Appendix G

***Preliminary Drainage Study***

STEVENS · CRESTO ENGINEERING, INC.

# CEQA PRELIMINARY DRAINAGE STUDY

## FOR:

# OTAY 250, TRACT 5607
**PDS 2015-SPA-15-001**

## OTAY MESA, CA

Prepared for:
**SUNROAD OTAY PARTNERS, LP**
4445 Eastgate Mall, Suite 400
San Diego, CA 92121

Prepared by:
**STEVENS CRESTO ENGINEERING INC.**
9665 Chesapeake Drive, Suite 200
San Diego, CA 92123

Revised: 08/25/16
Revised: 04/08/16
Date: 07/16/15
SCE Project: 14009.01

©Stevens Cresto Engineering, Inc. 2016

# TABLE OF CONTENTS


| TOPIC | SECTION | PAGE |
|---|---|---|
| **INTRODUCTION / PROJECT DESCRIPTION** | **1** | 1-1 |
| **VICINITY MAP & SITE MAP (Tentative Map Reduction)** | **2** | 2-1 |
| **EXISTING HYDROLOGY** | **3** | 3-1 |
| Exhibit "A" – Existing Drainage Basins (11" X 17" Reduction) | | 3-2 |
| Exhibit "B" – Existing Runoff Coefficient Study | | 3-24 |
| BASIN "A" | 3-1 | 3-3 |
| BASIN "B" | 3-2 | 3-9 |
| BASIN "C" | 3-3 | 3-17 |
| **POST-PROJECT HYDROLOGY** | **4** | 4-1 |
| Exhibit "C" – Post-Project Drainage Basins (11" X 17" Reduction) | | 4-2 |
| Exhibit "D" – Post-Project Runoff Coefficient Study | | 4-313 |
| BASIN "A" | 4-1 | 4-6 |
| BASIN "B" | 4-2 | 4-177 |
| BASIN "C" | 4-3 | 4-270 |
| **HYDRAULICS - DETENTION** | **5** | 5-1 |
| ALLOWABLE PEAK DISCHARGE RATES (LOTS) | 5-1 | 5-2 |
| DETENTION CALCULATIONS | 5-2 | 5-3 |
| DUAL PURPOSE BIOFILTRATION SIZING CONFIRMATION | 5-3 | 5-29 |
| **APPENDIX A (County Hydrology Figures/Tables)** | **6** | 6-1 |
| **DRAINAGE EXHIBITS** | **7** | 7-1 |
| Exhibit "A" – Existing Drainage Basins | | |
| Exhibit "C" – Post-Project Drainage Basins | | |

# SECTION 1

## INTRODUCTION / PROJECT DESCRIPTION

**Sunroad Otay 250 / County of San Diego Tract 5607** is a proposed commercial/light industrial subdivision containing thirty (developable) lots on approximately 253 acres. In its current form, the project represents a replacement, by expansion and re-design, of the existing approved "Sunroad Tech Centre" County of San Diego Tract 5139-RPL6. The project is located north of Otay Mesa Road, east of State Highway SR-125, south of Lone Star Road, and extends east to Vann Centre Drive, in the Otay Mesa area within the County of San Diego, California. This study has been prepared as required by the County of San Diego and accompanies the Tentative Map application for the **Sunroad Otay 250** Subdivision. The proposed lots for **Sunroad Otay 250** will be rough graded for future ultimate development. On-lot water quality and hydromodification BMPs will be constructed with the future ultimate development to satisfy current criteria at the time of permit processing. BMPs at this phase of development will be limited to those BMPs required to provide water quality, hydromodification mitigation, and peak flow mitigation for runoff from the public right of way; see the project Storm Water Quality Management Plan (SWQMP) for water quality and hydromodification details.

This report analyzes runoff generated from three distinct watersheds, labeled Basins "A", "B", and "C", within this study. Peak rates of runoff generated by the project are calculated for a 100 year design storm, using the Modified Rational Method, per the County of San Diego Hydrology Manual, dated June 2003. Hydrologic routing of the subdivision is provided in this study to demonstrate that the project will provide adequate peak flow mitigation at each downstream point of compliance once detention is implemented within the project. Hydrology routing within this study is performed using Advanced Engineering Software (AES) release 2014.

The project site, in the pre-project condition, is undeveloped property consisting of natural terrain, and low density residential that is situated within three distinct regional drainage basins. Runoff generated by basin "A" and basin "C" flows south across the border into Mexico and ultimately to the Tijuana River. (See Exhibit "A", in Section 7, for a graphic depicting the pre-project condition and drainage basins). Per agreement with County of San Diego "Flood Control Division" the County will adopt the City of San Diego, "Drainage Requirements for Developments in Otay Mesa", the agreement limits runoff from projects tributary to Mexico. Since the proposed development will increase runoff generated by the project site, the project will utilize on-lot (future) and regional detention facilities to mitigate for the increase in peak flow. Runoff generated by the project will not exceed pre-project peak flow rates, and runoff velocities will be dissipated by rock riprap at storm drain outfalls. The project has been designed to honor pre-project watershed basins and outfall locations. Considering the limitations which result from Subdivision layout and design, minor exchanges in watershed areas occur but are minimized to the maximum extent practicable. **Sunroad Otay 250** proposes the construction of seven detention ponds to mitigate peak flows generated by the proposed public roadway improvements.

### HYDROMODIFICATION REQUIREMENTS

**Sunroad Otay 250** is a Priority Development Project and, as such, is subject to the hydromodification mitigation requirements detailed in the San Diego Countywide Hydromodification Plan, dated March 25, 2011, and required per the Regional Water Quality Control Board Order No. R9-2007-0001, Provision D.1.g (6). All detention facilities proposed at **Sunroad Otay 250** will be designed to satisfy hydromodification detention requirements, in

addition to peak flow detention requirements. Hydromodification BMP facilities ensure that runoff flow rates generated by the project match, as closely as possible, pre-project flow rates generated by the project during design storms ranging from 0.5Q2 to Q10. See additional discussion and calculations within the project SWQMP.

## CONCLUSION

As previously discussed, **Sunroad Otay 250** contains basins which are tributary to the Tijuana River and is therefore required to limit its discharge of runoff to existing discharge rates in the developed condition. Regional detention facilities will be utilized to limit runoff to pre-development discharge rates. As shown in this report, the proposed storm drain systems have adequate capacity to convey runoff generated by the project during a 100-year frequency design storm without flooding streets or adjacent private property. Additionally, proposed detention facilities will limit flow rates and velocities to match existing values. The following table summarizes the changes in project runoff due to development of the **Sunroad Otay 250**.

**Existing and Proposed Runoff Summary**

| | Existing Condition | | Developed Condition[1] | | |
|---|---|---|---|---|---|
| Basin | Area (acres) | $Q_{100}$ (cfs) | Area (acres) | $Q_{100}$ (Undetained) (cfs) | $Q_{100}$ (Detained) (cfs) |
| A | 159.1 | 140.46 | 166.2 | 520.36 | 139.77 |
| B | 176.7 | 135.29 | 174.6 | 609.28 | 133.82 |
| C | 82.3 | 91.31 | 77.5 | 275.74 | 82.91 |

1. Project design has honored existing drainage basins to the maximum extent practicable; within the constraints/ confines of Subdivision layout. The developed runoff rates from the project area are the same or less than the existing runoff rates in all drainage basins to which the project is tributary. Runoff to downstream properties will not be increased; the project will not change flow characteristics to downstream, offsite, basins.

Calculations within this study model the proposed lots in a rough graded condition. Any future development on the lots will be required to provide adequate storm water BMPs to address peak flow, hydromodification and water quality mitigation needs. The table below summarizes the Q's and Tc's generated by each lot in the rough graded condition. Future developments will need to demonstrate conformance to these Q's and Tc's during site development review. Any significant deviation from the values below may, at the discretion of the County Engineer, require substantial remodeling of the subdivision calculations.

**ALLOWABLE PEAK DISCHARGE RATES (LOTS)**

| LOT NO. | GROSS LOT AREA (ac.) | BASIN | Tc (min) | $Q_{100}$ (cfs) |
|---|---|---|---|---|
| 1 | 10.42 | A + C | 10.14 | 18.13 |
| 2 | 3.23 | C | 10.09 | 5.68 |
| 3 | 3.51 | A + C | 10.15 | 5.86 |
| 4 | 7.98 | A | 10.10 | 13.81 |
| 5 | 4.89 | A | 10.12 | 8.41 |
| 6 | 5.53 | A | 10.11 | 9.47 |
| 7 | 5.40 | A | 10.11 | 9.36 |
| 8 | 5.55 | A | 10.15 | 9.78 |
| 9 | 1.76 | A | 10.07 | 3.17 |
| 10 | 1.89 | A | 9.98 | 3.29 |
| 11 | 2.02 | A | 10.16 | 3.48 |
| 12 | 2.09 | A | 10.15 | 3.12 |
| 13 | 8.06 | A | 10.12 | 13.97 |
| 14 | 10.08 | A | 10.30 | 16.96 |
| 15 | 5.24 | A | 10.15 | 9.01 |
| 16 | 8.03 | A | 10.12 | 13.26 |
| 17 | 3.16 | A | 10.11 | 5.50 |
| 18 | 3.30 | A | 10.15 | 5.63 |
| 19 | 6.42 | B | 10.15 | 11.22 |
| 21 | 5.65 | B | 10.08 | 9.28 |
| 22 | 11.84 | B | 10.22 | 15.88 |
| 23 | 5.52 | B | 10.11 | 9.48 |
| 24 | 6.71 | A | 10.15 | 11.44 |
| 25 | 5.64 | C | 10.13 | 9.19 |
| 26 | 4.15 | B | 10.09 | 9.13 |
| 27 | 5.68 | B | 10.29 | 11.29 |
| 28 | 6.92 | B | 10.20 | 11.70 |
| 29 | 12.01 | B | 9.83 | 20.85 |
| 30 | 6.70 | B + C | 10.02 | 11.10 |

**CEQA Issues of Concern:**

- The project will not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion on- or off-site. Discharge points (outlets) from the storm drain systems are designed to discharge to existing flow drainage ditches or existing storm drain systems at existing flow rates.

- The project will not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. As discussed in the previous bulleted item, each lot's discharge is conveyed to the existing ditches or storm drain systems through the proposed storm drain. Thus each lot is provided adequate drainage and protection against flooding. Since detention design on-site limits peak discharge from the development to existing levels, down stream properties are not impacted by the project.

- The project will not create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems. See discussion in the previous two bulleted items.

- The project will not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, including County Floodplain Maps. The project is located on FEMA, FIRM PANEL 2183 OF 2375 (MAP No. 06073C2183) and is not located within a floodplain or floodway; resultantly no County Floodplain Map exists for the project location.

- The project will not place, within a 100-year flood hazard area, structures which would impede or redirect flood flows. See previous bulleted item for further details.

- The project will not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam on-site or off-site. No levee or dam exists on-site or up-stream of the site.

Drainage Study for:
Sunroad Otay 250

## DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the Engineer of Work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current standards.

I understand that the check of project drawings and specifications by the County of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for project design.

8/25/16

Bryan T. Hill
R.C.E. 69339

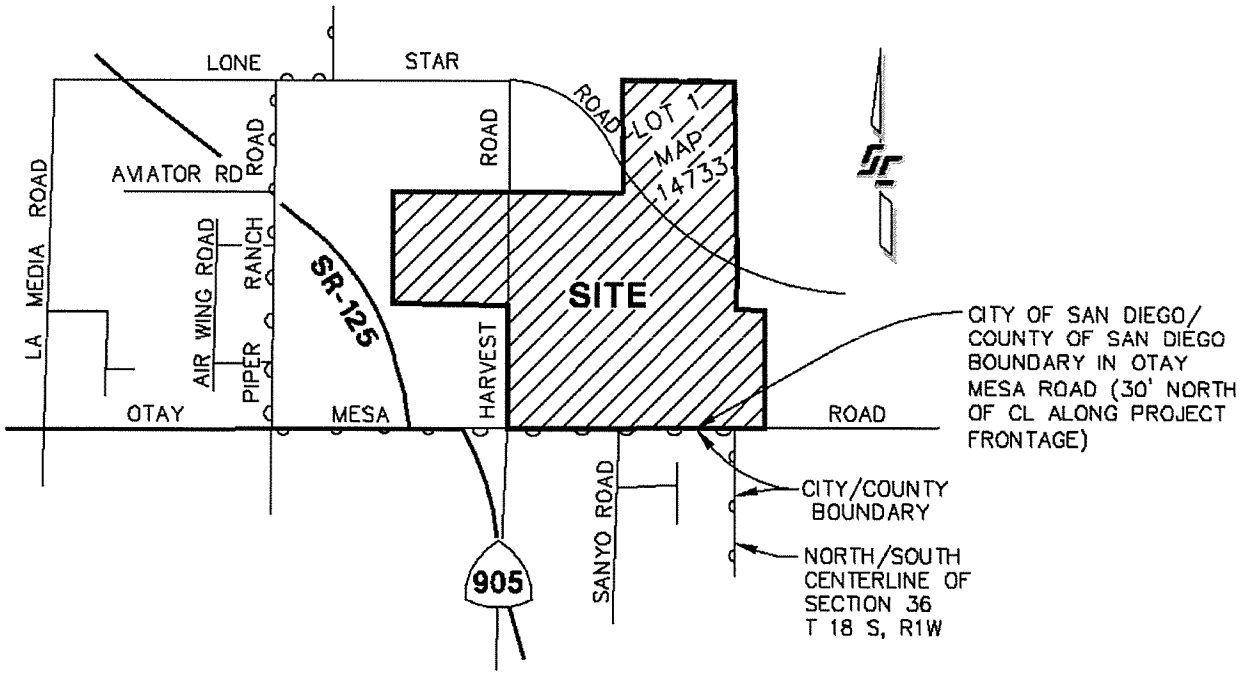
Date



2

# SECTION 2

## VICINITY MAP



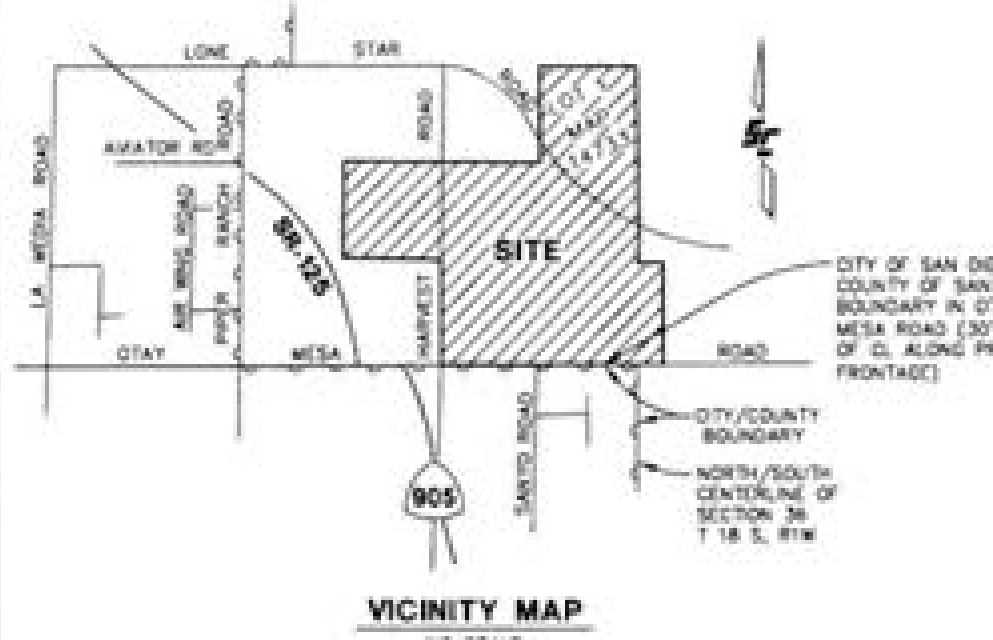

**VICINITY MAP**

NO SCALE

# COUNTY OF SAN DIEGO TRACT 5607

## ENVIRONMENTAL LOG NO. 98-19-013B

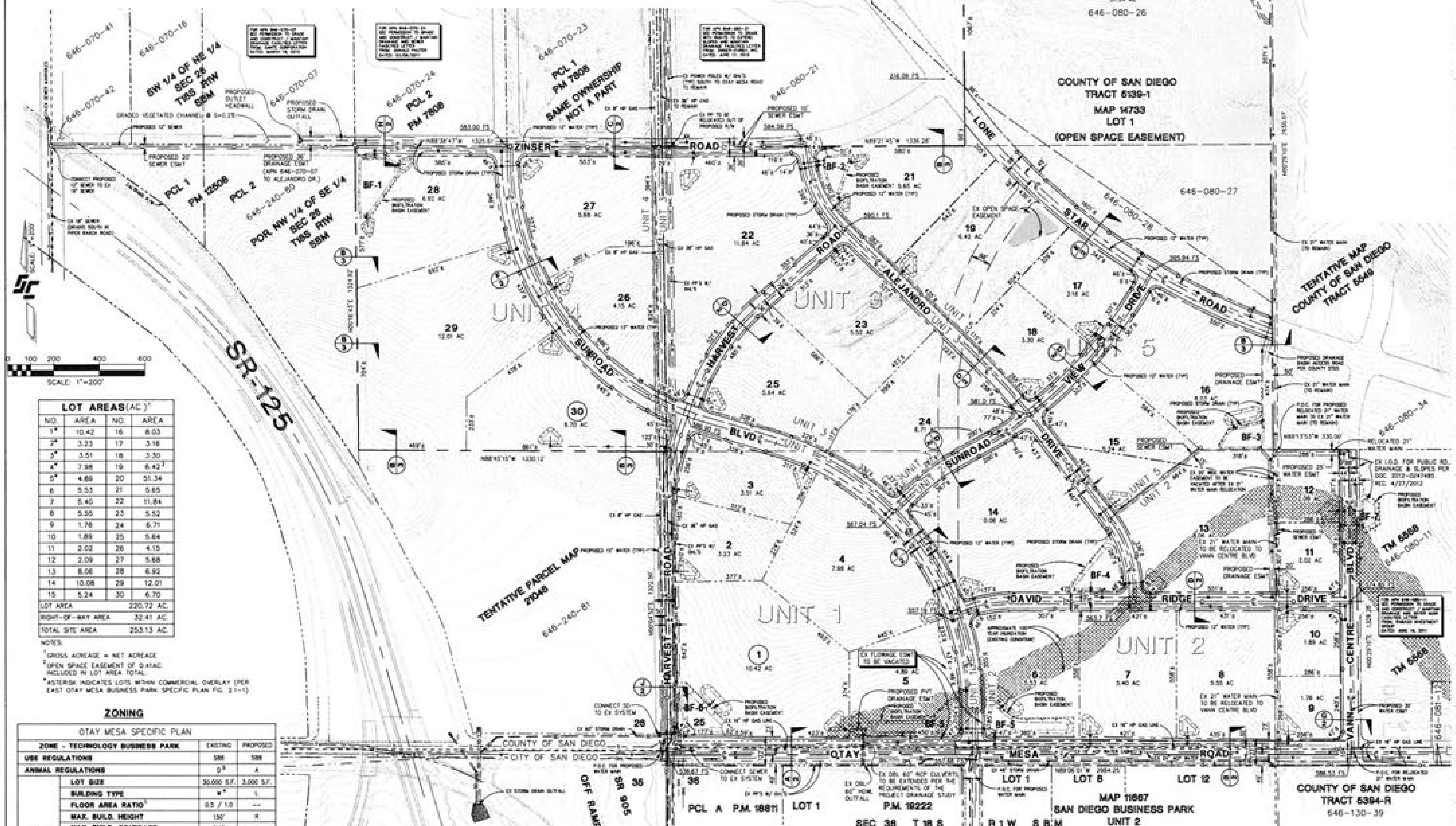
## OTAY 250
## TENTATIVE MAP




**VICINITY MAP**
NO SCALE

**SHEET INDEX**


C-1 TENTATIVE MAP
C-2 TYPICAL ROADWAY SECTIONS / SITE SECTIONS
C-3 PRELIMINARY GRADING PLAN
C-4 EXISTING MAPPING AND EASEMENT EXHIBIT
C-5 PRELIMINARY STRIPING PLAN - ONSITE STREETS
C-6 PRELIMINARY STRIPING PLAN - OTAY MESA ROAD
C-7 PRELIMINARY ROUTE STUDY - OTAY MESA ROAD
C-8 PRELIMINARY ROUTE STUDY - SUNROAD BOULEVARD
C-9 PRELIMINARY ROUTE STUDY - LONE STAR ROAD
C-10 PRELIMINARY ROUTE STUDY - HARVEST ROAD
C-11 PRELIMINARY ROUTE STUDY - DAVID RIDGE DRIVE, SUNROAD VIEW DRIVE
C-12 PRELIMINARY ROUTE STUDY - VANN CENTRE BOULEVARD
C-13 PRELIMINARY ROUTE STUDY - ZINSER ROAD
C-14 PRELIMINARY ROUTE STUDY - ALEJANDRO DRIVE
C-15 PRELIMINARY SEWER ALIGNMENT EXHIBIT
C-16 GRADING PLAN CONFORMANCE NOTES
C-17 EXISTING SLOPE ANALYSIS EXHIBIT


| LOT AREAS(AC.)[1] | | | |
|---|---|---|---|
| NO. | AREA | NO. | AREA |
| 1* | 10.42 | 16 | 8.03 |
| 2* | 3.23 | 17 | 3.16 |
| 3* | 3.51 | 18 | 3.30 |
| 4* | 7.98 | 19 | 6.42[2] |
| 5* | 4.89 | 20 | 51.34 |
| 6 | 5.53 | 21 | 5.65 |
| 7 | 5.40 | 22 | 11.84 |
| 8 | 5.55 | 23 | 5.52 |
| 9 | 1.76 | 24 | 6.71 |
| 10 | 1.89 | 25 | 5.64 |
| 11 | 2.02 | 26 | 4.15 |
| 12 | 2.09 | 27 | 5.68 |
| 13 | 8.06 | 28 | 6.92 |
| 14 | 10.08 | 29 | 12.01 |
| 15 | 5.24 | 30 | 6.70 |
| LOT AREA | | | 220.72 AC. |
| RIGHT-OF-WAY AREA | | | 32.41 AC. |
| TOTAL SITE AREA | | | 253.13 AC. |

NOTES:
[1] GROSS ACREAGE = NET ACREAGE
[2] OPEN SPACE EASEMENT OF 0.41AC. INCLUDED IN LOT AREA TOTAL.
* ASTERISK INDICATES LOTS WITHIN COMMERCIAL OVERLAY (PER EAST OTAY MESA BUSINESS PARK SPECIFIC PLAN FIG. 2.1-1)

**ZONING**

| OTAY MESA SPECIFIC PLAN | | | |
|---|---|---|---|
| ZONE - TECHNOLOGY BUSINESS PARK | | EXISTING | PROPOSED |
| USE REGULATIONS | | S88 | S88 |
| ANIMAL REGULATIONS | | D[5] | A |
| DEVELOPMENT REGULATIONS | LOT SIZE | 30,000 S.F. | 3,000 S.F. |
| | BUILDING TYPE | W[4] | L |
| | FLOOR AREA RATIO[1] | 0.5 / 1.0 | -- |
| | MAX. BUILD. HEIGHT | 150' | R |
| | MAX. BUILD. COVERAGE | 0.40 | -- |
| | MIN. BUILD. SETBACKS | | |
| | PRIME ARTERIAL RD. | 25' | 25' |
| | MAJOR RD. | 20' | 20' |
| | INDUSTRIAL/COMMERCIAL/MIXED USE COLLECTOR RD (4-LANE) | 20' | V |
| | INDUSTRIAL/COMMERCIAL/MIXED USE COLLECTOR RD (2-LANE) | 10' | V |
| | INTERIOR SIDE YARD[2] | 0'-30' | V |
| | REAR YARD | 5' | V |
| | ENCLOSURES[3] | SEE NOTE 3 | |
| SPECIAL AREA REGULATIONS | | | D,C |

ZONING NOTES:
[1] 1.0 FAR WHEN WITHIN 1,250 FT. OF ACTIVITY NODE; 0.5 FAR WHEN LOCATED MORE THAN 1,250 FT FROM ACTIVITY NODE.
[2] SUM OF INTERIOR YARDS SHALL EQUAL AT LEAST 30 FT.; 50 FT. FROM TOP OF SLOPE IF ADJACENT TO THE OTAY VALLEY REGIONAL PARK.
[3] OUTDOOR STORAGE WITH SCREENING PER DEVELOPMENT STANDARDS (FENCING, WALLS AND HEDGES).
[4] W: NON-RESIDENTIAL, ATTACHED OR DETACHED SAME LOT OR SEPARATE LOT.
[5] D: SEE DESIGNATOR "D" OF THE ANIMAL SCHEDULE OF THE COUNTY ZONING ORDINANCE, SECTION 3100.

**ASSESSOR'S PARCEL NUMBERS & TAX RATE AREA TABLE**

| PARCEL NUMBER | TAX RATE AREA |
|---|---|
| 646-310-17 | 84039 |
| 646-080-33 | 84039 |
| 646-080-32 | 84039 |
| 646-080-31 | 84038 |
| 646-080-29 | 84038 |
| 646-080-28 | 84039 |
| 646-240-30 | 84040 |
| 646-080-27 | 84028 |
| 646-080-26 | 84033 |

**NOTE:**
SEE SHEET C-3 FOR MINIMUM ON-LOT BMPS REQUIRED TO SATISFY INTERIM HYDROMODIFICATION CRITERIA.

**SLOPE ANALYSIS TABLE**

| | |
|---|---|
| 0-15% SLOPES | 231.8 AC. |
| 15-25% SLOPES | 11.8 AC. |
| 25-50% SLOPES | 8.6 AC. |
| 50% OR GREATER SLOPES | 0.8 AC. |

**LOT/UNIT TABLE**

| | |
|---|---|
| LOTS 1-5 | UNIT NO. 1 |
| LOTS 6-14 | UNIT NO. 2 |
| LOTS 22-25 | UNIT NO. 3 |
| LOTS 26-30 | UNIT NO. 4 |
| LOTS 15-21 | UNIT NO. 5 |

**LEGEND**

| DESCRIPTION | SYMBOL |
|---|---|
| PROPOSED LOT NUMBER (*ASTERISK-AT LOT NUMBER INDICATES LOTS WITHIN COMMERCIAL OVERLAY) | (1) THRU (30) |
| SUBDIVISION BOUNDARY | |
| PROPOSED LOT LINE | |
| PROPOSED RIGHT-OF-WAY | |
| UNIT BOUNDARY LINE | UNIT 1 / UNIT 2 |
| EXISTING RIGHT-OF-WAY | |
| PROPOSED SEWER MAIN W/MANHOLE | |
| PROPOSED WATER MAIN | W |
| PROPOSED STORM DRAIN | SD |
| PROPOSED STORM DRAIN INLET OR CLEANOUT | |
| PROPOSED COLLECTION BASIN & RISER (DETENTION BASIN CONTROL STRUCTURE) | |
| PROPOSED REGIONAL BIOFILTRATION BASIN | BF |
| 100 YEAR INUNDATION AREA (APPROXIMATE) | |
| SPECIAL FLOOD HAZARD AREA (APPROX.) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD (F.I.R.M. PANELS 06073C2179G & 06073C2183G) | ZONE "AE" |

**GENERAL NOTES**

1. EXISTING ZONING - S-88 TECHNOLOGY BUSINESS PARK/COMMERCIAL OVERLAY.
2. PROPOSED ZONING - S-88 TECHNOLOGY BUSINESS PARK/COMMERCIAL OVERLAY AND MIXED USE-RESIDENTIAL/RETAIL.
3. GROSS ACREAGE WITHIN SUBDIVISION BOUNDARY: 253.13 ACRES, NET AREA: 220.72 ACRES, STREETS: 32.41 ACRES.
4. TOTAL NUMBER OF LOTS: 30; 4 COMMERCIAL/TECHNOLOGY BUSINESS PARK LOTS, 25 MIXED USE LOTS, 1 OPEN SPACE LOT. MINIMUM LOT SIZE IS 1.8 ACRES.
5. CONTOUR INTERVALS: 5 FOOT MAJOR, 1 FOOT MINOR (MEAN SEA LEVEL DATUM).
6. SPECIAL ASSESSMENT ACT PROCEEDINGS - MAY BE REQUESTED FOR THIS PROJECT.
7. IMPROVEMENTS, EASEMENTS AND DEDICATIONS ARE AS REQUIRED BY THE COUNTY ENGINEER.
8. SCHOOLS:
   SAN YSIDRO SCHOOL DISTRICT
   SWEETWATER UNION HIGH SCHOOL DISTRICT
9. UTILITIES:
   A. SEWER - SAN DIEGO COUNTY SANITATION DISTRICT
   B. WATER - OTAY MUNICIPAL WATER DISTRICT
   C. GAS & ELECTRIC - SAN DIEGO GAS & ELECTRIC COMPANY
   D. TELEPHONE - AT&T
10. FIRE PROTECTION - SAN DIEGO COUNTY RURAL FIRE DISTRICT
11. ALL PROPOSED UTILITIES TO BE UNDERGROUND.
12. ALL EXISTING EASEMENTS NOT REMAINING IN USE SHALL BE VACATED PRIOR TO RECORDATION OF THE FINAL MAP(S) SUBJECT TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.
13. EXISTING TOPOGRAPHY WAS COMPILED USING PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY, BY MISSION AERIAL PHOTOGRAPHY/PHOTO GEODETIC CORP., 2006-2007.
14. THE FOLLOWING WAIVERS FROM THE SUBDIVISION ORDINANCE DESIGN STANDARDS ARE APPROVED: DESIGN EXCEPTION: SUNROAD BOULEVARD DESIGN SPEED, APPROVAL OBTAINED, LETTER DATED DECEMBER 1, 2008 FROM DPW PROJECT MANAGER.
15. LAMBERT COORDINATES: 146-1785 (CCS27)
16. DRAINAGE: STREETS & STORM DRAIN AS REQUIRED.
17. ALL ONSITE STREETS WILL BE PUBLIC.
18. THIS IS A SOLAR SUBDIVISION AS REQUIRED BY SECTION 81.401 (x), OF THE SUBDIVISION ORDINANCE. ALL LOTS HAVE AT LEAST 100 SQ. FT. OF UNOBSTRUCTED ACCESS TO SUNLIGHT ON THE BUILDABLE PORTION OF THE LOT.
19. THIS PROJECT IS A MULTI-UNIT SUBDIVISION. MULTIPLE FINAL MAPS MAY BE FILED PURSUANT TO SECTION 66456.1 OF THE SUBDIVISION MAP ACT.
20. PHASING OF THE PROJECT WILL BE ACCOMPLISHED BY RECORDATION OF FINAL MAPS BY UNIT.
21. STREET LIGHTS WILL BE INSTALLED TO COMPLY WITH THE REQUIREMENTS AS SPECIFIED BY THE COUNTY STANDARDS.
22. STORM DRAIN DETENTION WILL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EAST OTAY MESA BUSINESS PARK SPECIFIC PLAN (SEPT. 15, 2010). THIS DETENTION WILL BE ACCOMPLISHED THROUGH UTILIZATION OF PUBLIC, CATEGORY 3 DETENTION BASINS WHERE INDICATED ON THE TENTATIVE MAP.
23. WATER FACILITIES IF NOT EXISTING ARE ASSUMED FOR EACH STREET AND HALF WIDTH FRONTAGE IMPROVEMENT, SIZING REQUIREMENTS PER WATER DISTRICT.
24. PROPOSED DRIVEWAY LOCATIONS ARE NOT SHOWN HEREON. PRIVATE DRIVEWAY LOCATIONS MAY VARY DEPENDANT UPON THE NEEDS OF FUTURE DEVELOPMENT OF INDIVIDUAL LOTS AND ARE SUBJECT TO A SITE DEVELOPMENT PLAN REVIEW AND APPROVAL.

**LEGAL DESCRIPTION**

THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 26, TOWNSHIP 18 SOUTH, RANGE 1 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

TOGETHER WITH THE SOUTHWEST QUARTER, AND THE WEST 330 FEET OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER AND THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER, ALL IN SECTION 25, TOWNSHIP 18 SOUTH, RANGE 1 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTING THEREFROM THE FOLLOWING: THE WESTERLY 30 FEET OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER.

**BENCH MARK**

BRASS DISK STAMPED "JM 154 1969" LOCATED 3.09 MILES EAST ALONG OTAY MESA ROAD FROM INTERSECTION OF OTAY VALLEY ROAD, 20.5' SOUTH OF CENTERLINE OF OTAY MESA ROAD AND ABOUT 170' EAST OF CENTERLINE INTERSECTION OF HARVEST ROAD. STEEL FENCEPOST MARKER LIES 1' SOUTH OF DISK. RECORD FROM COUNTY OF SAN DIEGO VERTICAL CONTROL RECORD. ELEVATION: 541.10 DATUM: U.S.C.& G.S., M.S.L.

**GRADING QUANTITIES**

| | |
|---|---|
| CUT: | 1,350,000 CY |
| FILL: | 1,350,000 CY |
| NET: | 0 CY |

**GENERAL PLAN LAND USE DESIGNATION**

SPECIFIC PLAN AREA

**GENERAL PLAN REGIONAL CATEGORY**

VILLAGE

**PARK LAND DEDICATION**

PARK LAND WILL BE PROVIDED CONSISTENT WITH THE EAST OTAY MESA BUSINESS PARK SPECIFIC PLAN (SEPT. 15, 2010).

**STREET NAME APPROVAL**

THE PROPOSED STREET NAMES SHOWN WITHIN THE SUBDIVISION BOUNDARY HEREON HAVE RECEIVED PRELIMINARY APPROVAL FROM THE DEPARTMENT OF PLANNING AND LAND USE, BY: NORA RIVERA, DATES: MAY 3, 2001, APRIL 19, 2001 AND OCTOBER 17, 2007.

**OWNER/SUBDIVIDER**


SUNROAD OTAY PARTNERS, LP
4445 EASTGATE MALL, SUITE 400
SAN DIEGO, CA 92121
PHONE: (858) 362-8500
FAX: (858) 362-8448

SUNROAD OTAY PARTNERS, LP
BY: SUNROAD GP, INC., IT'S GENERAL PARTNER

BY: ______________________ DATE: __________
DAN FELDMAN
PRESIDENT


**ENGINEER OF WORK**


______________________ DATE: __________
MARK E. STEVENS
R.C.E. 35502

REGISTERED PROFESSIONAL ENGINEER MARK E. STEVENS No. 35502 Exp. 9-30-17 CIVIL STATE OF CALIFORNIA

STEVENS CRESTO ENGINEERING, INC.
CIVIL ENGINEERS · PLANNERS · LAND SURVEYORS
9665 CHESAPEAKE DRIVE
SUITE 320
SAN DIEGO, CA 92123-1352
PHONE: (858)694-5660
FAX: (858)694-5661
www.scengr.com


| REVISIONS | BY |
|---|---|
| | |

TENTATIVE MAP

**COUNTY OF SAN DIEGO TRACT 5607**
**OTAY 250**
**COUNTY OF SAN DIEGO, CALIFORNIA**

| | |
|---|---|
| Date: | JULY 17, 2015 |
| Scale: | AS SHOWN |
| Job: | 14009.01 |
| Sheet | C-1 |
| | 1 of 17 Sheets |

2-2

3

# SECTION 3

## EXISTING HYDROLOGY

**HYDROLOGY PROCEDURE:**

Hydrology routing within this study is performed using Advanced Engineering Software (AES) release 2014.

This study analyzes historic Basins "A", "B", and "C". Drainage Exhibit "A" within Section 7 depicts the pre-project basin limits being studied; a reduced copy follows. The site is located within Hydrologic Soil Groups D. A runoff coefficient study was performed for the pre-project condition and is included in this section as Exhibit "B". The study takes into account existing roads, low density residential development, and dirt trails in the project area. A composite runoff coefficient was generated for each sub-basin utilizing County runoff coefficients. Runoff coefficients were calculated for each sub-basin, by calculating a weighted runoff coefficient. Six hour precipitation is taken from the County of San Diego isopluvial maps (isopluvial maps are included in Section 6 for reference). Descriptions and calculations for each historic basin follow in Sections 3-A to 3-C.




## LEGEND

HISTORIC DRAINAGE BASIN BOUNDARY "A"

HISTORIC DRAINAGE BASIN BOUNDARY "B"

HISTORIC DRAINAGE BASIN BOUNDARY "C"

DRAINAGE SUB BASIN

A3 / 47.14 – BASIN DESIGNATION
BASIN AREA (Acres)

PROJECT BOUNDARY

EXISTING STORM DRAIN

RUNOFF/CHANNEL FLOW DIRECTION

SWALE/BROW DITCH FLOW DIRECTION

FLOW PATH

SCALE: NTS

0 100 200 400 600
SCALE: NTS

STEVENS CRESTO ENGINEERING, INC.
CIVIL ENGINEERS · PLANNERS · LAND SURVEYORS

REVISIONS

SUNROAD OTAY 250
SAN DIEGO, CALIFORNIA

EXHIBIT "A"
EXISTING DRAINAGE BASINS

DATE: 04/06/16
SCE NO. 14008.01
SHEET
A
1 OF 1 SHEETS

3-2

# SECTION 3-A

## EXISTING HYDROLOGY, BASIN A

Basin "A" topography generally falls gently from East to West from a highpoint in the South East corner of the watershed (design point 100 on Exhibit A). Runoff is conveyed via overland sheet flow through the center of the watershed as shown on Exhibit "A". Ultimately, runoff generated in the basin crosses southerly under Otay Mesa Road, approximately ¼ mile east of Harvest Road through an existing double 60" RCP culvert within Otay Mesa Road (design point 104 on Exhibit "A"); per record drawings for County of San Diego File No. SA 1120.00002. The existing culvert discharges to an open field south of Otay Mesa Road.

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                                SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD OTAY 250                                                        *
* 100 YEAR DESIGN STORM                                                   *
* PRE PROJECT BASIN A                                                     *
 *************************************************************************

  FILE NAME: 1400901\PREA.DAT
  TIME/DATE OF STUDY: 07:46 04/01/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)      (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    631.00
  DOWNSTREAM ELEVATION(FEET) =    627.00
```

```
 ELEVATION DIFFERENCE(FEET) =      4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.505
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.611
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   863.20
 REPRESENTATIVE CHANNEL SLOPE =  0.0440
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  26.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.207
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
 AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   4.79
 Tc(MIN.) =   13.29
 SUBAREA AREA(ACRES) =     9.97       SUBAREA RUNOFF(CFS) =   14.68
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =      14.93

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   3.56
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     963.20 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1875.60
 REPRESENTATIVE CHANNEL SLOPE =  0.0180
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  32.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.939
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3900
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      42.18
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.16
 AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   9.89
 Tc(MIN.) =   23.18
 SUBAREA AREA(ACRES) =    47.14       SUBAREA RUNOFF(CFS) =   54.04
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.383
 TOTAL AREA(ACRES) =       57.3         PEAK FLOW RATE(CFS) =      64.47

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.76   FLOW VELOCITY(FEET/SEC.) =   3.49
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    2838.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    103.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   23.18
  RAINFALL INTENSITY(INCH/HR) =   2.94
  TOTAL STREAM AREA(ACRES) =    57.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     64.47

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    630.00
  DOWNSTREAM ELEVATION(FEET) =    628.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.879
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.095
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   461.90
  REPRESENTATIVE CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  21.400
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.072
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.88
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   4.10
  Tc(MIN.) =   13.98
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    1.31
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       1.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   2.18
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     561.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1455.60
  REPRESENTATIVE CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  35.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.771
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.13
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =  11.41
  Tc(MIN.) =   25.39
  SUBAREA AREA(ACRES) =    20.58       SUBAREA RUNOFF(CFS) =   19.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       21.6         PEAK FLOW RATE(CFS) =      20.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   2.64
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    103.00 =    2017.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.39
  RAINFALL INTENSITY(INCH/HR) =   2.77
  TOTAL STREAM AREA(ACRES) =    21.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       64.47    23.18        2.939         57.28
      2       20.97    25.39        2.771         21.62

  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       83.61    23.18        2.939
      2       81.75    25.39        2.771

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      83.61   Tc(MIN.) =   23.18
  TOTAL AREA(ACRES) =       78.9
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    2838.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1801.80
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  32.500
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.361
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     112.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
  AVERAGE FLOW DEPTH(FEET) =   1.04   TRAVEL TIME(MIN.) =   9.38
  Tc(MIN.) =   32.56
  SUBAREA AREA(ACRES) =    68.16       SUBAREA RUNOFF(CFS) =   57.93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.367
  TOTAL AREA(ACRES) =      147.1         PEAK FLOW RATE(CFS) =     127.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   3.32
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    4640.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.361
  *USER SPECIFIED(SUBAREA):
  GENERAL COMMERCIAL RUNOFF COEFFICIENT = .5800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3730
  SUBAREA AREA(ACRES) =    3.92   SUBAREA RUNOFF(CFS) =    5.37
  TOTAL AREA(ACRES) =      151.0   TOTAL RUNOFF(CFS) =     132.94
  TC(MIN.) =   32.56

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.361
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3738
  SUBAREA AREA(ACRES) =    8.17   SUBAREA RUNOFF(CFS) =    7.52
  TOTAL AREA(ACRES) =      159.1   TOTAL RUNOFF(CFS) =     140.46
  TC(MIN.) =   32.56
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      159.1  TC(MIN.) =     32.56
  PEAK FLOW RATE(CFS)    =     140.46
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# SECTION 3-B

## EXISTING HYDROLOGY, BASIN B

Basin "B" topography falls gently from East to West. The watershed covers an area which extends from the Easterly high point to the SR-125 extension and south from Lone Star Road to a ridgeline at the southern boundary of the watershed. Runoff from the basin is conveyed via shallow overland flow and natural channel flow to a low point at the west end of the watershed, on the east side of SR-125 (design point 207 on Exhibit "A"). Runoff then discharges to an existing 3ft deep concrete ditch (constructed by CTV as part of the SR-125 improvements). This flow historically travels northwest in the concrete channel before entering the CALTRANS storm drain system at a headwall. Once in the CALTRANS storm drain facility, flow crosses westerly under SR-125 through a 72" RCP where the flow enters a 72" public storm drain system.

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                               SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD OTAY 250                                                        *
* 100 YR DESIGN STORM                                                     *
* PRE PROJECT BASIN B                                                     *
 *************************************************************************

  FILE NAME: 1400901\PREB.DAT
  TIME/DATE OF STUDY: 16:43 04/05/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)      (FT)    SIDE / SIDE/ WAY    (FT)    (FT)   (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    201.00 TO NODE    202.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  630.00
  DOWNSTREAM ELEVATION(FEET) =  627.00
```

```
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.361
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.275
 SUBAREA RUNOFF(CFS) =      0.26
 TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    627.00  DOWNSTREAM(FEET) =    606.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0304
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.20
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.470
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.34
 AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   8.56
 Tc(MIN.) =   17.92
 SUBAREA AREA(ACRES) =     6.46       SUBAREA RUNOFF(CFS) =    7.85
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =        6.6         PEAK FLOW RATE(CFS) =       8.02

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.78
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     790.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    609.00  DOWNSTREAM(FEET) =    554.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1280.00   CHANNEL SLOPE =  0.0430
 CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  50.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.40
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.809
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.23
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.07
 AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   6.95
 Tc(MIN.) =   24.87
 SUBAREA AREA(ACRES) =    52.99       SUBAREA RUNOFF(CFS) =   52.09
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       59.6         PEAK FLOW RATE(CFS) =      58.58

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   3.67
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =    2070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    204.00 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.) =   24.87
  RAINFALL INTENSITY(INCH/HR) =   2.81
  TOTAL STREAM AREA(ACRES) =    59.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     58.58

****************************************************************************
  FLOW PROCESS FROM NODE    286.00 TO NODE    287.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    603.00
  DOWNSTREAM ELEVATION(FEET) =    598.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.887
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    287.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    598.00  DOWNSTREAM(FEET) =    554.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   907.00   CHANNEL SLOPE =  0.0485
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.404
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.37
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   4.49
  Tc(MIN.) =   12.38
  SUBAREA AREA(ACRES) =     4.92       SUBAREA RUNOFF(CFS) =    7.58
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        5.0         PEAK FLOW RATE(CFS) =       7.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   4.11
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    204.00 =    1007.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    286.00 TO NODE    204.00 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.) =   12.38
 RAINFALL INTENSITY(INCH/HR) =   4.40
 TOTAL STREAM AREA(ACRES) =     5.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.77

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       58.58    24.87        2.809         59.59
     2        7.77    12.38        4.404          5.04

 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       36.93    12.38       4.404
     2       63.53    24.87       2.809

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      63.53   Tc(MIN.) =   24.87
 TOTAL AREA(ACRES) =       64.6
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =    2070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    554.00  DOWNSTREAM(FEET) =    538.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   650.00   CHANNEL SLOPE =  0.0246
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  23.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.641
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      69.57
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.34
 AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   2.49
 Tc(MIN.) =   27.36
 SUBAREA AREA(ACRES) =    13.06       SUBAREA RUNOFF(CFS) =   12.07
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       77.7         PEAK FLOW RATE(CFS) =      71.80

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   4.38
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    205.00 =    2720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 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.) =   27.36
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.64
  TOTAL STREAM AREA(ACRES) =    77.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.80

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    610.00
  DOWNSTREAM ELEVATION(FEET) =    605.50
  ELEVATION DIFFERENCE(FEET) =      4.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.177
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.755
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    205.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    605.50  DOWNSTREAM(FEET) =    538.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1437.00   CHANNEL SLOPE =  0.0470
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.004
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.68
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =  14.23
  Tc(MIN.) =   22.41
  SUBAREA AREA(ACRES) =     8.63       SUBAREA RUNOFF(CFS) =    9.07
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        8.7         PEAK FLOW RATE(CFS) =       9.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.07
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    205.00 =    1537.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    205.00 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.) =   22.41
  RAINFALL INTENSITY(INCH/HR) =   3.00
  TOTAL STREAM AREA(ACRES) =     8.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.12
```

```
 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1        71.80     27.36         2.641          77.69
     2         9.12     22.41         3.004           8.68

 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        72.25     22.41        3.004
     2        79.82     27.36        2.641

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       79.82   Tc(MIN.) =   27.36
 TOTAL AREA(ACRES) =        86.4
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    205.00 =    2720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    538.00  DOWNSTREAM(FEET) =    521.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   787.00   CHANNEL SLOPE =  0.0216
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  80.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.419
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      96.48
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.29
 AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   3.99
 Tc(MIN.) =   31.35
 SUBAREA AREA(ACRES) =    39.33       SUBAREA RUNOFF(CFS) =   33.30
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      125.7         PEAK FLOW RATE(CFS) =     106.41

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.63   FLOW VELOCITY(FEET/SEC.) =   3.37
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    206.00 =    3507.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    506.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1200.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  26.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.187
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
```

```
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     125.95
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.78
 AVERAGE FLOW DEPTH(FEET) =   1.13   TRAVEL TIME(MIN.) =   5.29
 Tc(MIN.) =   36.64
 SUBAREA AREA(ACRES) =    51.02       SUBAREA RUNOFF(CFS) =   39.06
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =      176.7         PEAK FLOW RATE(CFS) =     135.29

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =   3.85
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    207.00 =    4707.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      176.7  TC(MIN.) =     36.64
 PEAK FLOW RATE(CFS)    =     135.29
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

# SECTION 3-C

## EXISTING HYDROLOGY, BASIN C

Basin "C" topography falls southwest from a high point in the northeast corner of the watershed to the southwest corner. Runoff is conveyed via overland sheet flow through the center of the watershed before reaching a shallow roadside swale at the intersection of Harvest Road and Otay Mesa Road (design point 302 on Exhibit "A"). This runoff historically travels west in the swale and crosses southerly under Otay Mesa Road, approximately ¼ mile east of Piper Ranch Road, through a Reinforced Box Culvert (RCB) installed as part of the SR-125 extension (design point 313 on Exhibit "A"). This runoff from Basin "C1" – "C3" converges with offsite runoff at the RCB headwall before discharging to an open field south of Otay Mesa Road. Offsite runoff accounts for runoff west of Harvest Road and North of Otay Mesa Road with a small segment South of Otay Mesa Road.

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                               SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD OTAY 250                                                        *
* 100 YR DESIGN STORM                                                     *
* PRE PROJECT BASIN C                                                     *
 **************************************************************************

  FILE NAME: 1400901\PREC.DAT
  TIME/DATE OF STUDY: 13:03 04/06/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  ========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    619.00
  DOWNSTREAM ELEVATION(FEET) =    616.00
```

```
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.361
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.275
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1908.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0400
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.755
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.96
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =  16.26
  Tc(MIN.) =   25.62
  SUBAREA AREA(ACRES) =    22.83       SUBAREA RUNOFF(CFS) =   22.01
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       22.9         PEAK FLOW RATE(CFS) =      22.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   2.43
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =    2008.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   467.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0190
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.554
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.43
  AVERAGE FLOW DEPTH(FEET) =   0.43   TRAVEL TIME(MIN.) =   3.20
  Tc(MIN.) =   28.82
  SUBAREA AREA(ACRES) =     0.35       SUBAREA RUNOFF(CFS) =    0.76
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.358
  TOTAL AREA(ACRES) =       23.3         PEAK FLOW RATE(CFS) =      22.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   2.46
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    2475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   404.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.51
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.11
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   29.36
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2879.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    304.00 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.) =   29.36
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =    23.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.11

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    591.00
  DOWNSTREAM ELEVATION(FEET) =    585.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.430
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.122
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   746.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0480
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.876
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.62
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   7.67
```

```
  Tc(MIN.) =   15.10
  SUBAREA AREA(ACRES) =     7.85       SUBAREA RUNOFF(CFS) =   10.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      10.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     846.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    313.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1276.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0200
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  40.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.851
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.31
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   9.20
  Tc(MIN.) =   24.30
  SUBAREA AREA(ACRES) =    27.04       SUBAREA RUNOFF(CFS) =   26.98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       35.1         PEAK FLOW RATE(CFS) =      35.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   2.56
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    313.00 =    2122.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    313.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =    80.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =   12.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   2.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      35.03
  FLOW VELOCITY(FEET/SEC.) =   6.44   FLOW DEPTH(FEET) =   0.45
  TRAVEL TIME(MIN.) =   0.21   Tc(MIN.) =   24.50
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    304.00 =    2202.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    304.00 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.) =   24.50
  RAINFALL INTENSITY(INCH/HR) =   2.84
```

```
 TOTAL STREAM AREA(ACRES) =    35.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.03

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       22.11    29.36        2.523         23.28
     2       35.03    24.50        2.836         35.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       53.48    24.50        2.836
     2       53.28    29.36        2.523

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      53.48   Tc(MIN.) =   24.50
 TOTAL AREA(ACRES) =       58.4
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    2879.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   205.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =   12.00   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   2.00
 CHANNEL FLOW THRU SUBAREA(CFS) =      53.48
 FLOW VELOCITY(FEET/SEC.) =   7.55   FLOW DEPTH(FEET) =   0.59
 TRAVEL TIME(MIN.) =   0.45   Tc(MIN.) =   24.95
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    3084.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.802
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .5900
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3866
 SUBAREA AREA(ACRES) =    9.66   SUBAREA RUNOFF(CFS) =   15.97
 TOTAL AREA(ACRES) =       68.0   TOTAL RUNOFF(CFS) =      73.72
 TC(MIN.) =   24.95

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.802
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .4400
```

```
  S.C.S. CURVE NUMBER (AMC II) =    0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3959
  SUBAREA AREA(ACRES) =    14.26   SUBAREA RUNOFF(CFS) =    17.58
  TOTAL AREA(ACRES) =        82.3   TOTAL RUNOFF(CFS) =      91.31
  TC(MIN.) =   24.95
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        82.3  TC(MIN.) =     24.95
  PEAK FLOW RATE(CFS)    =       91.31
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```




STEVENS-CRESTO ENGINEERING, INC.
CIVIL ENGINEERS - PLANNERS - LAND SURVEYORS
9645 CHESAPEAKE DRIVE, SUITE 210, SAN DIEGO, CA 92123-1352
PHONE: 858.694.0460
FAX: 858.694.0461
www.scengr.com

REVISIONS

| | |
|---|---|
| | |
| | |
| | |
| | |

# SUNROAD OTAY 250

SAN DIEGO, CALIFORNIA

## EXHIBIT "B"
## EXISTING RUNOFF COEFFICIENT STUDY

DATE: 04/06/16
SCE NO. 14009.01
SHEET
B
1 OF 1 SHEETS

X:\2014\14009\CAD\REPORTS\SRN\B_EX C-VALUE.dwg 4/6/2016 11:42 PM PDT

3-24

| C-VALUE DETERMINATION | | | | | | |
|---|---|---|---|---|---|---|
| **Basin** | **$A_T$ (Ac.)** | **$A_{0.9}$ (Ac.)** | **$A_{0.46}$ (Ac.)** | **$A_{0.35}$ (Ac.)** | **C** | **Remarks** |
| A1 | 0.17 | | | 0.17 | 0.35 | Undeveloped Terrain |
| A2 | 9.97 | | | 9.97 | 0.35 | Undeveloped Terrain |
| A3 | 47.14 | 1.10 | 9.8 | 36.24 | 0.39 | Undeveloped Terrain/Residential and Portion of Otay Mesa Road |
| A4 | 20.58 | | | 20.58 | 0.35 | Undeveloped Terrain |
| A5 | 68.16 | 0.20 | 2.91 | 65.05 | 0.36 | Undeveloped Terrain |
| A6 | 8.17 | 0.56 | | 7.61 | 0.39 | Undeveloped Terrain and Portion of Otay Mesa Road |
| A7 | 0.12 | | | 0.12 | 0.35 | Undeveloped Terrain |
| A8 | 0.92 | | | 0.92 | 0.35 | Undeveloped Terrain |
| A9 | 3.92 | 1.58 | 0.29 | 2.05 | 0.58 | Undeveloped Terrain/Residential and Portion of Otay Mesa Road |
| B1 | 0.14 | | | 0.14 | 0.35 | Undeveloped Terrain |
| B2 | 6.46 | | | 6.46 | 0.35 | Undeveloped Terrain |
| B3 | 52.99 | | | 52.99 | 0.35 | Undeveloped Terrain |
| B4 | 39.33 | | | 39.33 | 0.35 | Undeveloped Terrain |
| B5 | 51.02 | | | 51.02 | 0.35 | Undeveloped Terrain |
| B6 | 8.68 | | | 8.68 | 0.35 | Undeveloped Terrain |
| B7 | 5.04 | | | 5.04 | 0.35 | Undeveloped Terrain |
| B8 | 13.06 | | | 13.06 | 0.35 | Undeveloped Terrain |
| C1 | 0.10 | | | 0.10 | 0.35 | Undeveloped Terrain |
| C2 | 22.83 | | | 22.83 | 0.35 | Undeveloped Terrain |
| C3 | 0.35 | 0.32 | | 0.03 | 0.85 | Otay Mesa Road and portion of Undeveloped Terrain |
| C4 | 0.21 | | | 0.21 | 0.35 | Undeveloped Terrain and Rough Graded Road |
| C5 | 27.04 | | | 27.04 | 0.35 | Undeveloped Terrain and Rough Graded Road |
| C6 | 9.66 | 4.16 | | 5.50 | 0.59 | Undeveloped Terrain/Portion of Otay Mesa Road, and Rough Graded Road |
| C7 | 14.26 | 2.36 | | 11.90 | 0.44 | Undeveloped Terrain and Portion of Otay Mesa Road |
| C8 | 7.85 | | | 7.85 | 0.35 | Undeveloped Terrain |

Assumptions:
1) Three land use types exist on site:
Impervious Surface (C-Value = 0.9)
Low Density Residential 2.0 DU/A (C-Value=0.46)
Undeveloped Terrain (C-Value = 0.35)
2) C-Values have been determined using the equation from
section 3.1.2 of County of San Diego Hydrology Manual (June 2003)

4

# SECTION 4

## POST-PROJECT HYDROLOGY

### [1]CRITERIA:

[1] Per agreement with County of San Diego "Flood Control Division", the County will adopt the City of San Diego, "Drainage Requirements for Developments in Otay Mesa". Paragraph one states the requirement for detention facilities on each property and paragraph two requires, "The detention facilities shall be designed so that the rate of runoff from the property will not be greater after development than it was before development...". Additionally, paragraph three of the memo states, "All drainage facilities...shall be designed for a $Q_{100}$ (existing)." A copy of the City of San Diego, "Drainage Requirements for Developments in Otay Mesa" and the acceptance letter acknowledged by the County, follows.

### POST-PROJECT HYDROLOGY

In the developed condition, Basins "A", "B", and "C" will generally maintain existing drainage patterns and outfall points. Hydrology routing within this study is performed using Advanced Engineering Software (AES) release 2014. In accordance with the above criteria, detention facilities will be implemented to reduce the peak runoff rates at all project outfalls to existing values for basins tributary to the Tijuana River. Additionally, Sunroad Otay 250 is subject to hydromodification mitigation criteria. The regional detention facilities will be designed as dual use facilities that incorporate biofiltration planters sized to provide water quality, hydromodification, and peak flow mitigation. See the Storm Water Quality Management Plan for **Sunroad Otay 250**, and Section 5-3 within this study, for additional details. Basins "A", "B", and "C" will each utilize regional detention basins to address the project's detention requirements from the increase in runoff generated by the public right-of-way. Analysis within this section includes hydrology routing for each basin, for two conditions each.

**Undetained Routing** – This analysis models the undetained condition of the project, using a runoff coefficient of 0.85 for the entire subdivision. 0.85 is utilized to represent the public roads and anticipated ultimate build out of the pads as high density commercial or residential development. See Exhibit "D" – Post-Project Runoff Coefficient Study.

**Detained Routing** - Calculations within this section route runoff on the rough graded pads and through the proposed storm drain systems to the regional detention facilities. In the ultimate condition, proposed developments will be required to maintain the release rates calculated in the rough graded condition for each pad. The inflow parameters for each regional facility are input into Hydraflow Hydrographs, within Section 5, for detention routing. The outflow parameters from Hydraflow Hydrographs are then input into AES for continuation of the hydrologic routing. See Exhibit "C" – Post-Project Drainage Basins in Section 7 (a reduced copy follows). A runoff coefficient of 0.85 is utilized for the proposed roads, and 0.35 is utilized for the rough graded pads, since the pads will be vegetated with hydroseed. See Exhibit "D" – Post-Project Runoff Coefficient Study for runoff coefficients.

## LEGEND

EXISTING GROUND CONTOURS
360 INDEX

DRAINAGE BASIN DESIGNATOR

A11 / 1.04 – BASIN DESIGNATION
BASIN AREA (Acres)

DRAINAGE BASIN BOUNDARY "A"

DRAINAGE BASIN BOUNDARY "B"

DRAINAGE BASIN BOUNDARY "C"

DRAINAGE SUB BASIN BOUNDARY

PROJECT BOUNDARY

HISTORIC BASIN ROUTING

STORM DRAIN CLEANOUT

STORM DRAIN CURB INLET

RUNOFF/CHANNEL FLOW DIRECTION

SWALE/BROW DITCH FLOW DIRECTION

HEAD WALL

PROPOSED STORM DRAIN

REGIONAL DETENTION BASIN

BF-1




NOTE:
FLOW PATHS ON THE ROUGH GRADED PADS HAVE MINIMIZED OVERLAND SHEET FLOW SINCE ADDITIONAL CONVEYANCE SYSTEMS, SUCH AS BROW DITCHES WILL LIKELY BE INCORPORATED INTO THE PADS AT FINAL ENGINEERING.

0 100 200 400 600
SCALE: NTS


STEVENS · CRESTO ENGINEERING, INC.
CIVIL ENGINEERS · PLANNERS · LAND SURVEYORS
9665 CHESAPEAKE DRIVE
SUITE 200
SAN DIEGO, CA 92123-1352
PHONE: 858.694.5660
FAX: 858.694.5661
www.scengr.com


REVISIONS

| | |
|---|---|
| △ | △ |
| △ | △ |
| △ | △ |
| △ | △ |
| △ | △ |

# SUNROAD OTAY 250

SAN DIEGO, CALIFORNIA

# EXHIBIT "C"
# POST-PROJECT DRAINAGE BASINS

DATE: 04/06/16

SCE NO. 14009.01

SHEET

C

1 OF 1 SHEETS

4-2

DATE: August 7, 1987

TO: All Private Engineers

FROM: Subdivision Engineer

SUBJECT: DRAINAGE REQUIREMENTS FOR DEVELOPMENTS IN OTAY MESA

In order to minimize the effects of increased storm water runoff in Mexico, due to development of property in Otay Mesa, all property in Otay Mesa that is within the water shed that drains into Mexico, shall be developed with the following requirements:

1. Each property owner shall provide storm water detention facilities so that there will be no increase in the rate of runoff due to development of the property.

2. The detention facilities shall be designed so that the rate of runoff from the property will not be greater after development than it was before development for a 5 year, 10 year, 25 year and 50 year storm.

3. All drainage facilities crossing four-lane major or higher classification streets shall be designed for a $Q_{100}$ (existing). Other facilities, except the major channel referred to in paragraph 5, may be designed for $Q_{50}$ (existing).

4. The Drainage Design Manual shall be used as guidelines for design of drainage facilities and computing design discharges.

5. The City Engineer's Office, Flood Control Section, is preparing a preliminary plan for the main north-south channel from Otay Mesa Road near La Media to the Mexican Border. The preliminary design will include the design "Q" ($Q_{100}$ existing), the invert grade, and the water surface elevation at the major road crossings.

C. R. LOCHHEAD
Subdivision Engineer

STEVENS · CRESTO ENGINEERING, INC.

RECEIVED
SEP 0 7 2001
STEVENS CRESTO
ENGINEERING, INC.

August 30, 2001

Mr. Douglas M. Isbell
Deputy Director
COUNTY OF SAN DIEGO
DEPARTMENT OF PUBLIC WORKS
County Operations Center
5555 Overland Ave., Bldg. 32
San Diego, CA 92123

SUBJECT: T.M. 5139- RPL6
Sunroad Tech Centre
Otay Mesa, California

RECEIVED
COUNTY OF SAN DIEGO
SEP 05 2001
DEPT. OF PUBLIC WORKS
ADMINISTRATIVE OFFICE

Dear Doug,

Pursuant to our telephone conversation several weeks back, I am writing this letter to memorialize the discussion we had about drainage design criteria that will be considered for the above mentioned project.

Sunroad Tech Centre, as you know, is located in the East Otay Specific Planning area and is burdened with numerous infrastructure requirements in order to bring the first unit on line. One way to minimize the extensive expense for the entire project is to take advantage of the policy of the City of San Diego when sizing storm systems in the Otay Mesa area.

For years the City of San Diego has required site detention from all properties developing in the area that drains toward Mexico. Our project is no exception to the rule as the majority of the site drains southward toward Mexico with property that is within the city of San Diego located in between.

Our office requested that the County consider the drainage policy of the City of San Diego for our project. The City policy allows properties to size storm drain systems to a 50-year pre-developed condition (see attached memo) where projects are required to provide storm water detention. We conceptually agreed that this approach seemed appropriate for our site given the following: (1) The project is located at the top of its contributing drainage basin; (2) The property drains directly into the City of San Diego; (3) The City's drainage system downstream has been sized accordingly to this policy; (4) Post development runoff will not exceed pre-development runoff for the property; and (5) The County Hydrology Method will be used to establish the pre-development runoff. We agreed that in our case, design storm criteria for the entire subdivision would be based on the Q100 pre-development condition instead of the Q50 as stated in the City policy.

CIVIL ENGINEERS · LAND PLANNERS · SURVEYORS
9620 CHESAPEAKE DRIVE, SUITE 107 · SAN DIEGO, CA · 92123-1324
PHONE 858 694 5660 · FAX 858 694 5661

After our conversation you followed up with the Flood Control Department. We received a call from Mr. Kent Burnham from that department who also agreed that the approach as identified and discussed would in fact be adequate to satisfy Flood Control and the Counties drainage design requirements for our project.

We have recently revised the storm drain design from our initial submittal where we sized the drainage system for a developed Q100 condition while assuming no detention on the property. The elimination of this over-conservative approach has required us to adjust our drainage study from what was presented in the initial report. In order for us to obtain buy-in from other departments in the approval process, will you please sign in the space provided to acknowledge this summary of understanding. We would like to attach it to subsequent department plan checks to clear the way for approval.

The adjustment has allowed us to down size our storm drain system throughout the project and has saved our client a significant amount of money. I can speak for all us when I say, we appreciate your consideration and approval of this request. It is playing a major role in bring project construction costs back in line.

Please sign below indicating that the above is consistent with your understanding of our conversation and meets with the approval of the County of San Diego.

Thank you for your time on this matter and we appreciate your assistance.

Sincerely,

**STEVENS CRESTO ENGINEERING, INC.**

Mark E. Stevens, RCE
Principal

Cc: Steve Berg – Sunroad Enterprises
Marty Eslambolchi – County of San Diego – Department of Public Works

APPROVED

9/6/2001
DATE

# SECTION 4-A

## POST-PROJECT HYDROLOGY, BASIN A

Developed Basin "A" is comprised of 166.2 acres and generates, during a 100-year storm event, a peak runoff rate of approximately 520.36 cfs in an undetained condition and 139.77 cfs in a detained condition. Project runoff generated by the basin is conveyed through the use of a proposed public storm drain system to one of four regional detention facilities. (Detention basins BF-3 to BF-5 and BF-7 on Exhibit "C"). Runoff generated by this basin historically travels west and crosses under Otay Mesa Road, approximately ¼ mile east of Harvest Road, through the existing double 60" RCP culvert (design point 110 on Exhibit "C"). Runoff generated by offsite undeveloped land upstream of the project will be collected within the project storm drain system for conveyance through the subdivision, this run-on will be conveyed through a bypass system not tributary to the regional detention basins. Flows will enter project storm drain through headwall structures, or desiltation risers, which are sized to accept the pre-development flow. Any future development upstream will be required to provide detention so that the pre-development peak flows are not exceeded.

Regional detention facilities will be utilized to mitigate for the increase in runoff generated by the proposed project. (See detention calculations in Section 5-A). In the rough graded condition, the regional detention basins provide adequate detention for the public roadways and graded pads. Since the pads will be vegetated with hydroseed and no impervious surfaces are proposed at this time, no on-lot detention is required in the rough graded condition. Final detention of the on lot basins will be accomplished through permanent on-lot detention structures during build out of each lot for ultimate use. A runoff coefficient was performed for the upstream basins generating project run-on, calculations are included in this section as Exhibit "D".

# UNDETAINED HYDROLOGY ROUTING - BASIN A

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                               SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD OTAY 250                                                        *
* 100 YEAR DESIGN STORM                                                   *
* POST-PROJECT BASIN A (UNDETAINED FLOWS)                                 *
 *************************************************************************

  FILE NAME: 1400901\UNDET\POSTA.DAT
  TIME/DATE OF STUDY: 17:50 04/06/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH   CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)      (FT)     SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   39.0     20.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  2   34.0     17.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  3   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  4   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  5   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  6   45.0     22.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  7   61.0     30.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    631.00
  DOWNSTREAM ELEVATION(FEET) =    627.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.505
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.611
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   863.20
  REPRESENTATIVE CHANNEL SLOPE =  0.0440
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  26.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.207
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   4.79
  Tc(MIN.) =   13.29
  SUBAREA AREA(ACRES) =     9.97       SUBAREA RUNOFF(CFS) =   14.68
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =      14.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   3.56
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     963.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1156.10
  REPRESENTATIVE CHANNEL SLOPE =  0.0180
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  32.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.266
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .4000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   6.39
  Tc(MIN.) =   19.68
  SUBAREA AREA(ACRES) =    33.91       SUBAREA RUNOFF(CFS) =   44.30
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.388
  TOTAL AREA(ACRES) =       44.0         PEAK FLOW RATE(CFS) =      55.89
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   3.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    2119.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    103.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    103.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    134.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    42.00
  UPSTREAM ELEVATION(FEET) =    571.00
  DOWNSTREAM ELEVATION(FEET) =    570.20
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.353
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   280.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   3.24   Tc(MIN.) =    5.59
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.357
  *USER SPECIFIED(SUBAREA):
```

```
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =     0.33      SUBAREA RUNOFF(CFS) =     2.06
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.93
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    118.00 =     322.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.357
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6036
  SUBAREA AREA(ACRES) =     0.34   SUBAREA RUNOFF(CFS) =     0.88
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.06
  TC(MIN.) =    5.59

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    117.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   245.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.86
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.06
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    6.43
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    117.00 =     567.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    117.00 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.) =    6.43
  RAINFALL INTENSITY(INCH/HR) =   6.72
  TOTAL STREAM AREA(ACRES) =     0.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.06

****************************************************************************
  FLOW PROCESS FROM NODE    116.60 TO NODE    116.70 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    574.00
  DOWNSTREAM ELEVATION(FEET) =    573.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    116.70 TO NODE    116.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.04   SUBAREA RUNOFF(CFS) =    6.99
  TOTAL AREA(ACRES) =       1.1   TOTAL RUNOFF(CFS) =       7.32
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    116.70 TO NODE    116.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.57
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.32
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    3.65
  LONGEST FLOWPATH FROM NODE    116.60 TO NODE    116.80 =     203.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.80 TO NODE    116.80 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.69   SUBAREA RUNOFF(CFS) =    4.64
  TOTAL AREA(ACRES) =       1.8   TOTAL RUNOFF(CFS) =      11.96
  TC(MIN.) =    3.65

****************************************************************************
  FLOW PROCESS FROM NODE    116.80 TO NODE    117.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.96
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    3.82
  LONGEST FLOWPATH FROM NODE    116.60 TO NODE    117.00 =     273.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.80 TO NODE    117.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.82
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.96

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        3.06     6.43        6.721          0.69
      2       11.96     3.82        7.904          1.78

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)
      1       13.78     3.82       7.904
      2       13.23     6.43       6.721

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.78   Tc(MIN.) =    3.82
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    117.00 =     567.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    104.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.80
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.78
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    3.94
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    104.00 =     625.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.94
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     2.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.78

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    42.00
  UPSTREAM ELEVATION(FEET) =    574.00
  DOWNSTREAM ELEVATION(FEET) =    573.20
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.353
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.49
  STREET FLOW TRAVEL TIME(MIN.) =   2.30   Tc(MIN.) =    4.65
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
```

```
  SUBAREA AREA(ACRES) =     0.28      SUBAREA RUNOFF(CFS) =     1.88
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       2.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.09
  FLOW VELOCITY(FEET/SEC.) =  2.14   DEPTH*VELOCITY(FT*FT/SEC.) =   0.66
  LONGEST FLOWPATH FROM NODE    191.00 TO NODE    104.00 =     297.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5844
  SUBAREA AREA(ACRES) =     0.34   SUBAREA RUNOFF(CFS) =     0.94
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.96
  TC(MIN.) =    4.65

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    104.00 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.) =    4.65
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.96

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        13.78      3.94         7.904          2.47
      2         2.96      4.65         7.904          0.64

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        16.29      3.94         7.904
      2        16.74      4.65         7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.74   Tc(MIN.) =    4.65
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    104.00 =     625.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.74
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    4.79
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    103.00 =     688.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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        16.74      4.79        7.904         3.11
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    103.00 =     688.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        55.89     19.68        3.266        44.05
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    2119.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       30.34       4.79         7.904
      2       62.80      19.68         3.266

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.80   Tc(MIN.) =   19.68
  TOTAL AREA(ACRES) =       47.2

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    103.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    105.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.40
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.80
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   20.21
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2449.30 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.40
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.80
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   20.73
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    2769.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    106.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    106.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    616.00
  DOWNSTREAM ELEVATION(FEET) =    615.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.709
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    54.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0170
  STREET LENGTH(FEET) =  1004.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   6.03   Tc(MIN.) =    9.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.140
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    4.59
  TOTAL AREA(ACRES) =       1.1        PEAK FLOW RATE(CFS) =       4.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.64
  FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    121.00 =    1074.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.140
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.06   SUBAREA RUNOFF(CFS) =    4.63
  TOTAL AREA(ACRES) =       2.1   TOTAL RUNOFF(CFS) =       9.31
  TC(MIN.) =    9.74

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 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.) =    9.74
  RAINFALL INTENSITY(INCH/HR) =   5.14
  TOTAL STREAM AREA(ACRES) =     2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.31

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    630.00
 DOWNSTREAM ELEVATION(FEET) =    629.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.295
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.673
 SUBAREA RUNOFF(CFS) =      0.16
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
 FLOW PROCESS FROM NODE    196.00 TO NODE    121.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0680
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.778
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.32
 AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   4.41
 Tc(MIN.) =   15.71
 SUBAREA AREA(ACRES) =     2.12       SUBAREA RUNOFF(CFS) =    2.80
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =        2.2         PEAK FLOW RATE(CFS) =       2.94

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.55
 LONGEST FLOWPATH FROM NODE    195.00 TO NODE    121.00 =     450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    195.00 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.) =   15.71
 RAINFALL INTENSITY(INCH/HR) =   3.78
 TOTAL STREAM AREA(ACRES) =     2.22
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.94

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1         9.31      9.74         5.140          2.13
     2         2.94     15.71         3.778          2.22

 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       11.13     9.74       5.140
      2        9.78    15.71       3.778

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.13   Tc(MIN.) =    9.74
  TOTAL AREA(ACRES) =        4.3
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    121.00 =    1074.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    29.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.13
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    122.00 =    1103.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   645.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.13
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   11.41
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    123.00 =    1748.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    123.00 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.) =   11.41
  RAINFALL INTENSITY(INCH/HR) =   4.64
  TOTAL STREAM AREA(ACRES) =     4.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.13

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    598.00
  DOWNSTREAM ELEVATION(FEET) =    596.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.810
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0300
  STREET LENGTH(FEET) =   563.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   2.68   Tc(MIN.) =    5.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.439
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    5.31
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       5.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  4.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
  LONGEST FLOWPATH FROM NODE    126.00 TO NODE    128.00 =     638.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.439
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.85   SUBAREA RUNOFF(CFS) =    5.37
```

```
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =      10.81
  TC(MIN.) =    5.49

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    123.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.81
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.57
  LONGEST FLOWPATH FROM NODE    126.00 TO NODE    123.00 =     669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    123.00 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.) =    5.57
  RAINFALL INTENSITY(INCH/HR) =   7.37
  TOTAL STREAM AREA(ACRES) =     1.71
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.81

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        11.13     11.41         4.643          4.35
      2        10.81      5.57         7.372          1.71

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        17.82      5.57        7.372
      2        17.94     11.41        4.643

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       17.94   Tc(MIN.) =   11.41
  TOTAL AREA(ACRES) =         6.1
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    123.00 =    1748.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    62.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.94
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    124.00 =    1810.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   474.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.94
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   12.61
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    125.00 =    2285.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 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.) =   12.61
  RAINFALL INTENSITY(INCH/HR) =   4.35
  TOTAL STREAM AREA(ACRES) =     6.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.94

****************************************************************************
  FLOW PROCESS FROM NODE    124.60 TO NODE    124.70 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    587.00
  DOWNSTREAM ELEVATION(FEET) =    586.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.01
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      1.01

****************************************************************************
  FLOW PROCESS FROM NODE    124.70 TO NODE    124.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.83   SUBAREA RUNOFF(CFS) =   25.73
  TOTAL AREA(ACRES) =       4.0   TOTAL RUNOFF(CFS) =     26.74
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    124.70 TO NODE    125.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0290
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.74
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    3.69
  LONGEST FLOWPATH FROM NODE    124.60 TO NODE    125.00 =     345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.57   SUBAREA RUNOFF(CFS) =   23.99
  TOTAL AREA(ACRES) =       7.6   TOTAL RUNOFF(CFS) =     50.73
  TC(MIN.) =    3.69

****************************************************************************
  FLOW PROCESS FROM NODE    124.80 TO NODE    125.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.15
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.73
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    3.76
  LONGEST FLOWPATH FROM NODE    124.60 TO NODE    125.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.60 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =     3.76
  RAINFALL INTENSITY(INCH/HR) =    7.90
  TOTAL STREAM AREA(ACRES) =      7.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.73

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        17.94     12.61         4.353           6.06
      2        50.73      3.76         7.904           7.55

  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        60.60      3.76         7.904
      2        45.87     12.61         4.353

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       60.60   Tc(MIN.) =     3.76
  TOTAL AREA(ACRES) =        13.6
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    125.00 =    2285.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    116.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.29
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.60
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =     3.79
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    116.00 =    2322.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =     3.79
  RAINFALL INTENSITY(INCH/HR) =    7.90
  TOTAL STREAM AREA(ACRES) =     13.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      60.60

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    589.00
  DOWNSTREAM ELEVATION(FEET) =    588.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.295
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.673
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   689.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0330
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.365
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   7.50
  Tc(MIN.) =   18.79
  SUBAREA AREA(ACRES) =     8.45       SUBAREA RUNOFF(CFS) =    9.95
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        8.6         PEAK FLOW RATE(CFS) =      10.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    115.00 =     789.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.13
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   18.87
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    116.00 =     822.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    116.00 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.) =   18.87
  RAINFALL INTENSITY(INCH/HR) =   3.36
  TOTAL STREAM AREA(ACRES) =     8.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.13

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       60.60     3.79        7.904         13.61
      2       10.13    18.87        3.356          8.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       62.64     3.79        7.904
      2       35.86    18.87        3.356

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.64   Tc(MIN.) =    3.79
  TOTAL AREA(ACRES) =       22.2
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    116.00 =    2322.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.86
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.64
  PIPE TRAVEL TIME(MIN.) =   1.22    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    106.00 =    2972.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    106.00 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       62.64     5.01        7.891         22.21
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    106.00 =    2972.30 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1       62.80    20.73       3.159       47.16
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    2769.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
      1      77.83       5.01        7.891
      2      87.88      20.73        3.159

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.88   Tc(MIN.) =   20.73
  TOTAL AREA(ACRES) =       69.4

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    106.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   745.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.88
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =   21.83
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    107.00 =    3717.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    585.40
  DOWNSTREAM ELEVATION(FEET) =    584.00
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.988
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0170
  STREET LENGTH(FEET) =   463.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.56
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   3.03   Tc(MIN.) =    6.02
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.011
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    3.22
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       3.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    132.00 =     533.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.011
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5637
  SUBAREA AREA(ACRES) =    0.75   SUBAREA RUNOFF(CFS) =    1.84
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       5.18
  TC(MIN.) =    6.02

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    148.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.18
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    6.99
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    148.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    148.00 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.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   6.37
  TOTAL STREAM AREA(ACRES) =     1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.18

****************************************************************************
  FLOW PROCESS FROM NODE    105.10 TO NODE    105.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    571.00
  DOWNSTREAM ELEVATION(FEET) =    570.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    105.20 TO NODE    105.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.91   SUBAREA RUNOFF(CFS) =    6.11
  TOTAL AREA(ACRES) =       1.0   TOTAL RUNOFF(CFS) =      6.72
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    105.20 TO NODE    105.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.72
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    3.66
  LONGEST FLOWPATH FROM NODE    105.10 TO NODE    105.30 =     203.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.30 TO NODE    105.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.99   SUBAREA RUNOFF(CFS) =    6.65
  TOTAL AREA(ACRES) =       2.0   TOTAL RUNOFF(CFS) =     13.37
  TC(MIN.) =    3.66

****************************************************************************
  FLOW PROCESS FROM NODE    105.30 TO NODE    105.40 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.37
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.74
  LONGEST FLOWPATH FROM NODE    105.10 TO NODE    105.40 =     240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.40 TO NODE    148.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.37
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    3.88
  LONGEST FLOWPATH FROM NODE    105.10 TO NODE    148.00 =     304.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.10 TO NODE    148.00 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.) =    3.88
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.37

****************************************************************************
  FLOW PROCESS FROM NODE    105.50 TO NODE    105.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    578.00
  DOWNSTREAM ELEVATION(FEET) =    577.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.54
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.54

****************************************************************************
  FLOW PROCESS FROM NODE    105.60 TO NODE    105.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    5.78
  TOTAL AREA(ACRES) =       0.9   TOTAL RUNOFF(CFS) =      6.32
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    105.60 TO NODE    105.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   133.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.32
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    3.52
  LONGEST FLOWPATH FROM NODE    105.50 TO NODE    105.70 =     198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.70 TO NODE    105.70 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.92   SUBAREA RUNOFF(CFS) =    6.18
  TOTAL AREA(ACRES) =       1.9   TOTAL RUNOFF(CFS) =     12.50
  TC(MIN.) =    3.52

********************************************************************************
  FLOW PROCESS FROM NODE    105.70 TO NODE    105.80 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.50
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    3.62
  LONGEST FLOWPATH FROM NODE    105.50 TO NODE    105.80 =     237.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    105.80 TO NODE    148.00 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.50
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE    105.50 TO NODE    148.00 =     301.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    105.50 TO NODE    148.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.77
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.50

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        5.18     6.99         6.366          1.31
```

```
     2        13.37      3.88         7.904           1.99
     3        12.50      3.77         7.904           1.86

  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        28.27      3.77        7.904
     2        28.74      3.88        7.904
     3        26.01      6.99        6.366

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       28.74   Tc(MIN.) =     3.88
  TOTAL AREA(ACRES) =         5.2
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    148.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    147.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.15
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.74
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =     4.97
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    147.00 =    1458.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    147.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.97
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     5.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.74

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    574.00
  DOWNSTREAM ELEVATION(FEET) =    573.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.204
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```

```
          THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    147.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0110
  STREET LENGTH(FEET) =   880.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   6.67   Tc(MIN.) =    9.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.095
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.81      SUBAREA RUNOFF(CFS) =    3.51
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.38
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    145.00 TO NODE    147.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    147.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.095
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.83   SUBAREA RUNOFF(CFS) =    3.59
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       7.19
  TC(MIN.) =    9.88

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

```
 FLOW PROCESS FROM NODE    145.00 TO NODE    147.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.88
 RAINFALL INTENSITY(INCH/HR) =   5.10
 TOTAL STREAM AREA(ACRES) =     1.66
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.19

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       28.74     4.97        7.904          5.16
    2        7.19     9.88        5.095          1.66

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1       32.36     4.97       7.904
    2       25.71     9.88       5.095

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.36   Tc(MIN.) =    4.97
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    147.00 =    1458.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    147.00 TO NODE    149.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    92.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.36
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.12
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    149.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   101.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      32.36
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    142.00 =    1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    157.50 TO NODE    157.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    595.00
  DOWNSTREAM ELEVATION(FEET) =    594.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE    157.60 TO NODE    157.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.37   SUBAREA RUNOFF(CFS) =    9.20
  TOTAL AREA(ACRES) =       1.6   TOTAL RUNOFF(CFS) =     10.62
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    157.60 TO NODE    157.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0110
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.17
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      10.62
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    3.63
  LONGEST FLOWPATH FROM NODE    157.50 TO NODE    157.70 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.70 TO NODE    157.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.55   SUBAREA RUNOFF(CFS) =   10.41
  TOTAL AREA(ACRES) =       3.1   TOTAL RUNOFF(CFS) =      21.03
  TC(MIN.) =    3.63

****************************************************************************
  FLOW PROCESS FROM NODE    157.70 TO NODE    158.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.90
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.03
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    3.71
  LONGEST FLOWPATH FROM NODE    157.50 TO NODE    158.00 =     277.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    157.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   375.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.03
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    4.65
  LONGEST FLOWPATH FROM NODE    157.50 TO NODE    157.00 =     652.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.50 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.65
  RAINFALL INTENSITY(INCH/HR) =   7.90
```

```
 TOTAL STREAM AREA(ACRES) =      3.13
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.03

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    38.00
 UPSTREAM ELEVATION(FEET) =    594.80
 DOWNSTREAM ELEVATION(FEET) =    594.00
 ELEVATION DIFFERENCE(FEET) =      0.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.164
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 STREET LENGTH(FEET) =   655.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 31.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.34
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.33
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.89
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
 STREET FLOW TRAVEL TIME(MIN.) =   3.78   Tc(MIN.) =    5.95
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.069
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    4.39
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.51

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.09
 FLOW VELOCITY(FEET/SEC.) =  3.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
 LONGEST FLOWPATH FROM NODE    155.00 TO NODE    157.00 =     693.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.069
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.75   SUBAREA RUNOFF(CFS) =    4.51
  TOTAL AREA(ACRES) =       1.5   TOTAL RUNOFF(CFS) =      9.01
  TC(MIN.) =    5.95

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    157.00 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.) =    5.95
  RAINFALL INTENSITY(INCH/HR) =   7.07
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.01

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.03     4.65        7.904          3.13
      2        9.01     5.95        7.069          1.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.07     4.65       7.904
      2       27.82     5.95       7.069

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.07   Tc(MIN.) =    4.65
  TOTAL AREA(ACRES) =        4.6
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    157.00 =     693.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    159.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.50
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.07
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    4.85
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    159.00 =     797.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    159.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    159.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    156.50 TO NODE    156.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    590.00
  DOWNSTREAM ELEVATION(FEET) =    589.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE    156.60 TO NODE    156.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.65   SUBAREA RUNOFF(CFS) =   11.09
  TOTAL AREA(ACRES) =       1.8   TOTAL RUNOFF(CFS) =     12.16
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    156.60 TO NODE    156.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0140
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.85
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.16
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    3.66
  LONGEST FLOWPATH FROM NODE    156.50 TO NODE    156.70 =     245.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    156.70 TO NODE    156.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    9.41
  TOTAL AREA(ACRES) =       3.2   TOTAL RUNOFF(CFS) =     21.57
  TC(MIN.) =    3.66

****************************************************************************
  FLOW PROCESS FROM NODE    156.70 TO NODE    156.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.20
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.57
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.73
  LONGEST FLOWPATH FROM NODE    156.50 TO NODE    156.80 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.50 TO NODE    156.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.73
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     3.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.57

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    598.00
  DOWNSTREAM ELEVATION(FEET) =    597.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    156.80 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0320
  STREET LENGTH(FEET) =   530.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   2.67   Tc(MIN.) =    5.20
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.712
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    3.54
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.13
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    156.80 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.80 TO NODE    156.80 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.712
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    3.47
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       7.14
  TC(MIN.) =    5.20

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    156.80 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.) =    5.20
  RAINFALL INTENSITY(INCH/HR) =   7.71
  TOTAL STREAM AREA(ACRES) =     1.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.14

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        21.57      3.73         7.904          3.21
      2         7.14      5.20         7.712          1.09

  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        26.70      3.73        7.904
      2        28.19      5.20        7.712

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       28.19   Tc(MIN.) =    5.20
  TOTAL AREA(ACRES) =         4.3
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    156.80 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.80 TO NODE    156.90 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.19
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.31
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    156.90 =     641.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.90 TO NODE    159.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.19
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.42
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    159.00 =     701.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    159.00 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        28.19      5.42        7.504         4.30
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    159.00 =     701.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        28.07      4.85        7.904         4.63
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    159.00 =     797.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       53.30       4.85        7.904
      2       54.84       5.42        7.504

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.84   Tc(MIN.) =    5.42
  TOTAL AREA(ACRES) =        8.9

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    159.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    140.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.83
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.84
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    6.35
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    140.00 =    1347.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    140.00 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.) =    6.35
  RAINFALL INTENSITY(INCH/HR) =   6.77
  TOTAL STREAM AREA(ACRES) =     8.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     54.84

****************************************************************************
  FLOW PROCESS FROM NODE    139.50 TO NODE    139.60 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    577.00
  DOWNSTREAM ELEVATION(FEET) =    576.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE    139.60 TO NODE    139.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.46   SUBAREA RUNOFF(CFS) =   16.53
  TOTAL AREA(ACRES) =      2.6   TOTAL RUNOFF(CFS) =     17.60
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    139.60 TO NODE    139.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0140
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     17.60
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    3.74
  LONGEST FLOWPATH FROM NODE    139.50 TO NODE    139.70 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.70 TO NODE    139.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.52   SUBAREA RUNOFF(CFS) =   16.93
  TOTAL AREA(ACRES) =      5.1   TOTAL RUNOFF(CFS) =     34.53
```

```
 TC(MIN.) =     3.74

****************************************************************************
 FLOW PROCESS FROM NODE    139.70 TO NODE    139.80 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.53
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    3.80
 LONGEST FLOWPATH FROM NODE    139.50 TO NODE    139.80 =     308.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    139.80 TO NODE    140.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.53
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.89
 LONGEST FLOWPATH FROM NODE    139.50 TO NODE    140.00 =     364.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    139.80 TO NODE    140.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.89
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     5.14
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.53

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1        54.84      6.35         6.774          8.93
     2        34.53      3.89         7.904          5.14

 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        68.10      3.89         7.904
```

```
      2       84.43      6.35       6.774

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      84.43   Tc(MIN.) =     6.35
  TOTAL AREA(ACRES) =       14.1
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    140.00 =    1347.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.43
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =     6.81
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    142.00 =    1677.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    144.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    580.00
  DOWNSTREAM ELEVATION(FEET) =    579.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    141.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0240
```

```
  STREET LENGTH(FEET) =   848.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   4.43   Tc(MIN.) =    6.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.388
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    4.83
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       4.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.09
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    141.00 =     898.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    141.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.388
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.91   SUBAREA RUNOFF(CFS) =    4.94
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       9.88
  TC(MIN.) =    6.96

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 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.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   6.39
  TOTAL STREAM AREA(ACRES) =     1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.88

****************************************************************************
  FLOW PROCESS FROM NODE    140.50 TO NODE    140.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    568.00
  DOWNSTREAM ELEVATION(FEET) =    567.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.54
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.54

**************************************************************************
  FLOW PROCESS FROM NODE    140.60 TO NODE    140.60 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.92   SUBAREA RUNOFF(CFS) =   26.34
  TOTAL AREA(ACRES) =       4.0   TOTAL RUNOFF(CFS) =     26.87
  TC(MIN.) =    3.14

**************************************************************************
  FLOW PROCESS FROM NODE    140.60 TO NODE    140.70 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.87
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    3.51
  LONGEST FLOWPATH FROM NODE    140.50 TO NODE    140.70 =     255.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    140.70 TO NODE    140.70 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.96   SUBAREA RUNOFF(CFS) =   26.61
  TOTAL AREA(ACRES) =       8.0   TOTAL RUNOFF(CFS) =     53.48
  TC(MIN.) =    3.51
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    140.70 TO NODE    140.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    3.57
  LONGEST FLOWPATH FROM NODE    140.50 TO NODE    140.80 =     312.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.80 TO NODE    141.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.48
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    3.58
  LONGEST FLOWPATH FROM NODE    140.50 TO NODE    141.00 =     324.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.50 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.) =    3.58
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     7.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     53.48

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         9.88      6.96         6.388           1.82
      2        53.48      3.58         7.904           7.96

  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        58.57      3.58         7.904
      2        53.11      6.96         6.388
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      58.57   Tc(MIN.) =    3.58
 TOTAL AREA(ACRES) =        9.8
 LONGEST FLOWPATH FROM NODE    143.00 TO NODE    141.00 =     898.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.90
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      58.57
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.66
 LONGEST FLOWPATH FROM NODE    143.00 TO NODE    142.00 =     946.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 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       58.57     3.66        7.904        9.78
 LONGEST FLOWPATH FROM NODE    143.00 TO NODE    142.00 =     946.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc       INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
     1       84.43     6.81        6.475       14.07
 LONGEST FLOWPATH FROM NODE    155.00 TO NODE    142.00 =    1677.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
     1     103.94       3.66        7.904
     2     132.40       6.81        6.475

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     132.40   Tc(MIN.) =    6.81
 TOTAL AREA(ACRES) =       23.9

****************************************************************************
 FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       132.40      6.81        6.475        23.85
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    142.00 =    1677.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        32.36      5.28        7.627         6.82
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    142.00 =    1651.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1      135.07       5.28         7.627
      2      159.87       6.81         6.475

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     159.87   Tc(MIN.) =     6.81
  TOTAL AREA(ACRES) =       30.7

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.62
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     159.87
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =     6.86
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    107.00 =    1738.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    107.00 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       159.87      6.86        6.447        30.67
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    107.00 =    1738.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        87.88     21.83        3.055        69.37
```

```
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    107.00 =    3717.30 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc       INTENSITY
 NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
     1     187.48       6.86        6.447
     2     163.64      21.83        3.055

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     187.48   Tc(MIN.) =    6.86
 TOTAL AREA(ACRES) =      100.0

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    107.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    109.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   670.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  39.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.53
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     187.48
 PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    7.68
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    109.00 =    4387.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =  1050.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  39.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.53
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     187.48
 PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    8.98
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    110.00 =    5437.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    110.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    110.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    39.00
  UPSTREAM ELEVATION(FEET) =    580.00
  DOWNSTREAM ELEVATION(FEET) =    579.20
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.212
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    160.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0250
  STREET LENGTH(FEET) =   568.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =    5.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.673
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.64      SUBAREA RUNOFF(CFS) =    4.17
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       4.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.34
  FLOW VELOCITY(FEET/SEC.) =  3.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    160.00 =     607.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.673
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =  0.66  SUBAREA RUNOFF(CFS) =  4.30
 TOTAL AREA(ACRES) =  1.3  TOTAL RUNOFF(CFS) =  8.61
 TC(MIN.) =  5.24

****************************************************************************
 FLOW PROCESS FROM NODE  165.00 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.) =  5.24
 RAINFALL INTENSITY(INCH/HR) =  7.67
 TOTAL STREAM AREA(ACRES) =  1.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE =  8.61

****************************************************************************
 FLOW PROCESS FROM NODE  159.50 TO NODE  159.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  65.00
 UPSTREAM ELEVATION(FEET) =  577.00
 DOWNSTREAM ELEVATION(FEET) =  576.00
 ELEVATION DIFFERENCE(FEET) =  1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =  3.143
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =  1.28
 TOTAL AREA(ACRES) =  0.19  TOTAL RUNOFF(CFS) =  1.28

****************************************************************************
 FLOW PROCESS FROM NODE  159.60 TO NODE  159.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =  3.15  SUBAREA RUNOFF(CFS) =  21.16
 TOTAL AREA(ACRES) =  3.3  TOTAL RUNOFF(CFS) =  22.44
 TC(MIN.) =  3.14

****************************************************************************
 FLOW PROCESS FROM NODE  159.60 TO NODE  159.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   189.00   MANNING'S N =  0.019
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.14
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.44
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    3.58
 LONGEST FLOWPATH FROM NODE    159.50 TO NODE    159.70 =     254.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    159.70 TO NODE    159.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    3.19   SUBAREA RUNOFF(CFS) =   21.43
 TOTAL AREA(ACRES) =       6.5   TOTAL RUNOFF(CFS) =      43.87
 TC(MIN.) =    3.58

****************************************************************************
 FLOW PROCESS FROM NODE    159.70 TO NODE    160.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    67.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.96
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      43.87
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.66
 LONGEST FLOWPATH FROM NODE    159.50 TO NODE    160.00 =     321.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    159.50 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.) =    3.66
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     6.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.87

 ** CONFLUENCE DATA **
 STREAM     RUNOFF        Tc       INTENSITY      AREA
 NUMBER      (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
    1         8.61      5.24         7.673          1.32
    2        43.87      3.66         7.904          6.53
```

```
  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       49.90     3.66       7.904
      2       51.20     5.24       7.673

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      51.20   Tc(MIN.) =    5.24
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    160.00 =     607.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.72
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.20
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.43
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    162.00 =     719.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    586.00
  DOWNSTREAM ELEVATION(FEET) =    585.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

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

```
 FLOW PROCESS FROM NODE    171.00 TO NODE    161.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 STREET LENGTH(FEET) =   469.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 45.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.68
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.95
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
 STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    5.18
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.727
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.74      SUBAREA RUNOFF(CFS) =    4.86
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.57
 FLOW VELOCITY(FEET/SEC.) =  3.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    161.00 =     519.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.727
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    4.99
 TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.98
 TC(MIN.) =    5.18

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    161.00 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.) =    5.18
 RAINFALL INTENSITY(INCH/HR) =   7.73
 TOTAL STREAM AREA(ACRES) =     1.52
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.98

****************************************************************************
  FLOW PROCESS FROM NODE    160.50 TO NODE    160.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    581.00
  DOWNSTREAM ELEVATION(FEET) =    580.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE    160.60 TO NODE    160.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.25   SUBAREA RUNOFF(CFS) =    8.40
  TOTAL AREA(ACRES) =       1.4   TOTAL RUNOFF(CFS) =      9.14
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    160.60 TO NODE    160.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.26
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.14
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    3.62
  LONGEST FLOWPATH FROM NODE    160.50 TO NODE    160.70 =     245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.70 TO NODE    160.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     1.37   SUBAREA RUNOFF(CFS) =     9.20
  TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =      18.34
  TC(MIN.) =    3.62

****************************************************************************
  FLOW PROCESS FROM NODE    160.70 TO NODE    161.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.38
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.34
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    3.74
  LONGEST FLOWPATH FROM NODE    160.50 TO NODE    161.00 =     318.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.50 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.74
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.34

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         9.98      5.18         7.727           1.52
      2        18.34      3.74         7.904           2.73

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        25.55      3.74         7.904
      2        27.91      5.18         7.727

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.91   Tc(MIN.) =    5.18
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    161.00 =     519.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  17.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      27.91
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    5.96
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    162.00 =     919.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        27.91      5.96        7.055         4.25
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    162.00 =     919.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        51.20      5.43        7.497         7.85
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    162.00 =     719.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       76.60       5.43         7.497
     2       76.09       5.96         7.055

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      76.60   Tc(MIN.) =    5.43
 TOTAL AREA(ACRES) =       12.1

****************************************************************************
 FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    163.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.84
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      76.60
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    6.04
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    163.00 =    1319.00 FEET.

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

```
 FLOW PROCESS FROM NODE    162.00 TO NODE    163.00 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.) =    6.04
 RAINFALL INTENSITY(INCH/HR) =   7.00
 TOTAL STREAM AREA(ACRES) =    12.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     76.60

****************************************************************************
 FLOW PROCESS FROM NODE    172.00 TO NODE    173.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    575.40
 DOWNSTREAM ELEVATION(FEET) =    574.00
 ELEVATION DIFFERENCE(FEET) =      1.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.988
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    173.00 TO NODE    163.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 STREET LENGTH(FEET) =   693.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 45.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    9.36
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.07
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
 STREET FLOW TRAVEL TIME(MIN.) =   3.77   Tc(MIN.) =    6.76
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.510
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    1.04      SUBAREA RUNOFF(CFS) =    5.75
 TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       5.87
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.33
  FLOW VELOCITY(FEET/SEC.) =  3.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE    172.00 TO NODE    163.00 =     763.00 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) =  6.510
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.07   SUBAREA RUNOFF(CFS) =    5.92
  TOTAL AREA(ACRES) =       2.1   TOTAL RUNOFF(CFS) =     11.79
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    163.00 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.) =    6.76
  RAINFALL INTENSITY(INCH/HR) =   6.51
  TOTAL STREAM AREA(ACRES) =     2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.79

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       76.60     6.04        6.995         12.10
      2       11.79     6.76        6.510          2.13

  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       87.14     6.04        6.995
      2       83.07     6.76        6.510

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.14   Tc(MIN.) =    6.04
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    163.00 =    1319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    111.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
```

```
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.33
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.14
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    6.25
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    111.00 =    1469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 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.) =    6.25
  RAINFALL INTENSITY(INCH/HR) =   6.85
  TOTAL STREAM AREA(ACRES) =    14.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     87.14

****************************************************************************
  FLOW PROCESS FROM NODE    108.50 TO NODE    108.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    567.00
  DOWNSTREAM ELEVATION(FEET) =    566.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    108.60 TO NODE    108.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.84   SUBAREA RUNOFF(CFS) =   25.80
  TOTAL AREA(ACRES) =       3.9   TOTAL RUNOFF(CFS) =     26.40
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    108.60 TO NODE    108.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0160
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.40
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.40
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    3.58
  LONGEST FLOWPATH FROM NODE    108.50 TO NODE    108.70 =     285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.70 TO NODE    108.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.93   SUBAREA RUNOFF(CFS) =   26.40
  TOTAL AREA(ACRES) =       7.9   TOTAL RUNOFF(CFS) =      52.81
  TC(MIN.) =    3.58

****************************************************************************
  FLOW PROCESS FROM NODE    108.70 TO NODE    111.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.81
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.81
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.66
  LONGEST FLOWPATH FROM NODE    108.50 TO NODE    111.00 =     368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.50 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.) =    3.66
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     7.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     52.81

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        87.14      6.25         6.848          14.23
      2        52.81      3.66         7.904           7.86
```

```
  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      128.31     3.66       7.904
      2      132.89     6.25       6.848

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     132.89   Tc(MIN.) =    6.25
  TOTAL AREA(ACRES) =       22.1
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    111.00 =    1469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.50 TO NODE    111.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    108.50 TO NODE    111.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    36.00
  UPSTREAM ELEVATION(FEET) =    562.00
  DOWNSTREAM ELEVATION(FEET) =    561.30
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.163
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   640.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   4.97   Tc(MIN.) =    7.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.283
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    3.74
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.96
  FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     676.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.283
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.72   SUBAREA RUNOFF(CFS) =    3.85
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       7.69
  TC(MIN.) =    7.14

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    152.00 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.) =    7.14
  RAINFALL INTENSITY(INCH/HR) =   6.28
  TOTAL STREAM AREA(ACRES) =     1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.69

****************************************************************************
  FLOW PROCESS FROM NODE    151.10 TO NODE    151.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    566.00
  DOWNSTREAM ELEVATION(FEET) =    565.10
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.832
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.47
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
 FLOW PROCESS FROM NODE    151.20 TO NODE    151.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =   32.92
 TOTAL AREA(ACRES) =       5.0   TOTAL RUNOFF(CFS) =      33.39
 TC(MIN.) =    2.83

****************************************************************************
 FLOW PROCESS FROM NODE    151.20 TO NODE    151.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   530.00   MANNING'S N =  0.019
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.63
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      33.39
 PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    3.66
 LONGEST FLOWPATH FROM NODE    151.10 TO NODE    151.30 =     585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    151.30 TO NODE    151.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    4.80   SUBAREA RUNOFF(CFS) =   32.25
 TOTAL AREA(ACRES) =       9.8   TOTAL RUNOFF(CFS) =      65.64
 TC(MIN.) =    3.66

****************************************************************************
 FLOW PROCESS FROM NODE    151.30 TO NODE    152.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.89
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.64
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    3.70
  LONGEST FLOWPATH FROM NODE    151.10 TO NODE    152.00 =     637.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    151.10 TO NODE    152.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.70
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     9.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     65.64

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         7.69      7.14         6.283          1.44
      2        65.64      3.70         7.904          9.77

  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        69.63      3.70        7.904
      2        59.87      7.14        6.283

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      69.63   Tc(MIN.) =    3.70
  TOTAL AREA(ACRES) =       11.2
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     676.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    111.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.85
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.63
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    3.91
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    111.00 =     796.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    111.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       69.63      3.91       7.904       11.21
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    111.00 =     796.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1      132.89      6.25       6.848       22.09
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    111.00 =    1469.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1     152.78        3.91        7.904
      2     193.22        6.25        6.848

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     193.22   Tc(MIN.) =    6.25
  TOTAL AREA(ACRES) =       33.3

**************************************************************************
  FLOW PROCESS FROM NODE    108.50 TO NODE    111.00 IS CODE =  12
--------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   485.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  40.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.60
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     193.22
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    6.84
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    112.00 =    1954.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  10
--------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  13
--------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  21
--------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    56.00
  UPSTREAM ELEVATION(FEET) =    557.10
  DOWNSTREAM ELEVATION(FEET) =    556.00
  ELEVATION DIFFERENCE(FEET) =      1.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.689
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

********************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    177.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0140
  STREET LENGTH(FEET) =   472.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 45.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   3.01   Tc(MIN.) =    5.70
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.268
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    5.31
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       5.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.84
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    177.00 =     528.00 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) =  7.268
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     0.87   SUBAREA RUNOFF(CFS) =     5.37
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =      10.81
  TC(MIN.) =    5.70

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.81
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.72
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     538.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    586.00
  DOWNSTREAM ELEVATION(FEET) =    583.20
  ELEVATION DIFFERENCE(FEET) =      2.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.372
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  7 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0400
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 61.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  30.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    3.36
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    2.22
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.11
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     270.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.36
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.35

****************************************************************************
  FLOW PROCESS FROM NODE    181.50 TO NODE    181.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    584.00
  DOWNSTREAM ELEVATION(FEET) =    583.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.27

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

```
 FLOW PROCESS FROM NODE    181.60 TO NODE    181.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =     0.88   SUBAREA RUNOFF(CFS) =     5.91
 TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       6.18
 TC(MIN.) =    3.14

****************************************************************************
 FLOW PROCESS FROM NODE    181.60 TO NODE    181.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0140
 FLOW LENGTH(FEET) =   133.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.18
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    3.59
 LONGEST FLOWPATH FROM NODE    181.50 TO NODE    181.70 =     198.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    181.70 TO NODE    181.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =     0.88   SUBAREA RUNOFF(CFS) =     5.91
 TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =      12.09
 TC(MIN.) =    3.59

****************************************************************************
 FLOW PROCESS FROM NODE    181.70 TO NODE    182.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.09
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    3.76
 LONGEST FLOWPATH FROM NODE    181.50 TO NODE    182.00 =     268.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    181.50 TO NODE    182.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.76
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.09

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         2.35      3.36         7.904          0.35
      2        12.09      3.76         7.904          1.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        13.17      3.36         7.904
      2        14.44      3.76         7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.44   Tc(MIN.) =    3.76
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     270.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   442.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.17
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.44
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =    4.79
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    183.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.79
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     2.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.44
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    182.50 TO NODE    182.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    565.00
  DOWNSTREAM ELEVATION(FEET) =    564.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    182.60 TO NODE    182.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.71   SUBAREA RUNOFF(CFS) =   18.21
  TOTAL AREA(ACRES) =       2.8   TOTAL RUNOFF(CFS) =     18.81
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    182.60 TO NODE    182.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.81
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    3.64
  LONGEST FLOWPATH FROM NODE    182.50 TO NODE    182.70 =     245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.70 TO NODE    182.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
```

```
  SUBAREA AREA(ACRES) =     2.78   SUBAREA RUNOFF(CFS) =    18.68
  TOTAL AREA(ACRES) =        5.6   TOTAL RUNOFF(CFS) =      37.49
  TC(MIN.) =    3.64

****************************************************************************
  FLOW PROCESS FROM NODE    182.70 TO NODE    183.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   440.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.93
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.49
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    4.26
  LONGEST FLOWPATH FROM NODE    182.50 TO NODE    183.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.70 TO NODE    183.00 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.) =    4.26
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     5.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     37.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       14.44     4.79        7.904          2.15
      2       37.49     4.26        7.904          5.58

  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       51.93     4.26        7.904
      2       51.93     4.79        7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      51.93   Tc(MIN.) =    4.79
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    183.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    184.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
```

```
  FLOW LENGTH(FEET) =   424.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.53
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.93
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    5.22
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =    1136.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    184.00 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.) =    5.22
  RAINFALL INTENSITY(INCH/HR) =   7.69
  TOTAL STREAM AREA(ACRES) =     7.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     51.93

****************************************************************************
  FLOW PROCESS FROM NODE    183.50 TO NODE    183.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    563.00
  DOWNSTREAM ELEVATION(FEET) =    562.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.74
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
  FLOW PROCESS FROM NODE    183.60 TO NODE    183.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.58   SUBAREA RUNOFF(CFS) =   17.33
  TOTAL AREA(ACRES) =       2.7   TOTAL RUNOFF(CFS) =     18.07
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    183.60 TO NODE    183.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.75
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.07
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    3.64
 LONGEST FLOWPATH FROM NODE    183.50 TO NODE    183.70 =     235.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    183.70 TO NODE    183.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    2.64   SUBAREA RUNOFF(CFS) =   17.74
 TOTAL AREA(ACRES) =       5.3   TOTAL RUNOFF(CFS) =      35.81
 TC(MIN.) =    3.64

****************************************************************************
 FLOW PROCESS FROM NODE    183.70 TO NODE    184.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.019
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.40
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      35.81
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    3.75
 LONGEST FLOWPATH FROM NODE    183.50 TO NODE    184.00 =     312.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    183.70 TO NODE    184.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.75
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     5.33
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.81

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       51.93     5.22        7.691          7.73
    2       35.81     3.75        7.904          5.33
```

```
  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       86.35     3.75       7.904
      2       86.78     5.22       7.691

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      86.78   Tc(MIN.) =     5.22
  TOTAL AREA(ACRES) =       13.1
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =    1136.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   417.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.28
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.78
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =     5.78
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    185.00 =    1553.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 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.) =     5.78
  RAINFALL INTENSITY(INCH/HR) =   7.20
  TOTAL STREAM AREA(ACRES) =    13.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     86.78

****************************************************************************
  FLOW PROCESS FROM NODE    184.50 TO NODE    184.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    554.00
  DOWNSTREAM ELEVATION(FEET) =    553.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.81
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.81
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    184.60 TO NODE    184.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.60   SUBAREA RUNOFF(CFS) =   17.47
  TOTAL AREA(ACRES) =       2.7   TOTAL RUNOFF(CFS) =     18.27
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    184.60 TO NODE    184.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.27
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    3.63
  LONGEST FLOWPATH FROM NODE    184.50 TO NODE    184.70 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.70 TO NODE    184.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.67   SUBAREA RUNOFF(CFS) =   17.94
  TOTAL AREA(ACRES) =       5.4   TOTAL RUNOFF(CFS) =     36.21
  TC(MIN.) =    3.63

****************************************************************************
  FLOW PROCESS FROM NODE    184.70 TO NODE    185.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.53
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.21
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    3.74
```

```
 LONGEST FLOWPATH FROM NODE    184.50 TO NODE    185.00 =     310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    184.70 TO NODE    185.00 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.) =    3.74
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     5.39
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.21

****************************************************************************
 FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    578.00
 DOWNSTREAM ELEVATION(FEET) =    574.00
 ELEVATION DIFFERENCE(FEET) =      4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.614
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    188.00 TO NODE    185.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  7 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 STREET LENGTH(FEET) =  1090.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 61.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  30.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.92
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   12.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.58
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
 STREET FLOW TRAVEL TIME(MIN.) =   5.08   Tc(MIN.) =    7.69
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.988
*USER SPECIFIED(SUBAREA):
LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
SUBAREA AREA(ACRES) =    2.22      SUBAREA RUNOFF(CFS) =   11.30
TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =      11.40

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.11
FLOW VELOCITY(FEET/SEC.) =  4.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.88
LONGEST FLOWPATH FROM NODE    187.00 TO NODE    185.00 =    1190.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    187.00 TO NODE    185.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =    7.69
RAINFALL INTENSITY(INCH/HR) =   5.99
TOTAL STREAM AREA(ACRES) =     2.24
PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.40

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       86.78     5.78        7.197         13.06
    2       36.21     3.74        7.904          5.39
    3       11.40     7.69        5.988          2.24

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      120.77     3.74       7.904
    2      128.33     5.78       7.197
    3      111.04     7.69       5.988

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     128.33   Tc(MIN.) =    5.78
TOTAL AREA(ACRES) =       20.7
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    185.00 =    1553.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    185.00 TO NODE    178.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
REPRESENTATIVE SLOPE =  0.0100
FLOW LENGTH(FEET) =   133.00   MANNING'S N =  0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) =  18.15
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =     128.33
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.90
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    178.00 =    1686.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 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      128.33     5.90        7.101       20.69
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    178.00 =    1686.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
      1       10.81     5.72        7.247        1.75
  LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     538.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
      1     135.13       5.72        7.247
      2     138.92       5.90        7.101

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     138.92   Tc(MIN.) =    5.90
  TOTAL AREA(ACRES) =       22.4

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    112.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.65
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     138.92
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.96
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    112.00 =    1746.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    112.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      138.92     5.96       7.061       22.44
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    112.00 =    1746.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      193.22     6.84       6.458       33.30
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    112.00 =    1954.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     307.15       5.96       7.061
      2     320.27       6.84       6.458

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     320.27   Tc(MIN.) =    6.84
  TOTAL AREA(ACRES) =       55.7

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.84
  RAINFALL INTENSITY(INCH/HR) =   6.46
  TOTAL STREAM AREA(ACRES) =    55.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    320.27

****************************************************************************
  FLOW PROCESS FROM NODE    111.10 TO NODE    111.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    546.00
  DOWNSTREAM ELEVATION(FEET) =    545.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    111.20 TO NODE    111.20 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     1.76   SUBAREA RUNOFF(CFS) =   11.82
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =      12.23
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    111.20 TO NODE    111.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0120
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.23
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    3.66
  LONGEST FLOWPATH FROM NODE    111.10 TO NODE    111.30 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.30 TO NODE    111.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     2.74   SUBAREA RUNOFF(CFS) =   18.41
  TOTAL AREA(ACRES) =        4.6   TOTAL RUNOFF(CFS) =      30.64
  TC(MIN.) =    3.66

****************************************************************************
  FLOW PROCESS FROM NODE    111.30 TO NODE    112.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.64
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    3.74
  LONGEST FLOWPATH FROM NODE    111.10 TO NODE    112.00 =     285.00 FEET.

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

```
 FLOW PROCESS FROM NODE    111.30 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.74
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     4.56
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     30.64

****************************************************************************
 FLOW PROCESS FROM NODE    111.50 TO NODE    111.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    553.00
 DOWNSTREAM ELEVATION(FEET) =    552.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.60
 TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
 FLOW PROCESS FROM NODE    111.60 TO NODE    111.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    1.57   SUBAREA RUNOFF(CFS) =   10.55
 TOTAL AREA(ACRES) =       1.7   TOTAL RUNOFF(CFS) =     11.15
 TC(MIN.) =    3.14

****************************************************************************
 FLOW PROCESS FROM NODE    111.60 TO NODE    111.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.15
 PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    3.64
 LONGEST FLOWPATH FROM NODE    111.50 TO NODE    111.70 =     215.00 FEET.

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

```
 FLOW PROCESS FROM NODE    111.70 TO NODE    111.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    3.13   SUBAREA RUNOFF(CFS) =   21.03
 TOTAL AREA(ACRES) =       4.8   TOTAL RUNOFF(CFS) =      32.18
 TC(MIN.) =    3.64

****************************************************************************
 FLOW PROCESS FROM NODE    111.70 TO NODE    112.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.18
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.72
 LONGEST FLOWPATH FROM NODE    111.50 TO NODE    112.00 =     265.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    111.70 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.72
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     4.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.18

****************************************************************************
 FLOW PROCESS FROM NODE    190.00 TO NODE    191:00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    552.50
 DOWNSTREAM ELEVATION(FEET) =    551.50
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.486
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  7 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   515.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 61.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  30.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.59
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   3.68   Tc(MIN.) =    7.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.266
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    5.43
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       5.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.91
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    112.00 =     615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.17
  RAINFALL INTENSITY(INCH/HR) =   6.27
  TOTAL STREAM AREA(ACRES) =     1.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.54

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      320.27     6.84        6.458        55.74
      2       30.64     3.74        7.904         4.56
      3       32.18     3.72        7.904         4.79
```

```
     4        5.54     7.17        6.266          1.04

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1       239.78      3.72        7.904
      2       240.97      3.74        7.904
      3       376.88      6.84        6.458
      4       366.08      7.17        6.266

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      376.88   Tc(MIN.) =     6.84
  TOTAL AREA(ACRES) =        66.1
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    112.00 =    1954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.19
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     376.88
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =     6.87
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    110.00 =    1989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    110.00 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       376.88      6.87        6.440        66.13
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    110.00 =    1989.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       187.48      8.98        5.419       100.04
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    110.00 =    5437.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1      520.36       6.87        6.440
      2      504.65       8.98        5.419

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      520.36   Tc(MIN.) =     6.87
```

```
  TOTAL AREA(ACRES) =      166.2
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      166.2  TC(MIN.) =      6.87
  PEAK FLOW RATE(CFS)    =     520.36
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# DETAINED HYDROLOGY ROUTING - BASIN A

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                                SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD OTAY 250                                                        *
* 100 YEAR DESIGN STORM                                                   *
* POST-PROJECT BASIN A                                                    *
 *************************************************************************

  FILE NAME: 1400901\POSTA.DAT
  TIME/DATE OF STUDY: 11:47 04/04/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   39.0     20.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  2   34.0     17.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  3   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  4   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  5   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  6   45.0     22.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  7   61.0     30.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    631.00
  DOWNSTREAM ELEVATION(FEET) =    627.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.505
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.611
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.17   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   863.20
  REPRESENTATIVE CHANNEL SLOPE =  0.0440
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  26.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.207
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   4.79
  Tc(MIN.) =   13.29
  SUBAREA AREA(ACRES) =     9.97       SUBAREA RUNOFF(CFS) =   14.68
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       10.1         PEAK FLOW RATE(CFS) =      14.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   3.56
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     963.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1156.10
  REPRESENTATIVE CHANNEL SLOPE =  0.0180
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  32.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.266
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .4000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.01
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   6.39
  Tc(MIN.) =   19.68
  SUBAREA AREA(ACRES) =    33.91       SUBAREA RUNOFF(CFS) =   44.30
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.388
  TOTAL AREA(ACRES) =       44.0         PEAK FLOW RATE(CFS) =      55.89
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   3.37
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    2119.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    103.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    103.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    134.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    42.00
  UPSTREAM ELEVATION(FEET) =    571.00
  DOWNSTREAM ELEVATION(FEET) =    570.20
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.353
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   280.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   3.24   Tc(MIN.) =    5.59
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.357
  *USER SPECIFIED(SUBAREA):
```

```
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =     0.33      SUBAREA RUNOFF(CFS) =     2.06
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.93
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    118.00 =     322.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.357
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6036
  SUBAREA AREA(ACRES) =     0.34   SUBAREA RUNOFF(CFS) =     0.88
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       3.06
  TC(MIN.) =    5.59

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    117.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   245.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.86
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.06
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    6.43
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    117.00 =     567.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    117.00 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.) =    6.43
  RAINFALL INTENSITY(INCH/HR) =   6.72
  TOTAL STREAM AREA(ACRES) =     0.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.06

****************************************************************************
  FLOW PROCESS FROM NODE    116.60 TO NODE    116.70 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    574.00
  DOWNSTREAM ELEVATION(FEET) =    573.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.09
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.09

****************************************************************************
  FLOW PROCESS FROM NODE    116.70 TO NODE    116.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.04   SUBAREA RUNOFF(CFS) =    1.91
  TOTAL AREA(ACRES) =       1.1   TOTAL RUNOFF(CFS) =       2.00
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    116.70 TO NODE    116.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.20
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   10.15
  LONGEST FLOWPATH FROM NODE    116.60 TO NODE    116.80 =     203.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.80 TO NODE    116.80 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.007
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.69   SUBAREA RUNOFF(CFS) =    1.21
  TOTAL AREA(ACRES) =       1.8   TOTAL RUNOFF(CFS) =       3.12
  TC(MIN.) =   10.15

****************************************************************************
  FLOW PROCESS FROM NODE    116.80 TO NODE    117.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.12
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   10.39
 LONGEST FLOWPATH FROM NODE    116.60 TO NODE    117.00 =     273.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.80 TO NODE    117.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.39
 RAINFALL INTENSITY(INCH/HR) =   4.93
 TOTAL STREAM AREA(ACRES) =     1.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.12

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.06     6.43        6.721          0.69
     2        3.12    10.39        4.933          1.78

 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     6.43        6.721
     2        5.37    10.39        4.933

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.37   Tc(MIN.) =   10.39
 TOTAL AREA(ACRES) =        2.5
 LONGEST FLOWPATH FROM NODE    133.00 TO NODE    117.00 =     567.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    117.00 TO NODE    104.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.62
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.37
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.56
 LONGEST FLOWPATH FROM NODE    133.00 TO NODE    104.00 =     625.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    117.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   4.88
  TOTAL STREAM AREA(ACRES) =     2.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.37

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    42.00
  UPSTREAM ELEVATION(FEET) =    574.00
  DOWNSTREAM ELEVATION(FEET) =    573.20
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.353
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.49
  STREET FLOW TRAVEL TIME(MIN.) =   2.30   Tc(MIN.) =    4.65
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.88
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       2.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.09
```

```
 FLOW VELOCITY(FEET/SEC.) =  2.14   DEPTH*VELOCITY(FT*FT/SEC.) =   0.66
 LONGEST FLOWPATH FROM NODE    191.00 TO NODE    104.00 =     297.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5844
 SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    0.94
 TOTAL AREA(ACRES) =       0.6   TOTAL RUNOFF(CFS) =       2.96
 TC(MIN.) =    4.65

****************************************************************************
 FLOW PROCESS FROM NODE    191.00 TO NODE    104.00 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.) =    4.65
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     0.64
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.96

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        5.37    10.56        4.881          2.47
     2        2.96     4.65        7.904          0.64

 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        6.27     4.65       7.904
     2        7.19    10.56       4.881

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.19   Tc(MIN.) =   10.56
 TOTAL AREA(ACRES) =        3.1
 LONGEST FLOWPATH FROM NODE    133.00 TO NODE    104.00 =     625.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    63.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.7 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.03
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.19
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    103.00 =     688.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    103.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  22.00   RAIN INTENSITY(INCH/HOUR) =  3.04
  TOTAL AREA(ACRES) =     3.11   TOTAL RUNOFF(CFS) =      2.20

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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        2.20    22.00       3.040        3.11
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    103.00 =     688.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       55.89    19.68       3.266       44.05
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    2119.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1      57.86       19.68        3.266
      2      54.22       22.00        3.040

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      57.86   Tc(MIN.) =   19.68
  TOTAL AREA(ACRES) =       47.2

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    103.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    105.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.86
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   20.22
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =    2449.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.18
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.86
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   20.75
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    2769.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    106.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    106.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    616.00
  DOWNSTREAM ELEVATION(FEET) =    615.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.709
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    54.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

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

```
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  62
----------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
======================================================================
 REPRESENTATIVE SLOPE =  0.0170
 STREET LENGTH(FEET) =  1004.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 39.00

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

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.50
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.86
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
 STREET FLOW TRAVEL TIME(MIN.) =   6.03   Tc(MIN.) =    9.74
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.140
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    4.59
 TOTAL AREA(ACRES) =       1.1        PEAK FLOW RATE(CFS) =       4.67

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.64
 FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    121.00 =    1074.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    121.00 IS CODE =  81
----------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.140
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    1.06   SUBAREA RUNOFF(CFS) =    4.63
 TOTAL AREA(ACRES) =       2.1   TOTAL RUNOFF(CFS) =       9.31
 TC(MIN.) =    9.74

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 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.) =    9.74
 RAINFALL INTENSITY(INCH/HR) =   5.14
 TOTAL STREAM AREA(ACRES) =     2.13
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.31

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    630.00
  DOWNSTREAM ELEVATION(FEET) =    629.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.295
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.673
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    121.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   350.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0680
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.778
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.32
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   4.41
  Tc(MIN.) =   15.71
  SUBAREA AREA(ACRES) =     2.12       SUBAREA RUNOFF(CFS) =    2.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       2.2         PEAK FLOW RATE(CFS) =      2.94

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    121.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 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.) =   15.71
  RAINFALL INTENSITY(INCH/HR) =   3.78
  TOTAL STREAM AREA(ACRES) =     2.22
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.94

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1         9.31       9.74         5.140          2.13
     2         2.94      15.71         3.778          2.22

 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        11.13      9.74         5.140
     2         9.78     15.71         3.778

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      11.13   Tc(MIN.) =     9.74
 TOTAL AREA(ACRES) =         4.3
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    121.00 =    1074.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    29.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.13
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =     9.82
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    122.00 =    1103.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   645.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.75
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.13
 PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =    11.41
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    123.00 =    1748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    123.00 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.) =   11.41
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.64
  TOTAL STREAM AREA(ACRES) =     4.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.13

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    127.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    598.00
  DOWNSTREAM ELEVATION(FEET) =    596.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.810
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0300
  STREET LENGTH(FEET) =   563.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 39.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   2.68   Tc(MIN.) =    5.49
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.439
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    5.31
  TOTAL AREA(ACRES) =       0.9        PEAK FLOW RATE(CFS) =       5.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.98
  FLOW VELOCITY(FEET/SEC.) =  4.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
  LONGEST FLOWPATH FROM NODE    126.00 TO NODE    128.00 =     638.00 FEET.

**************************************************************************** 4-107
```

```
 FLOW PROCESS FROM NODE    128.00 TO NODE    128.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.439
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.85   SUBAREA RUNOFF(CFS) =    5.37
 TOTAL AREA(ACRES) =       1.7   TOTAL RUNOFF(CFS) =     10.81
 TC(MIN.) =    5.49

****************************************************************************
 FLOW PROCESS FROM NODE    128.00 TO NODE    123.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    31.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.81
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.57
 LONGEST FLOWPATH FROM NODE    126.00 TO NODE    123.00 =     669.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    126.00 TO NODE    123.00 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.) =    5.57
 RAINFALL INTENSITY(INCH/HR) =   7.37
 TOTAL STREAM AREA(ACRES) =     1.71
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.81

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY      AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
     1        11.13     11.41         4.643          4.35
     2        10.81      5.57         7.372          1.71

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        17.82      5.57         7.372
     2        17.94     11.41         4.643

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      17.94   Tc(MIN.) =   11.41
 TOTAL AREA(ACRES) =        6.1
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    123.00 =    1748.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    62.80   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.94
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   11.55
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    124.00 =    1810.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   474.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.94
 PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =   12.61
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    125.00 =    2285.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    125.00 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.) =   12.61
 RAINFALL INTENSITY(INCH/HR) =   4.35
 TOTAL STREAM AREA(ACRES) =     6.06
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.94

****************************************************************************
 FLOW PROCESS FROM NODE    124.60 TO NODE    124.70 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    587.00
 DOWNSTREAM ELEVATION(FEET) =    586.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.28
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    124.70 TO NODE    124.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.83   SUBAREA RUNOFF(CFS) =    7.04
  TOTAL AREA(ACRES) =       4.0   TOTAL RUNOFF(CFS) =      7.31
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    124.70 TO NODE    125.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0290
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.31
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE    124.60 TO NODE    125.00 =     345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.017
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.57   SUBAREA RUNOFF(CFS) =    6.27
  TOTAL AREA(ACRES) =       7.6   TOTAL RUNOFF(CFS) =      13.26
  TC(MIN.) =   10.12

****************************************************************************
  FLOW PROCESS FROM NODE    124.80 TO NODE    125.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.26
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.27
  LONGEST FLOWPATH FROM NODE    124.60 TO NODE    125.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.60 TO NODE    125.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   4.97
  TOTAL STREAM AREA(ACRES) =     7.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.94    12.61        4.353          6.06
      2       13.26    10.27        4.968          7.55

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       28.97    10.27       4.968
      2       29.55    12.61       4.353

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.55   Tc(MIN.) =   12.61
  TOTAL AREA(ACRES) =       13.6
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    125.00 =    2285.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    116.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.55
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    116.00 =    2322.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    116.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  26.00   RAIN INTENSITY(INCH/HOUR) =  2.73
```

```
  TOTAL AREA(ACRES) =    13.61   TOTAL RUNOFF(CFS) =      7.93

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   26.00
  RAINFALL INTENSITY(INCH/HR) =   2.73
  TOTAL STREAM AREA(ACRES) =    13.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.93

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    589.00
  DOWNSTREAM ELEVATION(FEET) =    588.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   11.295
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.673
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   689.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0330
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.365
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.53
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   7.50
  Tc(MIN.) =   18.79
  SUBAREA AREA(ACRES) =     8.45       SUBAREA RUNOFF(CFS) =    9.95
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        8.6         PEAK FLOW RATE(CFS) =      10.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    115.00 =     789.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.13
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   18.87
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    116.00 =     822.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    116.00 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.) =   18.87
  RAINFALL INTENSITY(INCH/HR) =   3.36
  TOTAL STREAM AREA(ACRES) =     8.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.13

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        7.93    26.00        2.729         13.61
      2       10.13    18.87        3.356          8.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       15.89    18.87        3.356
      2       16.17    26.00        2.729

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.17   Tc(MIN.) =   26.00
  TOTAL AREA(ACRES) =       22.2
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    116.00 =    2322.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   650.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      16.17
 PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =   27.48
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    106.00 =    2972.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    106.00 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       16.17    27.48       2.634       22.21
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    106.00 =    2972.30 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       57.86    20.75       3.157       47.16
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    2769.30 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      70.07      20.75        3.157
    2      64.44      27.48        2.634

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      70.07   Tc(MIN.) =   20.75
 TOTAL AREA(ACRES) =       69.4

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    106.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   745.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      70.07
 PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   21.92
 LONGEST FLOWPATH FROM NODE    119.00 TO NODE    107.00 =    3717.30 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

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

```
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    585.40
 DOWNSTREAM ELEVATION(FEET) =    584.00
 ELEVATION DIFFERENCE(FEET) =      1.40
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.988
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0170
 STREET LENGTH(FEET) =   463.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 34.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.76
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.56
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
 STREET FLOW TRAVEL TIME(MIN.) =   3.03   Tc(MIN.) =    6.02
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.011
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    3.22
 TOTAL AREA(ACRES) =       0.6        PEAK FLOW RATE(CFS) =       3.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.10
 FLOW VELOCITY(FEET/SEC.) =  2.93   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    130.00 TO NODE    132.00 =     533.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.011
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5637
  SUBAREA AREA(ACRES) =     0.75   SUBAREA RUNOFF(CFS) =     1.84
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       5.18
  TC(MIN.) =    6.02

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    148.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.18
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    6.99
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    148.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    148.00 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.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   6.37
  TOTAL STREAM AREA(ACRES) =     1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.18

****************************************************************************
  FLOW PROCESS FROM NODE    105.10 TO NODE    105.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    571.00
  DOWNSTREAM ELEVATION(FEET) =    570.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    105.20 TO NODE    105.20 IS CODE =  81
```

```
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.91   SUBAREA RUNOFF(CFS) =    1.67
  TOTAL AREA(ACRES) =       1.0   TOTAL RUNOFF(CFS) =       1.84
  TC(MIN.) =    9.43

************************************************************************
  FLOW PROCESS FROM NODE    105.20 TO NODE    105.30 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.13
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.84
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE    105.10 TO NODE    105.30 =     203.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    105.30 TO NODE    105.30 IS CODE =  81
------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.002
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.99   SUBAREA RUNOFF(CFS) =    1.73
  TOTAL AREA(ACRES) =       2.0   TOTAL RUNOFF(CFS) =       3.48
  TC(MIN.) =   10.16

************************************************************************
  FLOW PROCESS FROM NODE    105.30 TO NODE    105.40 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.48
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.29
  LONGEST FLOWPATH FROM NODE    105.10 TO NODE    105.40 =     240.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    105.40 TO NODE    148.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.48
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE    105.10 TO NODE    148.00 =     304.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.10 TO NODE    148.00 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.) =   10.50
  RAINFALL INTENSITY(INCH/HR) =   4.90
  TOTAL STREAM AREA(ACRES) =     1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.48

****************************************************************************
  FLOW PROCESS FROM NODE    105.50 TO NODE    105.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    578.00
  DOWNSTREAM ELEVATION(FEET) =    577.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE    105.60 TO NODE    105.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.86   SUBAREA RUNOFF(CFS) =    1.58
  TOTAL AREA(ACRES) =       0.9   TOTAL RUNOFF(CFS) =      1.73
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    105.60 TO NODE    105.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   133.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.02
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.73
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    9.98
  LONGEST FLOWPATH FROM NODE    105.50 TO NODE    105.70 =     198.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.70 TO NODE    105.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.061
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.92   SUBAREA RUNOFF(CFS) =    1.63
  TOTAL AREA(ACRES) =       1.9   TOTAL RUNOFF(CFS) =       3.29
  TC(MIN.) =    9.98

****************************************************************************
  FLOW PROCESS FROM NODE    105.70 TO NODE    105.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    39.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    105.50 TO NODE    105.80 =     237.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.80 TO NODE    148.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE    105.50 TO NODE    148.00 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.50 TO NODE    148.00 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.) =   10.33
  RAINFALL INTENSITY(INCH/HR) =   4.95
  TOTAL STREAM AREA(ACRES) =     1.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.29

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         5.18      6.99         6.366          1.31
      2         3.48     10.50         4.898          1.99
      3         3.29     10.33         4.950          1.86

  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         9.73      6.99         6.366
      2        10.75     10.33         4.950
      3        10.73     10.50         4.898

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.75   Tc(MIN.) =   10.33
  TOTAL AREA(ACRES) =        5.2
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    148.00 =     858.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    147.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.75
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   11.82
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    147.00 =    1458.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    147.00 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.) =   11.82
  RAINFALL INTENSITY(INCH/HR) =   4.54
  TOTAL STREAM AREA(ACRES) =     5.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.75

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    574.00
  DOWNSTREAM ELEVATION(FEET) =    573.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.204
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    64.29
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    147.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0110
  STREET LENGTH(FEET) =   880.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   6.67   Tc(MIN.) =    9.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.095
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.81      SUBAREA RUNOFF(CFS) =    3.51
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.38
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    145.00 TO NODE    147.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    147.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.095
```

```
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     0.83   SUBAREA RUNOFF(CFS) =     3.59
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       7.19
  TC(MIN.) =    9.88

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    147.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   5.10
  TOTAL STREAM AREA(ACRES) =     1.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.19

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        10.75     11.82         4.537          5.16
      2         7.19      9.88         5.095          1.66

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        16.76      9.88        5.095
      2        17.15     11.82        4.537

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.15   Tc(MIN.) =   11.82
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    147.00 =    1458.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    149.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    92.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.41
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.15
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   12.03
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    149.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   101.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.41
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.15
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   12.26
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    142.00 =    1651.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    157.50 TO NODE    157.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    595.00
  DOWNSTREAM ELEVATION(FEET) =    594.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
  FLOW PROCESS FROM NODE    157.60 TO NODE    157.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.37   SUBAREA RUNOFF(CFS) =    2.52
  TOTAL AREA(ACRES) =       1.6   TOTAL RUNOFF(CFS) =      2.90
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    157.60 TO NODE    157.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0110
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.68
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.90
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    157.50 TO NODE    157.70 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.70 TO NODE    157.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.020
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.55   SUBAREA RUNOFF(CFS) =    2.72
  TOTAL AREA(ACRES) =       3.1   TOTAL RUNOFF(CFS) =      5.50
  TC(MIN.) =   10.11

****************************************************************************
  FLOW PROCESS FROM NODE    157.70 TO NODE    158.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.50
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.29
  LONGEST FLOWPATH FROM NODE    157.50 TO NODE    158.00 =     277.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    157.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   375.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.50
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   11.41
  LONGEST FLOWPATH FROM NODE    157.50 TO NODE    157.00 =     652.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.50 TO NODE    157.00 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.) =   11.41
 RAINFALL INTENSITY(INCH/HR) =   4.64
 TOTAL STREAM AREA(ACRES) =     3.13
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.50

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    38.00
 UPSTREAM ELEVATION(FEET) =    594.80
 DOWNSTREAM ELEVATION(FEET) =    594.00
 ELEVATION DIFFERENCE(FEET) =      0.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.164
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 STREET LENGTH(FEET) =   655.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 31.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.34
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.33
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.89
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
 STREET FLOW TRAVEL TIME(MIN.) =   3.78   Tc(MIN.) =    5.95
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.069
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    4.39
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.51

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.09
 FLOW VELOCITY(FEET/SEC.) =  3.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
 LONGEST FLOWPATH FROM NODE    155.00 TO NODE    157.00 =     693.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.069
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.75   SUBAREA RUNOFF(CFS) =    4.51
 TOTAL AREA(ACRES) =       1.5   TOTAL RUNOFF(CFS) =      9.01
 TC(MIN.) =    5.95

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    157.00 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.) =    5.95
 RAINFALL INTENSITY(INCH/HR) =   7.07
 TOTAL STREAM AREA(ACRES) =     1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.01

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        5.50    11.41        4.644          3.13
     2        9.01     5.95        7.069          1.50

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       11.88     5.95       7.069
     2       11.42    11.41       4.644

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      11.88   Tc(MIN.) =    5.95
 TOTAL AREA(ACRES) =        4.6
 LONGEST FLOWPATH FROM NODE    155.00 TO NODE    157.00 =     693.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    157.00 TO NODE    159.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.73
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.88
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    6.20
```

```
 LONGEST FLOWPATH FROM NODE    155.00 TO NODE    159.00 =     797.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    159.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    159.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    156.50 TO NODE    156.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    590.00
 DOWNSTREAM ELEVATION(FEET) =    589.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
 SUBAREA RUNOFF(CFS) =      0.29
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
 FLOW PROCESS FROM NODE    156.60 TO NODE    156.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    1.65   SUBAREA RUNOFF(CFS) =    3.03
 TOTAL AREA(ACRES) =       1.8   TOTAL RUNOFF(CFS) =      3.33
 TC(MIN.) =    9.43

****************************************************************************
 FLOW PROCESS FROM NODE    156.60 TO NODE    156.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0140
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.18
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      3.33
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   10.15
 LONGEST FLOWPATH FROM NODE    156.50 TO NODE    156.70 =     245.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    156.70 TO NODE    156.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 5.008
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.40   SUBAREA RUNOFF(CFS) =    2.45
  TOTAL AREA(ACRES) =       3.2   TOTAL RUNOFF(CFS) =      5.63
  TC(MIN.) =   10.15

****************************************************************************
  FLOW PROCESS FROM NODE    156.70 TO NODE    156.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.63
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE    156.50 TO NODE    156.80 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.50 TO NODE    156.80 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.31
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     3.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.63

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    598.00
  DOWNSTREAM ELEVATION(FEET) =    597.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

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

```
 FLOW PROCESS FROM NODE    166.00 TO NODE    156.80 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0320
 STREET LENGTH(FEET) =   530.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 31.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.77
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
 STREET FLOW TRAVEL TIME(MIN.) =   2.67   Tc(MIN.) =    5.20
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.712
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    3.54
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.67

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.13
 FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE    165.00 TO NODE    156.80 =     580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    156.80 TO NODE    156.80 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.712
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    3.47
 TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       7.14
 TC(MIN.) =    5.20

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    156.80 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.) =    5.20
 RAINFALL INTENSITY(INCH/HR) =   7.71
```

```
  TOTAL STREAM AREA(ACRES) =      1.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.14

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         5.63     10.31         4.957          3.21
      2         7.14      5.20         7.712          1.09

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1         9.98      5.20        7.712
      2        10.22     10.31        4.957

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.22   Tc(MIN.) =   10.31
  TOTAL AREA(ACRES) =        4.3
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    156.80 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.80 TO NODE    156.90 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.22
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    156.90 =     641.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.90 TO NODE    159.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.22
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    159.00 =     701.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    159.00 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        10.22     10.61        4.865         4.30
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    159.00 =     701.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        11.88      6.20        6.878         4.63
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    159.00 =     797.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       17.85      6.20        6.878
      2       18.62     10.61        4.865

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.62   Tc(MIN.) =   10.61
  TOTAL AREA(ACRES) =        8.9

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    159.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    140.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   550.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.62
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.62
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    140.00 =    1347.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    140.00 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.) =   11.81
  RAINFALL INTENSITY(INCH/HR) =   4.54
  TOTAL STREAM AREA(ACRES) =     8.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.62

****************************************************************************
  FLOW PROCESS FROM NODE    139.50 TO NODE    139.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    577.00
  DOWNSTREAM ELEVATION(FEET) =    576.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    139.60 TO NODE    139.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.46   SUBAREA RUNOFF(CFS) =    4.52
  TOTAL AREA(ACRES) =      2.6   TOTAL RUNOFF(CFS) =      4.81
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    139.60 TO NODE    139.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0140
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.64
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      4.81
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   10.15
  LONGEST FLOWPATH FROM NODE    139.50 TO NODE    139.70 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.70 TO NODE    139.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.007
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.52   SUBAREA RUNOFF(CFS) =    4.42
  TOTAL AREA(ACRES) =      5.1   TOTAL RUNOFF(CFS) =      9.01
  TC(MIN.) =   10.15

****************************************************************************
  FLOW PROCESS FROM NODE    139.70 TO NODE    139.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.01
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.26
  LONGEST FLOWPATH FROM NODE    139.50 TO NODE    139.80 =     308.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.80 TO NODE    140.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.01
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE    139.50 TO NODE    140.00 =     364.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.80 TO NODE    140.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   4.93
  TOTAL STREAM AREA(ACRES) =     5.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.01

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        18.62     11.81         4.539          8.93
      2         9.01     10.41         4.927          5.14

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        25.41     10.41        4.927
      2        26.92     11.81        4.539

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.92   Tc(MIN.) =   11.81
  TOTAL AREA(ACRES) =       14.1
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    140.00 =    1347.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.41
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.92
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   12.47
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    142.00 =    1677.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    142.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    144.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    580.00
  DOWNSTREAM ELEVATION(FEET) =    579.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    141.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0240
  STREET LENGTH(FEET) =   848.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      2.59
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   4.43   Tc(MIN.) =    6.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.388
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    4.83
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       4.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.09
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    141.00 =     898.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    141.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.388
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.91   SUBAREA RUNOFF(CFS) =    4.94
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       9.88
  TC(MIN.) =    6.96

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 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.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   6.39
  TOTAL STREAM AREA(ACRES) =     1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.88

****************************************************************************
  FLOW PROCESS FROM NODE    140.50 TO NODE    140.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    568.00
  DOWNSTREAM ELEVATION(FEET) =    567.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.15
```

```
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE    140.60 TO NODE    140.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.92   SUBAREA RUNOFF(CFS) =    7.20
  TOTAL AREA(ACRES) =       4.0   TOTAL RUNOFF(CFS) =      7.35
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    140.60 TO NODE    140.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.57
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.35
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE    140.50 TO NODE    140.70 =     255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.70 TO NODE    140.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.016
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.96   SUBAREA RUNOFF(CFS) =    6.95
  TOTAL AREA(ACRES) =       8.0   TOTAL RUNOFF(CFS) =      13.97
  TC(MIN.) =   10.12

****************************************************************************
  FLOW PROCESS FROM NODE    140.70 TO NODE    140.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    57.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.97
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.25
  LONGEST FLOWPATH FROM NODE    140.50 TO NODE    140.80 =     312.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    140.80 TO NODE    141.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    12.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.97
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE    140.50 TO NODE    141.00 =     324.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.50 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.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     7.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.97

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY      AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1         9.88      6.96         6.388          1.82
      2        13.97     10.28         4.965          7.96

  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        19.34      6.96        6.388
      2        21.65     10.28        4.965

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.65   Tc(MIN.) =   10.28
  TOTAL AREA(ACRES) =        9.8
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    141.00 =     898.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.65
```

```
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    142.00 =     946.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 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        21.65     10.38        4.934         9.78
  LONGEST FLOWPATH FROM NODE    143.00 TO NODE    142.00 =     946.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        26.92     12.47        4.384        14.07
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    142.00 =    1677.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF        Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1      44.07       10.38        4.934
      2      46.16       12.47        4.384

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.16   Tc(MIN.) =   12.47
  TOTAL AREA(ACRES) =       23.9

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        46.16     12.47        4.384        23.85
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    142.00 =    1677.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        17.15     12.26        4.433         6.82
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    142.00 =    1651.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF        Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1      62.53       12.26        4.433
      2      63.13       12.47        4.384
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.13   Tc(MIN.) =   12.47
  TOTAL AREA(ACRES) =       30.7

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    142.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    142.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  24.00   RAIN INTENSITY(INCH/HOUR) =  2.87
  TOTAL AREA(ACRES) =    30.67   TOTAL RUNOFF(CFS) =     22.22

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.00
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.22
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   24.13
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    107.00 =    1738.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    107.00 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       22.22    24.13        2.864       30.67
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    107.00 =    1738.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)    (INCH/HOUR)   (ACRE)
     1       70.07    21.92        3.047       69.37
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    107.00 =    3717.30 FEET.

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM     RUNOFF        Tc       INTENSITY
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
      1       90.25       21.92         3.047
      2       88.08       24.13         2.864

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      90.25   Tc(MIN.) =   21.92
  TOTAL AREA(ACRES) =      100.0

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    107.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    109.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   670.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.36
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.25
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   22.90
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    109.00 =    4387.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =  1050.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.36
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.25
  PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =   24.44
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    110.00 =    5437.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    110.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    110.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    39.00
  UPSTREAM ELEVATION(FEET) =    580.00
  DOWNSTREAM ELEVATION(FEET) =    579.20
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.212
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

********************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    160.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0250
  STREET LENGTH(FEET) =   568.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =    5.24
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.673
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.64      SUBAREA RUNOFF(CFS) =    4.17
  TOTAL AREA(ACRES) =       0.7        PEAK FLOW RATE(CFS) =       4.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.34
  FLOW VELOCITY(FEET/SEC.) =  3.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    160.00 =     607.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.673
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     0.66   SUBAREA RUNOFF(CFS) =     4.30
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       8.61
  TC(MIN.) =    5.24

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 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.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   7.67
  TOTAL STREAM AREA(ACRES) =     1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.61

****************************************************************************
  FLOW PROCESS FROM NODE    159.50 TO NODE    159.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    577.00
  DOWNSTREAM ELEVATION(FEET) =    576.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    159.60 TO NODE    159.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.15   SUBAREA RUNOFF(CFS) =    5.79
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       6.14
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    159.60 TO NODE    159.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   189.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.37
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =        6.14
  PIPE TRAVEL TIME(MIN.) =    0.72    Tc(MIN.) =    10.15
  LONGEST FLOWPATH FROM NODE    159.50 TO NODE    159.70 =     254.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.70 TO NODE    159.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.007
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.19   SUBAREA RUNOFF(CFS) =    5.59
  TOTAL AREA(ACRES) =        6.5   TOTAL RUNOFF(CFS) =      11.44
  TC(MIN.) =   10.15

****************************************************************************
  FLOW PROCESS FROM NODE    159.70 TO NODE    160.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    67.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.44
  PIPE TRAVEL TIME(MIN.) =    0.16    Tc(MIN.) =    10.31
  LONGEST FLOWPATH FROM NODE    159.50 TO NODE    160.00 =     321.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.50 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.) =   10.31
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     6.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY       AREA
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        8.61      5.24         7.673          1.32
      2       11.44     10.31         4.955          6.53

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       14.42      5.24         7.673
      2       17.00     10.31         4.955
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.00   Tc(MIN.) =   10.31
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    160.00 =     607.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.00
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    162.00 =     719.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    162.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    586.00
  DOWNSTREAM ELEVATION(FEET) =    585.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    161.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   469.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 45.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    5.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.727
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.74      SUBAREA RUNOFF(CFS) =    4.86
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.57
  FLOW VELOCITY(FEET/SEC.) =  3.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    161.00 =     519.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.727
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    4.99
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       9.98
  TC(MIN.) =    5.18

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    161.00 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.) =    5.18
  RAINFALL INTENSITY(INCH/HR) =   7.73
  TOTAL STREAM AREA(ACRES) =     1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.98

****************************************************************************
  FLOW PROCESS FROM NODE    160.50 TO NODE    160.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    581.00
  DOWNSTREAM ELEVATION(FEET) =    580.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    160.60 TO NODE    160.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.25   SUBAREA RUNOFF(CFS) =    2.30
  TOTAL AREA(ACRES) =       1.4   TOTAL RUNOFF(CFS) =      2.50
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    160.60 TO NODE    160.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.37
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.50
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    160.50 TO NODE    160.70 =     245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.70 TO NODE    160.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.018
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.37   SUBAREA RUNOFF(CFS) =    2.41
  TOTAL AREA(ACRES) =       2.7   TOTAL RUNOFF(CFS) =      4.79
  TC(MIN.) =   10.11

****************************************************************************
  FLOW PROCESS FROM NODE    160.70 TO NODE    161.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.79
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.34
  LONGEST FLOWPATH FROM NODE    160.50 TO NODE    161.00 =     318.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.50 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   4.95
  TOTAL STREAM AREA(ACRES) =     2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.79

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         9.98      5.18         7.727          1.52
      2         4.79     10.34         4.948          2.73

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        12.39      5.18         7.727
      2        11.19     10.34         4.948

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.39   Tc(MIN.) =    5.18
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    161.00 =     519.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.39
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =    6.16
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    162.00 =     919.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
```

```
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        12.39      6.16        6.910         4.25
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    162.00 =      919.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        17.00     10.58        4.875         7.85
  LONGEST FLOWPATH FROM NODE    165.00 TO NODE    162.00 =      719.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF        Tc       INTENSITY
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
      1       22.29        6.16        6.910
      2       25.74       10.58        4.875

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       25.74   Tc(MIN.) =   10.58
  TOTAL AREA(ACRES) =        12.1

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    163.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.31
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       25.74
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   11.38
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    163.00 =    1319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    163.00 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.) =   11.38
  RAINFALL INTENSITY(INCH/HR) =   4.65
  TOTAL STREAM AREA(ACRES) =    12.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.74

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    173.00 IS CODE =  21
```

```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    575.40
  DOWNSTREAM ELEVATION(FEET) =    574.00
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.988
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    163.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   693.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 45.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.36
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   3.77   Tc(MIN.) =    6.76
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.510
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    1.04      SUBAREA RUNOFF(CFS) =    5.75
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       5.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.33
  FLOW VELOCITY(FEET/SEC.) =  3.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE    172.00 TO NODE    163.00 =     763.00 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) =  6.510
  *USER SPECIFIED(SUBAREA):
```

```
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    1.07   SUBAREA RUNOFF(CFS) =    5.92
  TOTAL AREA(ACRES) =       2.1   TOTAL RUNOFF(CFS) =     11.79
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    163.00 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.) =    6.76
  RAINFALL INTENSITY(INCH/HR) =   6.51
  TOTAL STREAM AREA(ACRES) =     2.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.79

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY      AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1        25.74     11.38         4.651         12.10
      2        11.79      6.76         6.510          2.13

  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        27.07      6.76        6.510
      2        34.16     11.38        4.651

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.16   Tc(MIN.) =   11.38
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    163.00 =    1319.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    111.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.93
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.16
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.66
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    111.00 =    1469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 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.) =   11.66
  RAINFALL INTENSITY(INCH/HR) =   4.58
  TOTAL STREAM AREA(ACRES) =    14.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.16

****************************************************************************
  FLOW PROCESS FROM NODE    108.50 TO NODE    108.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    567.00
  DOWNSTREAM ELEVATION(FEET) =    566.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    108.60 TO NODE    108.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.84   SUBAREA RUNOFF(CFS) =    7.06
  TOTAL AREA(ACRES) =       3.9   TOTAL RUNOFF(CFS) =      7.22
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    108.60 TO NODE    108.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0160
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.42
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      7.22
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE    108.50 TO NODE    108.70 =     285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.70 TO NODE    108.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.021
  *USER SPECIFIED(SUBAREA):
```

```
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.93   SUBAREA RUNOFF(CFS) =    6.91
  TOTAL AREA(ACRES) =        7.9   TOTAL RUNOFF(CFS) =     13.81
  TC(MIN.) =   10.10

****************************************************************************
  FLOW PROCESS FROM NODE    108.70 TO NODE    111.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.81
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE    108.50 TO NODE    111.00 =     368.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.50 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.) =   10.30
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     7.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.81

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1       34.16     11.66         4.578         14.23
      2       13.81     10.30         4.959          7.86

  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       45.35     10.30        4.959
      2       46.91     11.66        4.578

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.91   Tc(MIN.) =   11.66
  TOTAL AREA(ACRES) =       22.1
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    111.00 =    1469.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.50 TO NODE    111.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    108.50 TO NODE    111.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    36.00
  UPSTREAM ELEVATION(FEET) =    562.00
  DOWNSTREAM ELEVATION(FEET) =    561.30
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.163
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  STREET LENGTH(FEET) =   640.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.66
  STREET FLOW TRAVEL TIME(MIN.) =   4.97   Tc(MIN.) =    7.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.283
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    3.74
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.96
  FLOW VELOCITY(FEET/SEC.) =  2.48   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
```

```
 LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     676.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.283
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.72   SUBAREA RUNOFF(CFS) =    3.85
 TOTAL AREA(ACRES) =       1.4   TOTAL RUNOFF(CFS) =       7.69
 TC(MIN.) =    7.14

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    152.00 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.) =    7.14
 RAINFALL INTENSITY(INCH/HR) =   6.28
 TOTAL STREAM AREA(ACRES) =     1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.69

****************************************************************************
 FLOW PROCESS FROM NODE    151.10 TO NODE    151.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
 UPSTREAM ELEVATION(FEET) =    566.00
 DOWNSTREAM ELEVATION(FEET) =    565.10
 ELEVATION DIFFERENCE(FEET) =      0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.496
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.615
 SUBAREA RUNOFF(CFS) =      0.14
 TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
 FLOW PROCESS FROM NODE    151.20 TO NODE    151.20 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.615
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    9.63
 TOTAL AREA(ACRES) =       5.0   TOTAL RUNOFF(CFS) =       9.77
 TC(MIN.) =    8.50

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

```
 FLOW PROCESS FROM NODE    151.20 TO NODE    151.30 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   530.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.77
 PIPE TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =   10.30
 LONGEST FLOWPATH FROM NODE    151.10 TO NODE    151.30 =     585.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    151.30 TO NODE    151.30 IS CODE =  81
----------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.959
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    4.80   SUBAREA RUNOFF(CFS) =    8.33
 TOTAL AREA(ACRES) =        9.8   TOTAL RUNOFF(CFS) =      16.96
 TC(MIN.) =   10.30

**********************************************************************
 FLOW PROCESS FROM NODE    151.30 TO NODE    152.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.40
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.96
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.42
 LONGEST FLOWPATH FROM NODE    151.10 TO NODE    152.00 =     637.00 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    151.10 TO NODE    152.00 IS CODE =   1
----------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
======================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.42
 RAINFALL INTENSITY(INCH/HR) =   4.92
 TOTAL STREAM AREA(ACRES) =     9.77
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.96

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.69     7.14        6.283          1.44
```

```
     2       16.96     10.42         4.922           9.77

  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        19.30      7.14        6.283
      2        22.98     10.42        4.922

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.98   Tc(MIN.) =   10.42
  TOTAL AREA(ACRES) =        11.2
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    152.00 =     676.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    111.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.07
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       22.98
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   10.67
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    111.00 =     796.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    111.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        22.98     10.67        4.848        11.21
  LONGEST FLOWPATH FROM NODE    150.00 TO NODE    111.00 =     796.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        46.91     11.66        4.578        22.09
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    111.00 =    1469.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1       65.90      10.67        4.848
      2       68.61      11.66        4.578

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       68.61   Tc(MIN.) =   11.66
  TOTAL AREA(ACRES) =        33.3

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

```
 FLOW PROCESS FROM NODE    108.50 TO NODE    111.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   485.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  22.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.55
 GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      68.61
 PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   12.43
 LONGEST FLOWPATH FROM NODE    170.00 TO NODE    112.00 =    1954.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    56.00
 UPSTREAM ELEVATION(FEET) =    557.10
 DOWNSTREAM ELEVATION(FEET) =    556.00
 ELEVATION DIFFERENCE(FEET) =      1.10
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.689
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    177.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0140
 STREET LENGTH(FEET) =   472.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 45.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.78
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
 STREET FLOW TRAVEL TIME(MIN.) =   3.01   Tc(MIN.) =    5.70
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.268
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    5.31
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       5.44

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.84
 FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
 LONGEST FLOWPATH FROM NODE    175.00 TO NODE    177.00 =     528.00 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) =  7.268
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.87   SUBAREA RUNOFF(CFS) =    5.37
 TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =      10.81
 TC(MIN.) =    5.70

****************************************************************************
 FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.81
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.72
 LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     538.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
```

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

**************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  13
--------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    586.00
 DOWNSTREAM ELEVATION(FEET) =    583.20
 ELEVATION DIFFERENCE(FEET) =      2.80
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.372
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

**************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
--------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  7 USED)<<<<<
==========================================================================
 REPRESENTATIVE SLOPE =  0.0400
 STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 61.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  30.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.24
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.02
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    3.36
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    2.22
 TOTAL AREA(ACRES) =       0.4       PEAK FLOW RATE(CFS) =       2.35

 END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.11
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     270.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.36
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.35

****************************************************************************
  FLOW PROCESS FROM NODE    181.50 TO NODE    181.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    584.00
  DOWNSTREAM ELEVATION(FEET) =    583.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.07
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.07

****************************************************************************
  FLOW PROCESS FROM NODE    181.60 TO NODE    181.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.88   SUBAREA RUNOFF(CFS) =    1.62
  TOTAL AREA(ACRES) =       0.9   TOTAL RUNOFF(CFS) =      1.69
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    181.60 TO NODE    181.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0140
  FLOW LENGTH(FEET) =   133.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.43
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      1.69
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   10.07
```

```
 LONGEST FLOWPATH FROM NODE    181.50 TO NODE    181.70 =     198.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    181.70 TO NODE    181.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.031
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =     0.88   SUBAREA RUNOFF(CFS) =     1.55
 TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       3.17
 TC(MIN.) =   10.07

****************************************************************************
 FLOW PROCESS FROM NODE    181.70 TO NODE    182.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.90
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.17
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   10.31
 LONGEST FLOWPATH FROM NODE    181.50 TO NODE    182.00 =     268.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    181.50 TO NODE    182.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.31
 RAINFALL INTENSITY(INCH/HR) =   4.96
 TOTAL STREAM AREA(ACRES) =     1.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.17

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1         2.35      3.36         7.904          0.35
     2         3.17     10.31         4.955          1.80

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1         3.39      3.36         7.904
     2         4.64     10.31         4.955

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       4.64   Tc(MIN.) =   10.31
  TOTAL AREA(ACRES) =        2.2
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     270.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   442.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.34
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.64
  PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =   11.69
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    183.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 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.) =   11.69
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =     2.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.64

****************************************************************************
  FLOW PROCESS FROM NODE    182.50 TO NODE    182.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    565.00
  DOWNSTREAM ELEVATION(FEET) =    564.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    182.60 TO NODE    182.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.71   SUBAREA RUNOFF(CFS) =    4.98
  TOTAL AREA(ACRES) =       2.8   TOTAL RUNOFF(CFS) =      5.15
```

```
 TC(MIN.) =     9.43

****************************************************************************
 FLOW PROCESS FROM NODE    182.60 TO NODE    182.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.17
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.15
 PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   10.15
 LONGEST FLOWPATH FROM NODE    182.50 TO NODE    182.70 =     245.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    182.70 TO NODE    182.70 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.007
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    2.78   SUBAREA RUNOFF(CFS) =    4.87
 TOTAL AREA(ACRES) =       5.6   TOTAL RUNOFF(CFS) =       9.78
 TC(MIN.) =   10.15

****************************************************************************
 FLOW PROCESS FROM NODE    182.70 TO NODE    183.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   440.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.78
 PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =   11.65
 LONGEST FLOWPATH FROM NODE    182.50 TO NODE    183.00 =     685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    182.70 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.65
 RAINFALL INTENSITY(INCH/HR) =   4.58
 TOTAL STREAM AREA(ACRES) =     5.58
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.78

 ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         4.64    11.69        4.570          2.15
     2         9.78    11.65        4.582          5.58

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        14.41    11.65        4.582
     2        14.40    11.69        4.570

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.41   Tc(MIN.) =   11.65
  TOTAL AREA(ACRES) =        7.7
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    183.00 =     712.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    184.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   424.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.16
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.41
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   12.63
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =    1136.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    184.00 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.) =   12.63
  RAINFALL INTENSITY(INCH/HR) =   4.35
  TOTAL STREAM AREA(ACRES) =     7.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.41

****************************************************************************
  FLOW PROCESS FROM NODE    183.50 TO NODE    183.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    563.00
  DOWNSTREAM ELEVATION(FEET) =    562.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
```

```
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    183.60 TO NODE    183.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.58   SUBAREA RUNOFF(CFS) =    4.74
  TOTAL AREA(ACRES) =       2.7   TOTAL RUNOFF(CFS) =       4.94
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    183.60 TO NODE    183.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.13
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.94
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    183.50 TO NODE    183.70 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.70 TO NODE    183.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.018
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.64   SUBAREA RUNOFF(CFS) =    4.64
  TOTAL AREA(ACRES) =       5.3   TOTAL RUNOFF(CFS) =       9.36
  TC(MIN.) =   10.11

****************************************************************************
  FLOW PROCESS FROM NODE    183.70 TO NODE    184.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.36
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE    183.50 TO NODE    184.00 =     312.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    183.70 TO NODE    184.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   4.93
  TOTAL STREAM AREA(ACRES) =     5.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.36

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       14.41    12.63         4.348          7.73
      2        9.36    10.38         4.935          5.33

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       22.06    10.38         4.935
      2       22.66    12.63         4.348

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.66   Tc(MIN.) =   12.63
  TOTAL AREA(ACRES) =       13.1
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    184.00 =    1136.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   417.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.04
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.66
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   13.50
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    185.00 =    1553.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 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.) =   13.50
  RAINFALL INTENSITY(INCH/HR) =   4.17
  TOTAL STREAM AREA(ACRES) =    13.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.66
```

4-1660

```
****************************************************************************
  FLOW PROCESS FROM NODE    184.50 TO NODE    184.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    554.00
  DOWNSTREAM ELEVATION(FEET) =    553.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    184.60 TO NODE    184.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.60   SUBAREA RUNOFF(CFS) =    4.78
  TOTAL AREA(ACRES) =       2.7   TOTAL RUNOFF(CFS) =       5.00
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    184.60 TO NODE    184.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.14
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.00
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    184.50 TO NODE    184.70 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.70 TO NODE    184.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.018
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.67   SUBAREA RUNOFF(CFS) =    4.69
  TOTAL AREA(ACRES) =       5.4   TOTAL RUNOFF(CFS) =       9.47
  TC(MIN.) =   10.11
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    184.70 TO NODE    185.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.47
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE    184.50 TO NODE    185.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    184.70 TO NODE    185.00 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.) =   10.31
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     5.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.47

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    578.00
  DOWNSTREAM ELEVATION(FEET) =    574.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.614
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    85.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    185.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  7 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =  1090.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 61.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  30.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.92
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   12.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.58
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
 STREET FLOW TRAVEL TIME(MIN.) =   5.08   Tc(MIN.) =    7.69
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.988
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    2.22      SUBAREA RUNOFF(CFS) =   11.30
 TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =      11.40

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.11
 FLOW VELOCITY(FEET/SEC.) =  4.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.88
 LONGEST FLOWPATH FROM NODE    187.00 TO NODE    185.00 =    1190.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    187.00 TO NODE    185.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.69
 RAINFALL INTENSITY(INCH/HR) =   5.99
 TOTAL STREAM AREA(ACRES) =     2.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.40

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1        22.66     13.50         4.166          13.06
     2         9.47     10.31         4.958           5.39
     3        11.40      7.69         5.988           2.24

 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        34.23      7.69        5.988
     2        37.95     10.31        4.958
     3        38.54     13.50        4.166

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      38.54   Tc(MIN.) =   13.50
 TOTAL AREA(ACRES) =       20.7
```

```
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    185.00 =    1553.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    185.00 TO NODE    178.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   133.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.19
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      38.54
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   13.74
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    178.00 =    1686.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 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       38.54    13.74       4.118       20.69
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    178.00 =    1686.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       10.81     5.72       7.247        1.75
 LONGEST FLOWPATH FROM NODE    175.00 TO NODE    178.00 =     538.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1      26.86       5.72        7.247
    2      44.69      13.74        4.118

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      44.69   Tc(MIN.) =   13.74
 TOTAL AREA(ACRES) =       22.4

****************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    178.00 TO NODE    112.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  22.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.49
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.69
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.84
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    112.00 =    1746.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    112.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       44.69     13.84        4.098       22.44
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    112.00 =    1746.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       68.61     12.43        4.394       33.30
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    112.00 =    1954.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
      1     108.72      12.43         4.394
      2     108.68      13.84         4.098

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     108.72   Tc(MIN.) =   12.43
  TOTAL AREA(ACRES) =       55.7

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.43
  RAINFALL INTENSITY(INCH/HR) =   4.39
  TOTAL STREAM AREA(ACRES) =    55.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    108.72

****************************************************************************
  FLOW PROCESS FROM NODE    111.10 TO NODE    111.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    546.00
  DOWNSTREAM ELEVATION(FEET) =    545.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE    111.20 TO NODE    111.20 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.76   SUBAREA RUNOFF(CFS) =    3.23
  TOTAL AREA(ACRES) =       1.8   TOTAL RUNOFF(CFS) =      3.34
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    111.20 TO NODE    111.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0120
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.96
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.34
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   10.14
  LONGEST FLOWPATH FROM NODE    111.10 TO NODE    111.30 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.30 TO NODE    111.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.008
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.74   SUBAREA RUNOFF(CFS) =    4.80
  TOTAL AREA(ACRES) =       4.6   TOTAL RUNOFF(CFS) =      7.99
  TC(MIN.) =   10.14

****************************************************************************
  FLOW PROCESS FROM NODE    111.30 TO NODE    112.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.20
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.99
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE    111.10 TO NODE    112.00 =     285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.30 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.97
  TOTAL STREAM AREA(ACRES) =     4.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.99

****************************************************************************
  FLOW PROCESS FROM NODE    111.50 TO NODE    111.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    553.00
  DOWNSTREAM ELEVATION(FEET) =    552.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE    111.60 TO NODE    111.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.57   SUBAREA RUNOFF(CFS) =    2.89
  TOTAL AREA(ACRES) =       1.7   TOTAL RUNOFF(CFS) =      3.05
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    111.60 TO NODE    111.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.61
```

```
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.05
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE    111.50 TO NODE    111.70 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.70 TO NODE    111.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.016
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.13   SUBAREA RUNOFF(CFS) =    5.49
  TOTAL AREA(ACRES) =       4.8   TOTAL RUNOFF(CFS) =      8.41
  TC(MIN.) =   10.12

****************************************************************************
  FLOW PROCESS FROM NODE    111.70 TO NODE    112.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.28
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.41
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.25
  LONGEST FLOWPATH FROM NODE    111.50 TO NODE    112.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.70 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.25
  RAINFALL INTENSITY(INCH/HR) =   4.97
  TOTAL STREAM AREA(ACRES) =     4.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.41

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    552.50
  DOWNSTREAM ELEVATION(FEET) =    551.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.486
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
```

```
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.13
TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    191.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  7 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 STREET LENGTH(FEET) =   515.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 61.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  30.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.59
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
 STREET FLOW TRAVEL TIME(MIN.) =   3.68   Tc(MIN.) =    7.17
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.266
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    5.43
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       5.54

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.91
 FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
 LONGEST FLOWPATH FROM NODE    190.00 TO NODE    112.00 =     615.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    191.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.17
 RAINFALL INTENSITY(INCH/HR) =   6.27
 TOTAL STREAM AREA(ACRES) =     1.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.54

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

```
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1      108.72     12.43        4.394          55.74
      2        7.99     10.28        4.966           4.56
      3        8.41     10.25        4.974           4.79
      4        5.54      7.17        6.266           1.04

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1        79.71      7.17       6.266
      2       110.49     10.25       4.974
      3       110.71     10.28       4.966
      4       127.11     12.43       4.394

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      127.11   Tc(MIN.) =   12.43
  TOTAL AREA(ACRES) =        66.1
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    112.00 =    1954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.80 TO NODE    112.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  24.00   RAIN INTENSITY(INCH/HOUR) =  2.87
  TOTAL AREA(ACRES) =    66.13   TOTAL RUNOFF(CFS) =     50.02

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    110.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.66
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.02
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   24.06
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    110.00 =    1989.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    110.00 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        50.02     24.06        2.869        66.13
  LONGEST FLOWPATH FROM NODE    170.00 TO NODE    110.00 =    1989.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        90.25     24.44        2.840       100.04
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    110.00 =    5437.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF        Tc       INTENSITY
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)
     1      138.86       24.06         2.869
     2      139.77       24.44         2.840

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     139.77   Tc(MIN.) =   24.44
  TOTAL AREA(ACRES) =      166.2
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      166.2  TC(MIN.) =     24.44
  PEAK FLOW RATE(CFS)    =     139.77
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# SECTION 4-B

## POST-PROJECT HYDROLOGY, BASIN B

Developed Basin "B" is comprised of 174.6 acres and generates, during a 100-year storm event, a peak runoff rate of approximately 609.28 cfs in an undetained condition and 133.82 cfs in a detained condition. Project runoff generated by the basin is conveyed through the use of a proposed public storm drain system to one of two detention facilities. (Detention Basins BF-1 and BF-2 on Exhibit "C"). Portions of undeveloped land, within historic Basin "B", exist after final construction of this project. Undeveloped (off-site) land is represented by proposed Basins "B16", "B17", "B18", "B19", "B20", "B21" and "B22"; see, Exhibit "C". Runoff generated from these undeveloped areas will be conveyed within earthen flow paths, swales, brow ditches, and graded swales. Runoff generated by basins "B16", "B19" and "B20" will be collected within a proposed inlet for conveyance through the subdivision within a bypass storm drain system. Runoff generated by basins "B17", "B18", "B21", and "B22" will be conveyed to Node 267 where it confluences with project runoff at the storm drain outfall.

Regional detention facilities will be utilized to mitigate for the increase in runoff generated by the proposed project. In the rough graded condition, the regional detention basins provide adequate detention for the public roadways and graded pads. Since the pads will be vegetated with hydroseed and no impervious surfaces are proposed at this time, no on-lot detention is required in the rough graded condition. Final detention of the on lot basins will be accomplished through permanent on-lot detention structures during build out of each lot for its ultimate use.

# UNDETAINED HYDROLOGY ROUTING - BASIN B

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                                SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD 250                                                             *
* 100 YEAR DESIGN STORM                                                   *
* POST-PROJECT BASIN B (UNDETAINED FLOWS)                                 *
 *************************************************************************

  FILE NAME: 1400901\UNDET\POSTB.DAT
  TIME/DATE OF STUDY: 17:51 04/06/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   26.0     13.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  2   45.0     22.5    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  3   34.0     17.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
```

```
  UPSTREAM ELEVATION(FEET) =    604.50
  DOWNSTREAM ELEVATION(FEET) =    603.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      1.41

****************************************************************************
  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) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.99   SUBAREA RUNOFF(CFS) =   20.09
  TOTAL AREA(ACRES) =       3.2   TOTAL RUNOFF(CFS) =     21.50
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.50
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    3.73
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.20   SUBAREA RUNOFF(CFS) =   21.50
  TOTAL AREA(ACRES) =       6.4   TOTAL RUNOFF(CFS) =     43.00
  TC(MIN.) =    3.73

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   101.85   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.69
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.00
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    3.85
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =     406.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   343.23   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.69
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.00
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    4.27
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    205.00 =     750.08 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    205.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    205.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    595.00
  DOWNSTREAM ELEVATION(FEET) =    594.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      2.08
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      2.08

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.39   SUBAREA RUNOFF(CFS) =   16.06
  TOTAL AREA(ACRES) =       2.7   TOTAL RUNOFF(CFS) =      18.14
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.14
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    3.63
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    208.00 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.70   SUBAREA RUNOFF(CFS) =   18.14
  TOTAL AREA(ACRES) =       5.4   TOTAL RUNOFF(CFS) =      36.28
  TC(MIN.) =    3.63

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.29   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.28
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    3.70
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    209.00 =     283.29 FEET.

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

```
 FLOW PROCESS FROM NODE    206.00 TO NODE    209.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.70
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     5.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.28

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    596.00
 DOWNSTREAM ELEVATION(FEET) =    595.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    211.00 TO NODE    209.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 26.00

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

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.21
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.05
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
 STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =    4.76
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    2.15
```

```
 TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       2.28

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.25
 FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    209.00 =     385.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.35   SUBAREA RUNOFF(CFS) =    2.35
 TOTAL AREA(ACRES) =       0.7   TOTAL RUNOFF(CFS) =       4.64
 TC(MIN.) =    4.76

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    209.00 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.) =    4.76
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     0.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.64

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1       36.28      3.70         7.904          5.40
     2        4.64      4.76         7.904          0.69

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1       39.89      3.70         7.904
     2       40.92      4.76         7.904

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      40.92   Tc(MIN.) =    4.76
 TOTAL AREA(ACRES) =        6.1
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    209.00 =     385.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    212.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    66.16   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.92
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    4.84
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     451.16 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    205.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    72.97   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.92
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    4.94
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    205.00 =     524.13 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    205.00 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        40.92      4.94        7.904         6.09
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    205.00 =     524.13 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        43.00      4.27        7.904         6.40
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    205.00 =     750.08 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       78.38       4.27        7.904
      2       83.92       4.94        7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.92   Tc(MIN.) =    4.94
  TOTAL AREA(ACRES) =        12.5

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    213.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   294.25   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.09
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.92
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.22
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    213.00 =    1044.33 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    217.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    49.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.09
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.92
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.27
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    217.00 =    1093.33 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 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.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   7.64
  TOTAL STREAM AREA(ACRES) =    12.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     83.92

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    600.00
  DOWNSTREAM ELEVATION(FEET) =    599.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   4.24   Tc(MIN.) =    6.77
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.501
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    4.31
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.02
  FLOW VELOCITY(FEET/SEC.) =  3.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    218.00 TO NODE    217.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.501
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.80   SUBAREA RUNOFF(CFS) =    4.42
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       8.84
  TC(MIN.) =    6.77

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.77
 RAINFALL INTENSITY(INCH/HR) =   6.50
 TOTAL STREAM AREA(ACRES) =     1.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.84

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       83.92     5.27        7.639         12.49
     2        8.84     6.77        6.501          1.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1       90.80     5.27        7.639
     2       80.25     6.77        6.501

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      90.80   Tc(MIN.) =    5.27
 TOTAL AREA(ACRES) =       14.1
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    217.00 =    1093.33 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    216.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    34.80   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.50
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.80
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    5.30
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    216.00 =    1128.13 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 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.) =    5.30
 RAINFALL INTENSITY(INCH/HR) =   7.61
 TOTAL STREAM AREA(ACRES) =    14.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     90.80

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    594.90
  DOWNSTREAM ELEVATION(FEET) =    594.00
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.045
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.48   SUBAREA RUNOFF(CFS) =   16.66
  TOTAL AREA(ACRES) =       2.6   TOTAL RUNOFF(CFS) =      17.74
  TC(MIN.) =    3.05

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.25
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.74
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    3.74
  LONGEST FLOWPATH FROM NODE    214.00 TO NODE    216.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.63   SUBAREA RUNOFF(CFS) =   17.67
  TOTAL AREA(ACRES) =       5.3   TOTAL RUNOFF(CFS) =      35.41
  TC(MIN.) =    3.74

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.74
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     5.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.41

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       90.80     5.30        7.610         14.09
      2       35.41     3.74        7.904          5.27

  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      122.83     3.74       7.904
      2      124.89     5.30       7.610

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     124.89   Tc(MIN.) =    5.30
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    216.00 =    1128.13 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    272.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    24.66   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.67
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     124.89
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.33
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    272.00 =    1152.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    273.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    59.03   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.67
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     124.89
```

```
  PIPE TRAVEL TIME(MIN.) =    0.06    Tc(MIN.) =     5.38
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    273.00 =    1211.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    273.00 TO NODE    274.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   107.28   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.67
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     124.89
  PIPE TRAVEL TIME(MIN.) =    0.10    Tc(MIN.) =     5.48
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    274.00 =    1319.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    275.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   163.53   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.67
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     124.89
  PIPE TRAVEL TIME(MIN.) =    0.15    Tc(MIN.) =     5.64
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    275.00 =    1482.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    276.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.67
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     124.89
  PIPE TRAVEL TIME(MIN.) =    0.31    Tc(MIN.) =     5.95
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    276.00 =    1812.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    276.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    276.00 IS CODE =  13
----------------------------------------------------------------------------
```

```
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    265.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    624.00
  DOWNSTREAM ELEVATION(FEET) =    623.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.029
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.045
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.23

********************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    266.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   390.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.972
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.44
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   4.50
  Tc(MIN.) =   14.53
  SUBAREA AREA(ACRES) =     2.39       SUBAREA RUNOFF(CFS) =    3.32
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        2.5         PEAK FLOW RATE(CFS) =       3.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    266.00 =     460.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    277.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1543.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.069
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.60
 AVERAGE FLOW DEPTH(FEET) =   0.94   TRAVEL TIME(MIN.) =   7.15
 Tc(MIN.) =   21.68
 SUBAREA AREA(ACRES) =    22.90       SUBAREA RUNOFF(CFS) =   24.59
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       25.4         PEAK FLOW RATE(CFS) =      27.30

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   4.13
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    277.00 =    2003.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    264.00 TO NODE    277.00 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.) =   21.68
 RAINFALL INTENSITY(INCH/HR) =   3.07
 TOTAL STREAM AREA(ACRES) =    25.42
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.30

****************************************************************************
 FLOW PROCESS FROM NODE    286.00 TO NODE    287.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    603.00
 DOWNSTREAM ELEVATION(FEET) =    598.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.887
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE    287.00 TO NODE    277.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   890.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0490
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.431
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.10
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.40
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   4.37
 Tc(MIN.) =   12.26
 SUBAREA AREA(ACRES) =     4.88       SUBAREA RUNOFF(CFS) =    7.57
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        5.0          PEAK FLOW RATE(CFS) =       7.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   4.20
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    277.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    286.00 TO NODE    277.00 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.) =   12.26
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.75

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1       27.30     21.68         3.069         25.42
      2        7.75     12.26         4.431          5.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       23.20     12.26        4.431
      2       32.67     21.68        3.069

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.67   Tc(MIN.) =   21.68
  TOTAL AREA(ACRES) =       30.4
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    277.00 =    2003.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    276.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    36.22   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.83
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.67
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   21.75
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    276.00 =    2039.22 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    276.00 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        32.67     21.75        3.062        30.42
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    276.00 =    2039.22 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1       124.89      5.95        7.067        19.36
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    276.00 =    1812.63 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1      133.82       5.95         7.067
     2       86.79      21.75         3.062

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     133.82   Tc(MIN.) =    5.95
 TOTAL AREA(ACRES) =       49.8

****************************************************************************
 FLOW PROCESS FROM NODE    276.00 TO NODE    276.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    276.00 TO NODE    278.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   269.78   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.91
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     133.82
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    6.27
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    278.00 =    2309.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    278.00 TO NODE    279.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.91
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     133.82
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.63
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    279.00 =    2609.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    279.00 TO NODE    280.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   239.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.91
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     133.82
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.92
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    280.00 =    2848.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    281.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   296.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.91
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     133.82
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    7.27
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    281.00 =    3144.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    263.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   296.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.91
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     133.82
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    263.00 =    3440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    584.25
  DOWNSTREAM ELEVATION(FEET) =    581.75
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.861
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    221.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0500
  STREET LENGTH(FEET) =   171.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    2.59
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.47      SUBAREA RUNOFF(CFS) =    3.16
  TOTAL AREA(ACRES) =       0.5        PEAK FLOW RATE(CFS) =       3.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.88
  FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    222.00 TO NODE    221.00 =     221.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    224.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   300.53   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    3.38
  LONGEST FLOWPATH FROM NODE    222.00 TO NODE    224.00 =     521.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.38
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.29

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    588.00
  DOWNSTREAM ELEVATION(FEET) =    587.10
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.045
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    4.49   SUBAREA RUNOFF(CFS) =   30.17
  TOTAL AREA(ACRES) =       4.5   TOTAL RUNOFF(CFS) =      30.57
  TC(MIN.) =    3.05

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.73
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.57
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    3.73
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    4.55   SUBAREA RUNOFF(CFS) =   30.57
  TOTAL AREA(ACRES) =       9.1   TOTAL RUNOFF(CFS) =      61.14
  TC(MIN.) =    3.73

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    228.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    87.63   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.46
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.14
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    3.81
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    228.00 =     547.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    224.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    24.06   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.46
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.14
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    3.83
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    224.00 =     571.69 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.83
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     9.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     61.14

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc       INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.29     3.38        7.904          0.49
     2       61.14     3.83        7.904          9.10

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       57.24     3.38        7.904
     2       64.43     3.83        7.904

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      64.43   Tc(MIN.) =    3.83
 TOTAL AREA(ACRES) =        9.6
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    224.00 =     571.69 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    229.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.51
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      64.43
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    4.07
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    229.00 =     871.69 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    229.00 TO NODE    230.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.51
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
```

```
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.43
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    4.31
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    230.00 =    1171.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.31
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     9.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     64.43

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    575.00
  DOWNSTREAM ELEVATION(FEET) =    572.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.751
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    230.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0350
  STREET LENGTH(FEET) =   846.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
  STREET FLOW TRAVEL TIME(MIN.) =   3.52   Tc(MIN.) =    5.27
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.640
```

```
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =  1.11   SUBAREA RUNOFF(CFS) =  7.21
 TOTAL AREA(ACRES) =  1.1   PEAK FLOW RATE(CFS) =  7.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37  HALFSTREET FLOOD WIDTH(FEET) =  12.07
 FLOW VELOCITY(FEET/SEC.) =  4.66  DEPTH*VELOCITY(FT*FT/SEC.) =  1.71
 LONGEST FLOWPATH FROM NODE  231.00 TO NODE  230.00 =  896.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  231.00 TO NODE  230.00 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.) =  5.27
 RAINFALL INTENSITY(INCH/HR) =  7.64
 TOTAL STREAM AREA(ACRES) =  1.13
 PEAK FLOW RATE(CFS) AT CONFLUENCE =  7.34

 ** CONFLUENCE DATA **
 STREAM    RUNOFF     Tc     INTENSITY     AREA
 NUMBER     (CFS)   (MIN.)  (INCH/HOUR)   (ACRE)
    1      64.43    4.31       7.904        9.59
    2       7.34    5.27       7.640        1.13

 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      70.44    4.31       7.904
    2      69.62    5.27       7.640

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =  70.44  Tc(MIN.) =  4.31
 TOTAL AREA(ACRES) =  10.7
 LONGEST FLOWPATH FROM NODE  225.00 TO NODE  230.00 =  1171.69 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE  230.00 TO NODE  233.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =  239.82  MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.35
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00  NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =  70.44
 PIPE TRAVEL TIME(MIN.) =  0.28  Tc(MIN.) =  4.59
 LONGEST FLOWPATH FROM NODE  225.00 TO NODE  233.00 =  1411.51 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     233.00 TO NODE     233.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     233.00 TO NODE     233.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     234.00 TO NODE     235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    571.26
  DOWNSTREAM ELEVATION(FEET) =    570.00
  ELEVATION DIFFERENCE(FEET) =      1.26
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.278
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE     235.00 TO NODE     235.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.71   SUBAREA RUNOFF(CFS) =    4.77
  TOTAL AREA(ACRES) =       0.8   TOTAL RUNOFF(CFS) =      5.44
  TC(MIN.) =    3.28

****************************************************************************
  FLOW PROCESS FROM NODE     235.00 TO NODE     236.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0230
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.44
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    3.52
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     158.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.81   SUBAREA RUNOFF(CFS) =    5.44
  TOTAL AREA(ACRES) =       1.6   TOTAL RUNOFF(CFS) =     10.88
  TC(MIN.) =    3.52

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    237.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.69   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.88
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    3.67
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    237.00 =     213.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    37.36   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.88
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    238.00 =     251.05 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   163.19   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      10.88
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    4.21
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    239.00 =     414.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.21
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.88

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    241.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    570.00
  DOWNSTREAM ELEVATION(FEET) =    569.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.54
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.54

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    241.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.52   SUBAREA RUNOFF(CFS) =   16.93
  TOTAL AREA(ACRES) =       2.6   TOTAL RUNOFF(CFS) =      17.47
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.78
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      17.47
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    3.61
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    242.00 =     340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.59   SUBAREA RUNOFF(CFS) =   17.40
  TOTAL AREA(ACRES) =       5.2   TOTAL RUNOFF(CFS) =      34.87
  TC(MIN.) =    3.61

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    243.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    42.81   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.10
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.87
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    3.68
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    243.00 =     382.81 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    243.00 TO NODE    239.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    83.47   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.10
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.87
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    3.80
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    239.00 =     466.28 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.80
```

```
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     5.19
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.87

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       10.88     4.21        7.904         1.62
     2       34.87     3.80        7.904         5.19

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       44.69     3.80        7.904
     2       45.75     4.21        7.904

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      45.75   Tc(MIN.) =    4.21
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    239.00 =     466.28 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    244.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   227.79   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.56
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      45.75
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    4.47
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     694.07 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    244.00 TO NODE    244.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    4.47
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     6.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.75

****************************************************************************
 FLOW PROCESS FROM NODE    245.00 TO NODE    246.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    554.00
  DOWNSTREAM ELEVATION(FEET) =    553.10
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.045
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    246.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    5.73   SUBAREA RUNOFF(CFS) =   38.50
  TOTAL AREA(ACRES) =      5.8   TOTAL RUNOFF(CFS) =     39.17
  TC(MIN.) =    3.05

****************************************************************************
  FLOW PROCESS FROM NODE    246.00 TO NODE    247.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.17
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    3.41
  LONGEST FLOWPATH FROM NODE    245.00 TO NODE    247.00 =     335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    247.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    5.83   SUBAREA RUNOFF(CFS) =   39.17
  TOTAL AREA(ACRES) =      11.7   TOTAL RUNOFF(CFS) =     78.34
  TC(MIN.) =    3.41

****************************************************************************
  FLOW PROCESS FROM NODE    247.00 TO NODE    248.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    40.23   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      78.34
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    3.45
 LONGEST FLOWPATH FROM NODE    245.00 TO NODE    248.00 =     375.23 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    248.00 TO NODE    244.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    37.16   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      78.34
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    3.49
 LONGEST FLOWPATH FROM NODE    245.00 TO NODE    244.00 =     412.39 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    245.00 TO NODE    244.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.49
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =    11.66
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.34

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
     1        45.75      4.47         7.904          6.81
     2        78.34      3.49         7.904         11.66

 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       124.09      3.49        7.904
     2       124.09      4.47        7.904

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     124.09   Tc(MIN.) =    4.47
 TOTAL AREA(ACRES) =       18.5
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     694.07 FEET.
```

4-209

```
****************************************************************************
  FLOW PROCESS FROM NODE    244.00 TO NODE    249.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   368.39   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.28
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     124.09
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    4.72
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    249.00 =    1062.46 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    249.40
  DOWNSTREAM ELEVATION(FEET) =    248.50
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.045
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.81
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.81

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.13   SUBAREA RUNOFF(CFS) =   21.03
  TOTAL AREA(ACRES) =      3.2   TOTAL RUNOFF(CFS) =     21.84
```

```
  TC(MIN.) =     3.05

****************************************************************************
  FLOW PROCESS FROM NODE     251.00 TO NODE     252.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.84
  PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =    3.98
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     252.00 TO NODE     252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.25   SUBAREA RUNOFF(CFS) =   21.84
  TOTAL AREA(ACRES) =       6.5   TOTAL RUNOFF(CFS) =      43.67
  TC(MIN.) =    3.98

****************************************************************************
  FLOW PROCESS FROM NODE     252.00 TO NODE     253.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    36.68   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.90
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.67
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    4.02
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    253.00 =     486.68 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     250.00 TO NODE     253.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.02
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     6.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.67
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    255.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    586.50
  DOWNSTREAM ELEVATION(FEET) =    585.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    255.00 TO NODE    253.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =  1320.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 45.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.19
  STREET FLOW TRAVEL TIME(MIN.) =   6.48   Tc(MIN.) =    9.01
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.407
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    1.91      SUBAREA RUNOFF(CFS) =    8.78
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       8.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.63
  FLOW VELOCITY(FEET/SEC.) =  3.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.65
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    253.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    253.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.407
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     1.92   SUBAREA RUNOFF(CFS) =     8.82
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      17.69
  TC(MIN.) =    9.01

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    253.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   5.41
  TOTAL STREAM AREA(ACRES) =     3.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.69

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        43.67      4.02         7.904          6.50
      2        17.69      9.01         5.407          3.85

  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        51.57      4.02        7.904
      2        47.57      9.01        5.407

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       51.57   Tc(MIN.) =     4.02
  TOTAL AREA(ACRES) =        10.4
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    253.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    249.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    73.78   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.51
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.57
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =     4.14
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    249.00 =    1443.78 FEET.
```



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

```
 FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 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         51.57      4.14        7.904        10.35
 LONGEST FLOWPATH FROM NODE    254.00 TO NODE    249.00 =    1443.78 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1        124.09      4.72        7.904        18.47
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    249.00 =    1062.46 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1       160.54       4.14        7.904
    2       175.67       4.72        7.904

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     175.67   Tc(MIN.) =    4.72
 TOTAL AREA(ACRES) =       28.8

****************************************************************************
 FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    249.00 TO NODE    233.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    63.68   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.26
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     175.67
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    4.77
 LONGEST FLOWPATH FROM NODE    254.00 TO NODE    233.00 =    1507.46 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    233.00 TO NODE    233.00 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        175.67      4.77        7.904        28.82
 LONGEST FLOWPATH FROM NODE    254.00 TO NODE    233.00 =    1507.46 FEET.
```

```
** MEMORY BANK #  3 CONFLUENCE DATA **
STREAM      RUNOFF       Tc       INTENSITY      AREA
NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
    1        70.44      4.59        7.904        10.72
LONGEST FLOWPATH FROM NODE    225.00 TO NODE    233.00 =    1411.51 FEET.

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF       Tc       INTENSITY
NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
    1      239.39       4.59        7.904
    2      246.10       4.77        7.904

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     246.10   Tc(MIN.) =     4.77
TOTAL AREA(ACRES) =       39.5

****************************************************************************
FLOW PROCESS FROM NODE    233.00 TO NODE    233.00 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE    233.00 TO NODE    256.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
REPRESENTATIVE SLOPE =  0.0100
FLOW LENGTH(FEET) =   404.90   MANNING'S N =  0.013
ASSUME FULL-FLOWING PIPELINE
PIPE-FLOW VELOCITY(FEET/SEC.) =  25.58
PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     246.10
PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.04
LONGEST FLOWPATH FROM NODE    254.00 TO NODE    256.00 =    1912.36 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 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.) =    5.04
RAINFALL INTENSITY(INCH/HR) =   7.87
TOTAL STREAM AREA(ACRES) =    39.54
PEAK FLOW RATE(CFS) AT CONFLUENCE =    246.10

****************************************************************************
FLOW PROCESS FROM NODE    257.00 TO NODE    258.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
```

```
  UPSTREAM ELEVATION(FEET) =     536.75
  DOWNSTREAM ELEVATION(FEET) =     536.00
  ELEVATION DIFFERENCE(FEET) =       0.75
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.780
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.13
  TOTAL AREA(ACRES) =       0.02   TOTAL RUNOFF(CFS) =       0.13

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    256.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =    5.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.608
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    3.49
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.74
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE    257.00 TO NODE    256.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 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.) =    5.31
  RAINFALL INTENSITY(INCH/HR) =   7.61
  TOTAL STREAM AREA(ACRES) =     0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.62

  ** CONFLUENCE DATA **
```

```
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1        246.10       5.04         7.865         39.54
     2          3.62       5.31         7.608          0.56

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF        Tc       INTENSITY
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)
     1        249.54       5.04         7.865
     2        241.66       5.31         7.608

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      249.54   Tc(MIN.) =     5.04
  TOTAL AREA(ACRES) =        40.1
  LONGEST FLOWPATH FROM NODE     254.00 TO NODE     256.00 =     1912.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     256.00 TO NODE     259.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     60.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.94
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      249.54
  PIPE TRAVEL TIME(MIN.) =    0.04    Tc(MIN.) =     5.08
  LONGEST FLOWPATH FROM NODE     254.00 TO NODE     259.00 =     1972.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     256.00 TO NODE     259.00 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.) =     5.08
  RAINFALL INTENSITY(INCH/HR) =    7.83
  TOTAL STREAM AREA(ACRES) =     40.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     249.54

****************************************************************************
  FLOW PROCESS FROM NODE     260.00 TO NODE     261.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =     65.00
  UPSTREAM ELEVATION(FEET) =     532.98
  DOWNSTREAM ELEVATION(FEET) =     532.00
  ELEVATION DIFFERENCE(FEET) =       0.98
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     3.164
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      3.09
TOTAL AREA(ACRES) =      0.46   TOTAL RUNOFF(CFS) =      3.09

****************************************************************************
 FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
SUBAREA AREA(ACRES) =    2.38   SUBAREA RUNOFF(CFS) =   15.99
TOTAL AREA(ACRES) =       2.8   TOTAL RUNOFF(CFS) =      19.08
TC(MIN.) =    3.16

****************************************************************************
 FLOW PROCESS FROM NODE    261.00 TO NODE    262.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      19.08
 PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    3.69
 LONGEST FLOWPATH FROM NODE    260.00 TO NODE    262.00 =     295.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    262.00 TO NODE    262.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
SUBAREA AREA(ACRES) =    3.86   SUBAREA RUNOFF(CFS) =   25.93
TOTAL AREA(ACRES) =       6.7   TOTAL RUNOFF(CFS) =      45.01
TC(MIN.) =    3.69

****************************************************************************
 FLOW PROCESS FROM NODE    262.00 TO NODE    259.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.33
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.01
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    3.72
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    259.00 =     325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    259.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.72
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     6.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.01

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY      AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1       249.54      5.08         7.827         40.10
      2        45.01      3.72         7.904          6.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1       292.11      3.72        7.904
      2       294.12      5.08        7.827

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     294.12   Tc(MIN.) =    5.08
  TOTAL AREA(ACRES) =       46.8
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    259.00 =    1972.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    263.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.40
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     294.12
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.14
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    263.00 =    2058.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       294.12      5.14        7.767        46.80
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    263.00 =    2058.36 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM      RUNOFF       Tc       INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       133.82      7.63        6.020        49.78
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    263.00 =    3440.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1      384.27       5.14         7.767
      2      361.80       7.63         6.020

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      384.27   Tc(MIN.) =     5.14
  TOTAL AREA(ACRES) =        96.6

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    267.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   278.72   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.16
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     384.27
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =     5.33
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    267.00 =    3718.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    267.00 TO NODE    267.00 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.) =    5.33
  RAINFALL INTENSITY(INCH/HR) =   7.58
  TOTAL STREAM AREA(ACRES) =    96.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    384.27

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  100.00
  UPSTREAM ELEVATION(FEET) =  610.00
  DOWNSTREAM ELEVATION(FEET) =  605.50
  ELEVATION DIFFERENCE(FEET) =  4.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =  8.177
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.755
  SUBAREA RUNOFF(CFS) =  0.10
  TOTAL AREA(ACRES) =  0.05  TOTAL RUNOFF(CFS) =  0.10

********************************************************************************
  FLOW PROCESS FROM NODE  283.00 TO NODE  288.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1350.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =  50.00  "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030  MAXIMUM DEPTH(FEET) =  1.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.154
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =  5.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  1.79
  AVERAGE FLOW DEPTH(FEET) =  0.06  TRAVEL TIME(MIN.) =  12.60
  Tc(MIN.) =  20.77
  SUBAREA AREA(ACRES) =  8.65  SUBAREA RUNOFF(CFS) =  9.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =  8.7  PEAK FLOW RATE(CFS) =  9.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08  FLOW VELOCITY(FEET/SEC.) =  2.33
  LONGEST FLOWPATH FROM NODE  282.00 TO NODE  288.00 =  1450.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE  288.00 TO NODE  288.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.154
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =  5.30  SUBAREA RUNOFF(CFS) =  5.85
  TOTAL AREA(ACRES) =  14.0  TOTAL RUNOFF(CFS) =  15.46
  TC(MIN.) =  20.77

********************************************************************************
  FLOW PROCESS FROM NODE  288.00 TO NODE  267.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =   962.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0200
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.841
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.73
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.39
 AVERAGE FLOW DEPTH(FEET) =   1.02   TRAVEL TIME(MIN.) =   3.65
 Tc(MIN.) =   24.43
 SUBAREA AREA(ACRES) =    14.60       SUBAREA RUNOFF(CFS) =   14.52
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       28.6         PEAK FLOW RATE(CFS) =      28.44

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.10   FLOW VELOCITY(FEET/SEC.) =   4.67
 LONGEST FLOWPATH FROM NODE    282.00 TO NODE    267.00 =    2412.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    267.00 TO NODE    267.00 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.) =   24.43
 RAINFALL INTENSITY(INCH/HR) =   2.84
 TOTAL STREAM AREA(ACRES) =    28.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.44

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY      AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
     1       384.27      5.33        7.585         96.58
     2        28.44     24.43        2.841         28.60

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF        Tc       INTENSITY
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)
     1       390.48      5.33        7.585
     2       172.40     24.43        2.841

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     390.48   Tc(MIN.) =    5.33
 TOTAL AREA(ACRES) =      125.2
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    267.00 =    3718.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    267.00 TO NODE    285.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   391.00
```

```
 REPRESENTATIVE CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.250
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00

        ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.123
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     421.30
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.95
 AVERAGE FLOW DEPTH(FEET) =   3.00   TRAVEL TIME(MIN.) =   0.55
 Tc(MIN.) =    5.88
 SUBAREA AREA(ACRES) =    24.70       SUBAREA RUNOFF(CFS) =   61.58
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.571
 TOTAL AREA(ACRES) =      149.9         PEAK FLOW RATE(CFS) =     609.28

        ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.


 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  3.00   FLOW VELOCITY(FEET/SEC.) =  17.28

 ==>FLOWDEPTH EXCEEDS MAXIMUM ALLOWABLE DEPTH

 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    285.00 =    4109.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    285.00 TO NODE    268.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   661.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  26.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50

        ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.429
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     637.16
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.89
 AVERAGE FLOW DEPTH(FEET) =   1.50   TRAVEL TIME(MIN.) =   1.01
```

```
 Tc(MIN.) =    6.89
 SUBAREA AREA(ACRES) =    24.70       SUBAREA RUNOFF(CFS) =   55.58
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.539
 TOTAL AREA(ACRES) =      174.6         PEAK FLOW RATE(CFS) =     609.28

        ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
            CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
            ALLOWABLE DEPTH).
            AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
            ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.


 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.50   FLOW VELOCITY(FEET/SEC.) =  10.41

 ==>FLOWDEPTH EXCEEDS MAXIMUM ALLOWABLE DEPTH

 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    268.00 =    4770.72 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      174.6  TC(MIN.) =      6.89
 PEAK FLOW RATE(CFS)    =     609.28
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

# DETAINED HYDROLOGY ROUTING - BASIN B

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                               SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD 250                                                             *
* POST-PROJECT 100 YEAR DESIGN STORM                                      *
* BASIN B                                                                 *
 *************************************************************************

  FILE NAME: 1400901\POSTB.DAT
  TIME/DATE OF STUDY: 17:07 04/05/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   26.0     13.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  2   45.0     22.5    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  3   34.0     17.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
```

```
  UPSTREAM ELEVATION(FEET) =     604.50
  DOWNSTREAM ELEVATION(FEET) =    603.50
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.39

****************************************************************************
  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) =  5.250
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.99   SUBAREA RUNOFF(CFS) =    5.49
  TOTAL AREA(ACRES) =       3.2   TOTAL RUNOFF(CFS) =      5.88
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.88
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   10.15
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.008
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.20   SUBAREA RUNOFF(CFS) =    5.61
  TOTAL AREA(ACRES) =       6.4   TOTAL RUNOFF(CFS) =      11.22
  TC(MIN.) =   10.15

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   101.85   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.5 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.22
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =     406.85 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   343.23   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.22
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    205.00 =     750.08 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    205.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    205.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    595.00
  DOWNSTREAM ELEVATION(FEET) =    594.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.31   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
```

```
  SUBAREA AREA(ACRES) =     2.39   SUBAREA RUNOFF(CFS) =     4.39
  TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =       4.96
  TC(MIN.) =     9.43

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.13
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.96
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   10.11
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    208.00 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    208.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.018
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =     2.70   SUBAREA RUNOFF(CFS) =     4.74
  TOTAL AREA(ACRES) =        5.4   TOTAL RUNOFF(CFS) =       9.48
  TC(MIN.) =   10.11

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.29   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.48
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE    206.00 TO NODE    209.00 =     283.29 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    209.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.24
  RAINFALL INTENSITY(INCH/HR) =   4.98
  TOTAL STREAM AREA(ACRES) =     5.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.48
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    596.00
  DOWNSTREAM ELEVATION(FEET) =    595.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    209.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =    4.76
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    2.15
  TOTAL AREA(ACRES) =       0.3        PEAK FLOW RATE(CFS) =       2.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.25
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    209.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     0.35   SUBAREA RUNOFF(CFS) =     2.35
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       4.64
  TC(MIN.) =    4.76

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    209.00 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.) =    4.76
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.69
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.64

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         9.48     10.24         4.979          5.40
      2         4.64      4.76         7.904          0.69

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1         9.04      4.76        7.904
      2        12.40     10.24        4.979

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.40   Tc(MIN.) =   10.24
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    209.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    212.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    66.16   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.40
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     451.16 FEET.

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

```
 FLOW PROCESS FROM NODE    212.00 TO NODE    205.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    72.97   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.40
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.57
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    205.00 =     524.13 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    212.00 TO NODE    205.00 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       12.40     10.57        4.876         6.09
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    205.00 =     524.13 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1       11.22     11.24        4.687         6.40
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    205.00 =     750.08 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       22.95      10.57        4.876
     2       23.14      11.24        4.687

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.14   Tc(MIN.) =   11.24
 TOTAL AREA(ACRES) =       12.5

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    213.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   294.25   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  17.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.09
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.14
```

```
  PIPE TRAVEL TIME(MIN.) =    0.61     Tc(MIN.) =    11.85
  LONGEST FLOWPATH FROM NODE     201.00 TO NODE     213.00 =     1044.33 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     213.00 TO NODE     217.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     49.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =    8.09
  GIVEN PIPE DIAMETER(INCH) =  30.00     NUMBER OF PIPES =    1
  PIPE-FLOW(CFS) =       23.14
  PIPE TRAVEL TIME(MIN.) =    0.10     Tc(MIN.) =    11.95
  LONGEST FLOWPATH FROM NODE     201.00 TO NODE     217.00 =     1093.33 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     217.00 TO NODE     217.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    11.95
  RAINFALL INTENSITY(INCH/HR) =    4.51
  TOTAL STREAM AREA(ACRES) =     12.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.14

****************************************************************************
  FLOW PROCESS FROM NODE     218.00 TO NODE     219.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =     50.00
  UPSTREAM ELEVATION(FEET) =     600.00
  DOWNSTREAM ELEVATION(FEET) =     599.00
  ELEVATION DIFFERENCE(FEET) =       1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =     2.526
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =       0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =       0.13

****************************************************************************
  FLOW PROCESS FROM NODE     219.00 TO NODE     217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  STREET LENGTH(FEET) =    730.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

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

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.33
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.34
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.87
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
 STREET FLOW TRAVEL TIME(MIN.) =   4.24   Tc(MIN.) =    6.77
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.501
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =     0.78      SUBAREA RUNOFF(CFS) =     4.31
 TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       4.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.02
 FLOW VELOCITY(FEET/SEC.) =  3.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
 LONGEST FLOWPATH FROM NODE    218.00 TO NODE    217.00 =     780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.501
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =     0.80   SUBAREA RUNOFF(CFS) =     4.42
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       8.84
 TC(MIN.) =    6.77

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.77
 RAINFALL INTENSITY(INCH/HR) =   6.50
 TOTAL STREAM AREA(ACRES) =     1.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.84

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1        23.14     11.95         4.506          12.49
     2         8.84      6.77         6.501           1.60

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       21.95     6.77       6.501
     2       29.27    11.95       4.506

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      29.27   Tc(MIN.) =   11.95
 TOTAL AREA(ACRES) =       14.1
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    217.00 =    1093.33 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    216.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    34.80   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.27
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   12.02
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    216.00 =    1128.13 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 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.) =   12.02
 RAINFALL INTENSITY(INCH/HR) =   4.49
 TOTAL STREAM AREA(ACRES) =    14.09
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.27

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    594.90
 DOWNSTREAM ELEVATION(FEET) =    594.00
 ELEVATION DIFFERENCE(FEET) =      0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.135
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
 SUBAREA RUNOFF(CFS) =      0.30
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.30

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3500
S.C.S. CURVE NUMBER (AMC II) =  0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) =  2.48  SUBAREA RUNOFF(CFS) =  4.65
TOTAL AREA(ACRES) =  2.6  TOTAL RUNOFF(CFS) =  4.95
TC(MIN.) =  9.14

****************************************************************************
FLOW PROCESS FROM NODE  215.00 TO NODE  216.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
REPRESENTATIVE SLOPE =  0.0200
FLOW LENGTH(FEET) =  300.00  MANNING'S N =  0.019
DEPTH OF FLOW IN  24.0 INCH PIPE IS  8.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  5.31
GIVEN PIPE DIAMETER(INCH) =  24.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  4.95
PIPE TRAVEL TIME(MIN.) =  0.94  Tc(MIN.) =  10.08
LONGEST FLOWPATH FROM NODE  214.00 TO NODE  216.00 =  360.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  216.00 TO NODE  216.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.030
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3500
S.C.S. CURVE NUMBER (AMC II) =  0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) =  2.63  SUBAREA RUNOFF(CFS) =  4.63
TOTAL AREA(ACRES) =  5.3  TOTAL RUNOFF(CFS) =  9.28
TC(MIN.) =  10.08

****************************************************************************
FLOW PROCESS FROM NODE  216.00 TO NODE  216.00 IS CODE =  1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  10.08
RAINFALL INTENSITY(INCH/HR) =  5.03
TOTAL STREAM AREA(ACRES) =  5.27
PEAK FLOW RATE(CFS) AT CONFLUENCE =  9.28

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc       INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1      29.27     12.02        4.489        14.09
    2       9.28     10.08        5.030         5.27

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

4-230

```
  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        35.40     10.08        5.030
      2        37.55     12.02        4.489

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       37.55   Tc(MIN.) =   12.02
  TOTAL AREA(ACRES) =        19.4
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    216.00 =    1128.13 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  24.00   RAIN INTENSITY(INCH/HOUR) =  2.87
  TOTAL AREA(ACRES) =    19.36   TOTAL RUNOFF(CFS) =     13.60

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    272.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    24.66   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   24.06
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    272.00 =    1152.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    272.00 TO NODE    273.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    59.03   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   24.20
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    273.00 =    1211.82 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    273.00 TO NODE    274.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   107.28   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   24.46
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    274.00 =    1319.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    274.00 TO NODE    275.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   163.53   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   24.85
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    275.00 =    1482.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    275.00 TO NODE    276.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.99
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   25.63
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    276.00 =    1812.63 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    276.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    276.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    264.00 TO NODE    265.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  UPSTREAM ELEVATION(FEET) =    624.00
  DOWNSTREAM ELEVATION(FEET) =    623.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.029
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.045
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    265.00 TO NODE    266.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   390.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.972
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.44
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   4.50
  Tc(MIN.) =   14.53
  SUBAREA AREA(ACRES) =     2.39       SUBAREA RUNOFF(CFS) =    3.32
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        2.5         PEAK FLOW RATE(CFS) =       3.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    266.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    266.00 TO NODE    277.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1543.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0150
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.069
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.60
  AVERAGE FLOW DEPTH(FEET) =   0.94   TRAVEL TIME(MIN.) =   7.15
  Tc(MIN.) =   21.68
  SUBAREA AREA(ACRES) =    22.90       SUBAREA RUNOFF(CFS) =   24.59
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       25.4         PEAK FLOW RATE(CFS) =      27.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
 DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   4.13
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    277.00 =    2003.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    264.00 TO NODE    277.00 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.) =   21.68
 RAINFALL INTENSITY(INCH/HR) =   3.07
 TOTAL STREAM AREA(ACRES) =    25.42
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.30

****************************************************************************
 FLOW PROCESS FROM NODE    286.00 TO NODE    287.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    603.00
 DOWNSTREAM ELEVATION(FEET) =    598.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.895
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.887
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE    287.00 TO NODE    277.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   890.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0490
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.431
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.10
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.40
 AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   4.37
 Tc(MIN.) =   12.26
 SUBAREA AREA(ACRES) =     4.88       SUBAREA RUNOFF(CFS) =    7.57
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =        5.0         PEAK FLOW RATE(CFS) =       7.75

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   4.20
 LONGEST FLOWPATH FROM NODE    286.00 TO NODE    277.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    286.00 TO NODE    277.00 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.) =   12.26
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     5.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.75

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       27.30    21.68        3.069         25.42
      2        7.75    12.26        4.431          5.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       23.20    12.26       4.431
      2       32.67    21.68       3.069

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.67   Tc(MIN.) =   21.68
  TOTAL AREA(ACRES) =       30.4
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    277.00 =    2003.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    276.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    36.22   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.83
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.67
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   21.75
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    276.00 =    2039.22 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    277.00 TO NODE    276.00 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       32.67    21.75       3.062       30.42
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    276.00 =    2039.22 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
```

```
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       13.60     25.63        2.754        19.36
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    276.00 =    1812.63 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)      (MIN.)    (INCH/HOUR)
      1      44.21       21.75        3.062
      2      42.99       25.63        2.754

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.21   Tc(MIN.) =   21.75
  TOTAL AREA(ACRES) =       49.8

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    276.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    276.00 TO NODE    278.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   269.78   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.21
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   22.22
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    278.00 =    2309.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    278.00 TO NODE    279.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.21
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   22.75
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    279.00 =    2609.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    279.00 TO NODE    280.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   239.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
```

```
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.21
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   23.16
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    280.00 =    2848.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    281.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   296.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.21
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   23.68
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    281.00 =    3144.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    281.00 TO NODE    263.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   296.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.52
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.21
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   24.20
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    263.00 =    3440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    584.25
  DOWNSTREAM ELEVATION(FEET) =    581.75
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.861
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    223.00 TO NODE    221.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0500
 STREET LENGTH(FEET) =   171.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 34.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.66
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.91
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    2.59
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.47      SUBAREA RUNOFF(CFS) =    3.16
 TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       3.29

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.88
 FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
 LONGEST FLOWPATH FROM NODE    222.00 TO NODE    221.00 =     221.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    224.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   300.53   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.29
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    3.38
 LONGEST FLOWPATH FROM NODE    222.00 TO NODE    224.00 =     521.53 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.38
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.29

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    588.00
  DOWNSTREAM ELEVATION(FEET) =    587.10
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.135
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    4.49   SUBAREA RUNOFF(CFS) =    8.42
  TOTAL AREA(ACRES) =       4.5   TOTAL RUNOFF(CFS) =      8.53
  TC(MIN.) =    9.14

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.53
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   10.22
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    227.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    227.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.985
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3500
S.C.S. CURVE NUMBER (AMC II) =  0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
SUBAREA AREA(ACRES) =  4.55  SUBAREA RUNOFF(CFS) =  7.94
TOTAL AREA(ACRES) =  9.1  TOTAL RUNOFF(CFS) =  15.88
TC(MIN.) =  10.22

****************************************************************************
FLOW PROCESS FROM NODE  227.00 TO NODE  228.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
REPRESENTATIVE SLOPE =  0.0100
FLOW LENGTH(FEET) =  87.63  MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  7.31
GIVEN PIPE DIAMETER(INCH) =  24.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  15.88
PIPE TRAVEL TIME(MIN.) =  0.20  Tc(MIN.) =  10.42
LONGEST FLOWPATH FROM NODE  225.00 TO NODE  228.00 =  547.63 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  228.00 TO NODE  224.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
REPRESENTATIVE SLOPE =  0.0100
FLOW LENGTH(FEET) =  24.06  MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  7.31
GIVEN PIPE DIAMETER(INCH) =  24.00  NUMBER OF PIPES =  1
PIPE-FLOW(CFS) =  15.88
PIPE TRAVEL TIME(MIN.) =  0.05  Tc(MIN.) =  10.47
LONGEST FLOWPATH FROM NODE  225.00 TO NODE  224.00 =  571.69 FEET.

****************************************************************************
FLOW PROCESS FROM NODE  224.00 TO NODE  224.00 IS CODE =  1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =  10.47
RAINFALL INTENSITY(INCH/HR) =  4.91
TOTAL STREAM AREA(ACRES) =  9.10
PEAK FLOW RATE(CFS) AT CONFLUENCE =  15.88

** CONFLUENCE DATA **
STREAM    RUNOFF      Tc      INTENSITY     AREA
NUMBER     (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1       3.29     3.38       7.904        0.49
    2      15.88    10.47       4.906        9.10

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.41     3.38       7.904
      2       17.92    10.47       4.906

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.92   Tc(MIN.) =   10.47
  TOTAL AREA(ACRES) =        9.6
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    224.00 =     571.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    229.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.92
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    229.00 =     871.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    229.00 TO NODE    230.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.92
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    230.00 =    1171.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =   11.81
  RAINFALL INTENSITY(INCH/HR) =   4.54
  TOTAL STREAM AREA(ACRES) =     9.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.92

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    575.00
 DOWNSTREAM ELEVATION(FEET) =    572.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.751
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    232.00 TO NODE    230.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0350
 STREET LENGTH(FEET) =   846.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 34.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.73
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    9.02
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
 STREET FLOW TRAVEL TIME(MIN.) =   3.52   Tc(MIN.) =    5.27
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.640
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    1.11      SUBAREA RUNOFF(CFS) =    7.21
 TOTAL AREA(ACRES) =       1.1        PEAK FLOW RATE(CFS) =       7.34

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.07
 FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    230.00 =     896.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    230.00 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.) =    5.27
 RAINFALL INTENSITY(INCH/HR) =   7.64
```

```
  TOTAL STREAM AREA(ACRES) =      1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.34

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        17.92     11.81         4.540          9.59
      2         7.34      5.27         7.640          1.13

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        17.99      5.27         7.640
      2        22.28     11.81         4.540

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.28   Tc(MIN.) =    11.81
  TOTAL AREA(ACRES) =        10.7
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    230.00 =    1171.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    233.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   239.82   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.02
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.28
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   12.31
  LONGEST FLOWPATH FROM NODE    225.00 TO NODE    233.00 =    1411.51 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    233.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    233.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =  0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    571.26
```

```
  DOWNSTREAM ELEVATION(FEET) =    570.00
  ELEVATION DIFFERENCE(FEET) =      1.26
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.835
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.109
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.109
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.71   SUBAREA RUNOFF(CFS) =    1.27
  TOTAL AREA(ACRES) =       0.8   TOTAL RUNOFF(CFS) =      1.45
  TC(MIN.) =    9.83

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0230
  FLOW LENGTH(FEET) =    83.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.91
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.45
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     158.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.994
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.81   SUBAREA RUNOFF(CFS) =    1.42
  TOTAL AREA(ACRES) =       1.6   TOTAL RUNOFF(CFS) =      2.83
  TC(MIN.) =   10.19

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    237.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    55.69   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
```

```
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        2.83
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.38
 LONGEST FLOWPATH FROM NODE    234.00 TO NODE    237.00 =     213.69 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    37.36   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        2.83
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.52
 LONGEST FLOWPATH FROM NODE    234.00 TO NODE    238.00 =     251.05 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   163.19   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.75
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        2.83
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   11.09
 LONGEST FLOWPATH FROM NODE    234.00 TO NODE    239.00 =     414.24 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 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.) =   11.09
 RAINFALL INTENSITY(INCH/HR) =   4.73
 TOTAL STREAM AREA(ACRES) =     1.62
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.83

****************************************************************************
 FLOW PROCESS FROM NODE    240.00 TO NODE    241.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    570.00
 DOWNSTREAM ELEVATION(FEET) =    569.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
 SUBAREA RUNOFF(CFS) =      0.15
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
 FLOW PROCESS FROM NODE    241.00 TO NODE    241.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    2.52   SUBAREA RUNOFF(CFS) =    4.63
 TOTAL AREA(ACRES) =       2.6   TOTAL RUNOFF(CFS) =       4.78
 TC(MIN.) =    9.43

****************************************************************************
 FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.90
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.78
 PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   10.09
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    242.00 =     340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.025
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    2.59   SUBAREA RUNOFF(CFS) =    4.55
 TOTAL AREA(ACRES) =       5.2   TOTAL RUNOFF(CFS) =       9.13
 TC(MIN.) =   10.09

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    243.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    42.81   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.13
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.20
```

```
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    243.00 =     382.81 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    243.00 TO NODE    239.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    83.47   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.13
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.42
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    239.00 =     466.28 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    240.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.42
 RAINFALL INTENSITY(INCH/HR) =   4.92
 TOTAL STREAM AREA(ACRES) =     5.19
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.13

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1         2.83     11.09         4.729           1.62
     2         9.13     10.42         4.922           5.19

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
     1        11.79     10.42        4.922
     2        11.60     11.09        4.729

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       11.79   Tc(MIN.) =   10.42
 TOTAL AREA(ACRES) =         6.8
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    239.00 =     466.28 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    244.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   227.79   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
```

```
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.79
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   10.98
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     694.07 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    244.00 TO NODE    244.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.98
 RAINFALL INTENSITY(INCH/HR) =   4.76
 TOTAL STREAM AREA(ACRES) =     6.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.79

****************************************************************************
 FLOW PROCESS FROM NODE    245.00 TO NODE    246.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    554.00
 DOWNSTREAM ELEVATION(FEET) =    553.10
 ELEVATION DIFFERENCE(FEET) =      0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.135
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
 SUBAREA RUNOFF(CFS) =      0.19
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
 FLOW PROCESS FROM NODE    246.00 TO NODE    246.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    5.73   SUBAREA RUNOFF(CFS) =   10.75
 TOTAL AREA(ACRES) =       5.8   TOTAL RUNOFF(CFS) =      10.93
 TC(MIN.) =    9.14

****************************************************************************
 FLOW PROCESS FROM NODE    246.00 TO NODE    247.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   275.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.93
```

```
  PIPE TRAVEL TIME(MIN.) =    0.70    Tc(MIN.) =     9.83
  LONGEST FLOWPATH FROM NODE     245.00 TO NODE     247.00 =      335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     247.00 TO NODE     247.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.109
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =     5.83   SUBAREA RUNOFF(CFS) =    10.43
  TOTAL AREA(ACRES) =       11.7   TOTAL RUNOFF(CFS) =      20.85
  TC(MIN.) =    9.83

****************************************************************************
  FLOW PROCESS FROM NODE     247.00 TO NODE     248.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     40.23   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.89
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.85
  PIPE TRAVEL TIME(MIN.) =    0.08    Tc(MIN.) =     9.92
  LONGEST FLOWPATH FROM NODE     245.00 TO NODE     248.00 =      375.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     248.00 TO NODE     244.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     37.16   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.89
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.85
  PIPE TRAVEL TIME(MIN.) =    0.08    Tc(MIN.) =    10.00
  LONGEST FLOWPATH FROM NODE     245.00 TO NODE     244.00 =      412.39 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     245.00 TO NODE     244.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.00
  RAINFALL INTENSITY(INCH/HR) =   5.06
  TOTAL STREAM AREA(ACRES) =    11.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.85
```

```
 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1        11.79     10.98         4.760          6.81
     2        20.85     10.00         5.055         11.66

 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        31.95     10.00         5.055
     2        31.42     10.98         4.760

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       31.95   Tc(MIN.) =   10.00
 TOTAL AREA(ACRES) =        18.5
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    244.00 =     694.07 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    244.00 TO NODE    249.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   368.39   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.64
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.95
 PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.71
 LONGEST FLOWPATH FROM NODE    240.00 TO NODE    249.00 =    1062.46 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    249.40
 DOWNSTREAM ELEVATION(FEET) =    248.50
 ELEVATION DIFFERENCE(FEET) =      0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.135
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
 SUBAREA RUNOFF(CFS) =      0.23
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
 FLOW PROCESS FROM NODE    251.00 TO NODE    251.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.358
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    3.13   SUBAREA RUNOFF(CFS) =    5.87
 TOTAL AREA(ACRES) =       3.2   TOTAL RUNOFF(CFS) =      6.10
 TC(MIN.) =    9.14

****************************************************************************
 FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.62
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.10
 PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =   10.29
 LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =     450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.962
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =  0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    3.25   SUBAREA RUNOFF(CFS) =    5.64
 TOTAL AREA(ACRES) =       6.5   TOTAL RUNOFF(CFS) =      11.29
 TC(MIN.) =   10.29

****************************************************************************
 FLOW PROCESS FROM NODE    252.00 TO NODE    253.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    36.68   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.29
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.38
```

```
 LONGEST FLOWPATH FROM NODE    250.00 TO NODE    253.00 =     486.68 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    253.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.38
 RAINFALL INTENSITY(INCH/HR) =   4.93
 TOTAL STREAM AREA(ACRES) =     6.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.29

****************************************************************************
 FLOW PROCESS FROM NODE    254.00 TO NODE    255.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    586.50
 DOWNSTREAM ELEVATION(FEET) =    585.50
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.526
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    255.00 TO NODE    253.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0200
 STREET LENGTH(FEET) =  1320.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 45.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  22.50
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.68
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   11.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.39
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.19
 STREET FLOW TRAVEL TIME(MIN.) =   6.48   Tc(MIN.) =    9.01
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.407
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =     1.91      SUBAREA RUNOFF(CFS) =     8.78
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =        8.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.63
  FLOW VELOCITY(FEET/SEC.) =  3.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.65
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    253.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    253.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.407
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     1.92   SUBAREA RUNOFF(CFS) =     8.82
  TOTAL AREA(ACRES) =        3.8   TOTAL RUNOFF(CFS) =      17.69
  TC(MIN.) =    9.01

****************************************************************************
  FLOW PROCESS FROM NODE    254.00 TO NODE    253.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   5.41
  TOTAL STREAM AREA(ACRES) =     3.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.69

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1       11.29     10.38         4.934           6.50
      2       17.69      9.01         5.407           3.85

  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       27.49      9.01         5.407
      2       27.44     10.38         4.934

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.49   Tc(MIN.) =    9.01
  TOTAL AREA(ACRES) =       10.4
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    253.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    253.00 TO NODE    249.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    73.78   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.40
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.49
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.15
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    249.00 =    1443.78 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 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       27.49      9.15        5.351       10.35
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    249.00 =    1443.78 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)   (ACRE)
      1       31.95     10.71        4.836       18.47
  LONGEST FLOWPATH FROM NODE    240.00 TO NODE    249.00 =    1062.46 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)    (INCH/HOUR)
      1      54.80       9.15        5.351
      2      56.80      10.71        4.836

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      56.80   Tc(MIN.) =   10.71
  TOTAL AREA(ACRES) =       28.8

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    249.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    249.00 TO NODE    233.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    63.68   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.12
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.80
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.81
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    233.00 =    1507.46 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    233.00 TO NODE    233.00 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        56.80    10.81       4.806       28.82
 LONGEST FLOWPATH FROM NODE    254.00 TO NODE    233.00 =    1507.46 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1        22.28    12.31       4.420       10.72
 LONGEST FLOWPATH FROM NODE    225.00 TO NODE    233.00 =    1411.51 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       76.37      10.81       4.806
    2       74.52      12.31       4.420

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      76.37   Tc(MIN.) =   10.81
 TOTAL AREA(ACRES) =       39.5

****************************************************************************
 FLOW PROCESS FROM NODE    233.00 TO NODE    233.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    233.00 TO NODE    256.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   404.90   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.77
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      76.37
 PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   11.44
 LONGEST FLOWPATH FROM NODE    254.00 TO NODE    256.00 =    1912.36 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 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.) =   11.44
 RAINFALL INTENSITY(INCH/HR) =   4.63
 TOTAL STREAM AREA(ACRES) =    39.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     76.37
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    257.00 TO NODE    258.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    536.75
  DOWNSTREAM ELEVATION(FEET) =    536.00
  ELEVATION DIFFERENCE(FEET) =      0.75
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.780
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    258.00 TO NODE    256.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =    5.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.608
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.54      SUBAREA RUNOFF(CFS) =    3.49
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.74
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE    257.00 TO NODE    256.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    256.00 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.) =    5.31
  RAINFALL INTENSITY(INCH/HR) =   7.61
  TOTAL STREAM AREA(ACRES) =     0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc       INTENSITY      AREA
  NUMBER      (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1       76.37     11.44         4.634         39.54
      2        3.62      5.31         7.608          0.56

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       39.04      5.31        7.608
      2       78.57     11.44        4.634

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      78.57   Tc(MIN.) =   11.44
  TOTAL AREA(ACRES) =       40.1
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    256.00 =    1912.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    259.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.82
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.57
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.53
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    259.00 =    1972.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    256.00 TO NODE    259.00 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.) =   11.53
  RAINFALL INTENSITY(INCH/HR) =   4.61
  TOTAL STREAM AREA(ACRES) =    40.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.57

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    261.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    532.98
  DOWNSTREAM ELEVATION(FEET) =    532.00
  ELEVATION DIFFERENCE(FEET) =      0.98
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.492
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.228
  SUBAREA RUNOFF(CFS) =      0.84
  TOTAL AREA(ACRES) =      0.46   TOTAL RUNOFF(CFS) =      0.84

**************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    261.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.228
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.38   SUBAREA RUNOFF(CFS) =    4.35
  TOTAL AREA(ACRES) =       2.8   TOTAL RUNOFF(CFS) =      5.20
  TC(MIN.) =    9.49

**************************************************************************
  FLOW PROCESS FROM NODE    261.00 TO NODE    262.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.38
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.20
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    262.00 =     295.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    262.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.989
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.86   SUBAREA RUNOFF(CFS) =    6.74
  TOTAL AREA(ACRES) =       6.7   TOTAL RUNOFF(CFS) =     11.70
  TC(MIN.) =   10.20

**************************************************************************
  FLOW PROCESS FROM NODE    262.00 TO NODE    259.00 IS CODE =  41
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.70
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE    260.00 TO NODE    259.00 =     325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    259.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.97
  TOTAL STREAM AREA(ACRES) =     6.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.70

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        78.57     11.53         4.610          40.10
      2        11.70     10.28         4.966           6.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        84.64     10.28        4.966
      2        89.44     11.53        4.610

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      89.44   Tc(MIN.) =   11.53
  TOTAL AREA(ACRES) =       46.8
  LONGEST FLOWPATH FROM NODE    254.00 TO NODE    259.00 =    1972.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    259.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    259.00 TO NODE    259.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  24.00   RAIN INTENSITY(INCH/HOUR) =  2.87
  TOTAL AREA(ACRES) =    46.80   TOTAL RUNOFF(CFS) =     27.01

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

```
 FLOW PROCESS FROM NODE    259.00 TO NODE    263.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    86.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  14.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
 GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      27.01
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   24.17
 LONGEST FLOWPATH FROM NODE    254.00 TO NODE    263.00 =    2058.36 FEET.

**********************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  11
----------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
======================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        27.01     24.17        2.861        46.80
 LONGEST FLOWPATH FROM NODE    254.00 TO NODE    263.00 =    2058.36 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
     1        44.21     24.20        2.858        49.78
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    263.00 =    3440.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc       INTENSITY
 NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
     1       71.17      24.17        2.861
     2       71.20      24.20        2.858

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      71.20   Tc(MIN.) =   24.20
 TOTAL AREA(ACRES) =       96.6

**********************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    263.00 IS CODE =  12
----------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
======================================================================

**********************************************************************
 FLOW PROCESS FROM NODE    263.00 TO NODE    267.00 IS CODE =  41
----------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   278.72   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  23.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.71
 GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      71.20
```

```
  PIPE TRAVEL TIME(MIN.) =    0.43    Tc(MIN.) =    24.63
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    267.00 =    3718.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    267.00 TO NODE    267.00 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.) =   24.63
  RAINFALL INTENSITY(INCH/HR) =   2.83
  TOTAL STREAM AREA(ACRES) =    96.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.20

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    283.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    610.00
  DOWNSTREAM ELEVATION(FEET) =    605.50
  ELEVATION DIFFERENCE(FEET) =      4.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.177
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.755
  SUBAREA RUNOFF(CFS) =      0.10
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.10

****************************************************************************
  FLOW PROCESS FROM NODE    283.00 TO NODE    288.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1350.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =   50.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.154
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =  12.60
  Tc(MIN.) =   20.77
  SUBAREA AREA(ACRES) =     8.65       SUBAREA RUNOFF(CFS) =    9.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        8.7         PEAK FLOW RATE(CFS) =       9.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   2.33
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    288.00 =    1450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    288.00 TO NODE    288.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.154
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    5.30   SUBAREA RUNOFF(CFS) =    5.85
  TOTAL AREA(ACRES) =      14.0   TOTAL RUNOFF(CFS) =     15.46
  TC(MIN.) =   20.77

****************************************************************************
  FLOW PROCESS FROM NODE    288.00 TO NODE    267.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   962.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0200
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.841
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.39
  AVERAGE FLOW DEPTH(FEET) =   1.02   TRAVEL TIME(MIN.) =   3.65
  Tc(MIN.) =   24.43
  SUBAREA AREA(ACRES) =    14.60       SUBAREA RUNOFF(CFS) =   14.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       28.6         PEAK FLOW RATE(CFS) =      28.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.10   FLOW VELOCITY(FEET/SEC.) =   4.67
  LONGEST FLOWPATH FROM NODE    282.00 TO NODE    267.00 =    2412.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    267.00 TO NODE    267.00 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.) =   24.43
  RAINFALL INTENSITY(INCH/HR) =   2.84
  TOTAL STREAM AREA(ACRES) =    28.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       71.20    24.63        2.826         96.58
      2       28.44    24.43        2.841         28.60

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc       INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       99.04    24.43       2.841
     2       99.49    24.63       2.826

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      99.49   Tc(MIN.) =   24.63
 TOTAL AREA(ACRES) =      125.2
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    267.00 =    3718.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    267.00 TO NODE    285.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   391.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.250
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.752
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     111.38
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.35
 AVERAGE FLOW DEPTH(FEET) =   1.89   TRAVEL TIME(MIN.) =   1.03
 Tc(MIN.) =   25.66
 SUBAREA AREA(ACRES) =    24.70       SUBAREA RUNOFF(CFS) =   23.79
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.290
 TOTAL AREA(ACRES) =      149.9         PEAK FLOW RATE(CFS) =     119.55

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.96   FLOW VELOCITY(FEET/SEC.) =   6.46
 LONGEST FLOWPATH FROM NODE    264.00 TO NODE    285.00 =    4109.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    285.00 TO NODE    268.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   661.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  26.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.570
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     130.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.82
 AVERAGE FLOW DEPTH(FEET) =   1.15   TRAVEL TIME(MIN.) =   2.89
 Tc(MIN.) =   28.55
 SUBAREA AREA(ACRES) =    24.70       SUBAREA RUNOFF(CFS) =   22.21
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.298
 TOTAL AREA(ACRES) =      174.6         PEAK FLOW RATE(CFS) =     133.82

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =   3.85
  LONGEST FLOWPATH FROM NODE    264.00 TO NODE    268.00 =    4770.72 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      174.6  TC(MIN.) =     28.55
  PEAK FLOW RATE(CFS)    =     133.82
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# SECTION 4-C

## POST-PROJECT HYDROLOGY, BASIN C

Developed Basin "C" is comprised of 77.5 acres and generates, during a 100-year storm event, a peak runoff rate of approximately 275.74 cfs in an undetained condition and 82.91 cfs in a detained condition. Project runoff generated by the basin is conveyed through the use of a proposed public storm drain system to a detention facility. (Detention Basin BF-6 on Exhibit "C"). Historically, runoff from the basin travels west and crosses under Otay Mesa Road, approximately ¼ mile east of Piper Ranch Road, through an existing headwall. As part of the CALTRANS construction of SR 125, storm drain was extended from the headwall along the north side of Otay Mesa Road to the east. This storm drain was stubbed and plugged for future connection. Construction of **Sunroad Otay 250** will extend storm drain from Harvest road to connect with the CALTRANS stub. Onsite runoff converges with offsite runoff in the CALTRANS 24" RCB and the combined runoff is discharged to an open field South of Otay Mesa Road, as in the existing condition.

Onsite runoff will include Lot 1, 2 and 25 of the proposed subdivision, Harvest Road, and portions of Otay Mesa Road. A regional detention facility will be utilized to mitigate for the increase in runoff generated by the proposed project. The detention facility will be designed to reduce peak runoff to pre-development rates (see detention calculations in Section 5-C).

Regional detention facilities will be utilized to mitigate for the increase in runoff generated by the proposed project. In the rough graded condition, the regional detention basins provide adequate detention for the public roadways and graded pads. Since the pads will be vegetated with hydroseed and no impervious surfaces are proposed at this time, no on-lot detention is required in the rough graded condition. Final detention of the on lot basins will be accomplished through permanent on-lot detention structures during build out of each lot for its ultimate use.

# UNDETAINED HYDROLOGY ROUTING - BASIN C

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                                SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD OTAY 250                                                        *
* 100 YEAR DESIGN STORM                                                   *
* POST-PROJECT BASIN C (UNDETAINED FLOWS)                                 *
 *************************************************************************

  FILE NAME: 1400901\UNDET\POSTC.DAT
  TIME/DATE OF STUDY: 17:52 04/06/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  2   34.0     17.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  3   71.0     35.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  4   23.0      2.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    30.00
  UPSTREAM ELEVATION(FEET) =    594.60
  DOWNSTREAM ELEVATION(FEET) =    594.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.956
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0250
  STREET LENGTH(FEET) =   486.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 31.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =    4.60
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    0.56      SUBAREA RUNOFF(CFS) =    3.76
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       3.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.94
  FLOW VELOCITY(FEET/SEC.) =  3.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    3.96
```

```
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       7.86
  TC(MIN.) =    4.60

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    302.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.60
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.86

****************************************************************************
  FLOW PROCESS FROM NODE    301.50 TO NODE    301.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    593.00
  DOWNSTREAM ELEVATION(FEET) =    592.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE    301.60 TO NODE    301.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.55   SUBAREA RUNOFF(CFS) =   17.13
  TOTAL AREA(ACRES) =       2.6   TOTAL RUNOFF(CFS) =      17.80
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    301.60 TO NODE    301.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.019
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.67
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      17.80
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    3.73
  LONGEST FLOWPATH FROM NODE    301.50 TO NODE    301.70 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.70 TO NODE    301.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.59   SUBAREA RUNOFF(CFS) =   17.40
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      35.21
  TC(MIN.) =    3.73

****************************************************************************
  FLOW PROCESS FROM NODE    301.70 TO NODE    302.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.92
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.21
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    3.78
  LONGEST FLOWPATH FROM NODE    301.50 TO NODE    302.00 =     323.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.50 TO NODE    302.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.78
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     5.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1        7.86     4.60        7.904          1.17
      2       35.21     3.78        7.904          5.24

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

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

```
      1       41.66      3.78        7.904
      2       43.07      4.60        7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.07   Tc(MIN.) =    4.60
  TOTAL AREA(ACRES) =        6.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   246.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.71
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.07
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    4.90
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     762.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    303.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.90
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     6.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     43.07

****************************************************************************
  FLOW PROCESS FROM NODE    302.50 TO NODE    302.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    573.00
  DOWNSTREAM ELEVATION(FEET) =    572.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE    302.60 TO NODE    302.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
```

```
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     2.24   SUBAREA RUNOFF(CFS) =    15.05
  TOTAL AREA(ACRES) =        2.3   TOTAL RUNOFF(CFS) =      15.72
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    302.60 TO NODE    302.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0180
  FLOW LENGTH(FEET) =   174.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.72
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    3.57
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    302.70 =     239.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.70 TO NODE    302.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     2.34   SUBAREA RUNOFF(CFS) =    15.72
  TOTAL AREA(ACRES) =        4.7   TOTAL RUNOFF(CFS) =      31.44
  TC(MIN.) =    3.57

****************************************************************************
  FLOW PROCESS FROM NODE    302.70 TO NODE    302.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.44
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    3.61
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    302.80 =     279.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.80 TO NODE    303.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   575.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.44
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    4.15
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    303.00 =     854.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.50 TO NODE    303.00 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.) =    4.15
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     4.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.44

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        43.07      4.90         7.904          6.41
      2        31.44      4.15         7.904          4.68

  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        74.51      4.15        7.904
      2        74.51      4.90        7.904

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      74.51   Tc(MIN.) =    4.90
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    303.00 =     854.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==========================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.72
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.51
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    304.00 =    1014.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.01
  RAINFALL INTENSITY(INCH/HR) =   7.89
  TOTAL STREAM AREA(ACRES) =    11.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     74.51

****************************************************************************
  FLOW PROCESS FROM NODE    303.50 TO NODE    303.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    584.00
  DOWNSTREAM ELEVATION(FEET) =    583.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    303.60 TO NODE    303.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    2.02
  TOTAL AREA(ACRES) =       0.4   TOTAL RUNOFF(CFS) =      2.35
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    303.60 TO NODE    303.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.35
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.35
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    3.64
  LONGEST FLOWPATH FROM NODE    303.50 TO NODE    303.70 =     165.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    303.70 TO NODE    303.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    0.26   SUBAREA RUNOFF(CFS) =    1.75
  TOTAL AREA(ACRES) =       0.6   TOTAL RUNOFF(CFS) =       4.10
  TC(MIN.) =    3.64

****************************************************************************
  FLOW PROCESS FROM NODE    303.70 TO NODE    304.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.25
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.10
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    3.88
  LONGEST FLOWPATH FROM NODE    303.50 TO NODE    304.00 =     242.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.50 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.88
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     0.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       74.51     5.01        7.892         11.09
      2        4.10     3.88        7.904          0.61

  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       78.49     3.88        7.904
      2       78.60     5.01        7.892

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      78.60   Tc(MIN.) =    5.01
```

```
  TOTAL AREA(ACRES) =       11.7
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    304.00 =    1014.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   362.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.60
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.25
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    305.00 =    1376.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 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.) =    5.25
  RAINFALL INTENSITY(INCH/HR) =   7.66
  TOTAL STREAM AREA(ACRES) =    11.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.60

****************************************************************************
  FLOW PROCESS FROM NODE    304.50 TO NODE    304.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    556.00
  DOWNSTREAM ELEVATION(FEET) =    555.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE    304.60 TO NODE    304.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
```

```
  SUBAREA AREA(ACRES) =     1.51   SUBAREA RUNOFF(CFS) =    10.15
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =      10.82
  TC(MIN.) =     3.14

****************************************************************************
  FLOW PROCESS FROM NODE    304.60 TO NODE    304.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0140
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.82
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =     3.61
  LONGEST FLOWPATH FROM NODE    304.50 TO NODE    304.70 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.70 TO NODE    304.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =     1.62   SUBAREA RUNOFF(CFS) =    10.88
  TOTAL AREA(ACRES) =        3.2   TOTAL RUNOFF(CFS) =      21.70
  TC(MIN.) =     3.61

****************************************************************************
  FLOW PROCESS FROM NODE    304.70 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.28
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.70
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =     3.69
  LONGEST FLOWPATH FROM NODE    304.50 TO NODE    305.00 =     285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.50 TO NODE    305.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =     3.69
  RAINFALL INTENSITY(INCH/HR) =   7.90
```

```
  TOTAL STREAM AREA(ACRES) =      3.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.70

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY      AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
      1        78.60      5.25         7.656         11.70
      2        21.70      3.69         7.904          3.23

  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        97.83      3.69        7.904
      2        99.62      5.25        7.656

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       99.62   Tc(MIN.) =     5.25
  TOTAL AREA(ACRES) =        14.9
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    305.00 =    1376.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   677.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.09
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       99.62
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =     6.05
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    306.00 =    2053.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  56.37
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       99.62
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =     6.07
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    307.00 =    2101.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.07
  RAINFALL INTENSITY(INCH/HR) =   6.98
  TOTAL STREAM AREA(ACRES) =    14.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     99.62

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    586.00
  DOWNSTREAM ELEVATION(FEET) =    584.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.494
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    307.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0370
  STREET LENGTH(FEET) =  1240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.52
  STREET FLOW TRAVEL TIME(MIN.) =   4.62   Tc(MIN.) =    7.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.293
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    2.01      SUBAREA RUNOFF(CFS) =   10.75
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =      10.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.97
  FLOW VELOCITY(FEET/SEC.) =  5.24   DEPTH*VELOCITY(FT*FT/SEC.) =   2.13
```

```
 LONGEST FLOWPATH FROM NODE    315.00 TO NODE    307.00 =    1305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    315.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.12
 RAINFALL INTENSITY(INCH/HR) =   6.29
 TOTAL STREAM AREA(ACRES) =     2.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.86

****************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    547.00
 DOWNSTREAM ELEVATION(FEET) =    546.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.432
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    67.50
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0080
 STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 71.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  35.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   12.19
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
 STREET FLOW TRAVEL TIME(MIN.) =   5.49   Tc(MIN.) =    8.93
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.439
*USER SPECIFIED(SUBAREA):
LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
SUBAREA AREA(ACRES) =    1.44      SUBAREA RUNOFF(CFS) =    6.66
TOTAL AREA(ACRES) =       1.5        PEAK FLOW RATE(CFS) =       6.75

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.72
FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     815.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    312.00 TO NODE    307.00 IS CODE =  41
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
REPRESENTATIVE SLOPE =  0.0100
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       6.75
PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.01
LONGEST FLOWPATH FROM NODE    310.00 TO NODE    307.00 =     845.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    310.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  4
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
TIME OF CONCENTRATION(MIN.) =    9.01
RAINFALL INTENSITY(INCH/HR) =   5.41
TOTAL STREAM AREA(ACRES) =     1.46
PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.75

****************************************************************************
FLOW PROCESS FROM NODE    306.50 TO NODE    306.60 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
*USER SPECIFIED(SUBAREA):
URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
S.C.S. CURVE NUMBER (AMC II) =   0
INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
UPSTREAM ELEVATION(FEET) =    545.00
DOWNSTREAM ELEVATION(FEET) =    544.00
ELEVATION DIFFERENCE(FEET) =      1.00
SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.143
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
SUBAREA RUNOFF(CFS) =      0.67
TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
FLOW PROCESS FROM NODE    306.60 TO NODE    306.60 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    2.23   SUBAREA RUNOFF(CFS) =   14.98
  TOTAL AREA(ACRES) =       2.3   TOTAL RUNOFF(CFS) =      15.65
  TC(MIN.) =    3.14

****************************************************************************
  FLOW PROCESS FROM NODE    306.60 TO NODE    307.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.65
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    3.61
  LONGEST FLOWPATH FROM NODE    306.50 TO NODE    307.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
  SUBAREA AREA(ACRES) =    3.43   SUBAREA RUNOFF(CFS) =   23.04
  TOTAL AREA(ACRES) =       5.8   TOTAL RUNOFF(CFS) =      38.70
  TC(MIN.) =    3.61

****************************************************************************
  FLOW PROCESS FROM NODE    306.50 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.61
  RAINFALL INTENSITY(INCH/HR) =   7.90
  TOTAL STREAM AREA(ACRES) =     5.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       99.62     6.07        6.976         14.93
```

```
      2        10.86      7.12         6.293           2.03
      3         6.75      9.01         5.406           1.46
      4        38.70      3.61         7.904           5.76

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1       134.84      3.61        7.904
      2       147.58      6.07        6.976
      3       136.87      7.12        6.293
      4       119.74      9.01        5.406

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      147.58   Tc(MIN.) =     6.07
  TOTAL AREA(ACRES) =        24.2
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    307.00 =    2101.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    308.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.06
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     147.58
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =     6.15
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    308.00 =    2241.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    321.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   810.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.06
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     147.58
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =     6.60
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    321.00 =    3051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    321.00 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.) =     6.60
```

```
 RAINFALL INTENSITY(INCH/HR) =   6.61
 TOTAL STREAM AREA(ACRES) =    24.18
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    147.58

****************************************************************************
 FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    560.00
 DOWNSTREAM ELEVATION(FEET) =    557.00
 ELEVATION DIFFERENCE(FEET) =      3.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.361
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.275
 SUBAREA RUNOFF(CFS) =      0.18
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
 FLOW PROCESS FROM NODE    331.00 TO NODE    320.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1515.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0200
 CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  40.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.037
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.99
 AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =  12.67
 Tc(MIN.) =   22.03
 SUBAREA AREA(ACRES) =    29.33       SUBAREA RUNOFF(CFS) =   31.18
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
 TOTAL AREA(ACRES) =       29.4         PEAK FLOW RATE(CFS) =      31.28

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   2.45
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    320.00 =    1615.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =    85.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   4.00
 CHANNEL FLOW THRU SUBAREA(CFS) =      31.28
 FLOW VELOCITY(FEET/SEC.) =   7.71   FLOW DEPTH(FEET) =   0.68
 TRAVEL TIME(MIN.) =   0.18   Tc(MIN.) =   22.21
```

```
 LONGEST FLOWPATH FROM NODE    330.00 TO NODE    321.00 =    1700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    330.00 TO NODE    321.00 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.) =   22.21
 RAINFALL INTENSITY(INCH/HR) =   3.02
 TOTAL STREAM AREA(ACRES) =    29.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.28

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)    (ACRE)
     1       147.58      6.60         6.611         24.18
     2        31.28     22.21         3.021         29.43

 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       156.87      6.60         6.611
     2        98.72     22.21         3.021

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     156.87   Tc(MIN.) =    6.60
 TOTAL AREA(ACRES) =       53.6
 LONGEST FLOWPATH FROM NODE    302.50 TO NODE    321.00 =    3051.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 CHANNEL LENGTH THRU SUBAREA(FEET) =   215.00
 REPRESENTATIVE CHANNEL SLOPE =  0.0100
 CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   4.00
 CHANNEL FLOW THRU SUBAREA(CFS) =     156.87
 FLOW VELOCITY(FEET/SEC.) =  12.95   FLOW DEPTH(FEET) =   2.02
 TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    6.87
 LONGEST FLOWPATH FROM NODE    302.50 TO NODE    322.00 =    3266.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    322.00 TO NODE    322.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.438
 *USER SPECIFIED(SUBAREA):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .4400
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5470
```

```
  SUBAREA AREA(ACRES) =    14.26   SUBAREA RUNOFF(CFS) =    40.40
  TOTAL AREA(ACRES) =       67.9   TOTAL RUNOFF(CFS) =     239.05
  TC(MIN.) =    6.87

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    322.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.438
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .5900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5524
  SUBAREA AREA(ACRES) =    9.66   SUBAREA RUNOFF(CFS) =   36.70
  TOTAL AREA(ACRES) =       77.5   TOTAL RUNOFF(CFS) =     275.74
  TC(MIN.) =    6.87
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       77.5  TC(MIN.) =      6.87
  PEAK FLOW RATE(CFS)    =     275.74
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

# DETAINED HYDROLOGY ROUTING - BASIN C

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1662

                              Analysis prepared by:

                          STEVENS CRESTO ENGINEERING, INC.
                          9665 CHESAPEAKE DRIVE, SUITE 200
                               SAN DIEGO, CA 92123
                         PH: 858.694.5660 FAX: 858.694.5661

 ************************** DESCRIPTION OF STUDY **************************
* SUNROAD OTAY 250                                                        *
* 100 YEAR DESIGN STORM                                                   *
* POST-PROJECT BASIN C                                                    *
 **************************************************************************

  FILE NAME: 1400901\POSTC.DAT
  TIME/DATE OF STUDY: 17:48 04/06/2016
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-   CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   31.0     15.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  2   34.0     17.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  3   71.0     35.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150
  4   23.0      2.0    0.020/0.020/ ---    0.50    1.50 0.0312 0.125 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    30.00
 UPSTREAM ELEVATION(FEET) =    594.60
 DOWNSTREAM ELEVATION(FEET) =    594.00
 ELEVATION DIFFERENCE(FEET) =      0.60
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.956
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0250
 STREET LENGTH(FEET) =   486.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 31.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.35
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
 STREET FLOW TRAVEL TIME(MIN.) =   2.64   Tc(MIN.) =    4.60
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
 SUBAREA AREA(ACRES) =    0.56      SUBAREA RUNOFF(CFS) =    3.76
 TOTAL AREA(ACRES) =       0.6        PEAK FLOW RATE(CFS) =       3.90

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.94
 FLOW VELOCITY(FEET/SEC.) =  3.52   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     516.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8500
 SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    3.96
```

```
 TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       7.86
 TC(MIN.) =    4.60

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    302.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    4.60
 RAINFALL INTENSITY(INCH/HR) =   7.90
 TOTAL STREAM AREA(ACRES) =     1.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.86

****************************************************************************
 FLOW PROCESS FROM NODE    301.50 TO NODE    301.60 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    593.00
 DOWNSTREAM ELEVATION(FEET) =    592.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
 SUBAREA RUNOFF(CFS) =      0.18
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
 FLOW PROCESS FROM NODE    301.60 TO NODE    301.60 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
 *USER SPECIFIED(SUBAREA):
 URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =    2.55   SUBAREA RUNOFF(CFS) =    4.69
 TOTAL AREA(ACRES) =       2.6   TOTAL RUNOFF(CFS) =      4.87
 TC(MIN.) =    9.43

****************************************************************************
 FLOW PROCESS FROM NODE    301.60 TO NODE    301.70 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.019
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.87
 PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   10.13
 LONGEST FLOWPATH FROM NODE    301.50 TO NODE    301.70 =     265.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    301.70 TO NODE    301.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.013
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.59   SUBAREA RUNOFF(CFS) =    4.54
  TOTAL AREA(ACRES) =       5.2   TOTAL RUNOFF(CFS) =      9.19
  TC(MIN.) =   10.13

****************************************************************************
  FLOW PROCESS FROM NODE    301.70 TO NODE    302.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.24
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.19
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE    301.50 TO NODE    302.00 =     323.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.50 TO NODE    302.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.96
  TOTAL STREAM AREA(ACRES) =     5.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.19

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1         7.86      4.60         7.904          1.17
      2         9.19     10.28         4.964          5.24

  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        11.97      4.60         7.904
      2        14.13     10.28         4.964

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.13   Tc(MIN.) =   10.28
```

4-290

```
  TOTAL AREA(ACRES) =         6.4
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     516.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   246.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.13
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       14.13
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   10.86
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =     762.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    303.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.86
  RAINFALL INTENSITY(INCH/HR) =   4.79
  TOTAL STREAM AREA(ACRES) =     6.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.13

****************************************************************************
  FLOW PROCESS FROM NODE    302.50 TO NODE    302.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    573.00
  DOWNSTREAM ELEVATION(FEET) =    572.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    302.60 TO NODE    302.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.24   SUBAREA RUNOFF(CFS) =    4.12
  TOTAL AREA(ACRES) =       2.3   TOTAL RUNOFF(CFS) =      4.30
  TC(MIN.) =    9.43
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    302.60 TO NODE    302.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0180
  FLOW LENGTH(FEET) =   174.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.91
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.30
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    302.70 =     239.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.70 TO NODE    302.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.049
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.34   SUBAREA RUNOFF(CFS) =    4.13
  TOTAL AREA(ACRES) =       4.7   TOTAL RUNOFF(CFS) =      8.27
  TC(MIN.) =   10.02

****************************************************************************
  FLOW PROCESS FROM NODE    302.70 TO NODE    302.80 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.27
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.13
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    302.80 =     279.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.80 TO NODE    303.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   575.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.27
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    303.00 =     854.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    302.50 TO NODE    303.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   4.57
  TOTAL STREAM AREA(ACRES) =     4.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.27

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        14.13     10.86         4.793          6.41
      2         8.27     11.68         4.572          4.68

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        21.82     10.86        4.793
      2        21.75     11.68        4.572

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.82   Tc(MIN.) =   10.86
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    303.00 =     854.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.82
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    304.00 =    1014.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    304.00 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.) =   11.24
  RAINFALL INTENSITY(INCH/HR) =   4.69
  TOTAL STREAM AREA(ACRES) =    11.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    303.50 TO NODE    303.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    584.00
  DOWNSTREAM ELEVATION(FEET) =    583.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.09
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.09

****************************************************************************
  FLOW PROCESS FROM NODE    303.60 TO NODE    303.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.55
  TOTAL AREA(ACRES) =       0.4   TOTAL RUNOFF(CFS) =       0.64
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    303.60 TO NODE    303.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.29
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.64
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE    303.50 TO NODE    303.70 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.70 TO NODE    303.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.005
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    0.26   SUBAREA RUNOFF(CFS) =    0.46
  TOTAL AREA(ACRES) =       0.6   TOTAL RUNOFF(CFS) =       1.07
  TC(MIN.) =   10.16
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    303.70 TO NODE    304.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.61
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    303.50 TO NODE    304.00 =     242.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    303.50 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.89
  TOTAL STREAM AREA(ACRES) =     0.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.07

  ** CONFLUENCE DATA **
  STREAM      RUNOFF        Tc       INTENSITY       AREA
  NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
      1        21.82     11.24         4.687          11.09
      2         1.07     10.51         4.895           0.61

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

  ** PEAK FLOW RATE TABLE **
  STREAM      RUNOFF       Tc       INTENSITY
  NUMBER       (CFS)     (MIN.)    (INCH/HOUR)
      1        21.96     10.51       4.895
      2        22.84     11.24       4.687

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.84   Tc(MIN.) =   11.24
  TOTAL AREA(ACRES) =       11.7
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    304.00 =    1014.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   362.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
```

```
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.84
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   12.07
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    305.00 =    1376.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    305.00 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.) =   12.07
  RAINFALL INTENSITY(INCH/HR) =   4.48
  TOTAL STREAM AREA(ACRES) =    11.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.84

****************************************************************************
  FLOW PROCESS FROM NODE    304.50 TO NODE    304.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    556.00
  DOWNSTREAM ELEVATION(FEET) =    555.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    304.60 TO NODE    304.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.51   SUBAREA RUNOFF(CFS) =    2.77
  TOTAL AREA(ACRES) =       1.6   TOTAL RUNOFF(CFS) =      2.96
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    304.60 TO NODE    304.70 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0140
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.019
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.04
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.96
```

```
  PIPE TRAVEL TIME(MIN.) =    0.66    Tc(MIN.) =    10.09
  LONGEST FLOWPATH FROM NODE    304.50 TO NODE    304.70 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.70 TO NODE    304.70 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.026
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    1.62   SUBAREA RUNOFF(CFS) =    2.85
  TOTAL AREA(ACRES) =       3.2   TOTAL RUNOFF(CFS) =       5.68
  TC(MIN.) =   10.09

****************************************************************************
  FLOW PROCESS FROM NODE    304.70 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.68
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.26
  LONGEST FLOWPATH FROM NODE    304.50 TO NODE    305.00 =     285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.50 TO NODE    305.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.26
  RAINFALL INTENSITY(INCH/HR) =   4.97
  TOTAL STREAM AREA(ACRES) =     3.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.68

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       22.84    12.07        4.477         11.70
      2        5.68    10.26        4.971          3.23

  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       26.25    10.26       4.971
      2       27.96    12.07       4.477
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      27.96   Tc(MIN.) =   12.07
 TOTAL AREA(ACRES) =       14.9
 LONGEST FLOWPATH FROM NODE    302.50 TO NODE    305.00 =    1376.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    305.00 TO NODE    306.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =   677.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  17.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      27.96
 PIPE TRAVEL TIME(MIN.) =   1.33    Tc(MIN.) =   13.40
 LONGEST FLOWPATH FROM NODE    302.50 TO NODE    306.00 =    2053.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    306.00 TO NODE    307.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    48.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.82
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      27.96
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.45
 LONGEST FLOWPATH FROM NODE    302.50 TO NODE    307.00 =    2101.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  4
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   13.45
 RAINFALL INTENSITY(INCH/HR) =   4.17
 TOTAL STREAM AREA(ACRES) =    14.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.96

****************************************************************************
 FLOW PROCESS FROM NODE    315.00 TO NODE    316.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    586.00
 DOWNSTREAM ELEVATION(FEET) =    584.00
 ELEVATION DIFFERENCE(FEET) =      2.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.494
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    307.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0370
  STREET LENGTH(FEET) =  1240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 34.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  17.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.52
  STREET FLOW TRAVEL TIME(MIN.) =   4.62   Tc(MIN.) =    7.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.293
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    2.01      SUBAREA RUNOFF(CFS) =   10.75
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =      10.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.97
  FLOW VELOCITY(FEET/SEC.) =  5.24   DEPTH*VELOCITY(FT*FT/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE    315.00 TO NODE    307.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    315.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.12
  RAINFALL INTENSITY(INCH/HR) =   6.29
  TOTAL STREAM AREA(ACRES) =     2.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.86

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    311.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    547.00
  DOWNSTREAM ELEVATION(FEET) =    546.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.432
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    67.50
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.904
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    312.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0080
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 71.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  35.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   12.19
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   5.49   Tc(MIN.) =    8.93
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.439
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    1.44      SUBAREA RUNOFF(CFS) =    6.66
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       6.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.72
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    312.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    307.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

4-306

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.75
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.01
  LONGEST FLOWPATH FROM NODE    310.00 TO NODE    307.00 =     845.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   5.41
  TOTAL STREAM AREA(ACRES) =     1.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.75

****************************************************************************
  FLOW PROCESS FROM NODE    306.50 TO NODE    306.60 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    545.00
  DOWNSTREAM ELEVATION(FEET) =    544.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.428
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

****************************************************************************
  FLOW PROCESS FROM NODE    306.60 TO NODE    306.60 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.250
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    2.23   SUBAREA RUNOFF(CFS) =    4.10
  TOTAL AREA(ACRES) =       2.3   TOTAL RUNOFF(CFS) =      4.28
  TC(MIN.) =    9.43

****************************************************************************
  FLOW PROCESS FROM NODE    306.60 TO NODE    307.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0200
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.019
```

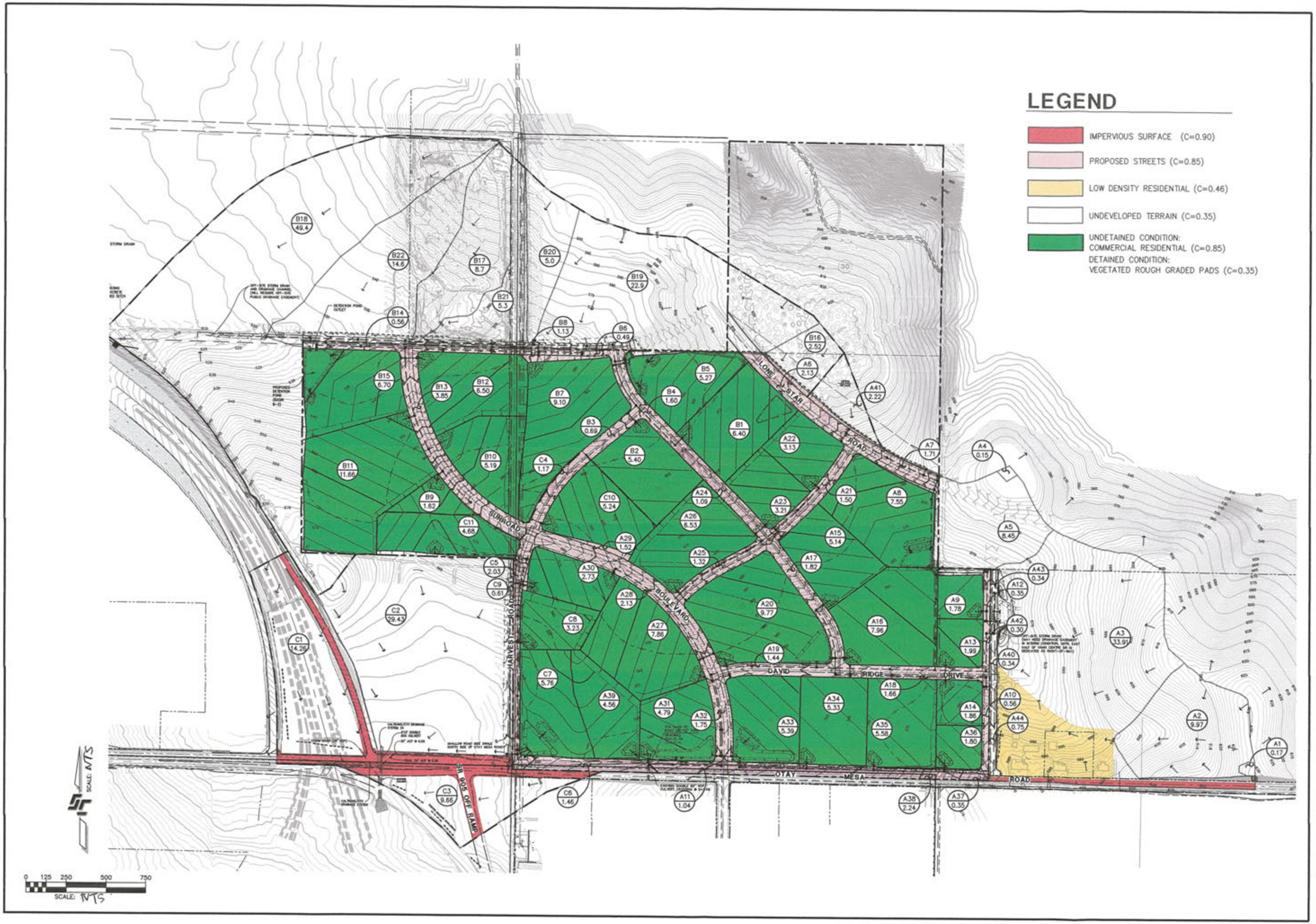
```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.28
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   10.08
  LONGEST FLOWPATH FROM NODE    306.50 TO NODE    307.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.028
  *USER SPECIFIED(SUBAREA):
  URBAN NEWLY GRADED AREAS RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
  SUBAREA AREA(ACRES) =    3.43   SUBAREA RUNOFF(CFS) =    6.04
  TOTAL AREA(ACRES) =       5.8   TOTAL RUNOFF(CFS) =     10.14
  TC(MIN.) =   10.08

****************************************************************************
  FLOW PROCESS FROM NODE    306.50 TO NODE    307.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  4
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.08
  RAINFALL INTENSITY(INCH/HR) =   5.03
  TOTAL STREAM AREA(ACRES) =     5.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.14

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       27.96    13.45        4.175         14.93
      2       10.86     7.12        6.293          2.03
      3        6.75     9.01        5.406          1.46
      4       10.14    10.08        5.028          5.76

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)
      1       41.90     7.12        6.293
      2       46.73     9.01        5.406
      3       48.30    10.08        5.028
      4       48.79    13.45        4.175

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.79   Tc(MIN.) =   13.45
  TOTAL AREA(ACRES) =       24.2
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    307.00 =    2101.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    307.00 IS CODE =  13
```

```
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  26.00   RAIN INTENSITY(INCH/HOUR) =  2.73
  TOTAL AREA(ACRES) =    24.18   TOTAL RUNOFF(CFS) =     28.41

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    308.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.41
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   26.40
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    308.00 =    2241.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    308.00 TO NODE    321.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   810.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.41
  PIPE TRAVEL TIME(MIN.) =   2.33    Tc(MIN.) =   28.74
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    321.00 =    3051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    321.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   28.74
  RAINFALL INTENSITY(INCH/HR) =   2.56
  TOTAL STREAM AREA(ACRES) =    24.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.41

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    331.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    560.00
  DOWNSTREAM ELEVATION(FEET) =    557.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    9.361
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.275
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

********************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    320.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1515.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0200
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =  40.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.037
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.99
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =  12.67
  Tc(MIN.) =   22.03
  SUBAREA AREA(ACRES) =    29.33       SUBAREA RUNOFF(CFS) =   31.18
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =       29.4         PEAK FLOW RATE(CFS) =      31.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   2.45
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    320.00 =    1615.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    321.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =    85.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   4.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      31.28
  FLOW VELOCITY(FEET/SEC.) =   7.71   FLOW DEPTH(FEET) =   0.68
  TRAVEL TIME(MIN.) =   0.18   Tc(MIN.) =   22.21
  LONGEST FLOWPATH FROM NODE    330.00 TO NODE    321.00 =    1700.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    321.00 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.) =   22.21
  RAINFALL INTENSITY(INCH/HR) =   3.02
  TOTAL STREAM AREA(ACRES) =    29.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)    (INCH/HOUR)    (ACRE)
      1       28.41    28.74        2.559         24.18
      2       31.28    22.21        3.021         29.43

  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       53.24    22.21        3.021
      2       54.91    28.74        2.559

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.91   Tc(MIN.) =   28.74
  TOTAL AREA(ACRES) =       53.6
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    321.00 =    3051.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    322.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  CHANNEL LENGTH THRU SUBAREA(FEET) =   215.00
  REPRESENTATIVE CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.013   MAXIMUM DEPTH(FEET) =   4.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      54.91
  FLOW VELOCITY(FEET/SEC.) =   9.34   FLOW DEPTH(FEET) =   0.98
  TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =   29.12
  LONGEST FLOWPATH FROM NODE    302.50 TO NODE    322.00 =    3266.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    322.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.537
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .4400
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.3976
  SUBAREA AREA(ACRES) =   14.26   SUBAREA RUNOFF(CFS) =   15.92
  TOTAL AREA(ACRES) =       67.9   TOTAL RUNOFF(CFS) =      68.46
  TC(MIN.) =   29.12

****************************************************************************
  FLOW PROCESS FROM NODE    322.00 TO NODE    322.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.537
  *USER SPECIFIED(SUBAREA):
  NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .5900
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4216
  SUBAREA AREA(ACRES) =    9.66   SUBAREA RUNOFF(CFS) =   14.46
  TOTAL AREA(ACRES) =       77.5   TOTAL RUNOFF(CFS) =      82.91
  TC(MIN.) =   29.12
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =       77.5  TC(MIN.) =     29.12
  PEAK FLOW RATE(CFS)    =      82.91
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```




STEVENS-CRESTO ENGINEERING, INC.
CIVIL ENGINEERS • PLANNERS • LAND SURVEYORS
9665 CHESAPEAKE DRIVE
SUITE 200
SAN DIEGO, CA 92123-1352
PHONE: 858.694.5660
FAX: 858.694.5661
www.scengr.com

REVISIONS

# SUNROAD OTAY 250
SAN DIEGO, CALIFORNIA

# EXHIBIT "D"
# POST-PROJECT
# RUNOFF COEFFICIENT STUDY

4-313

DATE: 04/06/16
SCE NO. 14009.01
SHEET
D
1 OF 1 SHEETS

X:\2014\14009\CAD\REPORTS\DRN\D_PR C-VALUE.dwg 4/6/2016 4:08:00 PM PDT

| C-VALUE DETERMINATION | | | | | | | |
|---|---|---|---|---|---|---|---|
| Basin | $A_T$ (Ac.) | $A_{0.9}$ (Ac.) | $A_{0.85}$ (Ac.) | $A_{0.46}$(Ac.) | $A_{0.35}$(Ac.) | C | Remarks |
| A1 | 0.17 | | | | 0.17 | 0.35 | Undeveloped Terrain |
| A2 | 9.97 | | | | 9.97 | 0.35 | Undeveloped Terrain |
| A3 | 33.91 | 1.31 | | 7.40 | 25.20 | 0.40 | Undeveloped Terrain/Residential and Portion of Otay Mesa Road |
| A4 | 0.15 | | | | 0.15 | 0.35 | Undeveloped Terrain |
| A5 | 8.45 | | | | 8.45 | 0.35 | Undeveloped Terrain |
| A6 | 2.13 | | 2.13 | | | 0.85 | Portion of Lone Star Road |
| A7 | 1.71 | | 1.71 | | | 0.85 | Portion of Lone Star Road |
| A8 | 7.55 | | | | 7.55 | 0.35 | Rough Graded Pad |
| A9 | 1.78 | | | | 1.78 | 0.35 | Rough Graded Pad |
| A10 | 0.56 | | 0.56 | | | 0.85 | Portion of Street |
| A11 | 1.04 | | 1.04 | | | 0.85 | Portion of Otay Mesa Road |
| A12 | 0.35 | | 0.35 | | | 0.85 | Portion of Street |
| A13 | 1.99 | | | | 1.99 | 0.35 | Rough Graded Pad |
| A14 | 1.86 | | | | 1.86 | 0.35 | Rough Graded Pad |
| A15 | 5.14 | | | | 5.14 | 0.35 | Rough Graded Pad |
| A16 | 7.96 | | | | 7.96 | 0.35 | Rough Graded Pad |
| A17 | 1.82 | | 1.82 | | | 0.85 | Portion of Street |
| A18 | 1.66 | | 1.66 | | | 0.85 | Portion of David Ridge Drive |
| A19 | 1.44 | | 1.44 | | | 0.85 | Portion of David Ridge Drive |
| A20 | 9.77 | | | | 9.77 | 0.35 | Rough Graded Pad |
| A21 | 1.50 | | 1.50 | | | 0.85 | Portion of Street |
| A22 | 3.13 | | | | 3.13 | 0.35 | Rough Graded Pad |
| A23 | 3.21 | | | | 3.21 | 0.35 | Rough Graded Pad |
| A24 | 1.09 | | 1.09 | | | 0.85 | Portion of Street |
| A25 | 1.32 | | 1.32 | | | 0.85 | Portion of Street |
| A26 | 6.53 | | | | 6.53 | 0.35 | Rough Graded Pad |
| A27 | 7.86 | | | | 7.86 | 0.35 | Rough Graded Pad |
| A28 | 2.13 | | 2.13 | | | 0.85 | Portion of Sunroad Boulevard |
| A29 | 1.52 | | 1.52 | | | 0.85 | Portion of Sunroad Boulevard |
| A30 | 2.73 | | | | 2.73 | 0.35 | Rough Graded Pad |
| A31 | 4.79 | | | | 4.79 | 0.35 | Rough Graded Pad |
| A32 | 1.75 | | | | 1.75 | 0.35 | Rough Graded Pad |
| A33 | 5.39 | | | | 5.39 | 0.35 | Rough Graded Pad |
| A34 | 5.33 | | | | 5.33 | 0.35 | Rough Graded Pad |
| A35 | 5.58 | | | | 5.58 | 0.35 | Rough Graded Pad |
| A36 | 1.80 | | | | 1.80 | 0.35 | Rough Graded Pad |
| A37 | 0.35 | | 0.35 | | | 0.85 | Portion of Otay Mesa Road |
| A38 | 2.24 | | 2.24 | | | 0.85 | Portion of Otay Mesa Road |
| A39 | 4.56 | | | | 4.56 | 0.35 | Rough Graded Pad |
| A40 | 0.34 | | | | 0.34 | 0.35 | Portion of Rough Graded Street |
| A41 | 2.22 | | | | 2.22 | 0.35 | Undeveloped Terrain |
| A42 | 0.30 | | 0.30 | | | 0.85 | Rough Graded Pad |
| A43 | 0.34 | | | | 0.34 | 0.35 | Portion of Rough Graded Street |
| A44 | 0.75 | | | | 0.75 | 0.35 | Portion of Rough Graded Street |
| B1 | 6.40 | | | | 6.40 | 0.35 | Rough Graded Pad |
| B2 | 5.40 | | | | 5.40 | 0.35 | Rough Graded Pad |
| B3 | 0.69 | | 0.69 | | | 0.85 | Portion of Harvest Road |
| B4 | 1.60 | | 1.60 | | | 0.85 | Portion of Street |
| B5 | 5.27 | | | | 5.27 | 0.35 | Rough Graded Pad |
| B6 | 0.49 | | 0.49 | | | 0.85 | Portion of Maderas Boulevard |
| B7 | 9.10 | | | | 9.10 | 0.35 | Rough Graded Pad |
| B8 | 1.13 | | 1.13 | | | 0.85 | Portion of Maderas Boulevard |
| B9 | 1.62 | | | | 1.62 | 0.35 | Rough Graded Pad |
| B10 | 5.19 | | | | 5.19 | 0.35 | Rough Graded Pad |
| B11 | 11.66 | | | | 11.66 | 0.35 | Rough Graded Pad |
| B12 | 6.50 | | | | 6.50 | 0.35 | Rough Graded Pad |
| B13 | 3.85 | | 3.85 | | | 0.85 | Portion of Sunroad Boulevard |
| B14 | 0.56 | | 0.56 | | | 0.85 | Portion of Maderas Boulevard |
| B15 | 6.70 | | | | 6.70 | 0.35 | Rough Graded Pad |
| B16 | 2.52 | | | | 2.52 | 0.35 | Undeveloped Terrain |
| B17 | 8.70 | | | | 8.70 | 0.35 | Undeveloped Terrain |
| B18 | 49.40 | | | | 49.40 | 0.35 | Undeveloped Terrain |
| B19 | 22.90 | | | | 22.90 | 0.35 | Undeveloped Terrain |
| B20 | 5.00 | | | | 5.00 | 0.35 | Undeveloped Terrain |
| B21 | 5.30 | | | | 5.30 | 0.35 | Undeveloped Terrain |
| B22 | 14.60 | | | | 14.60 | 0.35 | Undeveloped Terrain |
| C1 | 14.26 | 2.36 | | | 11.90 | 0.44 | Undeveloped Terrain |
| C2 | 29.43 | | | | 29.43 | 0.35 | Undeveloped Terrain |
| C3 | 9.66 | 4.16 | | | 5.50 | 0.59 | Otay Mesa Road and portion of Undeveloped Terrain |
| C4 | 1.17 | | 1.17 | | | 0.85 | Portion of Harvest Road |
| C5 | 2.03 | | 2.03 | | | 0.85 | Portion of Harvest Road |
| C6 | 1.46 | | 1.46 | | | 0.85 | Portion of Otay Mesa Road |
| C7 | 5.76 | | | | 5.76 | 0.35 | Rough Graded Pad |
| C8 | 3.23 | | | | 3.23 | 0.35 | Rough Graded Pad |
| C9 | 0.61 | | | | 0.61 | 0.35 | Rough Graded Pad |
| C10 | 5.24 | | | | 5.24 | 0.35 | Rough Graded Pad |
| C11 | 4.68 | | | | 4.68 | 0.35 | Rough Graded Pad |

Assumptions:
1) Four land use types exist on site:
Impervious Surface (C-Value = 0.9)
Street Basins (C-Value = 0.85)
Low Density Residential 2.0 DU/A (C-Value=0.46)
Rough Graded Pads and Undeveloped Terrain (C-Value = 0.35)
2) C-Values have been determined using the equation from
section 3.1.2 of County of San Diego Hydrology Manual (June 2003)

5

# SECTION 5

## HYDRAULICS - DETENTION

**ALLOWABLE PEAK DISCHARGE RATES (LOTS)** ..... **5-1**
Table 5-1, Allowable Peak Discharge Rates (Lots)

**DETENTION CALCULATIONS** ..... **5-2**
Table 5-2, Proposed Release Rate Summary

BASIN A PROPOSED DETENTION ..... 5-2A
Biofiltration\Detention Basin BF-3
Biofiltration\Detention Basin BF-4
Biofiltration\Detention Basin BF-5
Biofiltration\Detention Basin BF-7

BASIN B PROPOSED DETENTION ..... 5-2B
Biofiltration\Detention Basin BF-1
Biofiltration\Detention Basin BF-2

BASIN C PROPOSED DETENTION ..... 5-2C
Biofiltration\Detention Basin BF-6

**DUAL PURPOSE BIOFILTRATION SIZING CONFIRMATION** ..... **5-3**

# SECTION 5-1

## ALLOWABLE PEAK DISCHARGE RATES (LOTS)

**Description**

Allowable release rates for lots are determined by modeling each pad in the rough graded condition, with a runoff coefficient of 0.35. A runoff coefficient of 0.35 is used for the rough graded pads since they will be vegetated with hydroseed. In the ultimate build-out condition, future development will be responsible for maintaining the peak discharge rate calculated for each lot in the hydrology routing provided in Section 4 and summarized below. Conformance to this criteria will need to be demonstrated during the site plan review process.

### Table 5-1

**ALLOWABLE PEAK DISCHARGE RATES (LOTS)**

| LOT NO. | GROSS LOT AREA (ac.) | BASIN | Tc (min) | $Q_{100}$ (cfs) |
|---|---|---|---|---|
| 1 | 10.42 | A + C | 10.14 | 18.13 |
| 2 | 3.23 | C | 10.09 | 5.68 |
| 3 | 3.51 | A + C | 10.15 | 5.86 |
| 4 | 7.98 | A | 10.10 | 13.81 |
| 5 | 4.89 | A | 10.12 | 8.41 |
| 6 | 5.53 | A | 10.11 | 9.47 |
| 7 | 5.40 | A | 10.11 | 9.36 |
| 8 | 5.55 | A | 10.15 | 9.78 |
| 9 | 1.76 | A | 10.07 | 3.17 |
| 10 | 1.89 | A | 9.98 | 3.29 |
| 11 | 2.02 | A | 10.16 | 3.48 |
| 12 | 2.09 | A | 10.15 | 3.12 |
| 13 | 8.06 | A | 10.12 | 13.97 |
| 14 | 10.08 | A | 10.30 | 16.96 |
| 15 | 5.24 | A | 10.15 | 9.01 |
| 16 | 8.03 | A | 10.12 | 13.26 |
| 17 | 3.16 | A | 10.11 | 5.50 |
| 18 | 3.30 | A | 10.15 | 5.63 |
| 19 | 6.42 | B | 10.15 | 11.22 |
| 21 | 5.65 | B | 10.08 | 9.28 |
| 22 | 11.84 | B | 10.22 | 15.88 |
| 23 | 5.52 | B | 10.11 | 9.48 |
| 24 | 6.71 | A | 10.15 | 11.44 |
| 25 | 5.64 | C | 10.13 | 9.19 |
| 26 | 4.15 | B | 10.09 | 9.13 |
| 27 | 5.68 | B | 10.29 | 11.29 |
| 28 | 6.92 | B | 10.20 | 11.70 |
| 29 | 12.01 | B | 9.83 | 20.85 |
| 30 | 6.70 | B + C | 10.02 | 11.10 |

# SECTION 5-2

## DETENTION CALCULATIONS

**Description**

The development of the **Sunroad Otay 250** project increases runoff at the points of study for Basins "A", "B" and "C". In accordance with the "criteria" discussed in Section 4 of this report, detention facilities are required to reduce peak runoff flow rates to existing values. **Sunroad Otay 250** will utilize a combination of on-lot detention facilities (future) and regional detention facilities to satisfy the mitigation criteria. Calculations within this section route peak runoff flow rates from a 100 year design storm through each of the proposed detention facilities to confirm that existing peak runoff flow rates will not be exceeded at the three points of compliance (POC 1, 2, and 3). Design and calculations of detention pond sizing follow in Sections 4-1A, 4-1B, and 4-1C.

**Calculations**

1. GENERATE RATIONAL METHOD PEAK FLOW

See routing calculations in Section 4.

2. GENERATE INFLOW HYDROGRAPH UTILIZING "RATHYDRO":

The "Rational Method Hydrograph Program" by Rick Engineering Company, supplied by the County of San Diego, has been utilized to determine the developed "inflow" hydrograph, utilizing parameters at the outfall points for each of the regional detention facilities. The parameters for the inflow hydrograph are the Rational Method weighted runoff coefficient, time of concentration, peak flow, six hour precipitation and tributary basin area.

3. ROUTE INFLOW HYDROGRAPHS THROUGH DETENTION FACILITIES:

The software utilized to route each of the inflow hydrographs through the detention facilities is Hydraflow Hydrographs 2007. Each facility is modeled in the software using contour areas and outlet structure parameters which have been iteratively adjusted to satisfy the mitigation criteria. The software routes the hydrograph through each facility and generates an outflow hydrograph for the facility and a graphic output that depicts the hydraulic operation of the outlet structure; Hydrograph Reports and Pond Reports for each facility follow in this section.

**Detention Conclusion:**

As shown in the routing calculations within Section 4, and summarized in Table 5-2 within this section, the regional detention facilities will adequately mitigate for the increase in runoff from a 100 year design storm, so that runoff generated by the project does not exceed pre-project peak flow rates.

## Table 5-2

### Proposed Release Rate Summary

| | | INFLOW | | OUTFLOW[1] | |
|---|---|---|---|---|---|
| BIOFILTRATION | Area (acres) | $T_{C\ IN}$ (min) | $Q_{100\ IN}$ (cfs) | $T_{C\ OUT}$ (min) Detained | $Q_{100\ OUT}$ (cfs) Detained |
| BF-1 | 46.8 | 12 | 89.44 | 24 | 27.01 |
| BF-2 | 19.36 | 12 | 37.55 | 24 | 13.60 |
| BF-3 | 13.61 | 13 | 29.55 | 26 | 7.93 |
| BF-4 | 30.67 | 12 | 63.13 | 24 | 22.22 |
| BF-5 | 66.13 | 12 | 127.11 | 24 | 50.02 |
| BF-6 | 24.18 | 13 | 48.79 | 26 | 28.41 |
| BF-7 | 3.11 | 11 | 7.19 | 22 | 2.20 |

1. Project design has honored existing drainage basins to the maximum extent practicable; within the constraints/ confines of Subdivision layout. The developed runoff rates from the project area are the same or less than the existing runoff rates in all drainage basins to which the project is tributary. Runoff to downstream properties will not be increased; the project will not change flow characteristics to downstream, offsite, basins.

# SECTION 5-2A

## BASIN A, PROPOSED DETENTION

On-lot runoff generated within Basin "A" will be detained within on-lot detention facilities in the ultimate condition. Discharge from those detention facilities, along with undetained runoff from the public right-of-way, and from off-site, will be collected within public storm drain systems and conveyed to one of four regional detention facilities (see Exhibit "C"). Design specifications for the detention facilities are calculated within the Storm Water Quality Management Plan for **Sunroad Otay 250**. Routing calculations for each detention facility follow within this section.

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

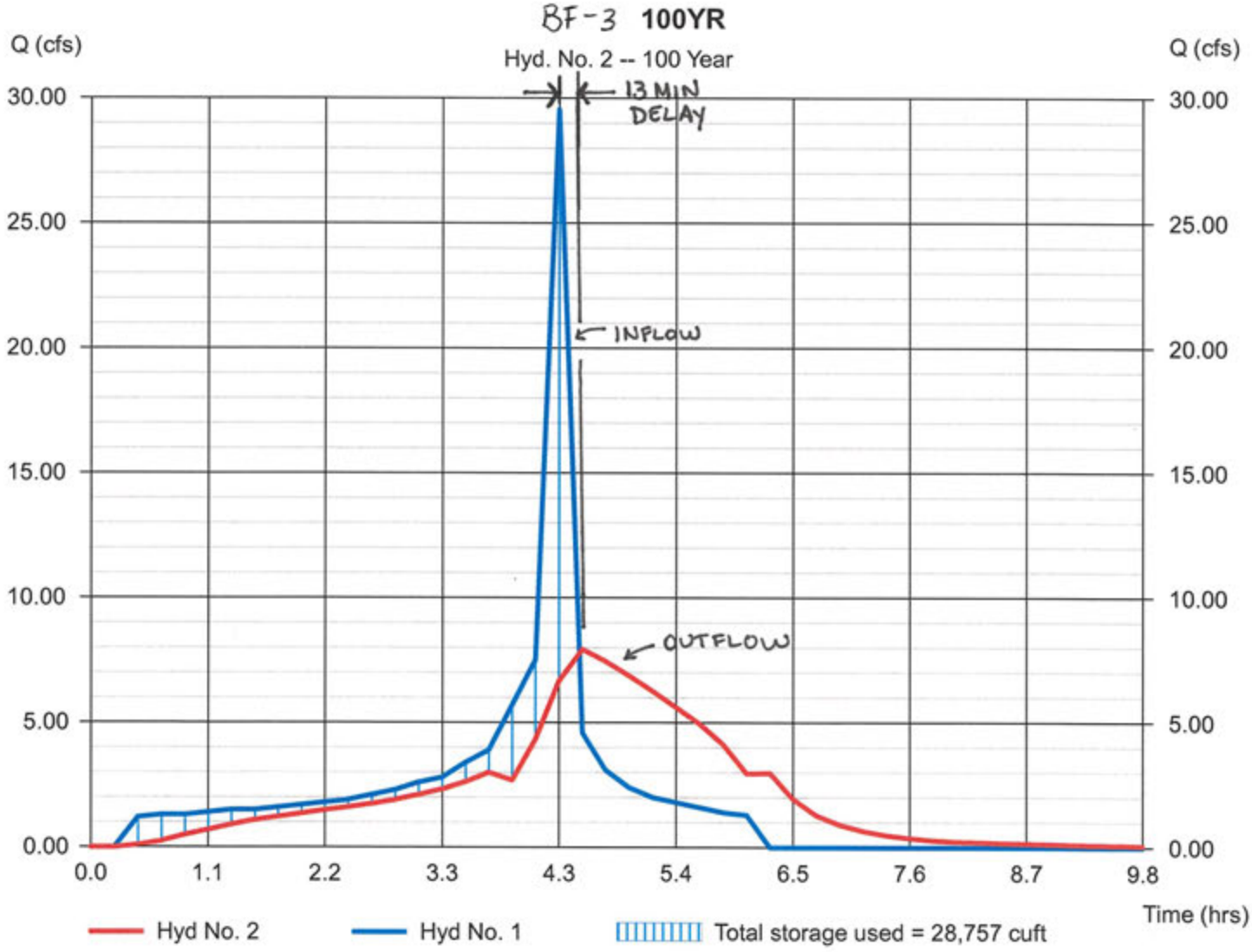
## Hyd. No. 2

BF-3 100YR

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 7.926 cfs ← PEAK Qout |
| Storm frequency | = | 100 yrs | Time to peak | = | 273 min |
| Time interval | = | 13 min | Hyd. volume | = | 72,730 cuft |
| Inflow hyd. No. | = | 1 - POND A1 INFLOW, 100YR | Max. Elevation | = | 580.07 ft |
| Reservoir name | = | Pond A1 | Max. Storage | = | 28,757 cuft |

Storage Indication method used.

13 MIN (IN) + 13 MIN DELAY = 26 MIN



# Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

## Pond No. 1 - BF-3

### Pond Data

**Contours** - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 578.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 578.00 | 13,503 | 0 | 0 |
| 1.00 | 579.00 | 14,493 | 13,994 | 13,994 |
| 2.00 | 580.00 | 15,508 | 14,996 | 28,990 |
| 3.00 | 581.00 | 16,548 | 16,024 | 45,013 |
| 4.00 | 582.00 | 17,682 | 17,110 | 62,124 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| Rise (in) | = 6.00 | 0.00 | Inactive | Inactive |
| Span (in) | = 30.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 0 | 0 | 0 |
| Invert El. (ft) | = 578.00 | 0.00 | 0.00 | 0.00 |
| Length (ft) | = 0.50 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 0.00 | 0.00 | 0.00 | n/a |
| N-Value | = .013 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | No | No | No |

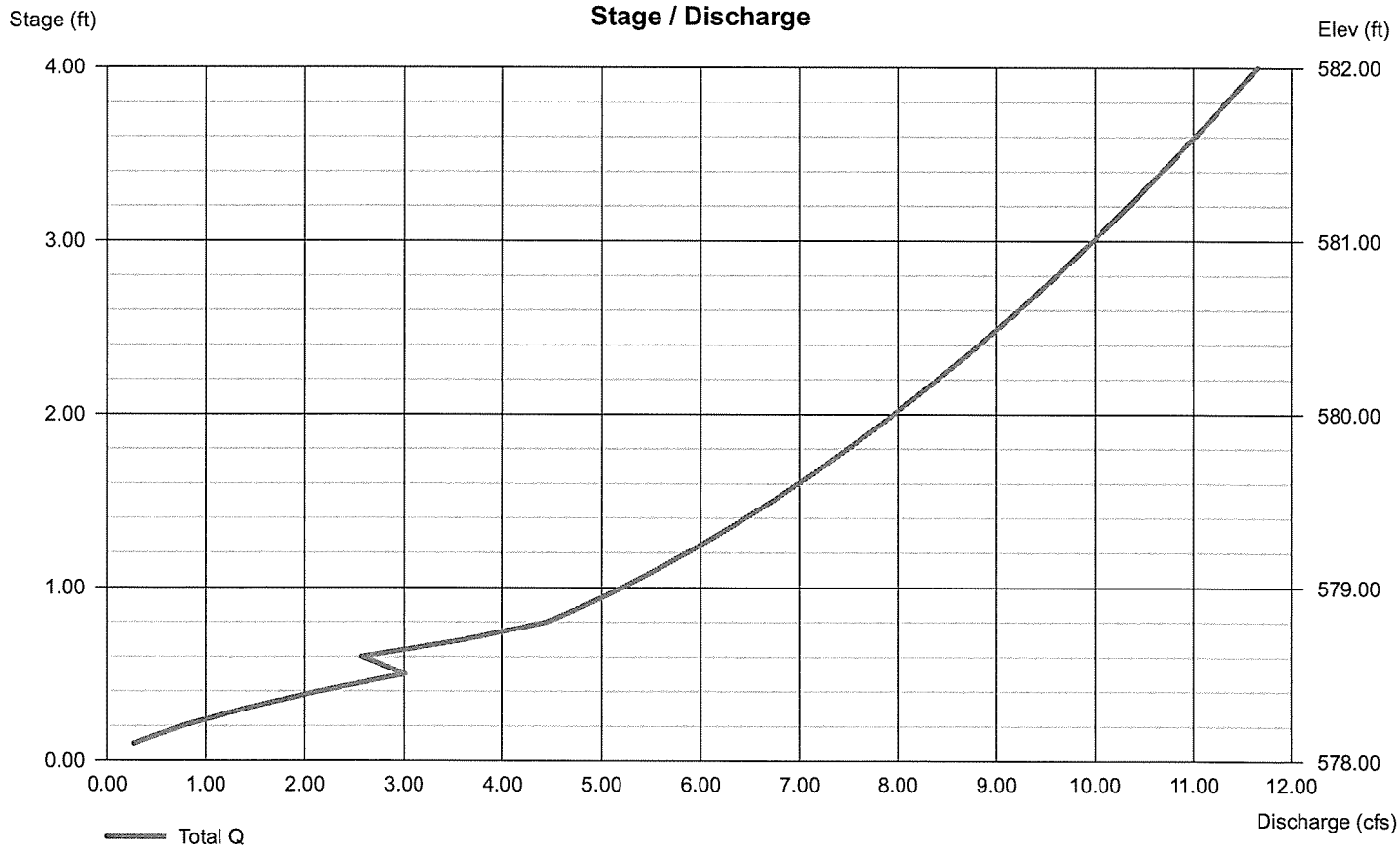
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| Crest Len (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = --- | --- | --- | --- |
| Multi-Stage | = No | No | No | No |

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 4/4/2016
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 13 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 13.61 ACRES
RUNOFF COEFFICIENT 0.4988
PEAK DISCHARGE 29.55 CFS

BF-3 INFLOW

100 YR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 13 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 26 | DISCHARGE (CFS) = 1.2 |
| TIME (MIN) = 39 | DISCHARGE (CFS) = 1.3 |
| TIME (MIN) = 52 | DISCHARGE (CFS) = 1.3 |
| TIME (MIN) = 65 | DISCHARGE (CFS) = 1.4 |
| TIME (MIN) = 78 | DISCHARGE (CFS) = 1.5 |
| TIME (MIN) = 91 | DISCHARGE (CFS) = 1.5 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 1.6 |
| TIME (MIN) = 117 | DISCHARGE (CFS) = 1.7 |
| TIME (MIN) = 130 | DISCHARGE (CFS) = 1.8 |
| TIME (MIN) = 143 | DISCHARGE (CFS) = 1.9 |
| TIME (MIN) = 156 | DISCHARGE (CFS) = 2.1 |
| TIME (MIN) = 169 | DISCHARGE (CFS) = 2.3 |
| TIME (MIN) = 182 | DISCHARGE (CFS) = 2.6 |
| TIME (MIN) = 195 | DISCHARGE (CFS) = 2.8 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 3.4 |
| TIME (MIN) = 221 | DISCHARGE (CFS) = 3.9 |
| TIME (MIN) = 234 | DISCHARGE (CFS) = 5.7 |
| TIME (MIN) = 247 | DISCHARGE (CFS) = 7.5 |
| TIME (MIN) = 260 | DISCHARGE (CFS) = 29.55 ← PEAK $Q_{100}$ |
| TIME (MIN) = 273 | DISCHARGE (CFS) = 4.6 |
| TIME (MIN) = 286 | DISCHARGE (CFS) = 3.1 |
| TIME (MIN) = 299 | DISCHARGE (CFS) = 2.4 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 2 |
| TIME (MIN) = 325 | DISCHARGE (CFS) = 1.8 |
| TIME (MIN) = 338 | DISCHARGE (CFS) = 1.6 |
| TIME (MIN) = 351 | DISCHARGE (CFS) = 1.4 |
| TIME (MIN) = 364 | DISCHARGE (CFS) = 1.3 |
| TIME (MIN) = 377 | DISCHARGE (CFS) = 0 |

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

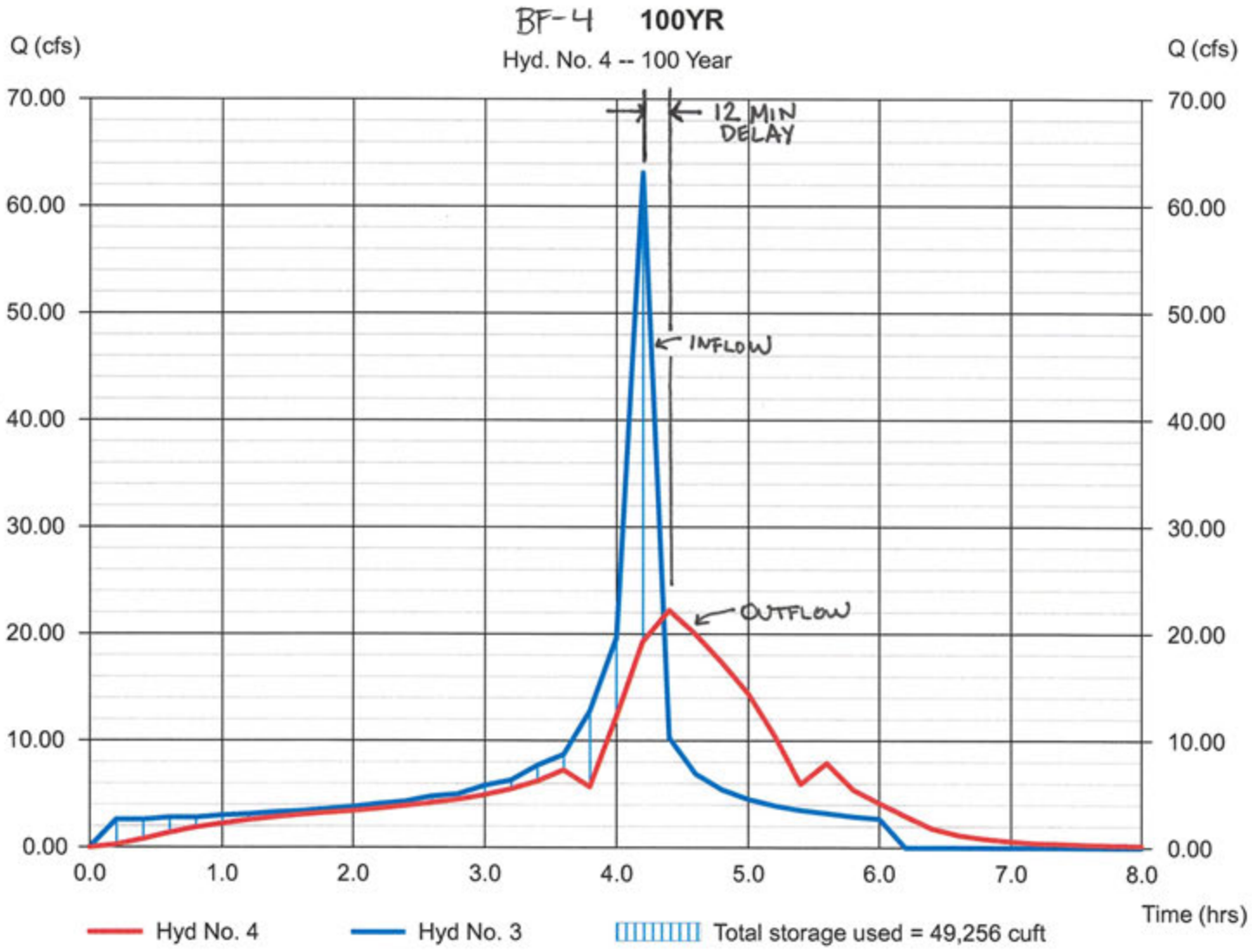
## Hyd. No. 4

BF-4 100 YR

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 22.22 cfs ← PEAK Qout |
| Storm frequency | = 100 yrs | Time to peak | = 264 min |
| Time interval | = 12 min | Hyd. volume | = 155,898 cuft |
| Inflow hyd. No. | = 3 - POND A2 INFLOW, 100YR | Max. Elevation | = 560.96 ft |
| Reservoir name | = Pond A2 | Max. Storage | = 49,256 cuft |

Storage Indication method used.

12 MIN (IN) + 12 MIN DELAY = 24 MIN



# Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

## Pond No. 2 - BF-4

### Pond Data

**Contours -** User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 558.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 558.00 | 16,222 | 0 | 0 |
| 1.00 | 559.00 | 17,339 | 16,776 | 16,776 |
| 2.00 | 560.00 | 18,488 | 17,909 | 34,684 |
| 3.00 | 561.00 | 20,875 | 19,667 | 54,352 |
| 4.00 | 562.00 | 22,099 | 21,482 | 75,834 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| Rise (in) | = 9.00 | 0.00 | Inactive | Inactive |
| Span (in) | = 48.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 0 | 0 | 0 |
| Invert El. (ft) | = 558.00 | 0.00 | 0.00 | 0.00 |
| Length (ft) | = 0.50 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 0.00 | 0.00 | 0.00 | n/a |
| N-Value | = .013 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | No | No | No |

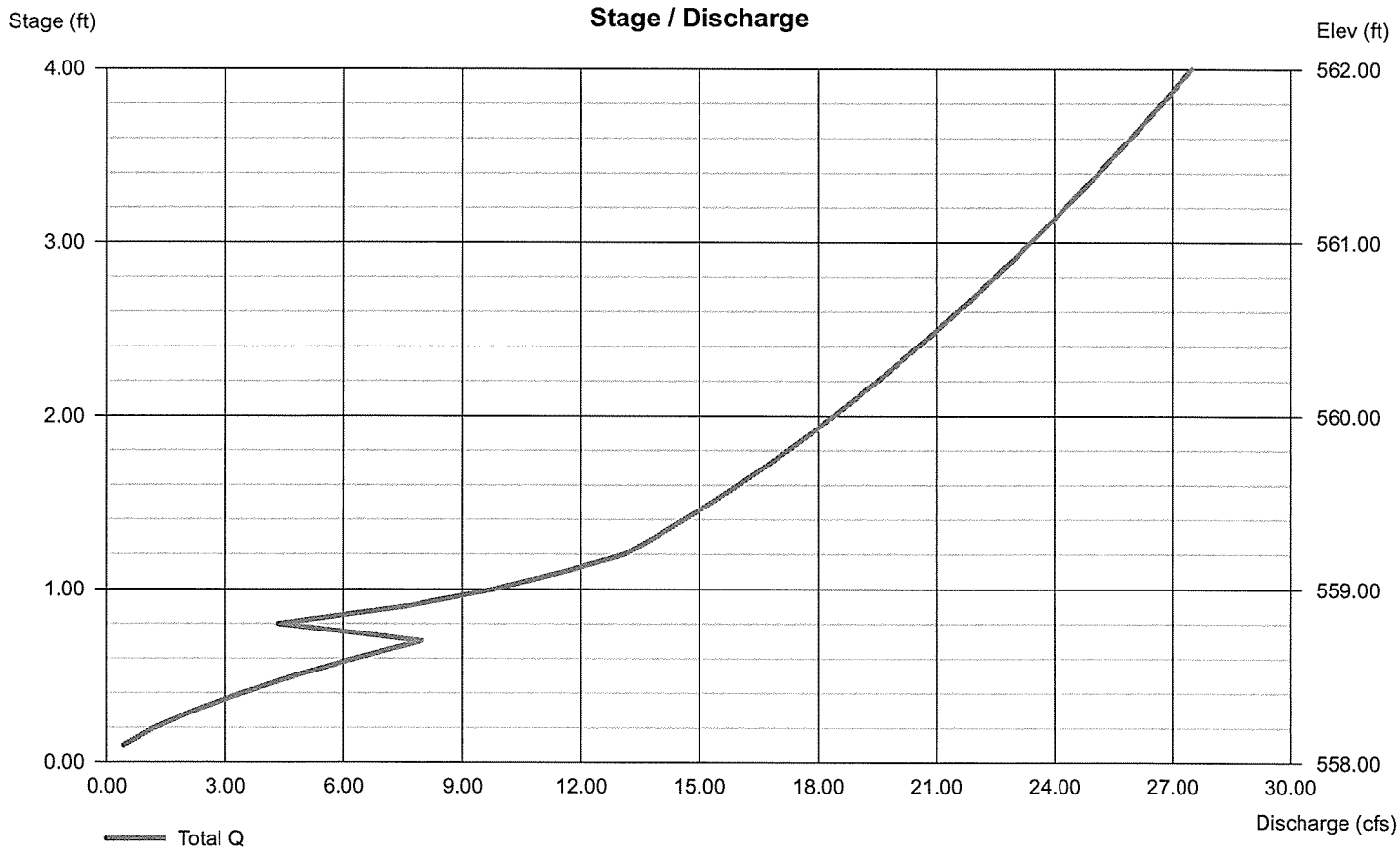
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| Crest Len (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = --- | --- | --- | --- |
| Multi-Stage | = No | No | No | No |

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 4/4/2016
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 12 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 30.67 ACRES
RUNOFF COEFFICIENT 0.4695
PEAK DISCHARGE 63.13 CFS

BF-4 INFLOW

100 YR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 12 | DISCHARGE (CFS) = 2.6 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 2.6 |
| TIME (MIN) = 36 | DISCHARGE (CFS) = 2.8 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 2.8 |
| TIME (MIN) = 60 | DISCHARGE (CFS) = 3 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 3.1 |
| TIME (MIN) = 84 | DISCHARGE (CFS) = 3.3 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 3.4 |
| TIME (MIN) = 108 | DISCHARGE (CFS) = 3.6 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 3.8 |
| TIME (MIN) = 132 | DISCHARGE (CFS) = 4.1 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 4.3 |
| TIME (MIN) = 156 | DISCHARGE (CFS) = 4.8 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 5 |
| TIME (MIN) = 180 | DISCHARGE (CFS) = 5.8 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 6.3 |
| TIME (MIN) = 204 | DISCHARGE (CFS) = 7.7 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 8.7 |
| TIME (MIN) = 228 | DISCHARGE (CFS) = 12.8 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 19.6 |
| TIME (MIN) = 252 | DISCHARGE (CFS) = 63.13 ← PEAK $Q_{100}$ |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 10.3 |
| TIME (MIN) = 276 | DISCHARGE (CFS) = 6.9 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 5.4 |
| TIME (MIN) = 300 | DISCHARGE (CFS) = 4.5 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 3.9 |
| TIME (MIN) = 324 | DISCHARGE (CFS) = 3.5 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 3.2 |
| TIME (MIN) = 348 | DISCHARGE (CFS) = 2.9 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 2.7 |
| TIME (MIN) = 372 | DISCHARGE (CFS) = 0 |

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

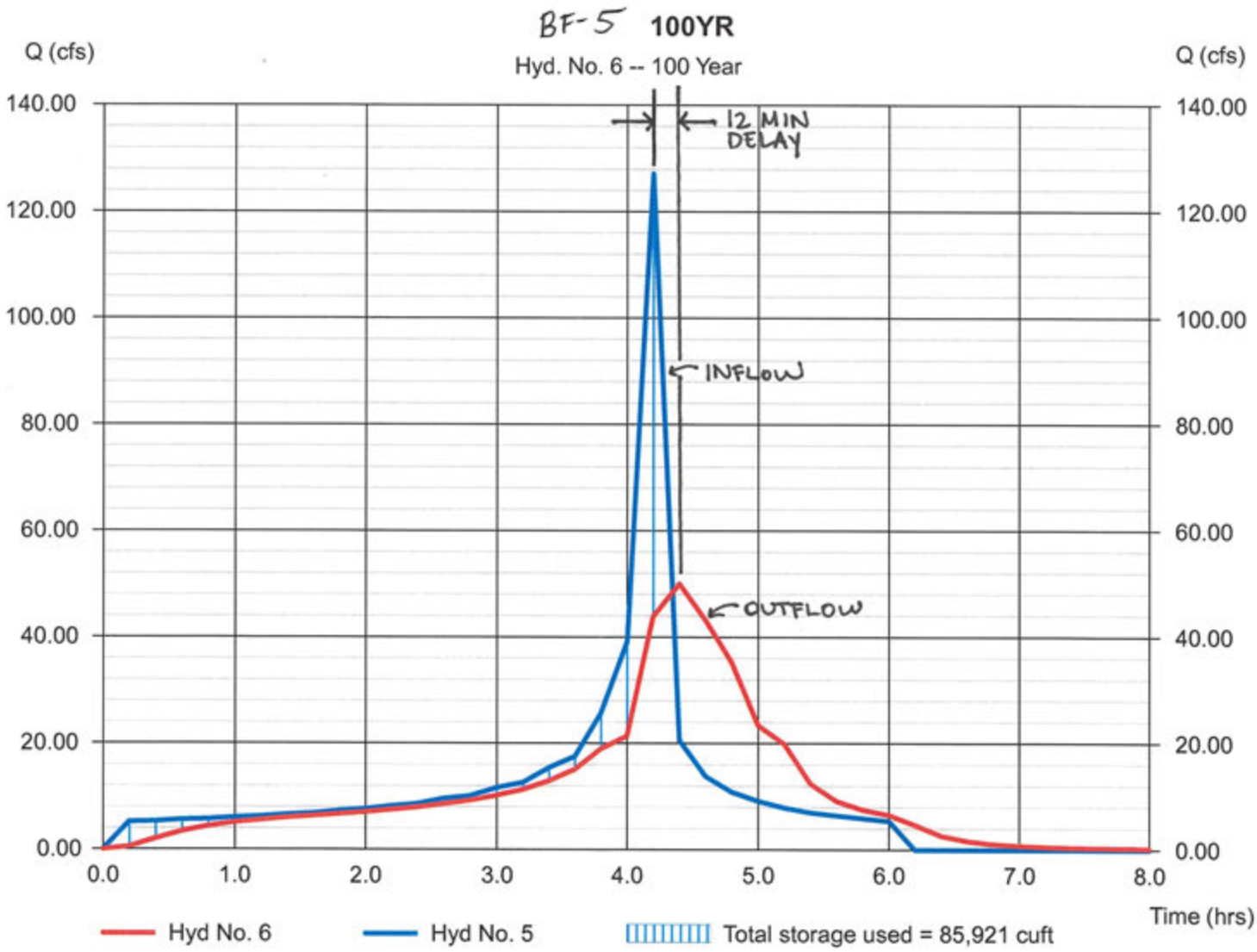
## Hyd. No. 6

BF-5 100YR

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 50.02 cfs ← PEAK Qout |
| Storm frequency | = 100 yrs | Time to peak | = 264 min |
| Time interval | = 12 min | Hyd. volume | = 312,987 cuft |
| Inflow hyd. No. | = 5 - POND A3 INFLOW, 100YR | Max. Elevation | = 548.44 ft |
| Reservoir name | = Pond A3 | Max. Storage | = 85,921 cuft |

Storage Indication method used.

12 MIN (IN) + 12 MIN DELAY = 24 MIN



# Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

## Pond No. 3 - BF-5

## Pond Data

**Contours -** User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 544.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 544.00 | 17,291 | 0 | 0 |
| 1.00 | 545.00 | 19,229 | 18,250 | 18,250 |
| 2.00 | 546.00 | 21,216 | 20,212 | 38,462 |
| 3.00 | 547.00 | 23,254 | 22,225 | 60,687 |
| 4.00 | 548.00 | 25,344 | 24,289 | 84,976 |
| 5.00 | 549.00 | 27,122 | 26,225 | 111,201 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| Rise (in) | = 15.00 | 0.00 | Inactive | Inactive |
| Span (in) | = 54.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 0 | 0 | 0 |
| Invert El. (ft) | = 544.00 | 0.00 | 0.00 | 0.00 |
| Length (ft) | = 0.50 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 0.00 | 0.00 | 0.00 | n/a |
| N-Value | = .013 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | No | No | No |

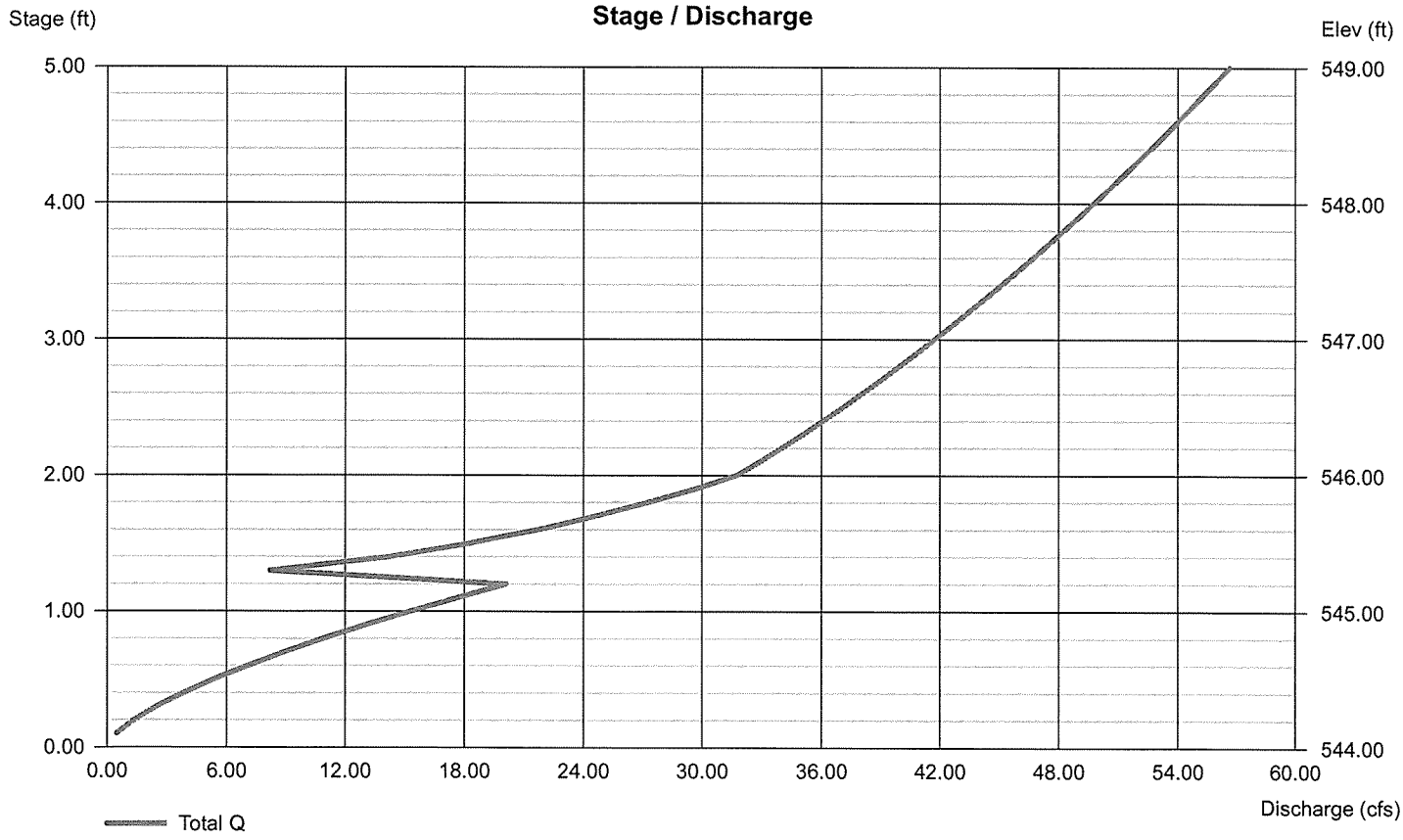
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| Crest Len (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = --- | --- | --- | --- |
| Multi-Stage | = No | No | No | No |

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 4/4/2016
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 12 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 66.13 ACRES
RUNOFF COEFFICIENT 0.4374
PEAK DISCHARGE 127.11 CFS

BF-5 INFLOW
100 YR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 12 | DISCHARGE (CFS) = 5.2 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 5.3 |
| TIME (MIN) = 36 | DISCHARGE (CFS) = 5.6 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 5.7 |
| TIME (MIN) = 60 | DISCHARGE (CFS) = 6 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 6.2 |
| TIME (MIN) = 84 | DISCHARGE (CFS) = 6.6 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 6.8 |
| TIME (MIN) = 108 | DISCHARGE (CFS) = 7.3 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 7.6 |
| TIME (MIN) = 132 | DISCHARGE (CFS) = 8.2 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 8.6 |
| TIME (MIN) = 156 | DISCHARGE (CFS) = 9.6 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 10.1 |
| TIME (MIN) = 180 | DISCHARGE (CFS) = 11.6 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 12.6 |
| TIME (MIN) = 204 | DISCHARGE (CFS) = 15.4 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 17.5 |
| TIME (MIN) = 228 | DISCHARGE (CFS) = 25.7 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 39.1 |
| TIME (MIN) = 252 | DISCHARGE (CFS) = 127.11 ← PEAK $Q_{100}$ |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 20.6 |
| TIME (MIN) = 276 | DISCHARGE (CFS) = 13.8 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 10.8 |
| TIME (MIN) = 300 | DISCHARGE (CFS) = 9.1 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 7.9 |
| TIME (MIN) = 324 | DISCHARGE (CFS) = 7 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 6.4 |
| TIME (MIN) = 348 | DISCHARGE (CFS) = 5.9 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 5.4 |
| TIME (MIN) = 372 | DISCHARGE (CFS) = 0 |

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

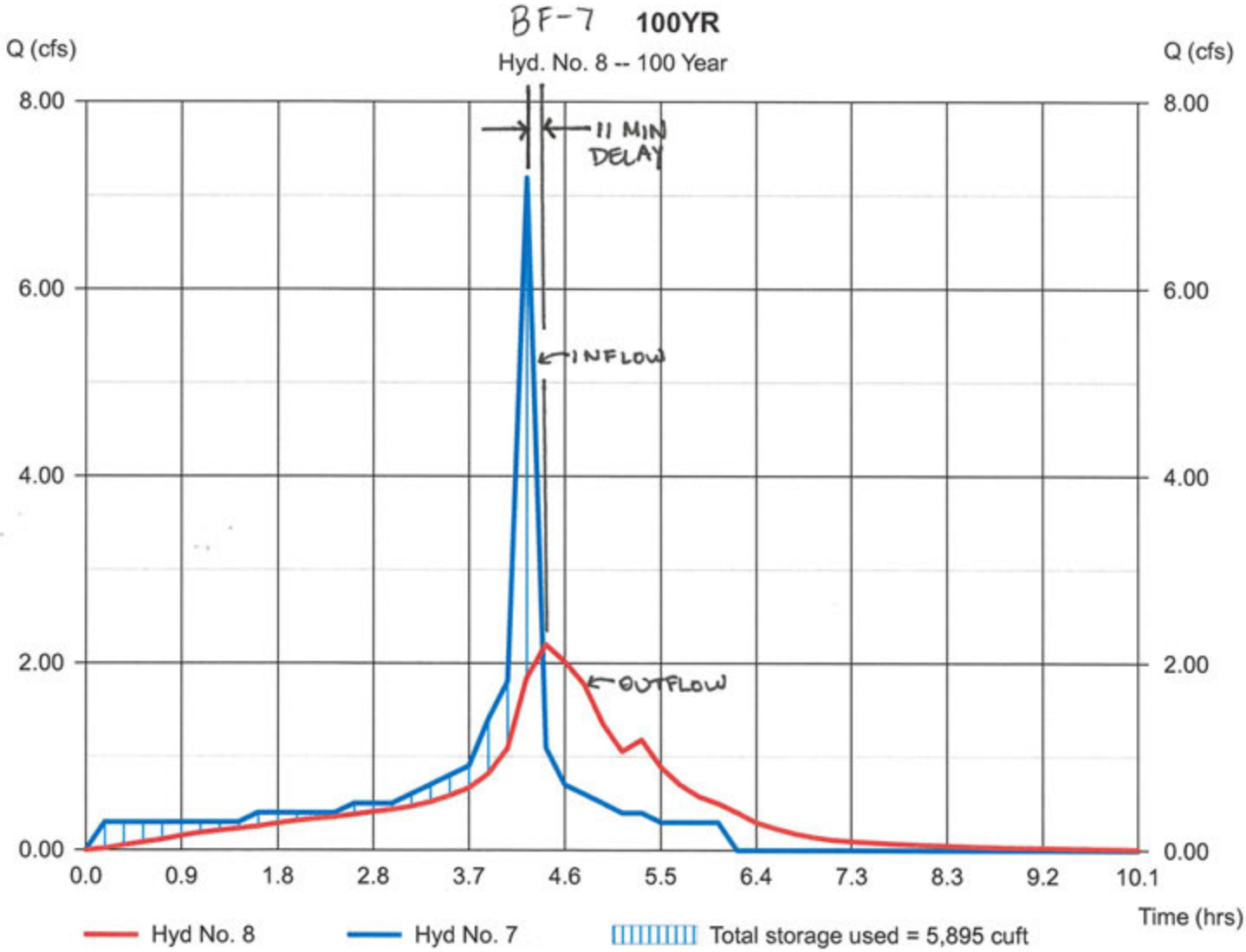
## Hyd. No. 8

BF-7 100YR

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 2.200 cfs ← PEAK Qout |
| Storm frequency | = | 100 yrs | Time to peak | = | 264 min |
| Time interval | = | 11 min | Hyd. volume | = | 15,961 cuft |
| Inflow hyd. No. | = | 7 - POND A4 INFLOW, 100YR | Max. Elevation | = | 564.14 ft |
| Reservoir name | = | Pond A4 | Max. Storage | = | 5,895 cuft |

Storage Indication method used.

11 MIN (IN) + 11 MIN DELAY = 22 MIN



# Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

## Pond No. 4 - BF-7

### Pond Data

**Contours -** User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 563.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 563.00 | 4,866 | 0 | 0 |
| 1.00 | 564.00 | 5,854 | 5,352 | 5,352 |
| 2.00 | 565.00 | 6,876 | 6,358 | 11,709 |
| 3.00 | 566.00 | 7,955 | 7,408 | 19,118 |
| 4.00 | 567.00 | 9,096 | 8,518 | 27,636 |
| 5.00 | 568.00 | 10,005 | 9,546 | 37,182 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| Rise (in) | = 6.00 | 0.00 | Inactive | Inactive |
| Span (in) | = 12.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 0 | 0 | 0 |
| Invert El. (ft) | = 563.00 | 0.00 | 0.00 | 0.00 |
| Length (ft) | = 0.50 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 0.00 | 0.00 | 0.00 | n/a |
| N-Value | = .013 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | No | No | No |

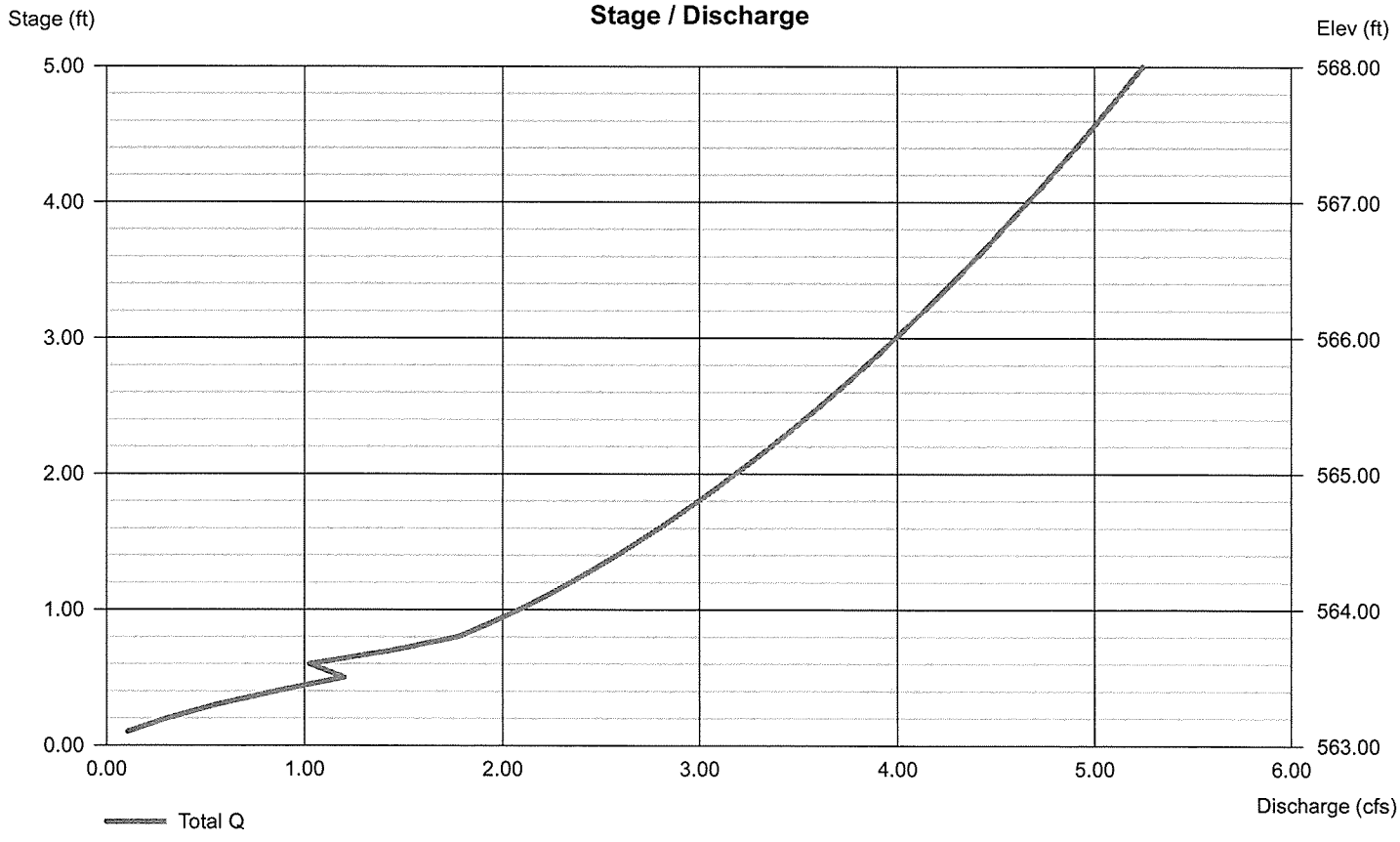
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| Crest Len (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = --- | --- | --- | --- |
| Multi-Stage | = No | No | No | No |

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).




5-16

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 4/4/2016
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 11 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 3.11 ACRES
RUNOFF COEFFICIENT 0.4737
PEAK DISCHARGE 7.19 CFS

BF - 7 INFLOW

100 YR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 11 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 22 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 33 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 44 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 55 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 66 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 77 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 88 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 99 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 110 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 121 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 132 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 143 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 154 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 165 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 176 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 187 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 198 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 209 | DISCHARGE (CFS) = 0.8 |
| TIME (MIN) = 220 | DISCHARGE (CFS) = 0.9 |
| TIME (MIN) = 231 | DISCHARGE (CFS) = 1.4 |
| TIME (MIN) = 242 | DISCHARGE (CFS) = 1.8 |
| TIME (MIN) = 253 | DISCHARGE (CFS) = 7.19 ← PEAK $Q_{100}$ |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 1.1 |
| TIME (MIN) = 275 | DISCHARGE (CFS) = 0.7 |
| TIME (MIN) = 286 | DISCHARGE (CFS) = 0.6 |
| TIME (MIN) = 297 | DISCHARGE (CFS) = 0.5 |
| TIME (MIN) = 308 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 319 | DISCHARGE (CFS) = 0.4 |
| TIME (MIN) = 330 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 341 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 352 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 363 | DISCHARGE (CFS) = 0.3 |
| TIME (MIN) = 374 | DISCHARGE (CFS) = 0 |

# SECTION 5-2B

## BASIN B, PROPOSED DETENTION

On-lot runoff generated within Basin "B" will be detained within on-lot detention facilities in the ultimate condition. Discharge from those detention facilities, along with undetained runoff from the public right-of-way, will be collected within public storm drain systems and conveyed to one of two regional detention facilities (see Exhibit "C"). Design specifications for the detention facilities are calculated within the Storm Water Quality Management Plan for **Sunroad Otay 250**. Routing calculations for each detention facility follow within this section.

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Tuesday, Apr 5, 2016

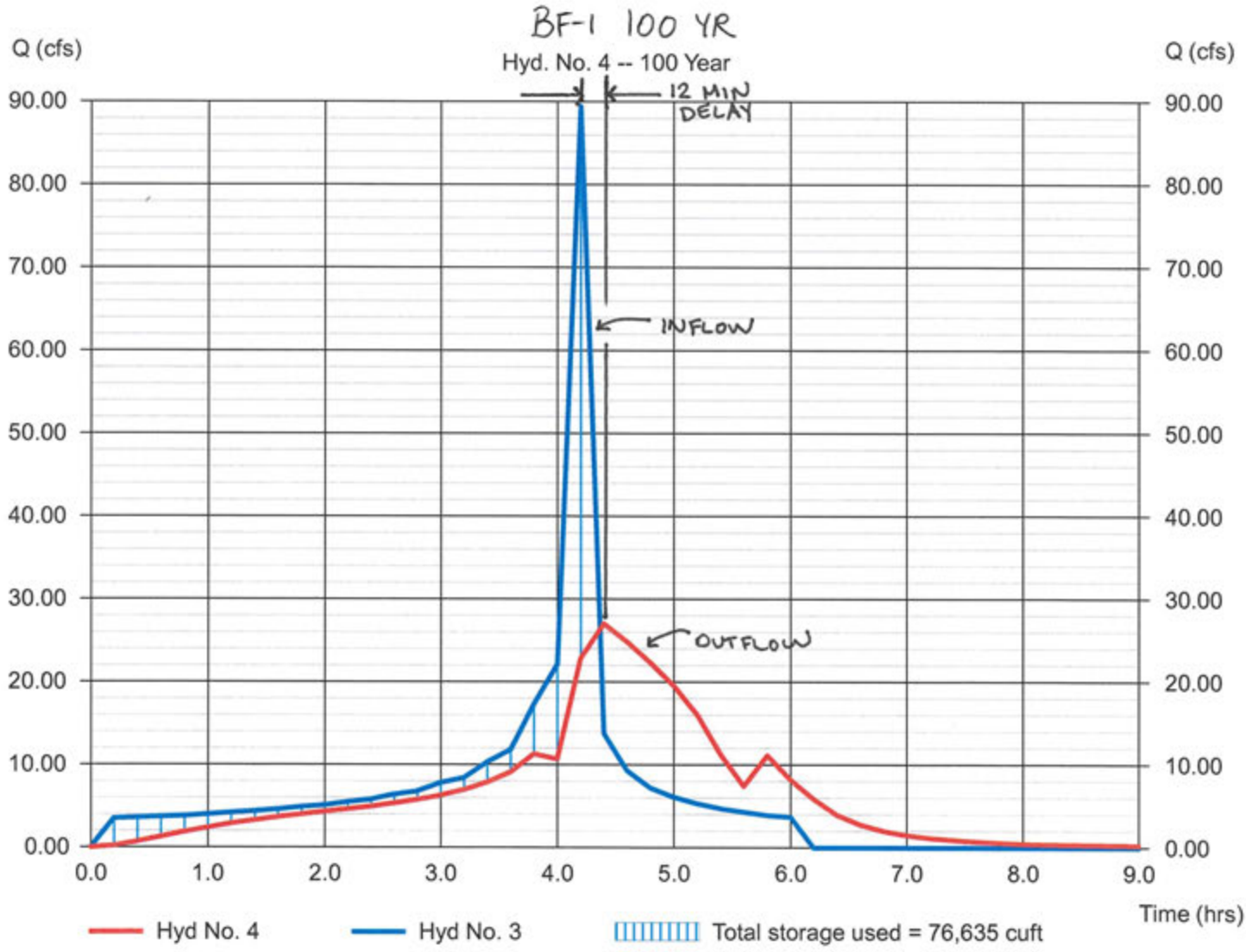
## Hyd. No. 4

BF-1 100YR

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 27.01 cfs ← PEAK Qout |
| Storm frequency | = 100 yrs | Time to peak | = 264 min |
| Time interval | = 12 min | Hyd. volume | = 210,047 cuft |
| Inflow hyd. No. | = 3 - Basin B2 | Max. Elevation | = 528.96 ft |
| Reservoir name | = Pond 2 | Max. Storage | = 76,635 cuft |

Storage Indication method used.

12 MIN (IN) + 12 MIN DELAY = 24 MIN



# Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Tuesday, Apr 5, 2016

## Pond No. 2 - BF-1

### Pond Data

**Contours -** User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 526.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 526.00 | 25,455 | 0 | 0 |
| 1.00 | 527.00 | 26,788 | 26,116 | 26,116 |
| 2.00 | 528.00 | 28,146 | 27,461 | 53,578 |
| 3.00 | 529.00 | 29,529 | 28,832 | 82,409 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| Rise (in) | = 11.00 | 0.00 | 0.00 | 0.00 |
| Span (in) | = 48.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 1 | 0 | 0 |
| Invert El. (ft) | = 526.00 | 0.00 | 0.00 | 0.00 |
| Length (ft) | = 0.50 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 0.00 | 0.00 | 0.00 | n/a |
| N-Value | = .013 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | No | No | No |

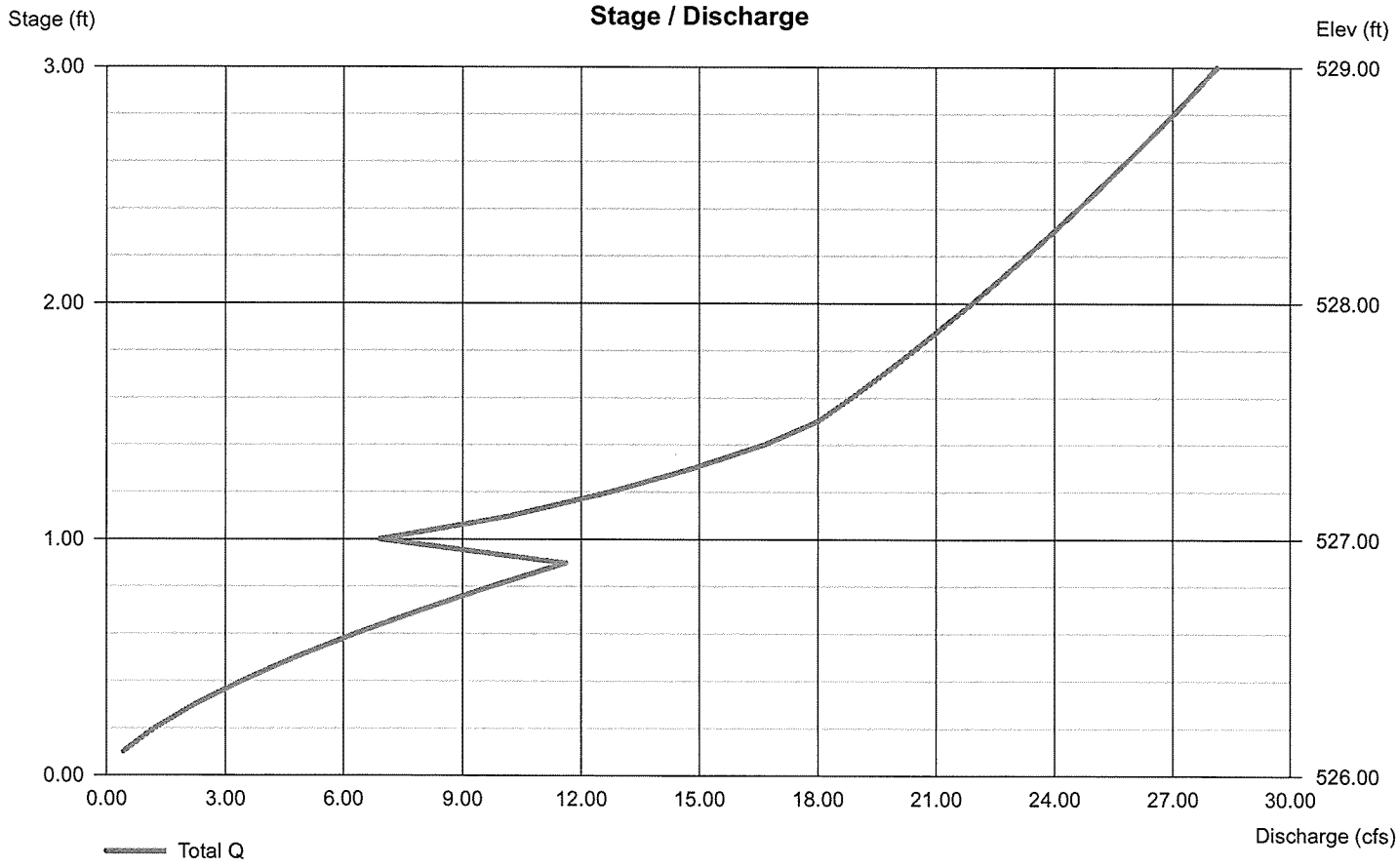
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| Crest Len (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = --- | --- | --- | --- |
| Multi-Stage | = No | No | No | No |

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 4/5/2016
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 12 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 46.8 ACRES
RUNOFF COEFFICIENT 0.41456
PEAK DISCHARGE 89.44 CFS

BF-1 INFLOW

100 YR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 12 | DISCHARGE (CFS) = 3.5 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 3.6 |
| TIME (MIN) = 36 | DISCHARGE (CFS) = 3.7 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 3.8 |
| TIME (MIN) = 60 | DISCHARGE (CFS) = 4 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 4.2 |
| TIME (MIN) = 84 | DISCHARGE (CFS) = 4.4 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 4.6 |
| TIME (MIN) = 108 | DISCHARGE (CFS) = 4.9 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 5.1 |
| TIME (MIN) = 132 | DISCHARGE (CFS) = 5.5 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 5.8 |
| TIME (MIN) = 156 | DISCHARGE (CFS) = 6.4 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 6.8 |
| TIME (MIN) = 180 | DISCHARGE (CFS) = 7.8 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 8.4 |
| TIME (MIN) = 204 | DISCHARGE (CFS) = 10.3 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 11.8 |
| TIME (MIN) = 228 | DISCHARGE (CFS) = 17.3 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 22.1 |
| TIME (MIN) = 252 | DISCHARGE (CFS) = 89.44 ← PEAK $Q_{100}$ |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 13.8 |
| TIME (MIN) = 276 | DISCHARGE (CFS) = 9.3 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 7.2 |
| TIME (MIN) = 300 | DISCHARGE (CFS) = 6.1 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 5.3 |
| TIME (MIN) = 324 | DISCHARGE (CFS) = 4.7 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 4.3 |
| TIME (MIN) = 348 | DISCHARGE (CFS) = 3.9 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 3.7 |
| TIME (MIN) = 372 | DISCHARGE (CFS) = 0 |

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Tuesday, Apr 5, 2016

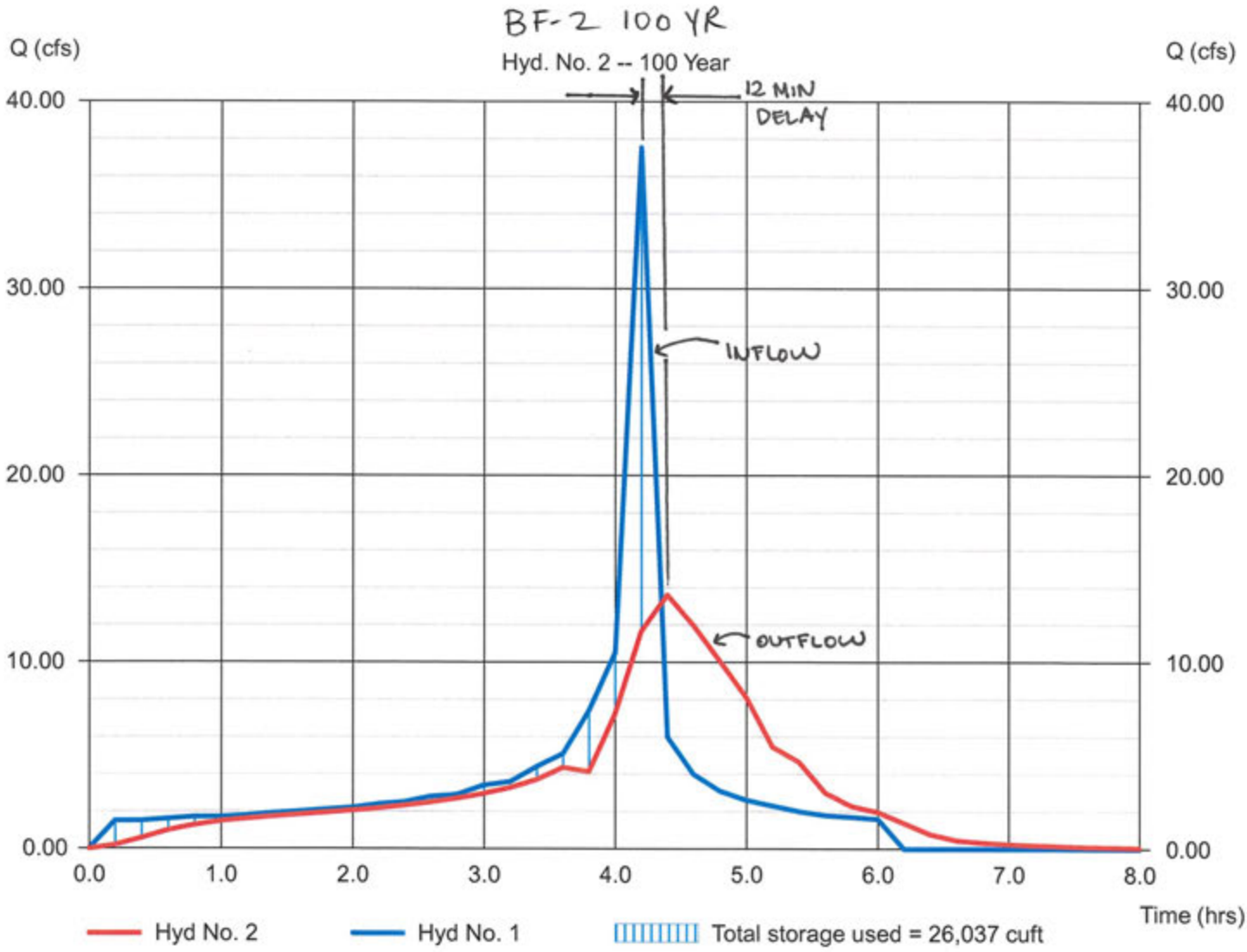
## Hyd. No. 2

BF-2 100 YR

| | | | |
|---|---|---|---|
| Hydrograph type | = Reservoir | Peak discharge | = 13.60 cfs ← PEAK QOUT |
| Storm frequency | = 100 yrs | Time to peak | = 264 min |
| Time interval | = 12 min | Hyd. volume | = 90,465 cuft |
| Inflow hyd. No. | = 1 - BASIN B1 | Max. Elevation | = 586.46 ft |
| Reservoir name | = Pond 1 | Max. Storage | = 26,037 cuft |

Storage Indication method used.

12 MIN (IN) + 12 MIN DELAY = 24 MIN



# Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Tuesday, Apr 5, 2016

## Pond No. 1 - BF-2

### Pond Data

**Contours -** User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 584.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 584.00 | 10,536 | 0 | 0 |
| 1.00 | 585.00 | 11,447 | 10,987 | 10,987 |
| 2.00 | 586.00 | 12,383 | 11,911 | 22,898 |
| 3.00 | 587.00 | 13,345 | 12,860 | 35,758 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| Rise (in) | = 6.00 | 0.00 | 0.00 | 0.00 |
| Span (in) | = 48.00 | 0.00 | 0.00 | 0.00 |
| No. Barrels | = 1 | 0 | 0 | 0 |
| Invert El. (ft) | = 584.00 | 0.00 | 0.00 | 0.00 |
| Length (ft) | = 0.50 | 0.00 | 0.00 | 0.00 |
| Slope (%) | = 0.00 | 0.00 | 0.00 | n/a |
| N-Value | = .013 | .013 | .013 | n/a |
| Orifice Coeff. | = 0.60 | 0.60 | 0.60 | 0.60 |
| Multi-Stage | = n/a | No | No | No |

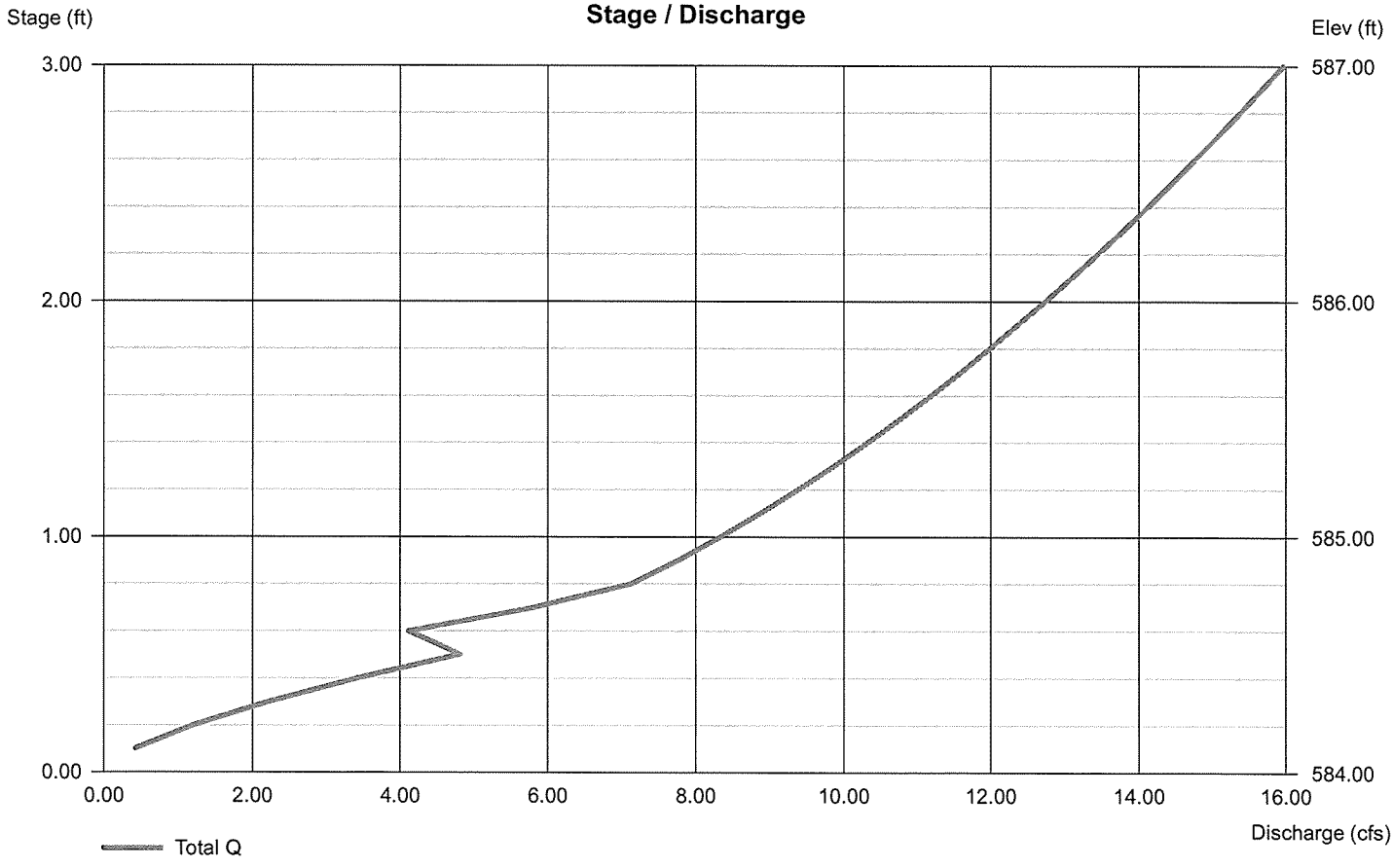
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| Crest Len (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Crest El. (ft) | = 0.00 | 0.00 | 0.00 | 0.00 |
| Weir Coeff. | = 3.33 | 3.33 | 3.33 | 3.33 |
| Weir Type | = --- | --- | --- | --- |
| Multi-Stage | = No | No | No | No |

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 4/4/2016
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 12 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 19.36 ACRES
RUNOFF COEFFICIENT 0.432
PEAK DISCHARGE 37.55 CFS

BF-2 INFLOW

100 YR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 12 | DISCHARGE (CFS) = 1.5 |
| TIME (MIN) = 24 | DISCHARGE (CFS) = 1.5 |
| TIME (MIN) = 36 | DISCHARGE (CFS) = 1.6 |
| TIME (MIN) = 48 | DISCHARGE (CFS) = 1.7 |
| TIME (MIN) = 60 | DISCHARGE (CFS) = 1.7 |
| TIME (MIN) = 72 | DISCHARGE (CFS) = 1.8 |
| TIME (MIN) = 84 | DISCHARGE (CFS) = 1.9 |
| TIME (MIN) = 96 | DISCHARGE (CFS) = 2 |
| TIME (MIN) = 108 | DISCHARGE (CFS) = 2.1 |
| TIME (MIN) = 120 | DISCHARGE (CFS) = 2.2 |
| TIME (MIN) = 132 | DISCHARGE (CFS) = 2.4 |
| TIME (MIN) = 144 | DISCHARGE (CFS) = 2.5 |
| TIME (MIN) = 156 | DISCHARGE (CFS) = 2.8 |
| TIME (MIN) = 168 | DISCHARGE (CFS) = 2.9 |
| TIME (MIN) = 180 | DISCHARGE (CFS) = 3.4 |
| TIME (MIN) = 192 | DISCHARGE (CFS) = 3.6 |
| TIME (MIN) = 204 | DISCHARGE (CFS) = 4.4 |
| TIME (MIN) = 216 | DISCHARGE (CFS) = 5.1 |
| TIME (MIN) = 228 | DISCHARGE (CFS) = 7.4 |
| TIME (MIN) = 240 | DISCHARGE (CFS) = 10.5 |
| TIME (MIN) = 252 | DISCHARGE (CFS) = 37.55 ← PEAK $Q_{100}$ |
| TIME (MIN) = 264 | DISCHARGE (CFS) = 6 |
| TIME (MIN) = 276 | DISCHARGE (CFS) = 4 |
| TIME (MIN) = 288 | DISCHARGE (CFS) = 3.1 |
| TIME (MIN) = 300 | DISCHARGE (CFS) = 2.6 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 2.3 |
| TIME (MIN) = 324 | DISCHARGE (CFS) = 2 |
| TIME (MIN) = 336 | DISCHARGE (CFS) = 1.8 |
| TIME (MIN) = 348 | DISCHARGE (CFS) = 1.7 |
| TIME (MIN) = 360 | DISCHARGE (CFS) = 1.6 |
| TIME (MIN) = 372 | DISCHARGE (CFS) = 0 |

# SECTION 5-2C

## BASIN C, PROPOSED DETENTION

On-lot runoff generated within Basin "C" will be detained within on-lot detention facilities in the ultimate condition. Discharge from those detention facilities, along with undetained runoff from the public right-of-way, will be collected within public storm drain systems and conveyed to a regional detention facility (see Exhibit "C"). Design specifications for the detention facilities are calculated within the Storm Water Quality Management Plan for **Sunroad Otay 250**. Routing calculations for each detention facility follow within this section.

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

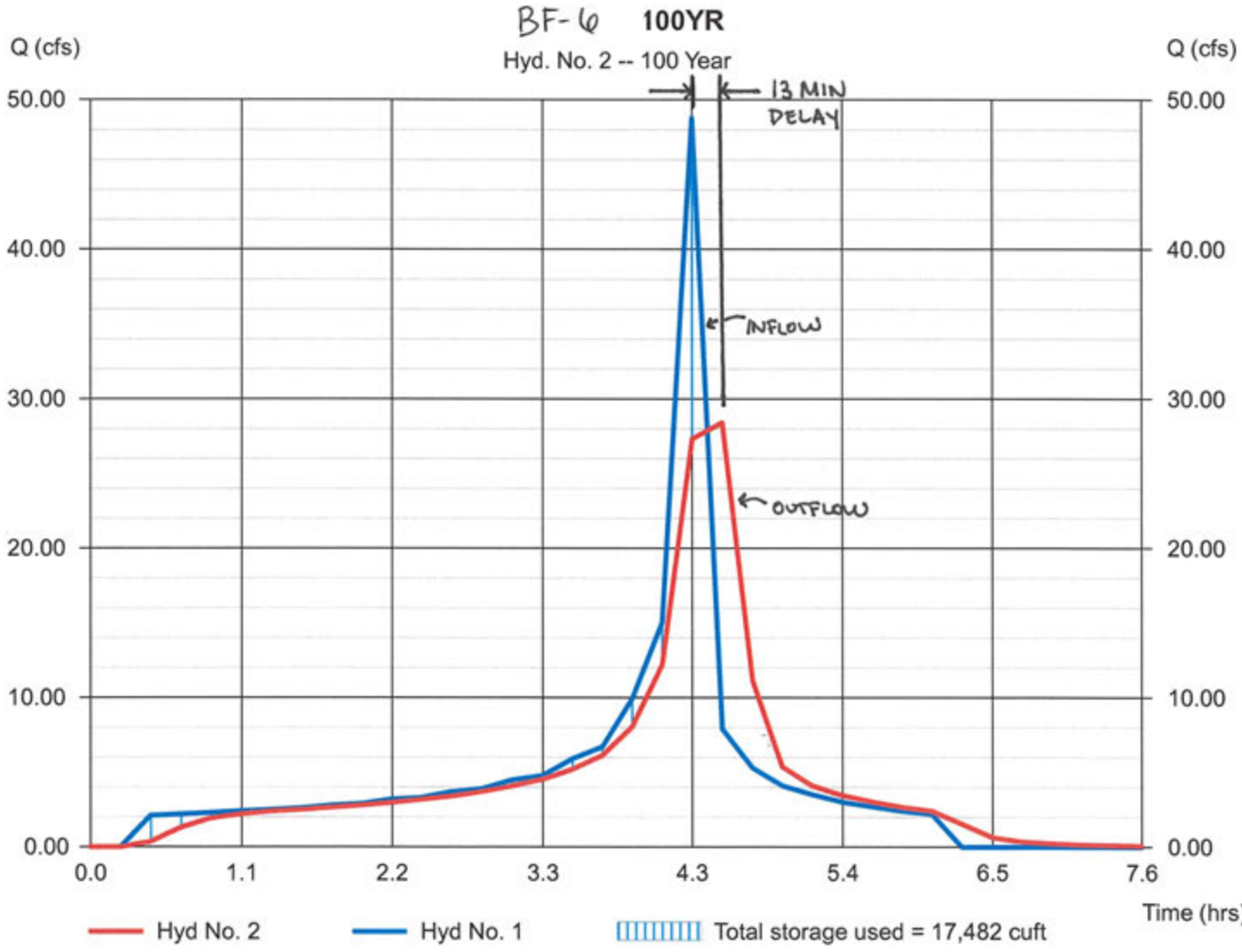
## Hyd. No. 2

BF-6 100YR

| | | | | | |
|---|---|---|---|---|---|
| Hydrograph type | = | Reservoir | Peak discharge | = | 28.41 cfs ← PEAK QOUT |
| Storm frequency | = | 100 yrs | Time to peak | = | 273 min |
| Time interval | = | 13 min | Hyd. volume | = | 125,259 cuft |
| Inflow hyd. No. | = | 1 - POND C1 INFLOW, 100YR | Max. Elevation | = | 536.84 ft |
| Reservoir name | = | Pond C1 | Max. Storage | = | 17,482 cuft |

Storage Indication method used.

13 MIN (IN) + 13 MIN DELAY = 26 MIN



# Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Monday, Apr 4, 2016

## Pond No. 1 - BF-6

### Pond Data

**Contours -** User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 534.00 ft

### Stage / Storage Table

| Stage (ft) | Elevation (ft) | Contour area (sqft) | Incr. Storage (cuft) | Total storage (cuft) |
|---|---|---|---|---|
| 0.00 | 534.00 | 7,819 | 0 | 0 |
| 1.00 | 535.00 | 8,616 | 8,213 | 8,213 |
| 2.00 | 536.00 | 9,438 | 9,023 | 17,236 |
| 3.00 | 537.00 | 10,285 | 9,857 | 27,094 |
| 4.00 | 538.00 | 11,157 | 10,717 | 37,811 |
| 5.00 | 539.00 | 12,055 | 11,602 | 49,413 |
| 6.00 | 540.00 | 12,977 | 12,512 | 61,925 |

### Culvert / Orifice Structures

| | [A] | [B] | [C] | [PrfRsr] |
|---|---|---|---|---|
| **Rise (in)** | = 18.00 | 0.00 | Inactive | Inactive |
| **Span (in)** | = 48.00 | 0.00 | 0.00 | 0.00 |
| **No. Barrels** | = 1 | 0 | 0 | 0 |
| **Invert El. (ft)** | = 534.00 | 0.00 | 0.00 | 0.00 |
| **Length (ft)** | = 0.50 | 0.00 | 0.00 | 0.00 |
| **Slope (%)** | = 0.00 | 0.00 | 0.00 | n/a |
| **N-Value** | = .013 | .013 | .013 | n/a |
| **Orifice Coeff.** | = 0.60 | 0.60 | 0.60 | 0.60 |
| **Multi-Stage** | = n/a | No | No | No |

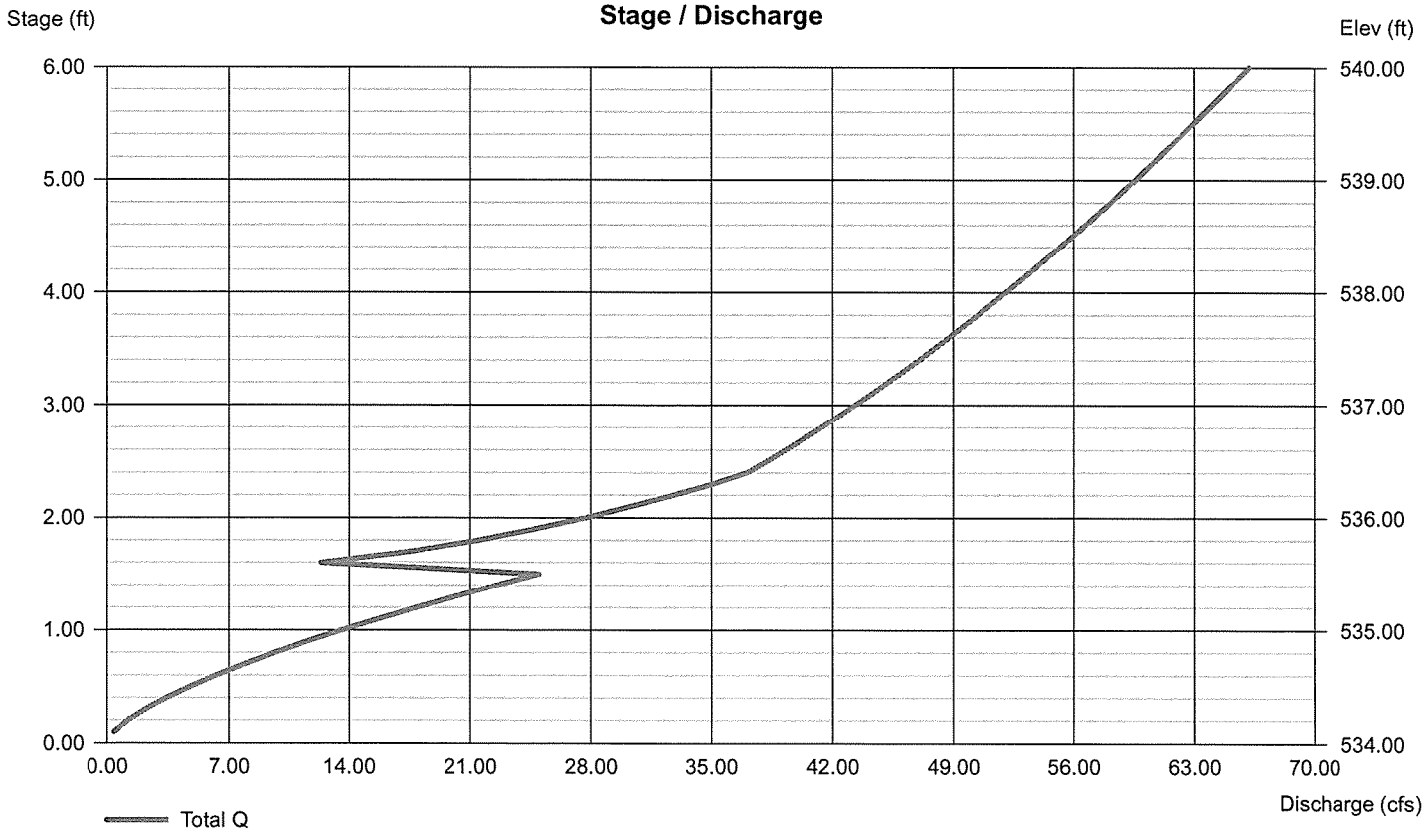
### Weir Structures

| | [A] | [B] | [C] | [D] |
|---|---|---|---|---|
| **Crest Len (ft)** | = 0.00 | 0.00 | 0.00 | 0.00 |
| **Crest El. (ft)** | = 0.00 | 0.00 | 0.00 | 0.00 |
| **Weir Coeff.** | = 3.33 | 3.33 | 3.33 | 3.33 |
| **Weir Type** | = --- | --- | --- | --- |
| **Multi-Stage** | = No | No | No | No |

**Exfil.(in/hr)** = 0.000 (by Wet area)

**TW Elev. (ft)** = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 4/4/2016
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 13 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 24.18 ACRES
RUNOFF COEFFICIENT 0.4833
PEAK DISCHARGE 48.79 CFS

BF-6 INFLOW

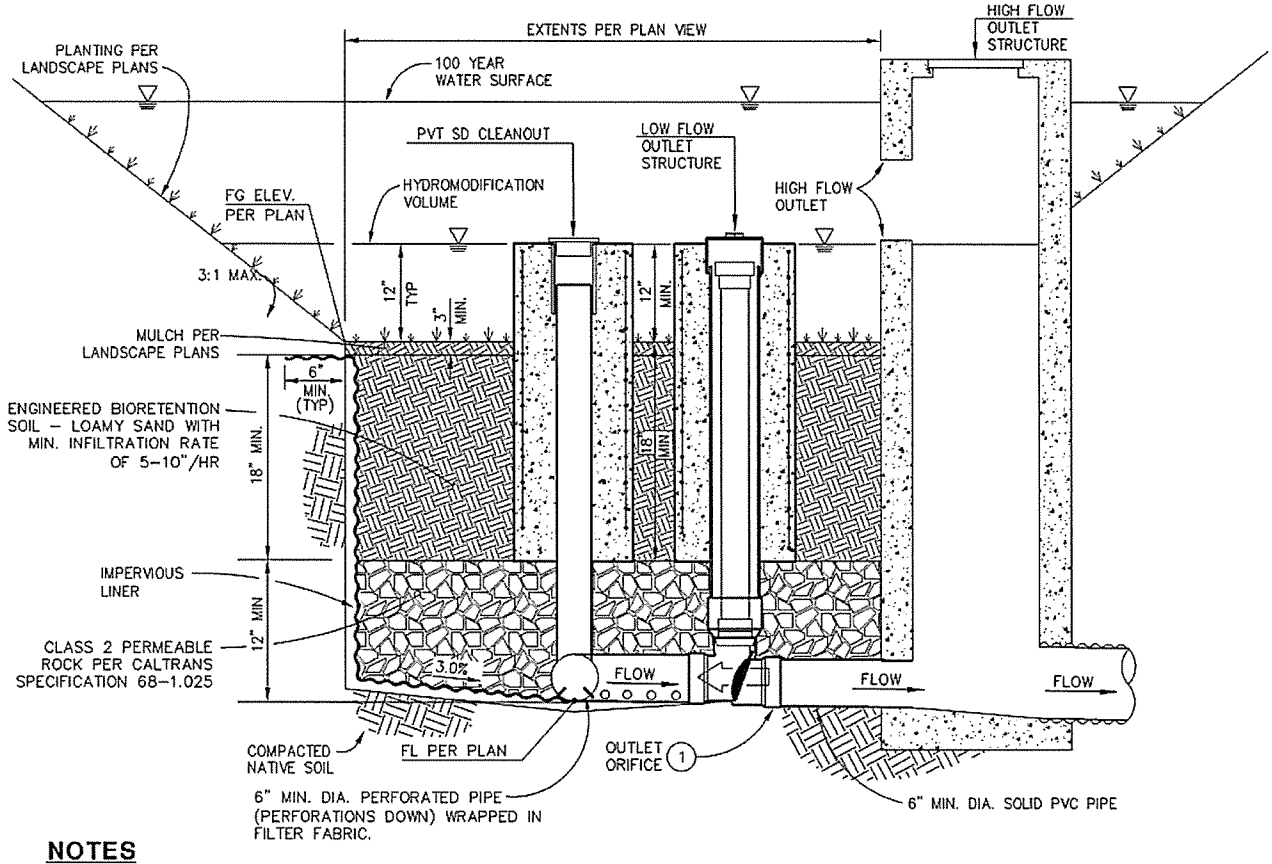
100 YR STORM

| | |
|---|---|
| TIME (MIN) = 0 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 13 | DISCHARGE (CFS) = 0 |
| TIME (MIN) = 26 | DISCHARGE (CFS) = 2.1 |
| TIME (MIN) = 39 | DISCHARGE (CFS) = 2.2 |
| TIME (MIN) = 52 | DISCHARGE (CFS) = 2.3 |
| TIME (MIN) = 65 | DISCHARGE (CFS) = 2.4 |
| TIME (MIN) = 78 | DISCHARGE (CFS) = 2.5 |
| TIME (MIN) = 91 | DISCHARGE (CFS) = 2.6 |
| TIME (MIN) = 104 | DISCHARGE (CFS) = 2.8 |
| TIME (MIN) = 117 | DISCHARGE (CFS) = 2.9 |
| TIME (MIN) = 130 | DISCHARGE (CFS) = 3.2 |
| TIME (MIN) = 143 | DISCHARGE (CFS) = 3.3 |
| TIME (MIN) = 156 | DISCHARGE (CFS) = 3.7 |
| TIME (MIN) = 169 | DISCHARGE (CFS) = 3.9 |
| TIME (MIN) = 182 | DISCHARGE (CFS) = 4.5 |
| TIME (MIN) = 195 | DISCHARGE (CFS) = 4.8 |
| TIME (MIN) = 208 | DISCHARGE (CFS) = 5.9 |
| TIME (MIN) = 221 | DISCHARGE (CFS) = 6.7 |
| TIME (MIN) = 234 | DISCHARGE (CFS) = 9.9 |
| TIME (MIN) = 247 | DISCHARGE (CFS) = 15 |
| TIME (MIN) = 260 | DISCHARGE (CFS) = 48.79 ← PEAK $Q_{100}$ |
| TIME (MIN) = 273 | DISCHARGE (CFS) = 7.9 |
| TIME (MIN) = 286 | DISCHARGE (CFS) = 5.3 |
| TIME (MIN) = 299 | DISCHARGE (CFS) = 4.1 |
| TIME (MIN) = 312 | DISCHARGE (CFS) = 3.5 |
| TIME (MIN) = 325 | DISCHARGE (CFS) = 3 |
| TIME (MIN) = 338 | DISCHARGE (CFS) = 2.7 |
| TIME (MIN) = 351 | DISCHARGE (CFS) = 2.4 |
| TIME (MIN) = 364 | DISCHARGE (CFS) = 2.2 |
| TIME (MIN) = 377 | DISCHARGE (CFS) = 0 |

# SECTION 5-3

## DUAL PURPOSE BIOFILTRATION SIZING CONFIRMATION

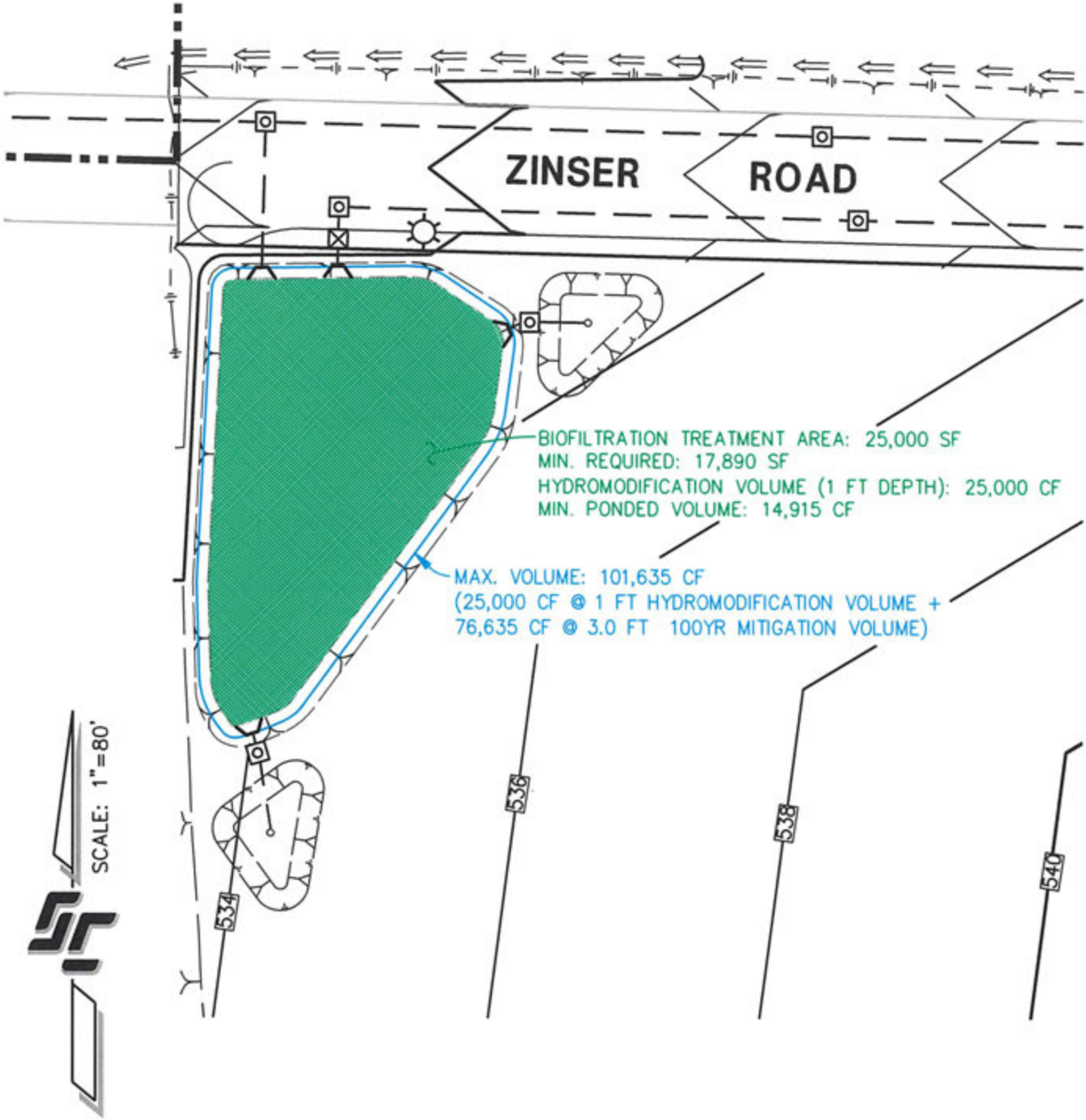
Sunroad Otay 250 proposes to use dual purpose biofiltration/ detention basins to provide pollutant control, hydromodification, and 100yr peak mitigation. It is anticipated that the basins will be constructed with a total ponded depth of 3-4 feet. The bottom of the basin will be constructed as a biofiltration planter. The facility will be designed to provide hydromodification storage within the biofiltration media and on the surface. Ponded depth for hydromodification purposes, storms up to a 10 year design storm, will be approximately 12". A hydromodification control structure, at the downstream end of the biofiltration underdrain system, will restrict low flows. Flows greater than those generated by a 10 year storm will enter the high flow outlet, a weir set above the hydromodification ponded depth. The high flow outlet will be sized for the peak design storm to ensure that post-project peak discharge rates do not exceed pre-project rates for storms up to a 100 year design storm. See Figure A below for a typical section of a dual purpose biofiltration facility. The calculations and exhibits within this section demonstrate that the basin sizes shown on the preliminary grading plan conservatively address both hydromodification and peak detention needs. It is anticipated that continuous simulation modeling will be used at final engineering to minimize treatment area and reduce ponded depths.




**NOTES**

(1) 6" PVC RECTORSEAL CLEAN CHECK EXTENDABLE BACKWATER VALVE, OR EQUIVALENT (HYDROMODIFICATION OUTLET CONTROL STRUCTURE), WITH LOW FLOW ORIFICE.

**Figure A**
**Typical Section of a Biofiltration/Detention Basin**

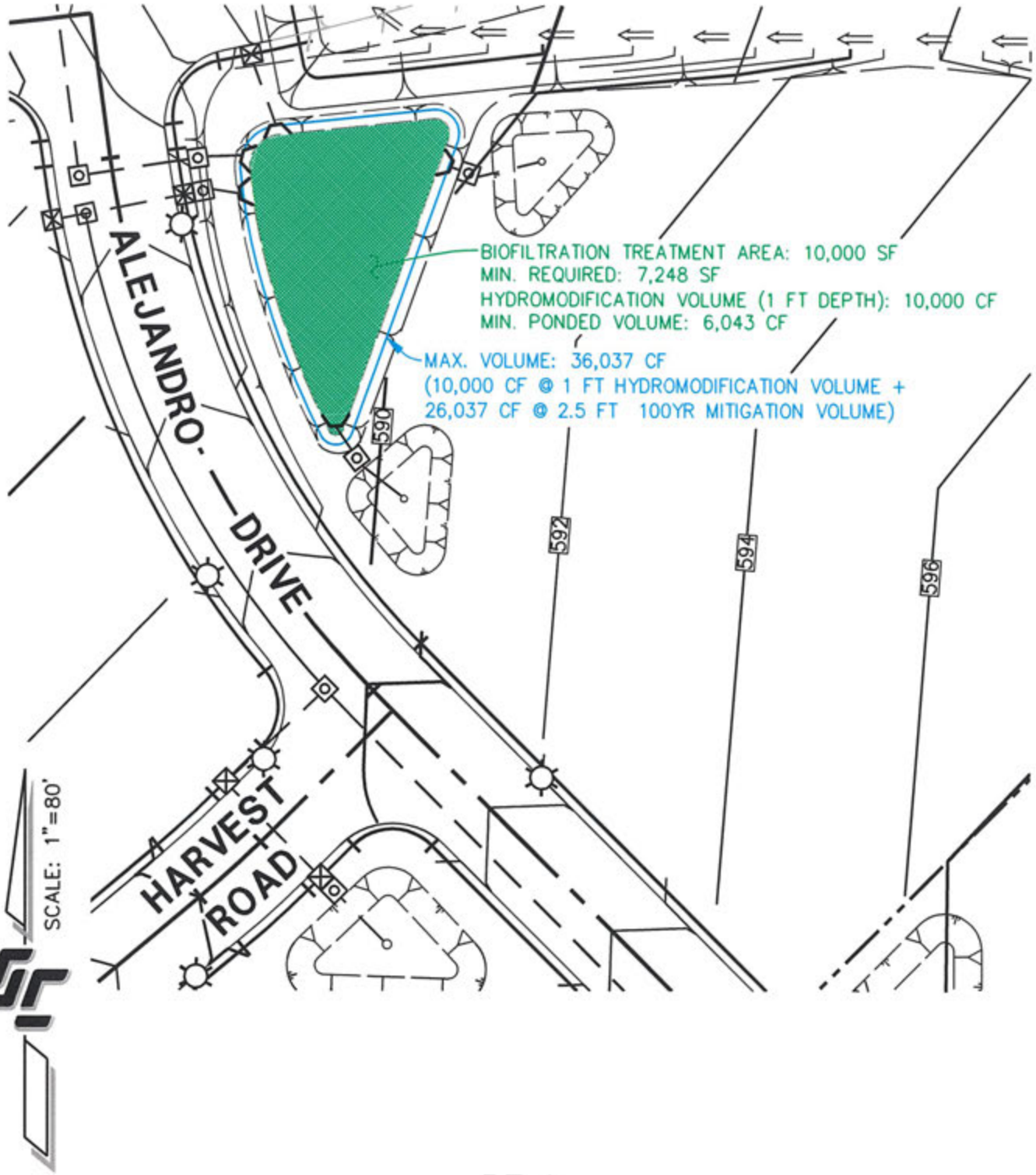



# BF-1
# DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'

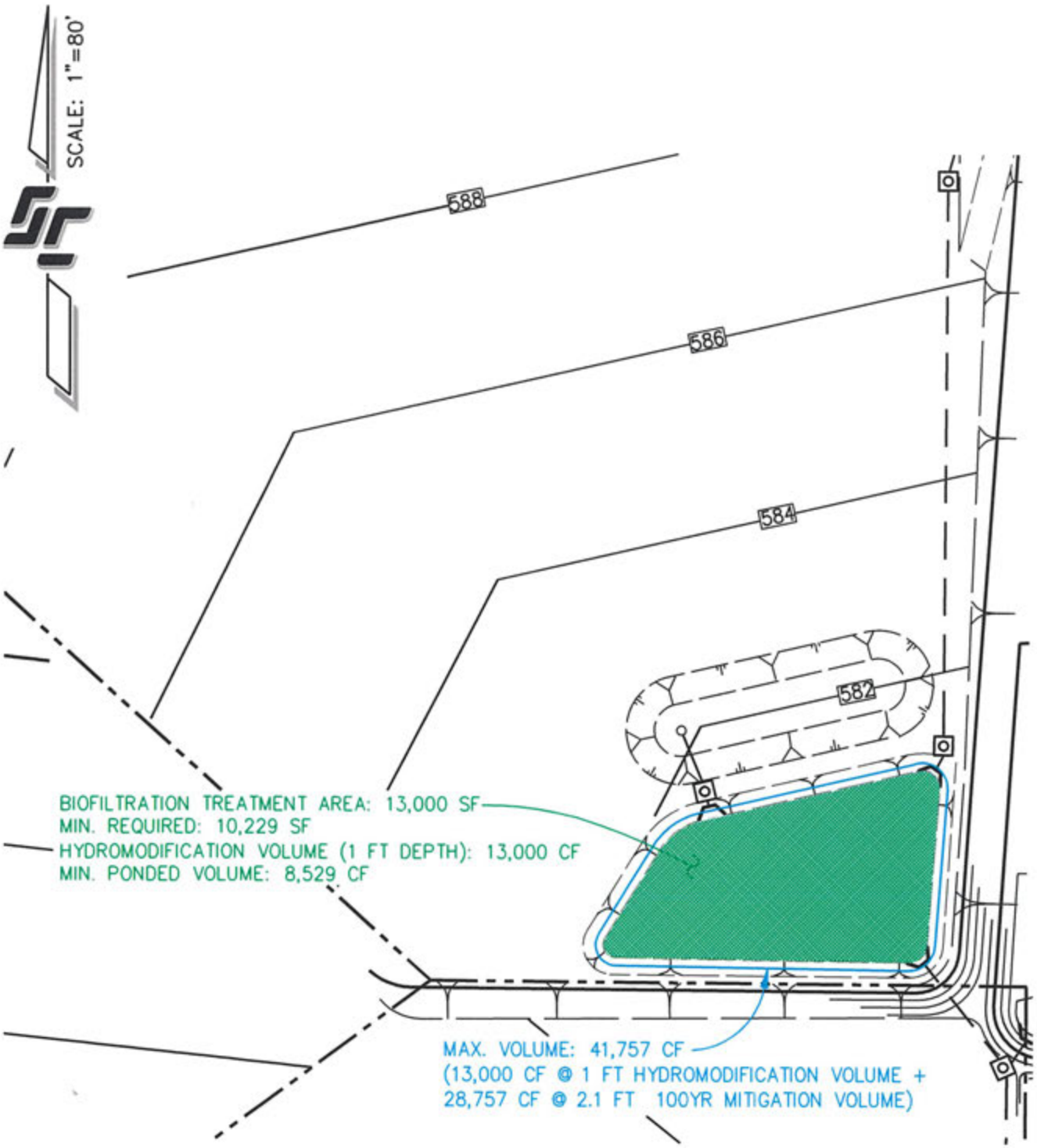
5-30

**SHEET 1 OF 7**



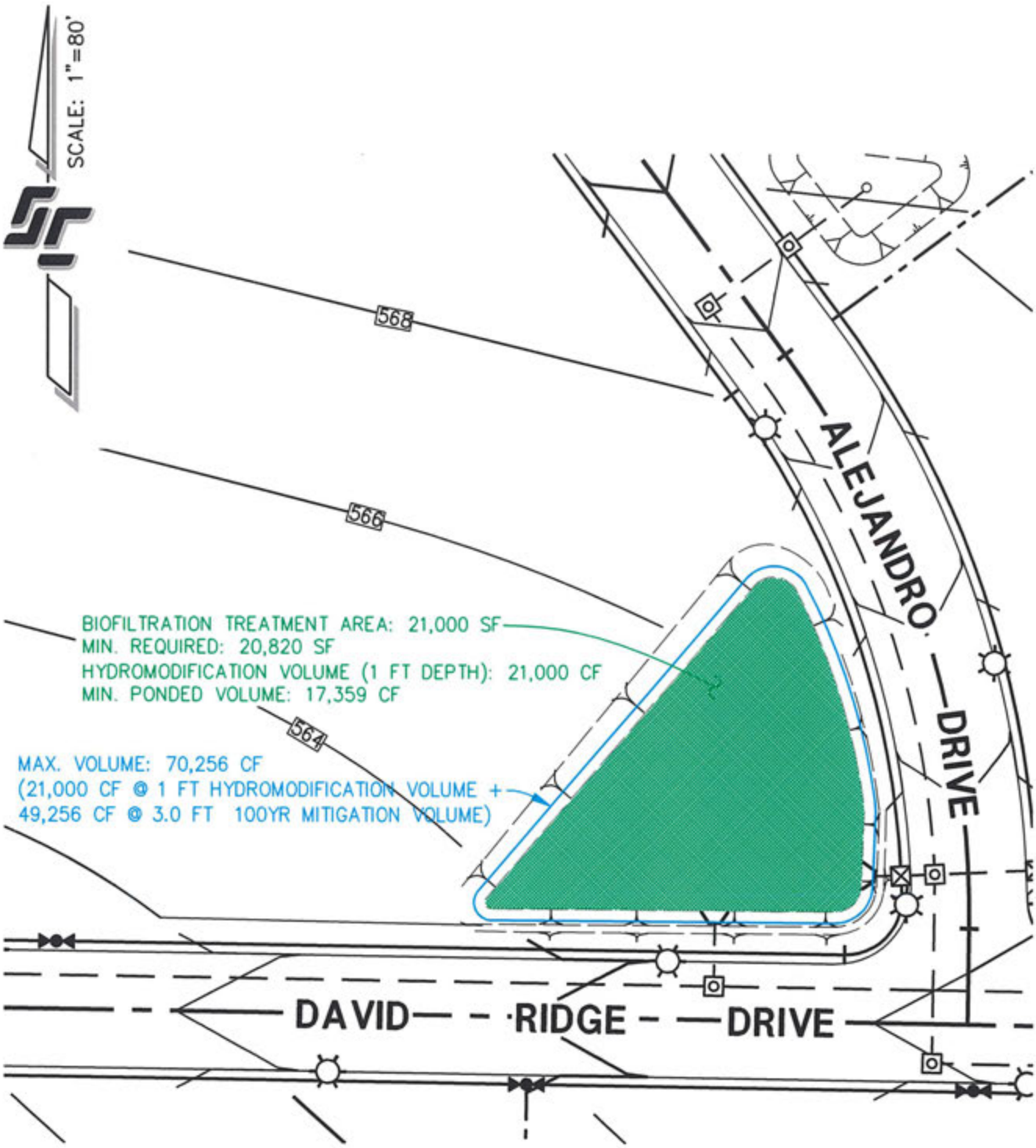

# BF-2
## DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'



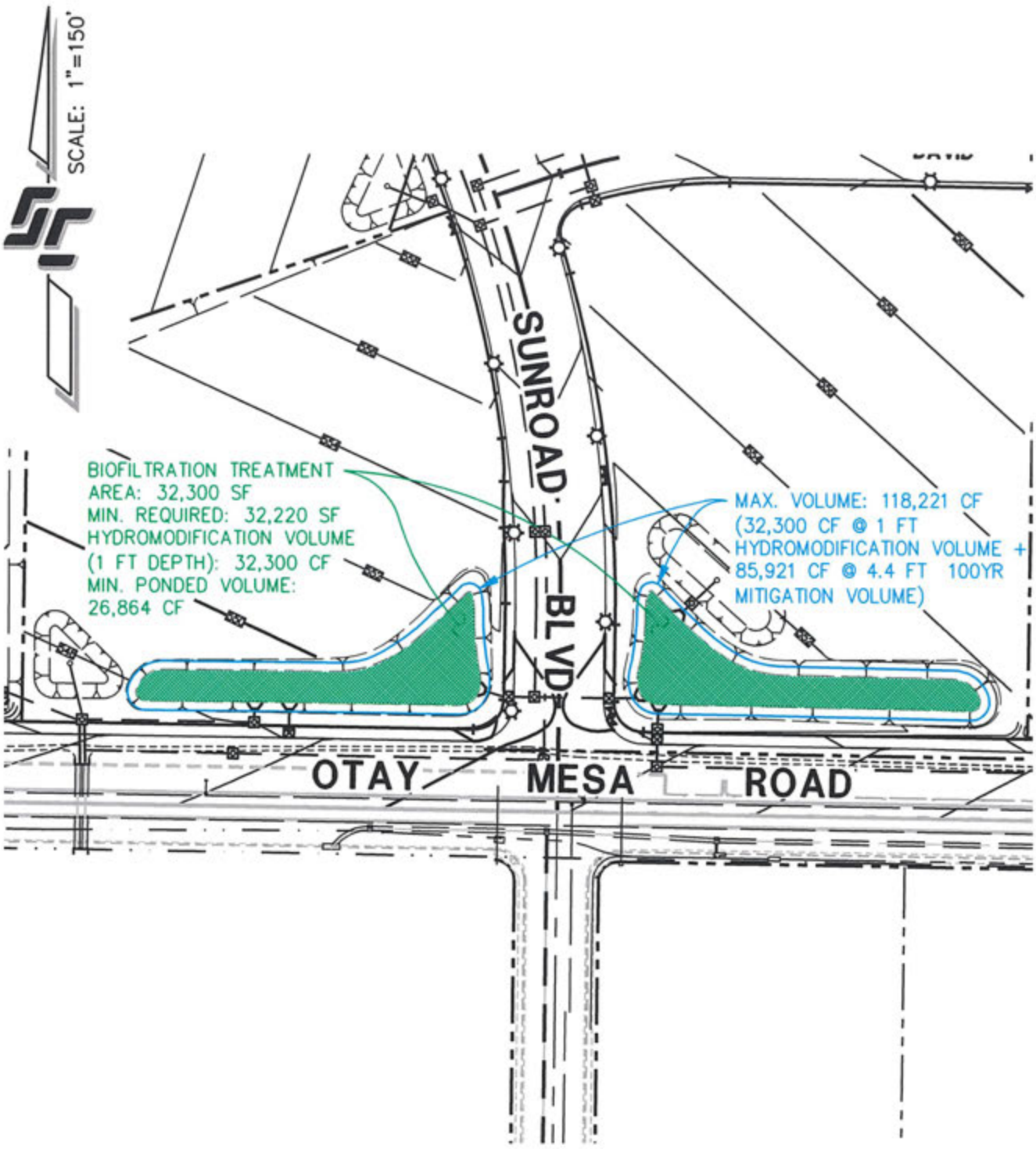

## BF-3
## DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'



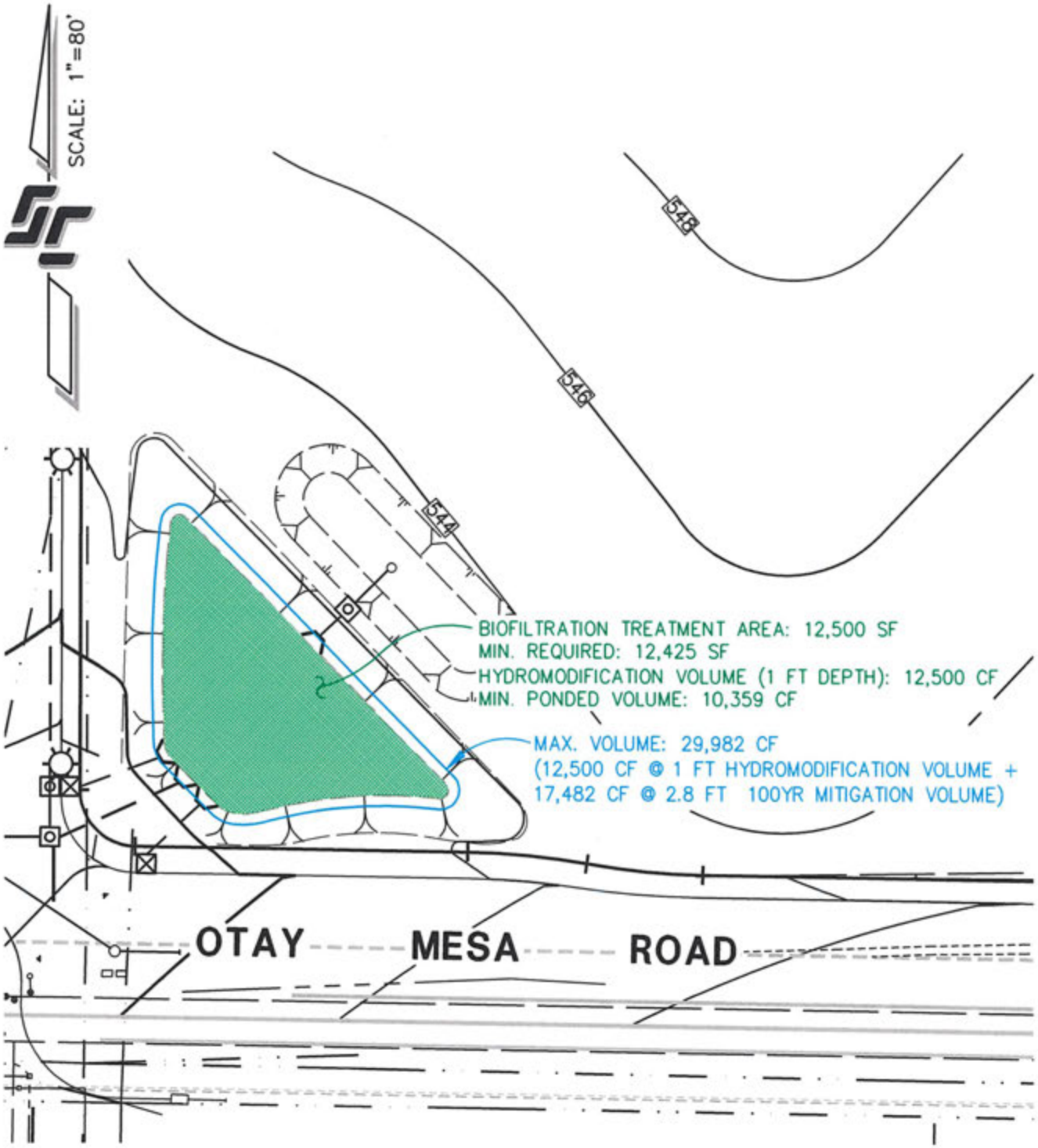

## BF-4
## DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'




## BF-5
## DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

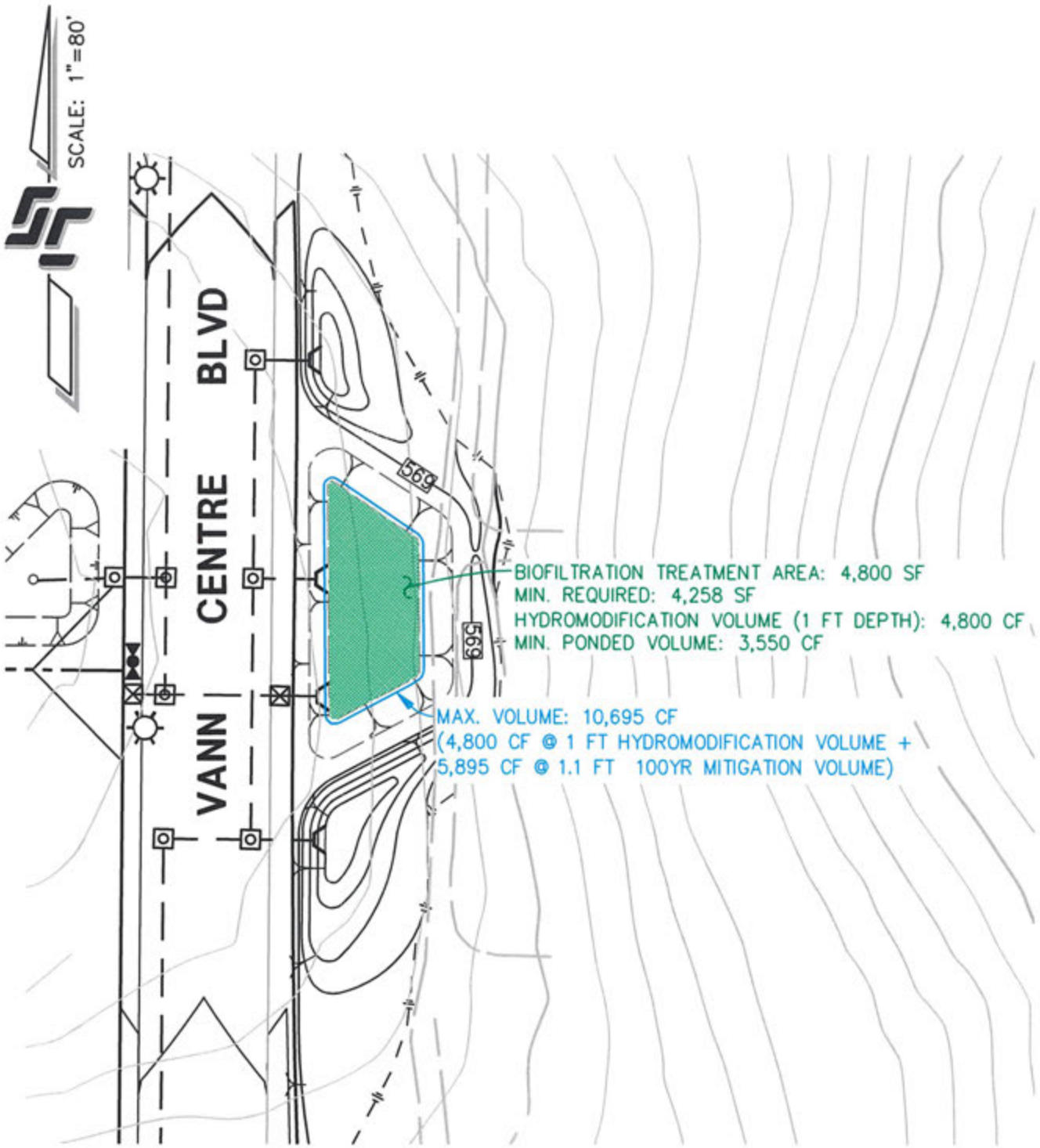
SCALE: 1"=150'




## BF-6
## DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'

5-35




## BF-7
## DUAL PURPOSE BIOFILTRATION/DETENTION BASIN

SCALE: 1"=80'

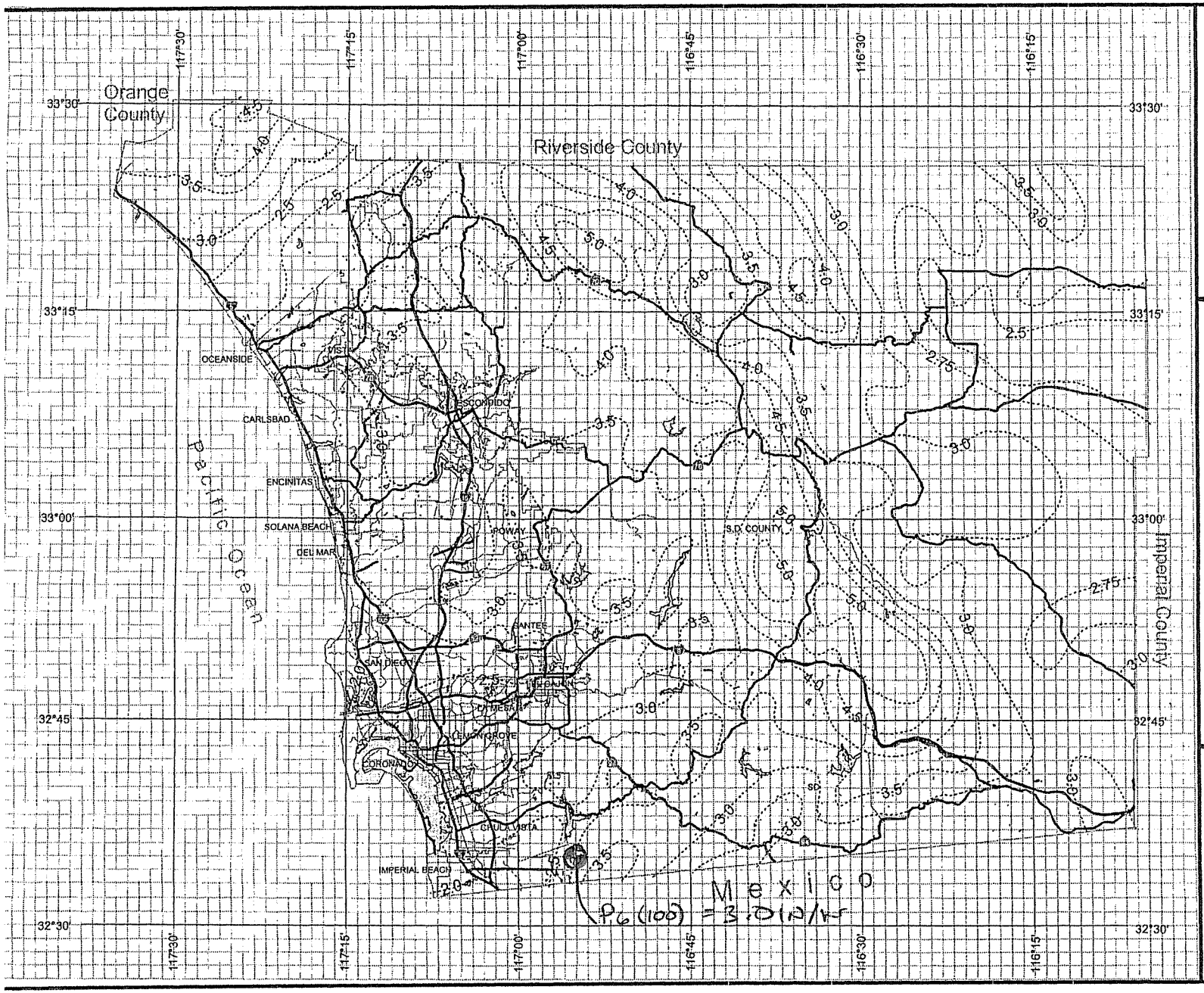
5-36

6

# SECTION 6

# APPENDIX A

## (County Hydrology Figures/Tables)




# County of San Diego Hydrology Manual

*Rainfall Isopluvials*

**100 Year Rainfall Event - 6 Hours**

Isopluvial (inches)

DPW GIS

SanGIS
We Have San Diego Covered!

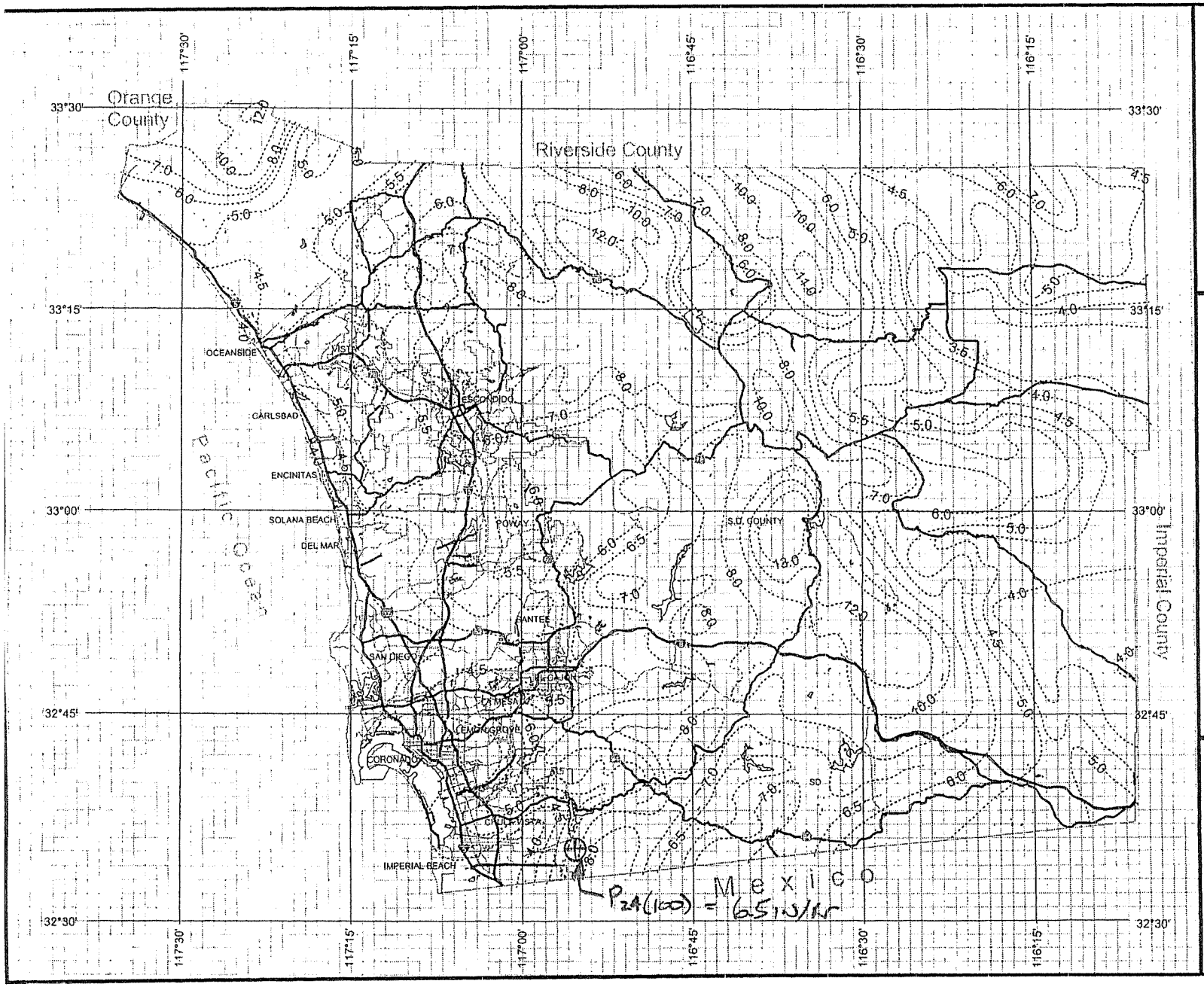
THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

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

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

N W E S

3 0 3 Miles




# County of San Diego Hydrology Manual

*Rainfall Isopluvials*

**100 Year Rainfall Event - 24 Hours**

Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

GIS
We Have San Diego Covered

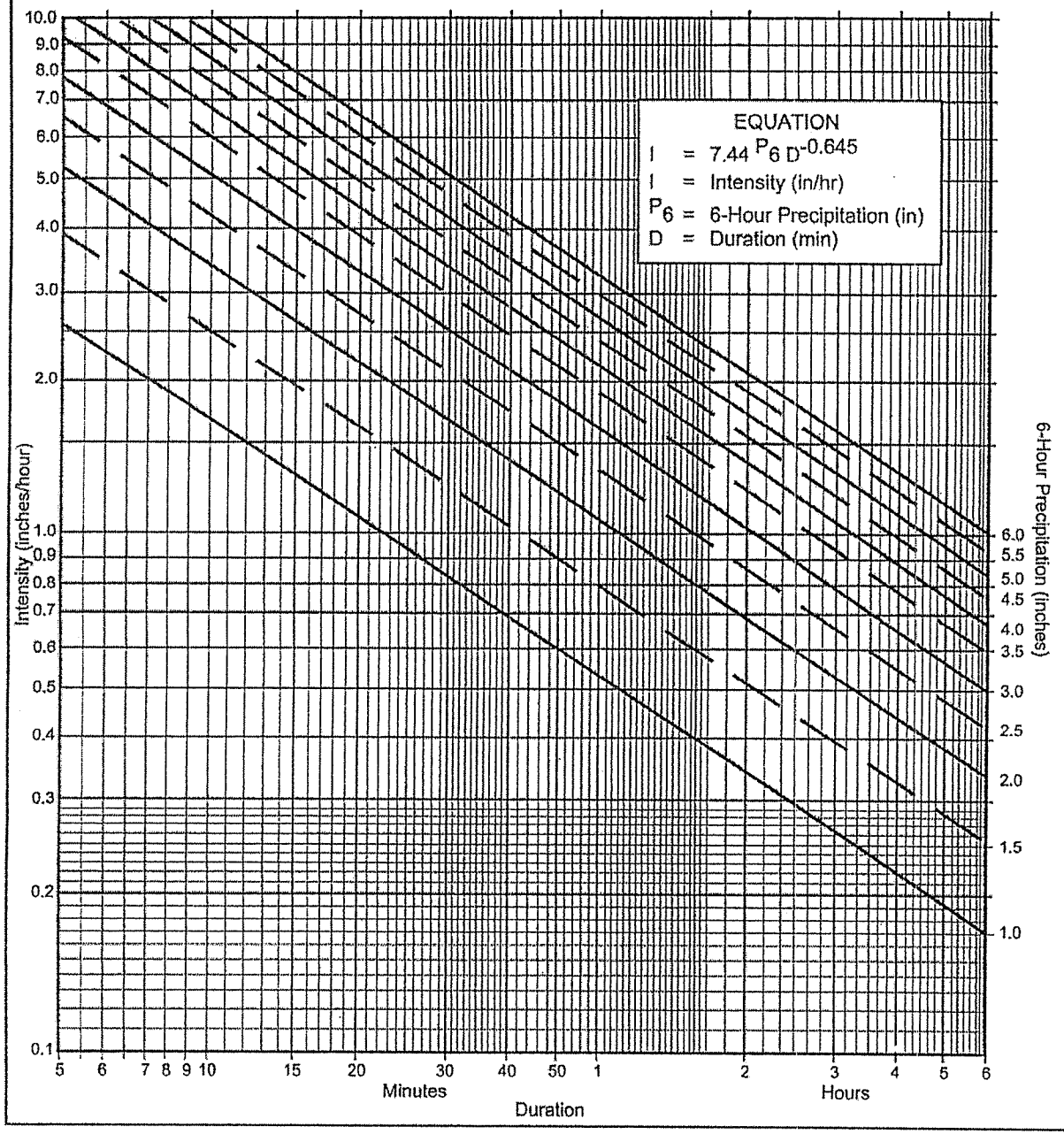
N
W E
S

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

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

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

3 0 3 Miles




**Directions for Application:**

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

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

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

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

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

**Application Form:**

(a) Selected frequency 100 year

(b) $P_6$ = 3.0 in., $P_{24}$ = 6.5, $\frac{P_6}{P_{24}}$ = 46 %(2)

(c) Adjusted $P_6$(2) = 3.0 in.

(d) $t_x$ = 31.2 min.

(e) I = 2.43 in./hr.

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

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

**Intensity-Duration Design Chart - Template**

FIGURE 3-1

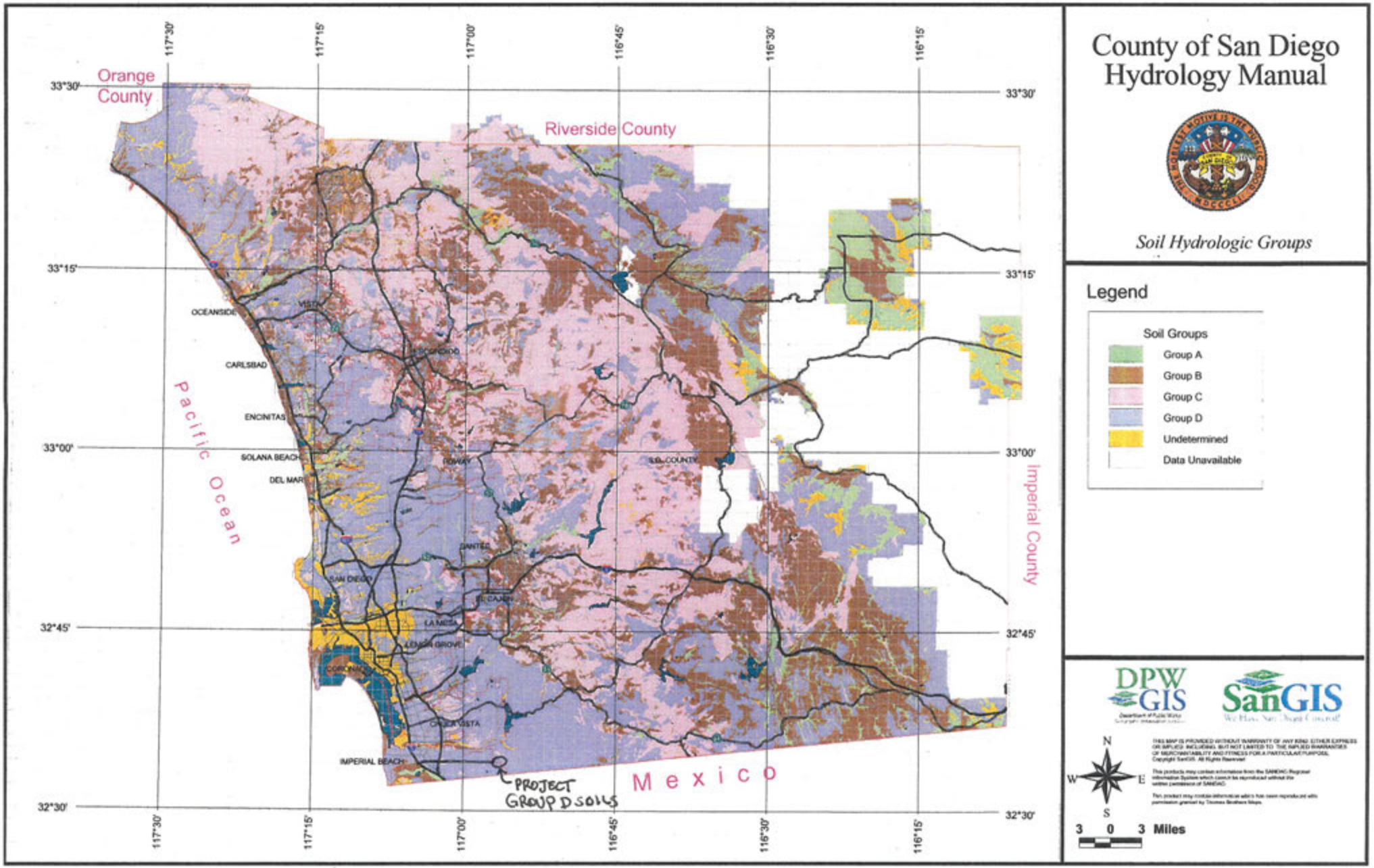


h-9

## Table 3-1
## RUNOFF COEFFICIENTS FOR URBAN AREAS

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

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




# County of San Diego Hydrology Manual

*Soil Hydrologic Groups*

Legend

Soil Groups
- Group A
- Group B
- Group C
- Group D
- Undetermined
- Data Unavailable

DPW GIS
Department of Public Works

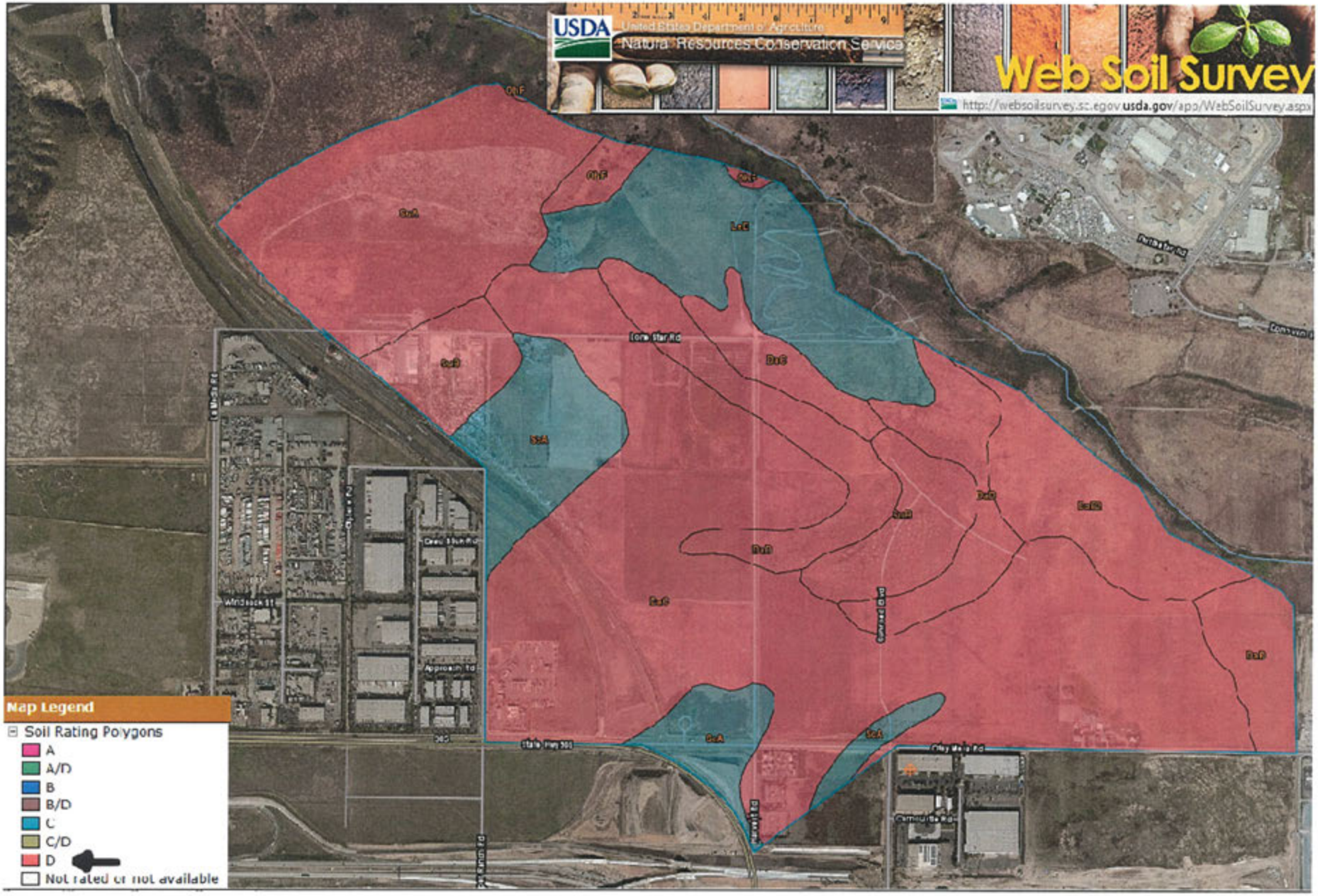
SanGIS
We Make San Diego Central

N
W E
S

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.
This product may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.
This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

3 0 3 Miles

D-6 * NOTE: SEE NRCS EXHIBIT THAT FOLLOWS.




*Note: Per Geocon's "Updated Geotechnical Investigation", dated July 20, 2015 the site is dominated by highly expansive silty and clayey soils. As such, type D hydrologic soils group will be used for the entire project area.

L-9

# SECTION 7

## DRAINAGE EXHIBITS

Exhibit "A" (Existing Drainage Basins)

Exhibit "C" (Post-Project Drainage Basins)

# LEGEND

HISTORIC DRAINAGE BASIN BOUNDARY "A"

HISTORIC DRAINAGE BASIN BOUNDARY "B"

HISTORIC DRAINAGE BASIN BOUNDARY "C"

DRAINAGE SUB BASIN

A3 / 47.14 — BASIN DESIGNATION

BASIN AREA (Acres)

PROJECT BOUNDARY

EXISTING STORM DRAIN

RUNOFF/CHANNEL FLOW DIRECTION

SWALE/BROW DITCH FLOW DIRECTION

FLOW PATH

DETENTION BASIN

EXISTING CALTRANS 72" RCP STORM DRAIN (503.6) FL DITCH (497.80) FL INLET HDWL

EXISTING CONCRETE LINED DITCH

**POC 2:** NODE 207 Q100=135.29 CFS

**POC 1:** NODE 104 Q100=140.46 CFS

**POC 3:** NODE 305 Q100=91.31 CFS

NODE 100 Q100=106.70 CFS

APPROXIMATE 100 YEAR INUNDATION (EXISTING CONDITION)

SEE DRAINAGE STUDY APPENDIX A FOR DETAILS OF CALTRANS SYSTEMS

SCALE: 1"=200'

0 100 200 400 600

SCALE: 1" = 200'


STEVENS-CRESTO ENGINEERING, INC.
CIVIL ENGINEERS - PLANNERS - LAND SURVEYORS
9665 CHESAPEAKE DRIVE, SUITE 320
SAN DIEGO, CA 92123-1352
PHONE: 858.614-5640
FAX: 858.614-5641
www.scengr.com


REVISIONS

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |

# SUNROAD OTAY 250

SAN DIEGO, CALIFORNIA

## EXHIBIT "A"
## EXISTING DRAINAGE BASINS

DATE: 04/06/16

SCE NO. 14009.01

SHEET A

1 OF 1 SHEETS

X:\2014\14009\CAD\REPORTS\DRNG\A_EX_DR.dwg 4/7/2016 6:05:45 PM PDT

# LEGEND

EXISTING GROUND CONTOURS
360 ——— INDEX

DRAINAGE BASIN DESIGNATOR

A11 / 1.04 –BASIN DESIGNATION
BASIN AREA (Acres)

DRAINAGE BASIN BOUNDARY "A"

DRAINAGE BASIN BOUNDARY "B"

DRAINAGE BASIN BOUNDARY "C"

DRAINAGE SUB BASIN BOUNDARY

PROJECT BOUNDARY

HISTORIC BASIN ROUTING

STORM DRAIN CLEANOUT

STORM DRAIN CURB INLET

RUNOFF/CHANNEL FLOW DIRECTION

SWALE/BROW DITCH FLOW DIRECTION

HEAD WALL

PROPOSED STORM DRAIN

REGIONAL DETENTION BASIN

BF-1

**POC 2:**
NODE 268
Q100=135.89 CFS (EXISTING)
Q100=133.82 CFS (DETAINED)
Q100=609.28 CFS (UNDETAINED)

**POC 1:**
NODE 110
Q100=140.46 CFS (EXISTING)
Q100=139.77 CFS (DETAINED)
Q100=520.36 CFS (UNDETAINED)

**POC 3:**
NODE 322
Q100=91.31 CFS (EXISTING)
Q100=82.91 CFS (DETAINED)
Q100=275.74 CFS (UNDETAINED)

NOTE:
FLOW PATHS ON THE ROUGH GRADED PADS HAVE MINIMIZED OVERLAND SHEET FLOW SINCE ADDITIONAL CONVEYANCE SYSTEMS, SUCH AS BROW DITCHES WILL LIKELY BE INCORPORATED INTO THE PADS AT FINAL ENGINEERING.

0 100 200 400 600
SCALE: 1" = 200'


STEVENS·CRESTO ENGINEERING, INC.
CIVIL ENGINEERS · PLANNERS · LAND SURVEYORS
9665 CHESAPEAKE DRIVE
SUITE 350
SAN DIEGO, CA 92123-1352
PHONE: 858.694.0660
FAX: 858.694.0644
www.scengr.com


REVISIONS

| | |
|---|---|
| | |
| | |
| | |
| | |
| | |

# SUNROAD OTAY 250
SAN DIEGO, CALIFORNIA

## EXHIBIT "C"
## POST-PROJECT DRAINAGE BASINS

DATE: 04/06/16
SCE NO. 14009.01
SHEET C
1 OF 1 SHEETS

X:\2014\14009\CAD\REPORTS\DRN\C_PR DRN.dwg 4/7/2016 5:54:44 PM PDT