.42	3.43	3.44
165.000	3.44	3.45	3.46	3.46	3.47
180.000	3.47	3.48	3.49	3.49	3.50
195.000	3.51	3.51	3.52	3.52	3.53
210.000	3.54	3.54	3.55	3.55	3.56
225.000	3.57	3.57	3.58	3.59	3.59
240.000	3.60	3.60	3.61	3.62	3.62
255.000	3.63	3.63	3.64	3.65	3.65
270.000	3.66	3.67	3.67	3.68	3.68
285.000	3.69	3.70	3.70	3.71	3.71
300.000	3.72	3.73	3.73	3.74	3.74
315.000	3.75	3.76	3.76	3.77	3.77
330.000	3.78	3.79	3.79	3.80	3.80
345.000	3.81	3.82	3.82	3.83	3.83
360.000	3.84	3.85	3.85	3.86	3.86
375.000	3.87	3.88	3.88	3.89	3.89
390.000	3.90	3.91	3.91	3.92	3.92
405.000	3.93	3.94	3.94	3.95	3.95
420.000	3.96	3.97	3.97	3.98	3.98
435.000	3.99	4.00	4.00	4.01	4.01
450.000	4.02	4.03	4.03	4.04	4.04
465.000	4.05	4.06	4.06	4.07	4.07
480.000	4.08	4.08	4.09	4.10	4.10
495.000	4.11	4.11	4.12	4.13	4.13
510.000	4.14	4.14	4.15	4.16	4.16
525.000	4.17	4.17	4.18	4.18	4.19
540.000	4.20	4.20	4.21	4.21	4.22
555.000	4.23	4.23	4.24	4.24	4.25
570.000	4.25	4.26	4.27	4.27	4.28
585.000	4.28	4.29	4.29	4.30	4.31
600.000	4.31	4.32	4.32	4.33	4.34

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Time vs. Elevation

Label: Onsite Detention Basin (OUT)

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
615.000	4.34	4.35	4.35	4.36	4.36
630.000	4.37	4.38	4.38	4.39	4.39
645.000	4.40	4.40	4.41	4.42	4.42
660.000	4.43	4.43	4.44	4.44	4.45
675.000	4.46	4.46	4.47	4.47	4.48
690.000	4.48	4.49	4.50	4.50	4.51
705.000	4.51	4.52	4.52	4.53	4.54
720.000	4.54	4.55	4.55	4.56	4.56
735.000	4.57	4.58	4.58	4.59	4.59
750.000	4.60	4.61	4.61	4.62	4.62
765.000	4.63	4.63	4.64	4.65	4.65
780.000	4.66	4.66	4.67	4.67	4.68
795.000	4.69	4.69	4.70	4.70	4.71
810.000	4.71	4.72	4.72	4.73	4.74
825.000	4.74	4.75	4.75	4.76	4.76
840.000	4.77	4.78	4.78	4.79	4.79
855.000	4.80	4.80	4.81	4.82	4.82
870.000	4.83	4.83	4.84	4.84	4.85
885.000	4.85	4.86	4.87	4.87	4.88
900.000	4.88	4.89	4.89	4.90	4.91
915.000	4.91	4.92	4.92	4.93	4.93
930.000	4.94	4.94	4.95	4.96	4.96
945.000	4.97	4.97	4.98	4.98	4.99
960.000	4.99	5.00	5.01	5.01	5.02
975.000	5.02	5.03	5.03	5.04	5.05
990.000	5.05	5.06	5.06	5.07	5.07
1,005.000	5.08	5.09	5.09	5.10	5.10
1,020.000	5.11	5.11	5.12	5.13	5.13
1,035.000	5.14	5.14	5.15	5.15	5.16
1,050.000	5.17	5.17	5.18	5.18	5.19
1,065.000	5.19	5.20	5.20	5.21	5.22
1,080.000	5.22	5.23	5.23	5.24	5.24
1,095.000	5.25	5.26	5.26	5.27	5.27
1,110.000	5.28	5.28	5.29	5.29	5.30
1,125.000	5.31	5.31	5.32	5.32	5.33
1,140.000	5.33	5.34	5.35	5.35	5.36
1,155.000	5.36	5.37	5.37	5.38	5.38
1,170.000	5.39	5.40	5.40	5.41	5.41
1,185.000	5.42	5.42	5.43	5.43	5.44
1,200.000	5.45	5.45	5.46	5.46	5.47
1,215.000	5.47	5.48	5.48	5.49	5.50

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Time vs. Elevation

Label: Onsite Detention Basin (OUT)

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,230.000	5.50	5.51	5.51	5.52	5.52
1,245.000	5.53	5.53	5.54	5.54	5.55
1,260.000	5.55	5.56	5.56	5.56	5.57
1,275.000	5.57	5.58	5.58	5.58	5.59
1,290.000	5.59	5.59	5.60	5.60	5.60
1,305.000	5.61	5.61	5.61	5.61	5.62
1,320.000	5.62	5.62	5.63	5.63	5.63
1,335.000	5.63	5.63	5.64	5.64	5.64
1,350.000	5.64	5.64	5.65	5.65	5.65
1,365.000	5.65	5.65	5.66	5.66	5.66
1,380.000	5.66	5.66	5.66	5.66	5.67
1,395.000	5.67	5.67	5.67	5.67	5.67
1,410.000	5.67	5.68	5.68	5.68	5.68
1,425.000	5.68	5.68	5.68	5.68	5.68
1,440.000	5.68	(N/A)	(N/A)	(N/A)	(N/A)

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Time vs. Volume

Label: Onsite Detention Basin

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.001	0.005	0.019	0.029
15.000	0.041	0.054	0.070	0.084	0.099
30.000	0.116	0.136	0.154	0.176	0.201
45.000	0.231	0.267	0.307	0.342	0.371
60.000	0.393	0.408	0.419	0.426	0.431
75.000	0.434	0.437	0.439	0.440	0.441
90.000	0.441	0.442	0.442	0.442	0.441
105.000	0.441	0.440	0.440	0.439	0.439
120.000	0.440	0.441	0.442	0.443	0.444
135.000	0.445	0.446	0.448	0.449	0.450
150.000	0.451	0.452	0.453	0.455	0.456
165.000	0.457	0.458	0.459	0.460	0.461
180.000	0.463	0.464	0.465	0.466	0.467
195.000	0.468	0.469	0.471	0.472	0.473
210.000	0.474	0.475	0.476	0.477	0.478
225.000	0.479	0.481	0.482	0.483	0.484
240.000	0.485	0.486	0.487	0.488	0.489
255.000	0.491	0.492	0.493	0.494	0.495
270.000	0.496	0.497	0.498	0.500	0.501
285.000	0.502	0.503	0.504	0.505	0.506
300.000	0.507	0.508	0.510	0.511	0.512
315.000	0.513	0.514	0.515	0.516	0.517
330.000	0.518	0.519	0.521	0.522	0.523
345.000	0.524	0.525	0.526	0.527	0.528
360.000	0.529	0.531	0.532	0.533	0.534
375.000	0.535	0.536	0.537	0.538	0.539
390.000	0.540	0.542	0.543	0.544	0.545
405.000	0.546	0.547	0.548	0.549	0.550
420.000	0.551	0.552	0.554	0.555	0.556
435.000	0.557	0.558	0.559	0.560	0.561
450.000	0.562	0.563	0.564	0.566	0.567
465.000	0.568	0.569	0.570	0.571	0.572
480.000	0.573	0.574	0.575	0.576	0.577
495.000	0.578	0.580	0.581	0.582	0.583
510.000	0.584	0.585	0.586	0.587	0.588
525.000	0.589	0.590	0.591	0.592	0.594
540.000	0.595	0.596	0.597	0.598	0.599
555.000	0.600	0.601	0.602	0.603	0.604
570.000	0.605	0.606	0.607	0.608	0.610
585.000	0.611	0.612	0.613	0.614	0.615
600.000	0.616	0.617	0.618	0.619	0.620

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Time vs. Volume

Label: Onsite Detention Basin

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
615.000	0.621	0.622	0.623	0.624	0.625
630.000	0.626	0.628	0.629	0.630	0.631
645.000	0.632	0.633	0.634	0.635	0.636
660.000	0.637	0.638	0.639	0.640	0.641
675.000	0.642	0.643	0.644	0.645	0.646
690.000	0.647	0.649	0.650	0.651	0.652
705.000	0.653	0.654	0.655	0.656	0.657
720.000	0.658	0.659	0.660	0.661	0.662
735.000	0.663	0.664	0.665	0.666	0.667
750.000	0.668	0.669	0.671	0.672	0.673
765.000	0.674	0.675	0.676	0.677	0.678
780.000	0.679	0.680	0.681	0.682	0.683
795.000	0.684	0.685	0.686	0.687	0.688
810.000	0.689	0.690	0.691	0.692	0.693
825.000	0.694	0.695	0.696	0.697	0.698
840.000	0.699	0.700	0.701	0.703	0.704
855.000	0.705	0.706	0.707	0.708	0.709
870.000	0.710	0.711	0.712	0.713	0.714
885.000	0.715	0.716	0.717	0.718	0.719
900.000	0.720	0.721	0.722	0.723	0.724
915.000	0.725	0.726	0.727	0.728	0.729
930.000	0.730	0.731	0.732	0.733	0.734
945.000	0.735	0.736	0.737	0.738	0.739
960.000	0.740	0.741	0.742	0.743	0.744
975.000	0.745	0.746	0.747	0.748	0.749
990.000	0.750	0.751	0.752	0.753	0.754
1,005.000	0.755	0.756	0.757	0.758	0.759
1,020.000	0.760	0.761	0.762	0.763	0.764
1,035.000	0.765	0.766	0.767	0.768	0.769
1,050.000	0.770	0.771	0.772	0.773	0.774
1,065.000	0.775	0.776	0.777	0.778	0.779
1,080.000	0.780	0.781	0.782	0.783	0.784
1,095.000	0.785	0.786	0.787	0.788	0.789
1,110.000	0.790	0.791	0.792	0.793	0.794
1,125.000	0.795	0.796	0.797	0.798	0.799
1,140.000	0.800	0.801	0.802	0.803	0.804
1,155.000	0.805	0.806	0.807	0.808	0.809
1,170.000	0.810	0.811	0.812	0.813	0.813
1,185.000	0.814	0.815	0.816	0.817	0.818
1,200.000	0.819	0.820	0.821	0.822	0.823
1,215.000	0.824	0.825	0.826	0.827	0.828

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Time vs. Volume

Label: Onsite Detention Basin

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,230.000	0.829	0.830	0.831	0.832	0.833
1,245.000	0.833	0.834	0.835	0.836	0.837
1,260.000	0.837	0.838	0.839	0.840	0.840
1,275.000	0.841	0.842	0.842	0.843	0.844
1,290.000	0.844	0.845	0.845	0.846	0.846
1,305.000	0.847	0.847	0.848	0.848	0.849
1,320.000	0.849	0.850	0.850	0.850	0.851
1,335.000	0.851	0.852	0.852	0.852	0.853
1,350.000	0.853	0.853	0.854	0.854	0.854
1,365.000	0.855	0.855	0.855	0.855	0.856
1,380.000	0.856	0.856	0.856	0.857	0.857
1,395.000	0.857	0.857	0.858	0.858	0.858
1,410.000	0.858	0.858	0.859	0.859	0.859
1,425.000	0.859	0.859	0.860	0.860	0.860
1,440.000	0.860	(N/A)	(N/A)	(N/A)	(N/A)

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Pipe Volume

Label: Onsite Detention Basin

Volume Results (Pipe)	
Pipe Storage Upstream Invert	0.20 ft
Pipe Storage Downstream Invert	0.00 ft
Pipe Storage Length	200.00 ft
Pipe Storage Diameter	96.0 in
Pipe Storage Number of Barrels	5
Pipe Storage Slice Width	1.00 ft
Pipe Storage Vertical Increment	0.20 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
0.00	0.00	0.0	0.00	0.00	0.00	0.0	0.000
0.20	0.20	0.3	200.00	0.00	0.00	0.0	0.003
0.40	0.40	0.9	200.00	0.00	0.20	0.3	0.014
0.60	0.60	1.7	200.00	0.00	0.40	0.9	0.030
0.80	0.80	2.6	200.00	0.00	0.60	1.7	0.049
1.00	1.00	3.6	200.00	0.00	0.80	2.6	0.071
1.20	1.20	4.7	200.00	0.00	1.00	3.6	0.096
1.40	1.40	5.9	200.00	0.00	1.20	4.7	0.122
1.60	1.60	7.2	200.00	0.00	1.40	5.9	0.150
1.80	1.80	8.5	200.00	0.00	1.60	7.2	0.179
2.00	2.00	9.8	200.00	0.00	1.80	8.5	0.210
2.20	2.20	11.2	200.00	0.00	2.00	9.8	0.242
2.40	2.40	12.7	200.00	0.00	2.20	11.2	0.274
2.60	2.60	14.2	200.00	0.00	2.40	12.7	0.308
2.80	2.80	15.7	200.00	0.00	2.60	14.2	0.343
3.00	3.00	17.2	200.00	0.00	2.80	15.7	0.378
3.20	3.20	18.8	200.00	0.00	3.00	17.2	0.413
3.40	3.40	20.3	200.00	0.00	3.20	18.8	0.449
3.60	3.60	21.9	200.00	0.00	3.40	20.4	0.485
3.80	3.80	23.5	200.00	0.00	3.60	21.9	0.522
4.00	4.00	25.1	200.00	0.00	3.80	23.5	0.559
4.20	4.20	26.7	200.00	0.00	4.00	25.1	0.595
4.40	4.40	28.3	200.00	0.00	4.20	26.7	0.632
4.60	4.60	29.9	200.00	0.00	4.40	28.3	0.669
4.80	4.80	31.5	200.00	0.00	4.60	29.9	0.705
5.00	5.00	33.0	200.00	0.00	4.80	31.5	0.741
5.20	5.20	34.6	200.00	0.00	5.00	33.0	0.776
5.40	5.40	36.1	200.00	0.00	5.20	34.6	0.811
5.60	5.60	37.6	200.00	0.00	5.40	36.1	0.846
5.80	5.80	39.0	200.00	0.00	5.60	37.6	0.879
6.00	6.00	40.4	200.00	0.00	5.80	39.0	0.912

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Pipe Volume

Label: Onsite Detention Basin

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
6.20	6.20	41.8	200.00	0.00	6.00	40.4	0.944
6.40	6.40	43.1	200.00	0.00	6.20	41.8	0.975
6.60	6.60	44.4	200.00	0.00	6.40	43.1	1.004
6.80	6.80	45.5	200.00	0.00	6.60	44.4	1.032
7.00	7.00	46.6	200.00	0.00	6.80	45.5	1.058
7.20	7.20	47.6	200.00	0.00	7.00	46.6	1.082
7.40	7.40	48.5	200.00	0.00	7.20	47.6	1.104
7.60	7.60	49.3	200.00	0.00	7.40	48.6	1.124
7.80	7.80	49.9	200.00	0.00	7.60	49.3	1.140
8.00	8.00	50.3	200.00	0.00	7.80	49.9	1.151
8.20	8.00	50.3	200.00	200.00	8.00	50.3	1.154

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Outlet Input Data

Label: Composite Outlet Structure - 1

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	8.20 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Stand Pipe	Riser - 1	Forward	TW	7.00	8.20
Orifice-Circular	Orifice - 1	Forward	TW	0.00	8.20
Rectangular Weir	Notch Weir	Forward	TW	5.50	8.20
Tailwater Settings	Tailwater			(N/A)	(N/A)

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Outlet Input Data

Label: Composite Outlet Structure - 1

Structure ID: Orifice - 1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.00 ft
Orifice Diameter	1.8 in
Orifice Coefficient	0.600

Structure ID: Notch Weir Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	5.50 ft
Weir Length	0.50 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: Riser - 1 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	0.00 ft
Diameter	54.0 in
Orifice Area	15.9 ft²
Orifice Coefficient	0.600
Weir Length	14.14 ft
Weir Coefficient	3.00 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Outlet Input Data

Label: Composite Outlet Structure - 1

Convergence Tolerances	
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = ()

Upstream ID =
Downstream ID =

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
Contributing Structures			

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = ()

Upstream ID =
Downstream ID =

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
Contributing Structures			

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = ()

Upstream ID =
Downstream ID =

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
Contributing Structures			

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Composite Rating Curve

Label: Composite Outlet Structure - 1

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
0.00	0.00	(N/A)	0.00
0.50	0.05	(N/A)	0.00
1.00	0.08	(N/A)	0.00
1.50	0.10	(N/A)	0.00
2.00	0.11	(N/A)	0.00
2.50	0.13	(N/A)	0.00
3.00	0.14	(N/A)	0.00
3.50	0.15	(N/A)	0.00
4.00	0.16	(N/A)	0.00
4.50	0.17	(N/A)	0.00
5.00	0.18	(N/A)	0.00
5.50	0.19	(N/A)	0.00
6.00	0.73	(N/A)	0.00
6.50	1.70	(N/A)	0.00
7.00	205.49	(N/A)	0.00
7.50	214.10	(N/A)	0.00
8.00	222.67	(N/A)	0.00
8.20	226.08	(N/A)	0.00

Contributing Structures
None Contributing
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Label: Onsite Detention Basin

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	3.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
0.00	0.00	0.000	0	0.00	0.00	0.00
0.50	0.05	0.022	0	0.00	0.05	10.80
1.00	0.08	0.071	0	0.00	0.08	34.67
1.50	0.10	0.136	0	0.00	0.10	65.87
2.00	0.11	0.210	0	0.00	0.11	101.69
2.50	0.13	0.291	0	0.00	0.13	141.11
3.00	0.14	0.378	0	0.00	0.14	182.87
3.50	0.15	0.467	0	0.00	0.15	226.29
4.00	0.16	0.559	0	0.00	0.16	270.53
4.50	0.17	0.650	0	0.00	0.17	314.90
5.00	0.18	0.741	0	0.00	0.18	358.74
5.50	0.19	0.829	0	0.00	0.19	401.24
6.00	0.73	0.912	0	0.00	0.73	442.26
6.50	1.70	0.989	0	0.00	1.70	480.58
7.00	205.49	1.058	0	0.00	205.49	717.66
7.50	214.10	1.114	0	0.00	214.10	753.33
8.00	222.67	1.151	0	0.00	222.67	779.68
8.20	226.08	1.154	0	0.00	226.08	784.58

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Level Pool Pond Routing Summary

Label: Onsite Detention Basin (IN)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	3.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	9.80 ft³/s	Time to Peak (Flow, In)	51.000 min
Flow (Peak Outlet)	0.39 ft³/s	Time to Peak (Flow, Outlet)	1,440.000 min

Elevation (Water Surface, Peak)	5.68 ft
Volume (Peak)	0.860 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	1.226 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	0.367 ac-ft
Volume (Retained)	0.858 ac-ft
Volume (Unrouted)	-0.001 ac-ft
Error (Mass Balance)	0.1 %

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Pond Routed Hydrograph (total out)

Label: Onsite Detention Basin (OUT)

Peak Discharge	0.39 ft³/s
Time to Peak	1,440.000 min
Hydrograph Volume	0.367 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	0.01	0.03	0.05	0.06
15.000	0.06	0.07	0.08	0.08	0.09
30.000	0.09	0.10	0.10	0.10	0.11
45.000	0.12	0.12	0.13	0.13	0.14
60.000	0.14	0.14	0.14	0.14	0.14
75.000	0.14	0.15	0.15	0.15	0.15
90.000	0.15	0.15	0.15	0.15	0.15
105.000	0.15	0.15	0.15	0.15	0.15
120.000	0.15	0.15	0.15	0.15	0.15
135.000	0.15	0.15	0.15	0.15	0.15
150.000	0.15	0.15	0.15	0.15	0.15
165.000	0.15	0.15	0.15	0.15	0.15
180.000	0.15	0.15	0.15	0.15	0.15
195.000	0.15	0.15	0.15	0.15	0.15
210.000	0.15	0.15	0.15	0.15	0.15
225.000	0.15	0.15	0.15	0.15	0.15
240.000	0.15	0.15	0.15	0.15	0.15
255.000	0.15	0.15	0.15	0.15	0.15
270.000	0.15	0.15	0.15	0.15	0.15
285.000	0.15	0.15	0.15	0.15	0.15
300.000	0.15	0.15	0.15	0.15	0.15
315.000	0.15	0.15	0.15	0.15	0.15
330.000	0.15	0.15	0.15	0.16	0.16
345.000	0.16	0.16	0.16	0.16	0.16
360.000	0.16	0.16	0.16	0.16	0.16
375.000	0.16	0.16	0.16	0.16	0.16
390.000	0.16	0.16	0.16	0.16	0.16
405.000	0.16	0.16	0.16	0.16	0.16
420.000	0.16	0.16	0.16	0.16	0.16
435.000	0.16	0.16	0.16	0.16	0.16
450.000	0.16	0.16	0.16	0.16	0.16
465.000	0.16	0.16	0.16	0.16	0.16
480.000	0.16	0.16	0.16	0.16	0.16
495.000	0.16	0.16	0.16	0.16	0.16
510.000	0.16	0.16	0.16	0.16	0.16
525.000	0.16	0.16	0.16	0.16	0.16
540.000	0.16	0.16	0.16	0.16	0.16

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Pond Routed Hydrograph (total out)

Label: Onsite Detention Basin (OUT)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
555.000	0.16	0.16	0.16	0.16	0.16
570.000	0.16	0.16	0.16	0.16	0.16
585.000	0.16	0.17	0.17	0.17	0.17
600.000	0.17	0.17	0.17	0.17	0.17
615.000	0.17	0.17	0.17	0.17	0.17
630.000	0.17	0.17	0.17	0.17	0.17
645.000	0.17	0.17	0.17	0.17	0.17
660.000	0.17	0.17	0.17	0.17	0.17
675.000	0.17	0.17	0.17	0.17	0.17
690.000	0.17	0.17	0.17	0.17	0.17
705.000	0.17	0.17	0.17	0.17	0.17
720.000	0.17	0.17	0.17	0.17	0.17
735.000	0.17	0.17	0.17	0.17	0.17
750.000	0.17	0.17	0.17	0.17	0.17
765.000	0.17	0.17	0.17	0.17	0.17
780.000	0.17	0.17	0.17	0.17	0.17
795.000	0.17	0.17	0.17	0.17	0.17
810.000	0.17	0.17	0.17	0.17	0.17
825.000	0.17	0.17	0.17	0.17	0.17
840.000	0.17	0.17	0.17	0.17	0.17
855.000	0.17	0.17	0.17	0.18	0.18
870.000	0.18	0.18	0.18	0.18	0.18
885.000	0.18	0.18	0.18	0.18	0.18
900.000	0.18	0.18	0.18	0.18	0.18
915.000	0.18	0.18	0.18	0.18	0.18
930.000	0.18	0.18	0.18	0.18	0.18
945.000	0.18	0.18	0.18	0.18	0.18
960.000	0.18	0.18	0.18	0.18	0.18
975.000	0.18	0.18	0.18	0.18	0.18
990.000	0.18	0.18	0.18	0.18	0.18
1,005.000	0.18	0.18	0.18	0.18	0.18
1,020.000	0.18	0.18	0.18	0.18	0.18
1,035.000	0.18	0.18	0.18	0.18	0.18
1,050.000	0.18	0.18	0.18	0.18	0.18
1,065.000	0.18	0.18	0.18	0.18	0.18
1,080.000	0.18	0.18	0.18	0.18	0.18
1,095.000	0.18	0.18	0.18	0.18	0.18
1,110.000	0.18	0.18	0.18	0.18	0.18
1,125.000	0.18	0.18	0.18	0.18	0.18
1,140.000	0.18	0.18	0.18	0.18	0.18
1,155.000	0.18	0.18	0.19	0.19	0.19
1,170.000	0.19	0.19	0.19	0.19	0.19

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Pond Routed Hydrograph (total out)

Label: Onsite Detention Basin (OUT)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,185.000	0.19	0.19	0.19	0.19	0.19
1,200.000	0.19	0.19	0.19	0.19	0.19
1,215.000	0.19	0.19	0.19	0.19	0.19
1,230.000	0.19	0.19	0.20	0.21	0.21
1,245.000	0.22	0.22	0.23	0.23	0.24
1,260.000	0.24	0.25	0.25	0.26	0.26
1,275.000	0.27	0.27	0.27	0.28	0.28
1,290.000	0.28	0.29	0.29	0.30	0.30
1,305.000	0.30	0.30	0.31	0.31	0.31
1,320.000	0.32	0.32	0.32	0.32	0.33
1,335.000	0.33	0.33	0.33	0.34	0.34
1,350.000	0.34	0.34	0.35	0.35	0.35
1,365.000	0.35	0.35	0.36	0.36	0.36
1,380.000	0.36	0.36	0.36	0.36	0.37
1,395.000	0.37	0.37	0.37	0.37	0.37
1,410.000	0.37	0.38	0.38	0.38	0.38
1,425.000	0.38	0.38	0.38	0.38	0.38
1,440.000	0.39	(N/A)	(N/A)	(N/A)	(N/A)

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Pond Inflow Summary

Label: Onsite Detention Basin (IN)

Summary for Hydrograph Addition at 'Onsite Detention Basin'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Unit Hydrograph (Onsite Runoff)

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Unit Hydrograph (Onsite Runoff)	0.459	50.000	10.48
Flow (In)	Onsite Detention Basin	1.226	51.000	9.80

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Diverted Hydrograph

Label: Outlet-1

Peak Discharge	0.39 ft³/s
Time to Peak	1,440.000 min
Hydrograph Volume	0.367 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	0.01	0.03	0.05	0.06
15.000	0.06	0.07	0.08	0.08	0.09
30.000	0.09	0.10	0.10	0.10	0.11
45.000	0.12	0.12	0.13	0.13	0.14
60.000	0.14	0.14	0.14	0.14	0.14
75.000	0.14	0.15	0.15	0.15	0.15
90.000	0.15	0.15	0.15	0.15	0.15
105.000	0.15	0.15	0.15	0.15	0.15
120.000	0.15	0.15	0.15	0.15	0.15
135.000	0.15	0.15	0.15	0.15	0.15
150.000	0.15	0.15	0.15	0.15	0.15
165.000	0.15	0.15	0.15	0.15	0.15
180.000	0.15	0.15	0.15	0.15	0.15
195.000	0.15	0.15	0.15	0.15	0.15
210.000	0.15	0.15	0.15	0.15	0.15
225.000	0.15	0.15	0.15	0.15	0.15
240.000	0.15	0.15	0.15	0.15	0.15
255.000	0.15	0.15	0.15	0.15	0.15
270.000	0.15	0.15	0.15	0.15	0.15
285.000	0.15	0.15	0.15	0.15	0.15
300.000	0.15	0.15	0.15	0.15	0.15
315.000	0.15	0.15	0.15	0.15	0.15
330.000	0.15	0.15	0.15	0.16	0.16
345.000	0.16	0.16	0.16	0.16	0.16
360.000	0.16	0.16	0.16	0.16	0.16
375.000	0.16	0.16	0.16	0.16	0.16
390.000	0.16	0.16	0.16	0.16	0.16
405.000	0.16	0.16	0.16	0.16	0.16
420.000	0.16	0.16	0.16	0.16	0.16
435.000	0.16	0.16	0.16	0.16	0.16
450.000	0.16	0.16	0.16	0.16	0.16
465.000	0.16	0.16	0.16	0.16	0.16
480.000	0.16	0.16	0.16	0.16	0.16
495.000	0.16	0.16	0.16	0.16	0.16
510.000	0.16	0.16	0.16	0.16	0.16
525.000	0.16	0.16	0.16	0.16	0.16
540.000	0.16	0.16	0.16	0.16	0.16

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Diverted Hydrograph

Label: Outlet-1

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
555.000	0.16	0.16	0.16	0.16	0.16
570.000	0.16	0.16	0.16	0.16	0.16
585.000	0.16	0.17	0.17	0.17	0.17
600.000	0.17	0.17	0.17	0.17	0.17
615.000	0.17	0.17	0.17	0.17	0.17
630.000	0.17	0.17	0.17	0.17	0.17
645.000	0.17	0.17	0.17	0.17	0.17
660.000	0.17	0.17	0.17	0.17	0.17
675.000	0.17	0.17	0.17	0.17	0.17
690.000	0.17	0.17	0.17	0.17	0.17
705.000	0.17	0.17	0.17	0.17	0.17
720.000	0.17	0.17	0.17	0.17	0.17
735.000	0.17	0.17	0.17	0.17	0.17
750.000	0.17	0.17	0.17	0.17	0.17
765.000	0.17	0.17	0.17	0.17	0.17
780.000	0.17	0.17	0.17	0.17	0.17
795.000	0.17	0.17	0.17	0.17	0.17
810.000	0.17	0.17	0.17	0.17	0.17
825.000	0.17	0.17	0.17	0.17	0.17
840.000	0.17	0.17	0.17	0.17	0.17
855.000	0.17	0.17	0.17	0.18	0.18
870.000	0.18	0.18	0.18	0.18	0.18
885.000	0.18	0.18	0.18	0.18	0.18
900.000	0.18	0.18	0.18	0.18	0.18
915.000	0.18	0.18	0.18	0.18	0.18
930.000	0.18	0.18	0.18	0.18	0.18
945.000	0.18	0.18	0.18	0.18	0.18
960.000	0.18	0.18	0.18	0.18	0.18
975.000	0.18	0.18	0.18	0.18	0.18
990.000	0.18	0.18	0.18	0.18	0.18
1,005.000	0.18	0.18	0.18	0.18	0.18
1,020.000	0.18	0.18	0.18	0.18	0.18
1,035.000	0.18	0.18	0.18	0.18	0.18
1,050.000	0.18	0.18	0.18	0.18	0.18
1,065.000	0.18	0.18	0.18	0.18	0.18
1,080.000	0.18	0.18	0.18	0.18	0.18
1,095.000	0.18	0.18	0.18	0.18	0.18
1,110.000	0.18	0.18	0.18	0.18	0.18
1,125.000	0.18	0.18	0.18	0.18	0.18
1,140.000	0.18	0.18	0.18	0.18	0.18
1,155.000	0.18	0.18	0.19	0.19	0.19
1,170.000	0.19	0.19	0.19	0.19	0.19

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Subsection: Diverted Hydrograph

Label: Outlet-1

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,185.000	0.19	0.19	0.19	0.19	0.19
1,200.000	0.19	0.19	0.19	0.19	0.19
1,215.000	0.19	0.19	0.19	0.19	0.19
1,230.000	0.19	0.19	0.20	0.21	0.21
1,245.000	0.22	0.22	0.23	0.23	0.24
1,260.000	0.24	0.25	0.25	0.26	0.26
1,275.000	0.27	0.27	0.27	0.28	0.28
1,290.000	0.28	0.29	0.29	0.30	0.30
1,305.000	0.30	0.30	0.31	0.31	0.31
1,320.000	0.32	0.32	0.32	0.32	0.33
1,335.000	0.33	0.33	0.33	0.34	0.34
1,350.000	0.34	0.34	0.35	0.35	0.35
1,365.000	0.35	0.35	0.36	0.36	0.36
1,380.000	0.36	0.36	0.36	0.36	0.37
1,395.000	0.37	0.37	0.37	0.37	0.37
1,410.000	0.37	0.38	0.38	0.38	0.38
1,425.000	0.38	0.38	0.38	0.38	0.38
1,440.000	0.39	(N/A)	(N/A)	(N/A)	(N/A)

UHS Rancho Springs 10-yr, 1 hr Detention Analysis

Index

C

Composite Outlet Structure - 1 (Composite Rating Curve)...20

Composite Outlet Structure - 1 (Individual Outlet Curves)...17, 18, 19

Composite Outlet Structure - 1 (Outlet Input Data)...14, 15, 16

M

Master Network Summary...3

O

Onsite Detention Basin (Elevation-Volume-Flow Table (Pond))...21

Onsite Detention Basin (IN) (Level Pool Pond Routing Summary)...22

Onsite Detention Basin (IN) (Pond Inflow Summary)...26

Onsite Detention Basin (OUT) (Pond Routed Hydrograph (total out))...23, 24, 25

Onsite Detention Basin (OUT) (Time vs. Elevation)...6, 7, 8

Onsite Detention Basin (Pipe Volume)...12, 13

Onsite Detention Basin (Time vs. Volume)...9, 10, 11

Outfall (POC) (Addition Summary)...5

Outlet-1 (Diverted Hydrograph)...27, 28, 29

U

Unit Hydrograph (Onsite Runoff) (Read Hydrograph)...4

User Notifications...2

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

             F L O O D    R O U T I N G    A N A L Y S I S

ACCORDING TO RIVERSIDE COUNTY FLOOD CONTORL AND WATER CONSERVATION DISTRICT
                    (RCFC&WCD) 1978 HYDROLOGY MANUAL
         (c) Copyright 1989-2011 Advanced Engineering Software (aes)
                 (Synthetic Unit Hydrograph Version 18.0)
                 Release Date: 05/01/2011  License ID 1499

                           Analysis prepared by:

                      Kimley-Horn and Associates, Inc.
                             765 The City Drive
                                 Suite 200
                              Orange, CA 92868

 ************************* DESCRIPTION OF STUDY *************************
* UHS Rancho Springs Unit Hydrograph                                    *
* Proposed Conditions, 100-yr, 24-hr                                    *
*                                                                       *
 *************************************************************************

  FILE NAME: RS_UNIT.DAT
  TIME/DATE OF STUDY: 12:57 05/12/2020


**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =       5.900 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
  Warning: Watershed Area is less than 10 acres
         *USER ENTERED "LAG" TIME =    0.100 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         VALLEY S-GRAPH SELECTED
         UNIFORM MEAN SOIL-LOSS(INCH/HOUR) =  0.050
         LOW SOIL-LOSS RATE PERCENT(DECIMAL) = 0.500
         MINIMUM SOIL-LOSS RATE(INCH/HOUR) =   0.010
         USER-ENTERED RAINFALL =  6.90 INCHES
         RCFC&WCD 24-Hour Storm (15-Minute period) SELECTED
         *USER SPECIFIED PRECIPITATION DEPTH-AREA ADJUSTMENT FACTOR = 0.9990


         UNIT HYDROGRAPH TIME UNIT =  15.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME = 250.000



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	50.817	12.086
2	90.903	9.534
3	97.798	1.640
4	99.444	0.392
5	99.778	0.079
6	99.944	0.040
7	100.000	0.013

↟

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0138	0.0069	0.0069
2	0.0207	0.0103	0.0103
3	0.0207	0.0103	0.0103
4	0.0276	0.0138	0.0138
5	0.0207	0.0103	0.0103
6	0.0207	0.0103	0.0103
7	0.0207	0.0103	0.0103
8	0.0276	0.0138	0.0138
9	0.0276	0.0138	0.0138
10	0.0276	0.0138	0.0138
11	0.0345	0.0172	0.0172
12	0.0345	0.0172	0.0172
13	0.0345	0.0172	0.0172
14	0.0345	0.0172	0.0172
15	0.0345	0.0172	0.0172
16	0.0414	0.0207	0.0207
17	0.0414	0.0207	0.0207
18	0.0483	0.0212	0.0271
19	0.0483	0.0208	0.0274
20	0.0551	0.0205	0.0347
21	0.0414	0.0201	0.0213
22	0.0483	0.0197	0.0285
23	0.0551	0.0194	0.0358
24	0.0551	0.0190	0.0361
25	0.0620	0.0187	0.0434
26	0.0620	0.0183	0.0437
27	0.0689	0.0180	0.0510
28	0.0689	0.0176	0.0513
29	0.0689	0.0173	0.0516
30	0.0758	0.0169	0.0589
31	0.0827	0.0166	0.0661
32	0.0896	0.0163	0.0733
33	0.1034	0.0159	0.0874
34	0.1034	0.0156	0.0878
35	0.1103	0.0153	0.0950
36	0.1172	0.0150	0.1022
37	0.1310	0.0147	0.1163
38	0.1379	0.0143	0.1235
39	0.1448	0.0140	0.1307
40	0.1516	0.0137	0.1379
41	0.1034	0.0134	0.0900
42	0.1034	0.0131	0.0903
43	0.1379	0.0128	0.1250
44	0.1379	0.0125	0.1253
45	0.1310	0.0122	0.1187
46	0.1310	0.0119	0.1190
47	0.1172	0.0116	0.1055

48	0.1241	0.0114	0.1127
49	0.1723	0.0111	0.1613
50	0.1792	0.0108	0.1684
51	0.1930	0.0105	0.1825
52	0.1999	0.0103	0.1896
53	0.2344	0.0100	0.2244
54	0.2344	0.0097	0.2246
55	0.1585	0.0095	0.1491
56	0.1585	0.0092	0.1493
57	0.1861	0.0089	0.1772
58	0.1792	0.0087	0.1705
59	0.1792	0.0084	0.1708
60	0.1723	0.0082	0.1641
61	0.1654	0.0080	0.1575
62	0.1585	0.0077	0.1508
63	0.1310	0.0075	0.1235
64	0.1310	0.0073	0.1237
65	0.0276	0.0070	0.0205
66	0.0276	0.0068	0.0208
67	0.0207	0.0066	0.0141
68	0.0207	0.0064	0.0143
69	0.0345	0.0062	0.0283
70	0.0345	0.0060	0.0285
71	0.0345	0.0058	0.0287
72	0.0276	0.0056	0.0220
73	0.0276	0.0054	0.0222
74	0.0276	0.0052	0.0224
75	0.0207	0.0050	0.0157
76	0.0138	0.0048	0.0090
77	0.0207	0.0047	0.0160
78	0.0276	0.0045	0.0231
79	0.0207	0.0043	0.0164
80	0.0138	0.0042	0.0096
81	0.0207	0.0040	0.0167
82	0.0207	0.0039	0.0168
83	0.0207	0.0037	0.0170
84	0.0138	0.0036	0.0102
85	0.0207	0.0035	0.0172
86	0.0138	0.0033	0.0105
87	0.0207	0.0032	0.0175
88	0.0138	0.0031	0.0107
89	0.0207	0.0030	0.0177
90	0.0138	0.0029	0.0109
91	0.0138	0.0028	0.0110
92	0.0138	0.0027	0.0111
93	0.0138	0.0027	0.0111
94	0.0138	0.0026	0.0112
95	0.0138	0.0025	0.0112
96	0.0138	0.0025	0.0113

TOTAL STORM RAINFALL(INCHES) = 6.89
TOTAL SOIL-LOSS(INCHES) = 1.02
TOTAL EFFECTIVE RAINFALL(INCHES) = 5.87

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.5031
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 2.8845

♠

==========

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

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

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	2.5	5.0	7.5	10.0
0.083	0.0006	0.08	Q	.	.	.	.
0.167	0.0011	0.08	Q	.	.	.	.
0.250	0.0017	0.08	Q	.	.	.	.
0.333	0.0030	0.19	Q	.	.	.	.
0.417	0.0043	0.19	Q	.	.	.	.
0.500	0.0057	0.19	Q	.	.	.	.
0.583	0.0073	0.23	Q	.	.	.	.
0.667	0.0089	0.23	Q	.	.	.	.
0.750	0.0105	0.23	Q	.	.	.	.
0.833	0.0125	0.28	VQ	.	.	.	.
0.917	0.0144	0.28	VQ	.	.	.	.
1.000	0.0164	0.28	VQ	.	.	.	.
1.083	0.0183	0.28	VQ	.	.	.	.
1.167	0.0202	0.28	VQ	.	.	.	.
1.250	0.0221	0.28	VQ	.	.	.	.
1.333	0.0239	0.25	VQ	.	.	.	.
1.417	0.0256	0.25	VQ	.	.	.	.
1.500	0.0273	0.25	VQ	.	.	.	.
1.583	0.0290	0.25	Q	.	.	.	.
1.667	0.0307	0.25	Q	.	.	.	.
1.750	0.0324	0.25	Q	.	.	.	.
1.833	0.0344	0.29	VQ	.	.	.	.
1.917	0.0364	0.29	VQ	.	.	.	.
2.000	0.0384	0.29	VQ	.	.	.	.
2.083	0.0406	0.32	VQ	.	.	.	.
2.167	0.0428	0.32	VQ	.	.	.	.
2.250	0.0450	0.32	VQ	.	.	.	.
2.333	0.0473	0.33	VQ	.	.	.	.
2.417	0.0495	0.33	VQ	.	.	.	.
2.500	0.0518	0.33	VQ	.	.	.	.
2.583	0.0543	0.37	VQ	.	.	.	.
2.667	0.0568	0.37	VQ	.	.	.	.
2.750	0.0594	0.37	VQ	.	.	.	.
2.833	0.0621	0.40	VQ	.	.	.	.
2.917	0.0649	0.40	VQ	.	.	.	.
3.000	0.0677	0.40	VQ	.	.	.	.
3.083	0.0705	0.41	VQ	.	.	.	.
3.167	0.0733	0.41	Q	.	.	.	.
3.250	0.0761	0.41	Q	.	.	.	.
3.333	0.0789	0.41	.Q	.	.	.	.
3.417	0.0818	0.41	.Q	.	.	.	.
3.500	0.0846	0.41	.Q	.	.	.	.
3.583	0.0874	0.41	.Q	.	.	.	.
3.667	0.0902	0.41	.Q	.	.	.	.
3.750	0.0930	0.41	.Q	.	.	.	.
3.833	0.0962	0.45	.Q	.	.	.	.
3.917	0.0993	0.45	.Q	.	.	.	.
4.000	0.1024	0.45	.Q	.	.	.	.
4.083	0.1057	0.48	.Q	.	.	.	.
4.167	0.1090	0.48	.Q	.	.	.	.
4.250	0.1124	0.48	.Q	.	.	.	.
4.333	0.1163	0.57	.VQ	.	.	.	.
4.417	0.1202	0.57	.VQ	.	.	.	.
4.500	0.1241	0.57	.VQ	.	.	.	.
4.583	0.1285	0.63	.VQ	.	.	.	.
4.667	0.1328	0.63	.VQ	.	.	.	.

```
4.750      0.1372      0.63  .VQ       .         .         .         .
4.833      0.1423      0.74  .VQ       .         .         .         .
4.917      0.1473      0.74  . Q       .         .         .         .
5.000      0.1524      0.74  . Q       .         .         .         .
5.083      0.1569      0.65  . Q       .         .         .         .
5.167      0.1613      0.65  . Q       .         .         .         .
5.250      0.1658      0.65  . Q       .         .         .         .
5.333      0.1700      0.62  . Q       .         .         .         .
5.417      0.1743      0.62  . Q       .         .         .         .
5.500      0.1785      0.62  . Q       .         .         .         .
5.583      0.1837      0.76  . VQ      .         .         .         .
5.667      0.1889      0.76  . VQ      .         .         .         .
5.750      0.1942      0.76  . VQ      .         .         .         .
5.833      0.1999      0.84  . VQ      .         .         .         .
5.917      0.2057      0.84  . VQ      .         .         .         .
6.000      0.2114      0.84  . VQ      .         .         .         .
6.083      0.2179      0.94  .  Q      .         .         .         .
6.167      0.2244      0.94  .  Q      .         .         .         .
6.250      0.2309      0.94  .  Q      .         .         .         .
6.333      0.2379      1.02  .  VQ     .         .         .         .
6.417      0.2449      1.02  .  VQ     .         .         .         .
6.500      0.2520      1.02  .  VQ     .         .         .         .
6.583      0.2597      1.12  .  VQ     .         .         .         .
6.667      0.2674      1.12  .  VQ     .         .         .         .
6.750      0.2751      1.12  .  VQ     .         .         .         .
6.833      0.2834      1.20  .  VQ     .         .         .         .
6.917      0.2917      1.20  .   Q     .         .         .         .
7.000      0.2999      1.20  .   Q     .         .         .         .
7.083      0.3083      1.22  .   Q     .         .         .         .
7.167      0.3167      1.22  .   Q     .         .         .         .
7.250      0.3251      1.22  .   Q     .         .         .         .
7.333      0.3342      1.31  .   VQ    .         .         .         .
7.417      0.3432      1.31  .   VQ    .         .         .         .
7.500      0.3523      1.31  .   VQ    .         .         .         .
7.583      0.3624      1.47  .    Q    .         .         .         .
7.667      0.3725      1.47  .    Q    .         .         .         .
7.750      0.3827      1.47  .    Q    .         .         .         .
7.833      0.3940      1.64  .    VQ   .         .         .         .
7.917      0.4053      1.64  .    VQ   .         .         .         .
8.000      0.4166      1.64  .    VQ   .         .         .         .
8.083      0.4296      1.89  .    V Q  .         .         .         .
8.167      0.4426      1.89  .     VQ  .         .         .         .
8.250      0.4557      1.89  .     VQ  .         .         .         .
8.333      0.4698      2.05  .     V Q .         .         .         .
8.417      0.4839      2.05  .     V Q .         .         .         .
8.500      0.4980      2.05  .     V Q .         .         .         .
8.583      0.5129      2.17  .      VQ .         .         .         .
8.667      0.5278      2.17  .      VQ .         .         .         .
8.750      0.5427      2.17  .      VQ .         .         .         .
8.833      0.5588      2.33  .      V Q.         .         .         .
8.917      0.5748      2.33  .      V Q.         .         .         .
9.000      0.5909      2.33  .       VQ.         .         .         .
9.083      0.6086      2.58  .       V Q         .         .         .
9.167      0.6264      2.58  .       V Q         .         .         .
9.250      0.6442      2.58  .       V Q         .         .         .
9.333      0.6636      2.82  .        V.Q        .         .         .
9.417      0.6830      2.82  .        V.Q        .         .         .
9.500      0.7024      2.82  .        V.Q        .         .         .
9.583      0.7231      3.00  .         V Q       .         .         .
9.667      0.7437      3.00  .         V Q       .         .         .
9.750      0.7644      3.00  .         V Q       .         .         .
9.833      0.7863      3.17  .         V Q       .         .         .
9.917      0.8081      3.17  .          VQ       .         .         .
```

```
10.000      0.8300      3.17  .          VQ       .         .         .
10.083      0.8484      2.68  .         QV        .         .         .
10.167      0.8669      2.68  .         Q V       .         .         .
10.250      0.8854      2.68  .         Q V       .         .         .
10.333      0.9008      2.24  .       Q . V       .         .         .
10.417      0.9162      2.24  .       Q . V       .         .         .
10.500      0.9317      2.24  .       Q . V       .         .         .
10.583      0.9495      2.59  .         Q  V      .         .         .
10.667      0.9674      2.59  .         Q  V      .         .         .
10.750      0.9852      2.59  .         Q  V      .         .         .
10.833      1.0052      2.91  .         .Q V      .         .         .
10.917      1.0253      2.91  .         .Q  V     .         .         .
11.000      1.0453      2.91  .         .Q  V     .         .         .
11.083      1.0652      2.89  .         .Q  V     .         .         .
11.167      1.0850      2.89  .         .Q   V    .         .         .
11.250      1.1049      2.89  .         .Q   V    .         .         .
11.333      1.1245      2.84  .         .Q   V    .         .         .
11.417      1.1440      2.84  .         .Q   V    .         .         .
11.500      1.1635      2.84  .         .Q    V   .         .         .
11.583      1.1819      2.67  .         Q     V   .         .         .
11.667      1.2003      2.67  .         Q     V   .         .         .
11.750      1.2187      2.67  .         Q     V   .         .         .
11.833      1.2368      2.63  .         Q      V  .         .         .
11.917      1.2549      2.63  .         Q      V  .         .         .
12.000      1.2730      2.63  .         Q      V  .         .         .
12.083      1.2954      3.26  .         .  Q   V  .         .         .
12.167      1.3178      3.26  .         .  Q    V .         .         .
12.250      1.3403      3.26  .         .  Q    V .         .         .
12.333      1.3666      3.82  .         .    Q  V .         .         .
12.417      1.3928      3.82  .         .    Q   V.         .         .
12.500      1.4191      3.82  .         .    Q   V.         .         .
12.583      1.4476      4.13  .         .     Q   V         .         .
12.667      1.4761      4.13  .         .     Q   V         .         .
12.750      1.5045      4.13  .         .     Q   V         .         .
12.833      1.5348      4.39  .         .      Q  .V        .         .
12.917      1.5650      4.39  .         .      Q  .V        .         .
13.000      1.5952      4.39  .         .      Q  . V       .         .
13.083      1.6289      4.90  .         .        Q. V       .         .
13.167      1.6627      4.90  .         .        Q.  V      .         .
13.250      1.6965      4.90  .         .        Q.  V      .         .
13.333      1.7327      5.26  .         .         .Q  V     .         .
13.417      1.7689      5.26  .         .         .Q  V     .         .
13.500      1.8051      5.26  .         .         .Q   V    .         .
13.583      1.8355      4.41  .         .      Q  .    V    .         .
13.667      1.8659      4.41  .         .      Q  .    V    .         .
13.750      1.8962      4.41  .         .      Q  .     V   .         .
13.833      1.9218      3.71  .         .   Q     .     V   .         .
13.917      1.9473      3.71  .         .   Q     .      V  .         .
14.000      1.9728      3.71  .         .   Q     .      V  .         .
14.083      1.9999      3.93  .         .    Q    .      V  .         .
14.167      2.0269      3.93  .         .    Q    .       V .         .
14.250      2.0539      3.93  .         .    Q    .       V .         .
14.333      2.0820      4.08  .         .     Q   .       V .         .
14.417      2.1102      4.08  .         .     Q   .        V.         .
14.500      2.1383      4.08  .         .     Q   .        V.         .
14.583      2.1663      4.06  .         .     Q   .         V         .
14.667      2.1942      4.06  .         .     Q   .         V         .
14.750      2.2222      4.06  .         .     Q   .         V         .
14.833      2.2496      3.98  .         .    Q    .         .V        .
14.917      2.2771      3.98  .         .    Q    .         .V        .
15.000      2.3045      3.98  .         .    Q    .         .V        .
15.083      2.3309      3.84  .         .    Q    .         . V       .
15.167      2.3573      3.84  .         .    Q    .         . V       .
```

| | | |

20.500	2.7918	0.39	.Q	.	.	.	V .
20.583	2.7945	0.40	.Q	.	.	.	V .
20.667	2.7973	0.40	.Q	.	.	.	V .
20.750	2.8000	0.40	.Q	.	.	.	V .
20.833	2.8022	0.32	.Q	.	.	.	V .
20.917	2.8045	0.32	.Q	.	.	.	V .
21.000	2.8067	0.32	.Q	.	.	.	V .
21.083	2.8090	0.34	.Q	.	.	.	V .
21.167	2.8114	0.34	.Q	.	.	.	V .
21.250	2.8137	0.34	.Q	.	.	.	V.
21.333	2.8159	0.32	.Q	.	.	.	V.
21.417	2.8181	0.32	.Q	.	.	.	V.
21.500	2.8203	0.32	.Q	.	.	.	V.
21.583	2.8226	0.35	.Q	.	.	.	V.
21.667	2.8250	0.35	.Q	.	.	.	V.
21.750	2.8274	0.35	.Q	.	.	.	V.
21.833	2.8296	0.32	.Q	.	.	.	V.
21.917	2.8318	0.32	.Q	.	.	.	V.
22.000	2.8340	0.32	.Q	.	.	.	V.
22.083	2.8364	0.35	.Q	.	.	.	V.
22.167	2.8389	0.35	.Q	.	.	.	V.
22.250	2.8413	0.35	.Q	.	.	.	V.
22.333	2.8435	0.33	.Q	.	.	.	V.
22.417	2.8458	0.33	.Q	.	.	.	V.
22.500	2.8480	0.33	.Q	.	.	.	V.
22.583	2.8499	0.27	.Q	.	.	.	V.
22.667	2.8518	0.27	.Q	.	.	.	V.
22.750	2.8536	0.27	.Q	.	.	.	V.
22.833	2.8555	0.26	.Q	.	.	.	V.
22.917	2.8573	0.26	.Q	.	.	.	V.
23.000	2.8591	0.26	.Q	.	.	.	V.
23.083	2.8609	0.26	.Q	.	.	.	V.
23.166	2.8627	0.26	.Q	.	.	.	V.
23.250	2.8646	0.26	.Q	.	.	.	V.
23.333	2.8664	0.27	.Q	.	.	.	V.
23.416	2.8682	0.27	.Q	.	.	.	V.
23.500	2.8701	0.27	.Q	.	.	.	V.
23.583	2.8719	0.27	.Q	.	.	.	V.
23.666	2.8737	0.27	.Q	.	.	.	V.
23.750	2.8756	0.27	.Q	.	.	.	V.
23.833	2.8774	0.27	.Q	.	.	.	V.
23.916	2.8793	0.27	.Q	.	.	.	V.
24.000	2.8811	0.27	.Q	.	.	.	V.
24.083	2.8820	0.13	Q	.	.	.	V.
24.166	2.8829	0.13	Q	.	.	.	V.
24.250	2.8838	0.13	Q	.	.	.	V.
24.333	2.8840	0.02	Q	.	.	.	V.
24.416	2.8842	0.02	Q	.	.	.	V.
24.500	2.8843	0.02	Q	.	.	.	V.
24.583	2.8844	0.01	Q	.	.	.	V.
24.666	2.8844	0.01	Q	.	.	.	V.
24.750	2.8844	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1485.0
10%	810.0
20%	585.0

RS_U_100.RES

30%	510.0
40%	450.0
50%	360.0
60%	240.0
70%	195.0
80%	60.0
90%	30.0

==========

END OF FLOODSCx ROUTING ANALYSIS

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Project Summary	
Title	UHS Rancho Springs_100 yr, 24 hr
Engineer	Nikki Kerry, P.E.
Company	Kimley-Horn and Associates, Inc.
Date	5/12/2020

Notes	1. Inflow hydrograph (100-year, 24 hr) calculated based on Synthetic Unit Hydrograph Method from Riverside County Flood Control and Water Conservation District Hydrology Manual (April 1978) using AES software. 2. Flow-through basin analysis completed using modfified Pul's (storage indication routing).

Table of Contents

	User Notifications	2
	Master Network Summary	3
Unit Hydrograph (Onsite Runoff)	Read Hydrograph	4
Outfall (POC)	Addition Summary	6
Onsite Detention Basin (OUT)	Time vs. Elevation	7
Onsite Detention Basin	Time vs. Volume	10
Onsite Detention Basin	Pipe Volume	13
Composite Outlet Structure - 1		
	Outlet Input Data	15
	Individual Outlet Curves	18
	Composite Rating Curve	24
Onsite Detention Basin		
	Elevation-Volume-Flow Table (Pond)	25
Onsite Detention Basin (IN)		
	Level Pool Pond Routing Summary	26
Onsite Detention Basin (OUT)		
	Pond Routed Hydrograph (total out)	27
Onsite Detention Basin (IN)		
	Pond Inflow Summary	30
Outlet-1		
	Diverted Hydrograph	31

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: User Notifications

User Notifications

Message Id	17
Scenario	Base
Element Type	Composite Outlet Structure
Element Id	21
Label	Composite Outlet Structure - 1
Time	(N/A)
Message	Riser orifice equation controls at one or more headwater elevations for outlet structure.
Source	Information

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Unit Hydrograph (Onsite Runoff)	Base	0	2.888	795.000	5.26

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)
Outfall (POC)	Base	0	2.676	810.000	4.42

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Onsite Detention Basin (IN)	Base	0	2.885	795.000	5.26	(N/A)	(N/A)
Onsite Detention Basin (OUT)	Base	0	2.676	810.000	4.42	3.75	0.513

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Read Hydrograph

Label: Unit Hydrograph (Onsite Runoff)

Peak Discharge	5.26 ft³/s
Time to Peak	800.000 min
Hydrograph Volume	2.888 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 5.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.08	0.08	0.08	0.19	0.19
25.000	0.19	0.24	0.24	0.24	0.29
50.000	0.29	0.29	0.28	0.28	0.28
75.000	0.25	0.25	0.25	0.25	0.25
100.000	0.25	0.29	0.29	0.29	0.32
125.000	0.32	0.32	0.33	0.33	0.33
150.000	0.37	0.37	0.37	0.40	0.40
175.000	0.40	0.41	0.41	0.41	0.41
200.000	0.41	0.41	0.41	0.41	0.41
225.000	0.45	0.45	0.45	0.48	0.48
250.000	0.48	0.57	0.57	0.57	0.64
275.000	0.64	0.64	0.74	0.74	0.74
300.000	0.65	0.65	0.65	0.62	0.62
325.000	0.62	0.76	0.76	0.76	0.84
350.000	0.84	0.84	0.94	0.94	0.94
375.000	1.02	1.02	1.02	1.12	1.12
400.000	1.12	1.20	1.20	1.20	1.22
425.000	1.22	1.22	1.32	1.32	1.32
450.000	1.47	1.47	1.47	1.64	1.64
475.000	1.64	1.90	1.90	1.90	2.05
500.000	2.05	2.05	2.17	2.17	2.17
525.000	2.33	2.33	2.33	2.58	2.58
550.000	2.58	2.82	2.82	2.82	3.00
575.000	3.00	3.00	3.18	3.18	3.18
600.000	2.68	2.68	2.68	2.24	2.24
625.000	2.24	2.59	2.59	2.59	2.91
650.000	2.91	2.91	2.89	2.89	2.89
675.000	2.84	2.84	2.84	2.67	2.67
700.000	2.67	2.63	2.63	2.63	3.26
725.000	3.26	3.26	3.82	3.82	3.82
750.000	4.14	4.14	4.14	4.39	4.39
775.000	4.39	4.91	4.91	4.91	5.26
800.000	5.26	5.26	4.41	4.41	4.41
825.000	3.71	3.71	3.71	3.93	3.93
850.000	3.93	4.09	4.09	4.09	4.07
875.000	4.07	4.07	3.99	3.99	3.99
900.000	3.84	3.84	3.84	3.69	3.69

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Read Hydrograph

Label: Unit Hydrograph (Onsite Runoff)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 5.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
925.000	3.69	3.28	3.28	3.28	3.01
950.000	3.01	3.01	1.71	1.71	1.71
975.000	0.72	0.72	0.72	0.47	0.47
1,000.000	0.47	0.37	0.37	0.37	0.52
1,025.000	0.52	0.52	0.65	0.65	0.65
1,050.000	0.67	0.67	0.67	0.60	0.60
1,075.000	0.60	0.54	0.54	0.54	0.53
1,100.000	0.53	0.53	0.45	0.45	0.45
1,125.000	0.31	0.31	0.31	0.32	0.32
1,150.000	0.32	0.46	0.46	0.46	0.45
1,175.000	0.45	0.45	0.32	0.32	0.32
1,200.000	0.33	0.33	0.33	0.39	0.39
1,225.000	0.39	0.40	0.40	0.40	0.32
1,250.000	0.32	0.32	0.34	0.34	0.34
1,275.000	0.32	0.32	0.32	0.35	0.35
1,300.000	0.35	0.32	0.32	0.32	0.35
1,325.000	0.35	0.35	0.33	0.33	0.33
1,350.000	0.27	0.27	0.27	0.27	0.27
1,375.000	0.27	0.26	0.26	0.26	0.27
1,400.000	0.27	0.27	0.27	0.27	0.27
1,425.000	0.27	0.27	0.27	0.13	0.13
1,450.000	0.13	0.02	0.02	0.02	0.01
1,475.000	0.01	0.01	0.00	(N/A)	(N/A)

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Addition Summary

Label: Outfall (POC)

Summary for Hydrograph Addition at 'Outfall (POC)'

Upstream Link	Upstream Node
Outlet-1	Onsite Detention Basin

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	2.676	810.000	4.42
Flow (In)	Outfall (POC)	2.676	810.000	4.42

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Time vs. Elevation

Label: Onsite Detention Basin (OUT)

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
0.000	0.00	0.01	0.01	0.02	0.03
15.000	0.05	0.06	0.08	0.10	0.11
30.000	0.13	0.15	0.18	0.20	0.22
45.000	0.24	0.26	0.29	0.31	0.34
60.000	0.36	0.38	0.40	0.43	0.45
75.000	0.47	0.49	0.50	0.51	0.52
90.000	0.53	0.53	0.54	0.55	0.56
105.000	0.57	0.58	0.59	0.60	0.61
120.000	0.62	0.63	0.64	0.65	0.66
135.000	0.67	0.69	0.70	0.71	0.72
150.000	0.73	0.74	0.76	0.77	0.78
165.000	0.80	0.81	0.82	0.84	0.85
180.000	0.87	0.88	0.89	0.91	0.92
195.000	0.94	0.95	0.97	0.98	0.99
210.000	1.01	1.02	1.03	1.04	1.05
225.000	1.06	1.07	1.08	1.10	1.11
240.000	1.12	1.13	1.15	1.16	1.17
255.000	1.19	1.20	1.22	1.23	1.25
270.000	1.27	1.28	1.30	1.32	1.34
285.000	1.36	1.38	1.40	1.42	1.44
300.000	1.46	1.48	1.49	1.51	1.53
315.000	1.54	1.56	1.57	1.59	1.60
330.000	1.62	1.64	1.66	1.68	1.70
345.000	1.72	1.74	1.76	1.78	1.80
360.000	1.82	1.84	1.86	1.88	1.90
375.000	1.92	1.94	1.96	1.98	2.00
390.000	2.02	2.04	2.06	2.08	2.10
405.000	2.11	2.13	2.15	2.17	2.18
420.000	2.20	2.21	2.23	2.24	2.25
435.000	2.27	2.28	2.30	2.31	2.33
450.000	2.34	2.36	2.37	2.39	2.40
465.000	2.42	2.43	2.45	2.46	2.48
480.000	2.50	2.52	2.54	2.55	2.57
495.000	2.59	2.60	2.62	2.64	2.65
510.000	2.67	2.68	2.70	2.71	2.73
525.000	2.74	2.76	2.77	2.79	2.80
540.000	2.82	2.84	2.85	2.87	2.89
555.000	2.90	2.92	2.94	2.96	2.97
570.000	2.99	3.01	3.03	3.04	3.06
585.000	3.07	3.09	3.11	3.12	3.13
600.000	3.14	3.14	3.14	3.14	3.14

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Time vs. Elevation

Label: Onsite Detention Basin (OUT)

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
615.000	3.13	3.13	3.12	3.11	3.11
630.000	3.11	3.11	3.11	3.11	3.11
645.000	3.12	3.13	3.13	3.14	3.15
660.000	3.15	3.16	3.16	3.17	3.17
675.000	3.17	3.18	3.18	3.18	3.18
690.000	3.18	3.18	3.18	3.18	3.18
705.000	3.18	3.17	3.17	3.17	3.17
720.000	3.18	3.19	3.20	3.21	3.22
735.000	3.24	3.26	3.28	3.30	3.32
750.000	3.34	3.36	3.38	3.40	3.42
765.000	3.44	3.46	3.48	3.50	3.52
780.000	3.54	3.57	3.59	3.61	3.63
795.000	3.66	3.68	3.71	3.73	3.74
810.000	3.75	3.75	3.75	3.75	3.74
825.000	3.73	3.72	3.71	3.69	3.68
840.000	3.68	3.67	3.67	3.66	3.66
855.000	3.65	3.65	3.65	3.65	3.65
870.000	3.65	3.65	3.65	3.65	3.65
885.000	3.65	3.64	3.64	3.64	3.64
900.000	3.63	3.63	3.63	3.62	3.62
915.000	3.61	3.61	3.60	3.59	3.59
930.000	3.58	3.56	3.55	3.54	3.53
945.000	3.52	3.50	3.49	3.47	3.46
960.000	3.43	3.39	3.35	3.32	3.28
975.000	3.24	3.19	3.14	3.10	3.06
990.000	3.02	2.98	2.94	2.90	2.86
1,005.000	2.83	2.79	2.76	2.73	2.70
1,020.000	2.68	2.65	2.63	2.61	2.59
1,035.000	2.58	2.56	2.55	2.53	2.52
1,050.000	2.51	2.50	2.49	2.48	2.47
1,065.000	2.46	2.45	2.44	2.43	2.42
1,080.000	2.41	2.40	2.39	2.38	2.37
1,095.000	2.36	2.35	2.34	2.34	2.33
1,110.000	2.32	2.31	2.30	2.29	2.28
1,125.000	2.27	2.26	2.25	2.24	2.23
1,140.000	2.23	2.22	2.21	2.20	2.19
1,155.000	2.19	2.19	2.18	2.18	2.18
1,170.000	2.17	2.17	2.17	2.16	2.16
1,185.000	2.16	2.15	2.14	2.14	2.13
1,200.000	2.13	2.13	2.12	2.12	2.11
1,215.000	2.11	2.11	2.11	2.10	2.10

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Time vs. Elevation

Label: Onsite Detention Basin (OUT)

Time vs. Elevation (ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)	Elevation (ft)
1,230.000	2.10	2.10	2.10	2.10	2.09
1,245.000	2.09	2.09	2.09	2.08	2.08
1,260.000	2.08	2.08	2.07	2.07	2.07
1,275.000	2.07	2.07	2.06	2.06	2.06
1,290.000	2.06	2.06	2.06	2.06	2.05
1,305.000	2.05	2.05	2.05	2.05	2.05
1,320.000	2.05	2.05	2.05	2.04	2.04
1,335.000	2.04	2.04	2.04	2.04	2.04
1,350.000	2.04	2.04	2.03	2.03	2.03
1,365.000	2.03	2.03	2.02	2.02	2.02
1,380.000	2.02	2.02	2.02	2.01	2.01
1,395.000	2.01	2.01	2.01	2.01	2.01
1,410.000	2.01	2.00	2.00	2.00	2.00
1,425.000	2.00	2.00	2.00	2.00	2.00
1,440.000	1.99	(N/A)	(N/A)	(N/A)	(N/A)

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Time vs. Volume

Label: Onsite Detention Basin

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
0.000	0.000	0.000	0.000	0.000	0.000
15.000	0.001	0.001	0.001	0.001	0.002
30.000	0.002	0.002	0.003	0.003	0.004
45.000	0.005	0.007	0.008	0.009	0.011
60.000	0.012	0.013	0.015	0.016	0.018
75.000	0.020	0.021	0.022	0.023	0.024
90.000	0.024	0.025	0.026	0.026	0.027
105.000	0.028	0.028	0.029	0.030	0.031
120.000	0.032	0.033	0.034	0.035	0.036
135.000	0.037	0.038	0.039	0.041	0.042
150.000	0.043	0.044	0.045	0.047	0.048
165.000	0.049	0.051	0.052	0.054	0.055
180.000	0.057	0.058	0.060	0.061	0.063
195.000	0.065	0.066	0.068	0.069	0.071
210.000	0.072	0.073	0.075	0.076	0.077
225.000	0.079	0.080	0.082	0.083	0.085
240.000	0.086	0.088	0.089	0.091	0.092
255.000	0.094	0.096	0.098	0.100	0.102
270.000	0.104	0.107	0.109	0.111	0.114
285.000	0.116	0.119	0.122	0.125	0.127
300.000	0.130	0.133	0.135	0.137	0.140
315.000	0.142	0.144	0.146	0.148	0.150
330.000	0.153	0.156	0.158	0.161	0.164
345.000	0.167	0.170	0.173	0.176	0.179
360.000	0.182	0.185	0.188	0.191	0.195
375.000	0.198	0.201	0.204	0.207	0.210
390.000	0.213	0.217	0.220	0.222	0.225
405.000	0.228	0.231	0.234	0.236	0.239
420.000	0.241	0.244	0.246	0.248	0.251
435.000	0.253	0.255	0.258	0.260	0.262
450.000	0.265	0.267	0.270	0.272	0.274
465.000	0.277	0.280	0.283	0.285	0.288
480.000	0.291	0.294	0.297	0.300	0.303
495.000	0.306	0.309	0.312	0.314	0.317
510.000	0.320	0.323	0.325	0.328	0.330
525.000	0.333	0.336	0.338	0.341	0.343
540.000	0.346	0.349	0.352	0.355	0.358
555.000	0.361	0.364	0.367	0.370	0.373
570.000	0.376	0.379	0.382	0.385	0.388
585.000	0.391	0.394	0.396	0.399	0.401
600.000	0.402	0.402	0.402	0.403	0.402

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Time vs. Volume

Label: Onsite Detention Basin

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
615.000	0.401	0.400	0.399	0.397	0.396
630.000	0.396	0.397	0.397	0.397	0.397
645.000	0.399	0.400	0.401	0.402	0.404
660.000	0.405	0.405	0.406	0.407	0.408
675.000	0.408	0.409	0.409	0.410	0.410
690.000	0.410	0.410	0.410	0.409	0.409
705.000	0.409	0.408	0.408	0.408	0.408
720.000	0.409	0.411	0.413	0.415	0.417
735.000	0.421	0.424	0.428	0.431	0.434
750.000	0.438	0.442	0.446	0.449	0.452
765.000	0.456	0.460	0.463	0.467	0.470
780.000	0.475	0.479	0.483	0.487	0.491
795.000	0.496	0.500	0.505	0.509	0.511
810.000	0.513	0.513	0.512	0.512	0.512
825.000	0.510	0.507	0.505	0.503	0.501
840.000	0.499	0.498	0.497	0.496	0.496
855.000	0.495	0.495	0.495	0.495	0.495
870.000	0.495	0.495	0.495	0.494	0.494
885.000	0.494	0.494	0.493	0.493	0.492
900.000	0.492	0.491	0.490	0.489	0.488
915.000	0.487	0.486	0.485	0.484	0.483
930.000	0.481	0.479	0.477	0.475	0.472
945.000	0.470	0.467	0.465	0.463	0.459
960.000	0.454	0.447	0.440	0.434	0.428
975.000	0.420	0.411	0.403	0.395	0.388
990.000	0.381	0.373	0.367	0.360	0.354
1,005.000	0.347	0.341	0.336	0.330	0.326
1,020.000	0.321	0.317	0.314	0.310	0.307
1,035.000	0.304	0.302	0.299	0.297	0.295
1,050.000	0.293	0.291	0.290	0.288	0.286
1,065.000	0.284	0.283	0.281	0.279	0.277
1,080.000	0.276	0.274	0.272	0.271	0.269
1,095.000	0.268	0.267	0.265	0.264	0.263
1,110.000	0.261	0.260	0.258	0.257	0.255
1,125.000	0.254	0.252	0.250	0.249	0.247
1,140.000	0.246	0.244	0.243	0.242	0.241
1,155.000	0.240	0.239	0.239	0.238	0.238
1,170.000	0.237	0.237	0.236	0.236	0.235
1,185.000	0.235	0.234	0.233	0.232	0.231
1,200.000	0.230	0.230	0.229	0.228	0.228
1,215.000	0.227	0.227	0.227	0.226	0.226

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Time vs. Volume

Label: Onsite Detention Basin

Time vs. Volume (ac-ft)

Output Time increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)	Volume (ac-ft)
1,230.000	0.226	0.226	0.225	0.225	0.225
1,245.000	0.225	0.224	0.224	0.223	0.223
1,260.000	0.222	0.222	0.222	0.221	0.221
1,275.000	0.221	0.220	0.220	0.220	0.219
1,290.000	0.219	0.219	0.219	0.219	0.219
1,305.000	0.218	0.218	0.218	0.218	0.217
1,320.000	0.217	0.217	0.217	0.217	0.217
1,335.000	0.217	0.217	0.216	0.216	0.216
1,350.000	0.216	0.215	0.215	0.215	0.215
1,365.000	0.214	0.214	0.214	0.213	0.213
1,380.000	0.213	0.213	0.212	0.212	0.212
1,395.000	0.212	0.211	0.211	0.211	0.211
1,410.000	0.211	0.211	0.210	0.210	0.210
1,425.000	0.210	0.210	0.210	0.210	0.209
1,440.000	0.209	(N/A)	(N/A)	(N/A)	(N/A)

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Pipe Volume

Label: Onsite Detention Basin

Volume Results (Pipe)	
Pipe Storage Upstream Invert	0.20 ft
Pipe Storage Downstream Invert	0.00 ft
Pipe Storage Length	200.00 ft
Pipe Storage Diameter	96.0 in
Pipe Storage Number of Barrels	5
Pipe Storage Slice Width	1.00 ft
Pipe Storage Vertical Increment	0.20 ft

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
0.00	0.00	0.0	0.00	0.00	0.00	0.0	0.000
0.20	0.20	0.3	200.00	0.00	0.00	0.0	0.003
0.40	0.40	0.9	200.00	0.00	0.20	0.3	0.014
0.60	0.60	1.7	200.00	0.00	0.40	0.9	0.030
0.80	0.80	2.6	200.00	0.00	0.60	1.7	0.049
1.00	1.00	3.6	200.00	0.00	0.80	2.6	0.071
1.20	1.20	4.7	200.00	0.00	1.00	3.6	0.096
1.40	1.40	5.9	200.00	0.00	1.20	4.7	0.122
1.60	1.60	7.2	200.00	0.00	1.40	5.9	0.150
1.80	1.80	8.5	200.00	0.00	1.60	7.2	0.179
2.00	2.00	9.8	200.00	0.00	1.80	8.5	0.210
2.20	2.20	11.2	200.00	0.00	2.00	9.8	0.242
2.40	2.40	12.7	200.00	0.00	2.20	11.2	0.274
2.60	2.60	14.2	200.00	0.00	2.40	12.7	0.308
2.80	2.80	15.7	200.00	0.00	2.60	14.2	0.343
3.00	3.00	17.2	200.00	0.00	2.80	15.7	0.378
3.20	3.20	18.8	200.00	0.00	3.00	17.2	0.413
3.40	3.40	20.3	200.00	0.00	3.20	18.8	0.449
3.60	3.60	21.9	200.00	0.00	3.40	20.4	0.485
3.80	3.80	23.5	200.00	0.00	3.60	21.9	0.522
4.00	4.00	25.1	200.00	0.00	3.80	23.5	0.559
4.20	4.20	26.7	200.00	0.00	4.00	25.1	0.595
4.40	4.40	28.3	200.00	0.00	4.20	26.7	0.632
4.60	4.60	29.9	200.00	0.00	4.40	28.3	0.669
4.80	4.80	31.5	200.00	0.00	4.60	29.9	0.705
5.00	5.00	33.0	200.00	0.00	4.80	31.5	0.741
5.20	5.20	34.6	200.00	0.00	5.00	33.0	0.776
5.40	5.40	36.1	200.00	0.00	5.20	34.6	0.811
5.60	5.60	37.6	200.00	0.00	5.40	36.1	0.846
5.80	5.80	39.0	200.00	0.00	5.60	37.6	0.879
6.00	6.00	40.4	200.00	0.00	5.80	39.0	0.912

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Pipe Volume

Label: Onsite Detention Basin

Elevation (ft)	Perpendicular Downstream Depth (ft)	Perpendicular Downstream Area (ft²)	Wetted Length (ft)	Filled Length (ft)	Perpendicular Upstream Depth (ft)	Perpendicular Upstream Area (ft²)	Total Volume (ac-ft)
6.20	6.20	41.8	200.00	0.00	6.00	40.4	0.944
6.40	6.40	43.1	200.00	0.00	6.20	41.8	0.975
6.60	6.60	44.4	200.00	0.00	6.40	43.1	1.004
6.80	6.80	45.5	200.00	0.00	6.60	44.4	1.032
7.00	7.00	46.6	200.00	0.00	6.80	45.5	1.058
7.20	7.20	47.6	200.00	0.00	7.00	46.6	1.082
7.40	7.40	48.5	200.00	0.00	7.20	47.6	1.104
7.60	7.60	49.3	200.00	0.00	7.40	48.6	1.124
7.80	7.80	49.9	200.00	0.00	7.60	49.3	1.140
8.00	8.00	50.3	200.00	0.00	7.80	49.9	1.151
8.20	8.00	50.3	200.00	200.00	8.00	50.3	1.154

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Outlet Input Data

Label: Composite Outlet Structure - 1

Requested Pond Water Surface Elevations	
Minimum (Headwater)	0.00 ft
Increment (Headwater)	0.50 ft
Maximum (Headwater)	8.21 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Stand Pipe	Riser - 1	Forward	TW	7.00	8.20
Orifice-Circular	Orifice - 1	Forward	TW	0.00	8.20
Rectangular Weir	Notch Weir	Forward	TW	1.75	8.20
Tailwater Settings	Tailwater			(N/A)	(N/A)

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Outlet Input Data

Label: Composite Outlet Structure - 1

Structure ID: Orifice - 1 Structure Type: Orifice-Circular	
Number of Openings	1
Elevation	0.00 ft
Orifice Diameter	1.8 in
Orifice Coefficient	0.600

Structure ID: Notch Weir Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	1.75 ft
Weir Length	0.50 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: Riser - 1 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	0.00 ft
Diameter	54.0 in
Orifice Area	15.9 ft²
Orifice Coefficient	0.600
Weir Length	14.14 ft
Weir Coefficient	3.00 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	True

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	30
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Outlet Input Data

Label: Composite Outlet Structure - 1

Convergence Tolerances	
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
0.00	0.00	(N/A)	0.00
0.50	0.05	(N/A)	0.00
1.00	0.08	(N/A)	0.00
1.50	0.10	(N/A)	0.00
1.75	0.10	(N/A)	0.00
2.00	0.11	(N/A)	0.00
2.50	0.13	(N/A)	0.00
3.00	0.14	(N/A)	0.00
3.50	0.15	(N/A)	0.00
4.00	0.16	(N/A)	0.00
4.50	0.17	(N/A)	0.00
5.00	0.18	(N/A)	0.00
5.50	0.19	(N/A)	0.00
6.00	0.20	(N/A)	0.00
6.50	0.20	(N/A)	0.00
7.00	0.21	(N/A)	0.00
7.50	0.22	(N/A)	0.00
8.00	0.23	(N/A)	0.00
8.20	0.23	(N/A)	0.00

Computation Messages
Upstream HW & DNstream TW < Inv.El
H =.43
H =.93
H =1.43
H =1.68
H =1.93
H =2.43
H =2.93
H =3.43
H =3.93
H =4.43
H =4.93
H =5.43
H =5.93
H =6.43
H =6.93

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
H =7.43
H =7.93
H =8.13

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Notch Weir (Rectangular Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
0.00	0.00	(N/A)	0.00
0.50	0.00	(N/A)	0.00
1.00	0.00	(N/A)	0.00
1.50	0.00	(N/A)	0.00
1.75	0.00	(N/A)	0.00
2.00	0.19	(N/A)	0.00
2.50	0.97	(N/A)	0.00
3.00	2.10	(N/A)	0.00
3.50	3.47	(N/A)	0.00
4.00	5.06	(N/A)	0.00
4.50	6.84	(N/A)	0.00
5.00	8.79	(N/A)	0.00
5.50	10.89	(N/A)	0.00
6.00	13.14	(N/A)	0.00
6.50	15.53	(N/A)	0.00
7.00	18.04	(N/A)	0.00
7.50	20.68	(N/A)	0.00
8.00	23.44	(N/A)	0.00
8.20	24.57	(N/A)	0.00

Computation Messages
HW & TW below Inv.El.=1.750
HW & TW below Inv.El.=1.750
HW & TW below Inv.El.=1.750
HW & TW below Inv.El.=1.750
H=.00; Htw=.00; Qfree=.00;
H=.25; Htw=.00; Qfree=.19;
H=.75; Htw=.00; Qfree=.97;
H=1.25; Htw=.00; Qfree=2.10;
H=1.75; Htw=.00; Qfree=3.47;

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Notch Weir (Rectangular Weir)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
H=2.25; Htw=.00; Qfree=5.06;
H=2.75; Htw=.00; Qfree=6.84;
H=3.25; Htw=.00; Qfree=8.79;
H=3.75; Htw=.00; Qfree=10.89;
H=4.25; Htw=.00; Qfree=13.14;
H=4.75; Htw=.00; Qfree=15.53;
H=5.25; Htw=.00; Qfree=18.04;
H=5.75; Htw=.00; Qfree=20.68;
H=6.25; Htw=.00; Qfree=23.44;
H=6.45; Htw=.00; Qfree=24.57;

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
0.00	0.00	(N/A)	0.00
0.50	0.00	(N/A)	0.00
1.00	0.00	(N/A)	0.00
1.50	0.00	(N/A)	0.00
1.75	0.00	(N/A)	0.00
2.00	0.00	(N/A)	0.00
2.50	0.00	(N/A)	0.00
3.00	0.00	(N/A)	0.00
3.50	0.00	(N/A)	0.00
4.00	0.00	(N/A)	0.00
4.50	0.00	(N/A)	0.00
5.00	0.00	(N/A)	0.00
5.50	0.00	(N/A)	0.00
6.00	0.00	(N/A)	0.00
6.50	0.00	(N/A)	0.00
7.00	202.53	(N/A)	0.00
7.50	209.64	(N/A)	0.00
8.00	216.51	(N/A)	0.00
8.20	219.20	(N/A)	0.00

Computation Messages

E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000
E < E1= 7.000

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Individual Outlet Curves

Label: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Tailwater (Pond Outfall)

Computation Messages
Orifice: H =7.00; Riser orifice equation controlling.
Orifice: H =7.50; Riser orifice equation controlling.
Orifice: H =8.00; Riser orifice equation controlling.
Orifice: H =8.20; Riser orifice equation controlling.

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Composite Rating Curve

Label: Composite Outlet Structure - 1

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
0.00	0.00	(N/A)	0.00
0.50	0.05	(N/A)	0.00
1.00	0.08	(N/A)	0.00
1.50	0.10	(N/A)	0.00
1.75	0.10	(N/A)	0.00
2.00	0.30	(N/A)	0.00
2.50	1.10	(N/A)	0.00
3.00	2.23	(N/A)	0.00
3.50	3.62	(N/A)	0.00
4.00	5.22	(N/A)	0.00
4.50	7.01	(N/A)	0.00
5.00	8.97	(N/A)	0.00
5.50	11.08	(N/A)	0.00
6.00	13.34	(N/A)	0.00
6.50	15.73	(N/A)	0.00
7.00	220.78	(N/A)	0.00
7.50	230.54	(N/A)	0.00
8.00	240.17	(N/A)	0.00
8.20	244.00	(N/A)	0.00

Contributing Structures
None Contributing
Orifice - 1
Orifice - 1
Orifice - 1
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir
Riser - 1 + Orifice - 1 + Notch Weir

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Elevation-Volume-Flow Table (Pond)

Label: Onsite Detention Basin

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	3.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
0.00	0.00	0.000	0	0.00	0.00	0.00
0.50	0.05	0.022	0	0.00	0.05	10.80
1.00	0.08	0.071	0	0.00	0.08	34.67
1.50	0.10	0.136	0	0.00	0.10	65.87
1.75	0.10	0.172	0	0.00	0.10	83.29
2.00	0.30	0.210	0	0.00	0.30	101.88
2.50	1.10	0.291	0	0.00	1.10	142.08
3.00	2.23	0.378	0	0.00	2.23	184.97
3.50	3.62	0.467	0	0.00	3.62	229.76
4.00	5.22	0.559	0	0.00	5.22	275.59
4.50	7.01	0.650	0	0.00	7.01	321.74
5.00	8.97	0.741	0	0.00	8.97	367.53
5.50	11.08	0.829	0	0.00	11.08	412.13
6.00	13.34	0.912	0	0.00	13.34	454.87
6.50	15.73	0.989	0	0.00	15.73	494.61
7.00	220.78	1.058	0	0.00	220.78	732.95
7.50	230.54	1.114	0	0.00	230.54	769.77
8.00	240.17	1.151	0	0.00	240.17	797.19
8.20	244.00	1.154	0	0.00	244.00	802.50

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Level Pool Pond Routing Summary

Label: Onsite Detention Basin (IN)

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	0.00 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	3.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	5.26 ft³/s	Time to Peak (Flow, In)	795.000 min
Flow (Peak Outlet)	4.42 ft³/s	Time to Peak (Flow, Outlet)	810.000 min

Elevation (Water Surface, Peak)	3.75 ft
Volume (Peak)	0.513 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	2.885 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	2.676 ac-ft
Volume (Retained)	0.208 ac-ft
Volume (Unrouted)	-0.001 ac-ft
Error (Mass Balance)	0.0 %

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Pond Routed Hydrograph (total out)

Label: Onsite Detention Basin (OUT)

Peak Discharge	4.42 ft³/s
Time to Peak	810.000 min
Hydrograph Volume	2.676 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
3.000	0.00	0.00	0.00	0.00	0.00
18.000	0.01	0.01	0.01	0.01	0.01
33.000	0.02	0.02	0.02	0.02	0.03
48.000	0.03	0.03	0.03	0.04	0.04
63.000	0.04	0.04	0.04	0.05	0.05
78.000	0.05	0.05	0.05	0.05	0.05
93.000	0.05	0.05	0.06	0.06	0.06
108.000	0.06	0.06	0.06	0.06	0.06
123.000	0.06	0.06	0.06	0.06	0.06
138.000	0.06	0.06	0.06	0.06	0.06
153.000	0.06	0.07	0.07	0.07	0.07
168.000	0.07	0.07	0.07	0.07	0.07
183.000	0.07	0.07	0.07	0.07	0.07
198.000	0.07	0.08	0.08	0.08	0.08
213.000	0.08	0.08	0.08	0.08	0.08
228.000	0.08	0.08	0.08	0.08	0.08
243.000	0.08	0.08	0.08	0.08	0.08
258.000	0.08	0.09	0.09	0.09	0.09
273.000	0.09	0.09	0.09	0.09	0.09
288.000	0.09	0.09	0.09	0.09	0.09
303.000	0.10	0.10	0.10	0.10	0.10
318.000	0.10	0.10	0.10	0.10	0.10
333.000	0.10	0.10	0.10	0.10	0.10
348.000	0.10	0.11	0.13	0.14	0.16
363.000	0.17	0.19	0.21	0.22	0.24
378.000	0.25	0.27	0.29	0.30	0.34
393.000	0.37	0.40	0.43	0.45	0.48
408.000	0.51	0.54	0.56	0.59	0.61
423.000	0.64	0.66	0.68	0.71	0.73
438.000	0.75	0.78	0.80	0.82	0.84
453.000	0.87	0.89	0.92	0.94	0.96
468.000	0.99	1.02	1.04	1.07	1.10
483.000	1.14	1.18	1.22	1.26	1.30
498.000	1.34	1.37	1.41	1.44	1.48
513.000	1.52	1.55	1.58	1.62	1.65
528.000	1.69	1.72	1.75	1.79	1.83
543.000	1.87	1.90	1.94	1.98	2.02

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Pond Routed Hydrograph (total out)

Label: Onsite Detention Basin (OUT)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
558.000	2.06	2.10	2.14	2.18	2.22
573.000	2.26	2.31	2.35	2.39	2.44
588.000	2.48	2.53	2.57	2.60	2.61
603.000	2.62	2.62	2.63	2.62	2.61
618.000	2.58	2.56	2.54	2.53	2.53
633.000	2.53	2.53	2.54	2.54	2.56
648.000	2.58	2.60	2.62	2.64	2.66
663.000	2.67	2.68	2.70	2.71	2.72
678.000	2.72	2.73	2.74	2.74	2.74
693.000	2.74	2.73	2.73	2.72	2.72
708.000	2.71	2.71	2.70	2.71	2.73
723.000	2.76	2.79	2.82	2.86	2.91
738.000	2.96	3.02	3.07	3.12	3.17
753.000	3.23	3.29	3.34	3.39	3.45
768.000	3.51	3.56	3.62	3.68	3.75
783.000	3.83	3.91	3.98	4.05	4.12
798.000	4.20	4.28	4.35	4.40	4.42
813.000	4.42	4.42	4.42	4.41	4.37
828.000	4.33	4.28	4.24	4.21	4.18
843.000	4.17	4.15	4.13	4.12	4.12
858.000	4.12	4.11	4.11	4.11	4.11
873.000	4.10	4.10	4.10	4.10	4.09
888.000	4.08	4.08	4.07	4.06	4.05
903.000	4.04	4.02	4.01	4.00	3.98
918.000	3.96	3.94	3.92	3.90	3.86
933.000	3.82	3.79	3.75	3.71	3.67
948.000	3.62	3.59	3.55	3.50	3.41
963.000	3.31	3.21	3.12	3.02	2.89
978.000	2.76	2.63	2.51	2.40	2.28
993.000	2.18	2.09	2.01	1.92	1.84
1,008.000	1.76	1.69	1.62	1.56	1.50
1,023.000	1.45	1.40	1.35	1.31	1.27
1,038.000	1.24	1.21	1.18	1.15	1.12
1,053.000	1.10	1.08	1.07	1.05	1.03
1,068.000	1.02	1.00	0.98	0.97	0.95
1,083.000	0.94	0.92	0.90	0.89	0.88
1,098.000	0.86	0.85	0.84	0.82	0.81
1,113.000	0.79	0.78	0.77	0.75	0.74
1,128.000	0.72	0.70	0.69	0.67	0.66
1,143.000	0.65	0.63	0.62	0.61	0.60
1,158.000	0.60	0.59	0.59	0.58	0.58
1,173.000	0.57	0.57	0.56	0.56	0.55

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Pond Routed Hydrograph (total out)

Label: Onsite Detention Basin (OUT)

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,188.000	0.54	0.53	0.52	0.51	0.51
1,203.000	0.50	0.49	0.49	0.48	0.48
1,218.000	0.47	0.47	0.47	0.46	0.46
1,233.000	0.46	0.46	0.45	0.45	0.45
1,248.000	0.44	0.44	0.43	0.43	0.42
1,263.000	0.42	0.42	0.41	0.41	0.41
1,278.000	0.40	0.40	0.40	0.39	0.39
1,293.000	0.39	0.39	0.39	0.39	0.38
1,308.000	0.38	0.38	0.38	0.37	0.37
1,323.000	0.37	0.37	0.37	0.37	0.37
1,338.000	0.37	0.37	0.36	0.36	0.36
1,353.000	0.36	0.35	0.35	0.35	0.34
1,368.000	0.34	0.34	0.33	0.33	0.33
1,383.000	0.33	0.32	0.32	0.32	0.32
1,398.000	0.31	0.31	0.31	0.31	0.31
1,413.000	0.31	0.31	0.30	0.30	0.30
1,428.000	0.30	0.30	0.30	0.30	0.29

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Pond Inflow Summary

Label: Onsite Detention Basin (IN)

Summary for Hydrograph Addition at 'Onsite Detention Basin'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Unit Hydrograph (Onsite Runoff)

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Unit Hydrograph (Onsite Runoff)	2.888	795.000	5.26
Flow (In)	Onsite Detention Basin	2.885	795.000	5.26

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Diverted Hydrograph

Label: Outlet-1

Peak Discharge	4.42 ft³/s
Time to Peak	810.000 min
Hydrograph Volume	2.676 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
3.000	0.00	0.00	0.00	0.00	0.00
18.000	0.01	0.01	0.01	0.01	0.01
33.000	0.02	0.02	0.02	0.02	0.03
48.000	0.03	0.03	0.03	0.04	0.04
63.000	0.04	0.04	0.04	0.05	0.05
78.000	0.05	0.05	0.05	0.05	0.05
93.000	0.05	0.05	0.06	0.06	0.06
108.000	0.06	0.06	0.06	0.06	0.06
123.000	0.06	0.06	0.06	0.06	0.06
138.000	0.06	0.06	0.06	0.06	0.06
153.000	0.06	0.07	0.07	0.07	0.07
168.000	0.07	0.07	0.07	0.07	0.07
183.000	0.07	0.07	0.07	0.07	0.07
198.000	0.07	0.08	0.08	0.08	0.08
213.000	0.08	0.08	0.08	0.08	0.08
228.000	0.08	0.08	0.08	0.08	0.08
243.000	0.08	0.08	0.08	0.08	0.08
258.000	0.08	0.09	0.09	0.09	0.09
273.000	0.09	0.09	0.09	0.09	0.09
288.000	0.09	0.09	0.09	0.09	0.09
303.000	0.10	0.10	0.10	0.10	0.10
318.000	0.10	0.10	0.10	0.10	0.10
333.000	0.10	0.10	0.10	0.10	0.10
348.000	0.10	0.11	0.13	0.14	0.16
363.000	0.17	0.19	0.21	0.22	0.24
378.000	0.25	0.27	0.29	0.30	0.34
393.000	0.37	0.40	0.43	0.45	0.48
408.000	0.51	0.54	0.56	0.59	0.61
423.000	0.64	0.66	0.68	0.71	0.73
438.000	0.75	0.78	0.80	0.82	0.84
453.000	0.87	0.89	0.92	0.94	0.96
468.000	0.99	1.02	1.04	1.07	1.10
483.000	1.14	1.18	1.22	1.26	1.30
498.000	1.34	1.37	1.41	1.44	1.48
513.000	1.52	1.55	1.58	1.62	1.65
528.000	1.69	1.72	1.75	1.79	1.83
543.000	1.87	1.90	1.94	1.98	2.02

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Diverted Hydrograph

Label: Outlet-1

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
558.000	2.06	2.10	2.14	2.18	2.22
573.000	2.26	2.31	2.35	2.39	2.44
588.000	2.48	2.53	2.57	2.60	2.61
603.000	2.62	2.62	2.63	2.62	2.61
618.000	2.58	2.56	2.54	2.53	2.53
633.000	2.53	2.53	2.54	2.54	2.56
648.000	2.58	2.60	2.62	2.64	2.66
663.000	2.67	2.68	2.70	2.71	2.72
678.000	2.72	2.73	2.74	2.74	2.74
693.000	2.74	2.73	2.73	2.72	2.72
708.000	2.71	2.71	2.70	2.71	2.73
723.000	2.76	2.79	2.82	2.86	2.91
738.000	2.96	3.02	3.07	3.12	3.17
753.000	3.23	3.29	3.34	3.39	3.45
768.000	3.51	3.56	3.62	3.68	3.75
783.000	3.83	3.91	3.98	4.05	4.12
798.000	4.20	4.28	4.35	4.40	4.42
813.000	4.42	4.42	4.42	4.41	4.37
828.000	4.33	4.28	4.24	4.21	4.18
843.000	4.17	4.15	4.13	4.12	4.12
858.000	4.12	4.11	4.11	4.11	4.11
873.000	4.10	4.10	4.10	4.10	4.09
888.000	4.08	4.08	4.07	4.06	4.05
903.000	4.04	4.02	4.01	4.00	3.98
918.000	3.96	3.94	3.92	3.90	3.86
933.000	3.82	3.79	3.75	3.71	3.67
948.000	3.62	3.59	3.55	3.50	3.41
963.000	3.31	3.21	3.12	3.02	2.89
978.000	2.76	2.63	2.51	2.40	2.28
993.000	2.18	2.09	2.01	1.92	1.84
1,008.000	1.76	1.69	1.62	1.56	1.50
1,023.000	1.45	1.40	1.35	1.31	1.27
1,038.000	1.24	1.21	1.18	1.15	1.12
1,053.000	1.10	1.08	1.07	1.05	1.03
1,068.000	1.02	1.00	0.98	0.97	0.95
1,083.000	0.94	0.92	0.90	0.89	0.88
1,098.000	0.86	0.85	0.84	0.82	0.81
1,113.000	0.79	0.78	0.77	0.75	0.74
1,128.000	0.72	0.70	0.69	0.67	0.66
1,143.000	0.65	0.63	0.62	0.61	0.60
1,158.000	0.60	0.59	0.59	0.58	0.58
1,173.000	0.57	0.57	0.56	0.56	0.55

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Subsection: Diverted Hydrograph

Label: Outlet-1

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 3.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
1,188.000	0.54	0.53	0.52	0.51	0.51
1,203.000	0.50	0.49	0.49	0.48	0.48
1,218.000	0.47	0.47	0.47	0.46	0.46
1,233.000	0.46	0.46	0.45	0.45	0.45
1,248.000	0.44	0.44	0.43	0.43	0.42
1,263.000	0.42	0.42	0.41	0.41	0.41
1,278.000	0.40	0.40	0.40	0.39	0.39
1,293.000	0.39	0.39	0.39	0.39	0.38
1,308.000	0.38	0.38	0.38	0.37	0.37
1,323.000	0.37	0.37	0.37	0.37	0.37
1,338.000	0.37	0.37	0.36	0.36	0.36
1,353.000	0.36	0.35	0.35	0.35	0.34
1,368.000	0.34	0.34	0.33	0.33	0.33
1,383.000	0.33	0.32	0.32	0.32	0.32
1,398.000	0.31	0.31	0.31	0.31	0.31
1,413.000	0.31	0.31	0.30	0.30	0.30
1,428.000	0.30	0.30	0.30	0.30	0.29

UHS Rancho Springs 100-yr, 24 hr Detention Analysis

Index

C

Composite Outlet Structure - 1 (Composite Rating Curve)...24

Composite Outlet Structure - 1 (Individual Outlet Curves)...18, 19, 20, 21, 22, 23

Composite Outlet Structure - 1 (Outlet Input Data)...15, 16, 17

M

Master Network Summary...3

O

Onsite Detention Basin (Elevation-Volume-Flow Table (Pond))...25

Onsite Detention Basin (IN) (Level Pool Pond Routing Summary)...26

Onsite Detention Basin (IN) (Pond Inflow Summary)...30

Onsite Detention Basin (OUT) (Pond Routed Hydrograph (total out))...27, 28, 29

Onsite Detention Basin (OUT) (Time vs. Elevation)...7, 8, 9

Onsite Detention Basin (Pipe Volume)...13, 14

Onsite Detention Basin (Time vs. Volume)...10, 11, 12

Outfall (POC) (Addition Summary)...6

Outlet-1 (Diverted Hydrograph)...31, 32, 33

U

Unit Hydrograph (Onsite Runoff) (Read Hydrograph)...4, 5

User Notifications...2

APPENDIX C: INLET CAPACITY CALCULATIONS

Worksheet for 2'x2' Grate Inlet in Sag (Largest runoff)

Project Description	
Solve For	Spread

Input Data	
Discharge	1.30 cfs
Gutter Width	0.00 ft
Gutter Cross Slope	0.000 ft/ft
Road Cross Slope	0.020 ft/ft
Grate Width	2.00 ft
Grate Length	2.0 ft
Local Depression	0.0 in
Local Depression Width	0.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

Results	
Spread	12.9 ft
Depth	3.1 in
Gutter Depression	0.0 in
Total Depression	0.0 in
Open Grate Area	1.8 ft²
Active Grate Weir Length	4.0 ft

Worksheet for 2'x2' Grate Inlet On Grade (Largest runoff)

Project Description	
Solve For	Efficiency

Input Data	
Discharge	1.30 cfs
Slope	0.020 ft/ft
Gutter Width	0.00 ft
Gutter Cross Slope	0.000 ft/ft
Road Cross Slope	0.020 ft/ft
Roughness Coefficient	0.015
Grate Width	2.00 ft
Grate Length	2.0 ft
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

Options	
Grate Flow Option	Exclude None

Results	
Efficiency	61.24 %
Intercepted Flow	0.80 cfs
Bypass Flow	0.50 cfs
Spread	6.8 ft
Depth	1.6 in
Flow Area	0.5 ft²
Gutter Depression	0.0 in
Total Depression	0.0 in
Velocity	2.80 ft/s
Splash Over Velocity	5.66 ft/s
Frontal Flow Factor	1.000
Side Flow Factor	0.021
Grate Flow Ratio	0.604
Active Grate Length	1.0 ft

Worksheet for 3' Curb Inlet (Largest runoff)

Project Description	
Solve For	Spread

Input Data	
Discharge	1.00 cfs
Gutter Width	0.00 ft
Gutter Cross Slope	0.000 ft/ft
Road Cross Slope	0.020 ft/ft
Curb Opening Length	3.0 ft
Opening Height	0.8 ft
Curb Throat Type	Horizontal
Local Depression	0.0 in
Local Depression Width	0.0 in
Throat Incline Angle	90.00 degrees

Results	
Spread	11.6 ft
Depth	2.8 in
Gutter Depression	0.0 in
Total Depression	0.0 in

Worksheet for 7' Curb Inlet (Largest runoff)

Project Description	
Solve For	Spread

Input Data	
Discharge	2.10 cfs
Gutter Width	0.00 ft
Gutter Cross Slope	0.000 ft/ft
Road Cross Slope	0.020 ft/ft
Curb Opening Length	7.0 ft
Opening Height	0.8 ft
Curb Throat Type	Horizontal
Local Depression	0.0 in
Local Depression Width	0.0 in
Throat Incline Angle	90.00 degrees

Results	
Spread	10.8 ft
Depth	2.6 in
Gutter Depression	0.0 in
Total Depression	0.0 in