PRELIMINARY DRAINAGE STUDY
For

33521 ZEIDERS ROAD
MENIFEE, CA

APN: 384-150-001

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TABLE OF CONTENTS

	SECTION
Executive Summary	**1.0**
Introduction	1.1
Existing Conditions	1.2
Proposed Conditions	1.3
Summary Conclusions	1.4
References	1.5
Methodology	**2.0**
Rational Method	2.1
Hydrologic Parameters	2.2
AES Rational Method Computer Model	2.3
Detention (100-Year 1-Hr Event)	2.4

Appendix

Appendix A – Hydrology Support Material
Appendix B – AES Output: Existing, Proposed, Mitigated and Offsite
Appendix C – Detention Analysis
Appendix D – Hydrologic Maps (Existing and Proposed)

1.0 EXECUTIVE SUMMARY

1.1 Introduction

This preliminary drainage study for the 33521 Zeiders Road project, herein referred to as "the project," has been prepared to analyze the hydrologic characteristics of the existing and proposed site condition of the project. This report presents the methodology and the calculations used for determining the runoff from the project site in both the existing and proposed conditions produced by the 100-year 1-hr storm event. This report has been prepared using the Riverside County Flood Control District (RFCFD) and Water Conservation District (WCD) Hydrology Manual, dated April 1978.

The project proposes to construct eleven industrial buildings with loading docks, drive aisles, parking areas, and landscaping,

Currently, the east half of Zeiders Road is paved for two-way traffic. The project proposes to pave the west portion of Zeiders Road and construct associated improvements.

1.2 Existing Conditions

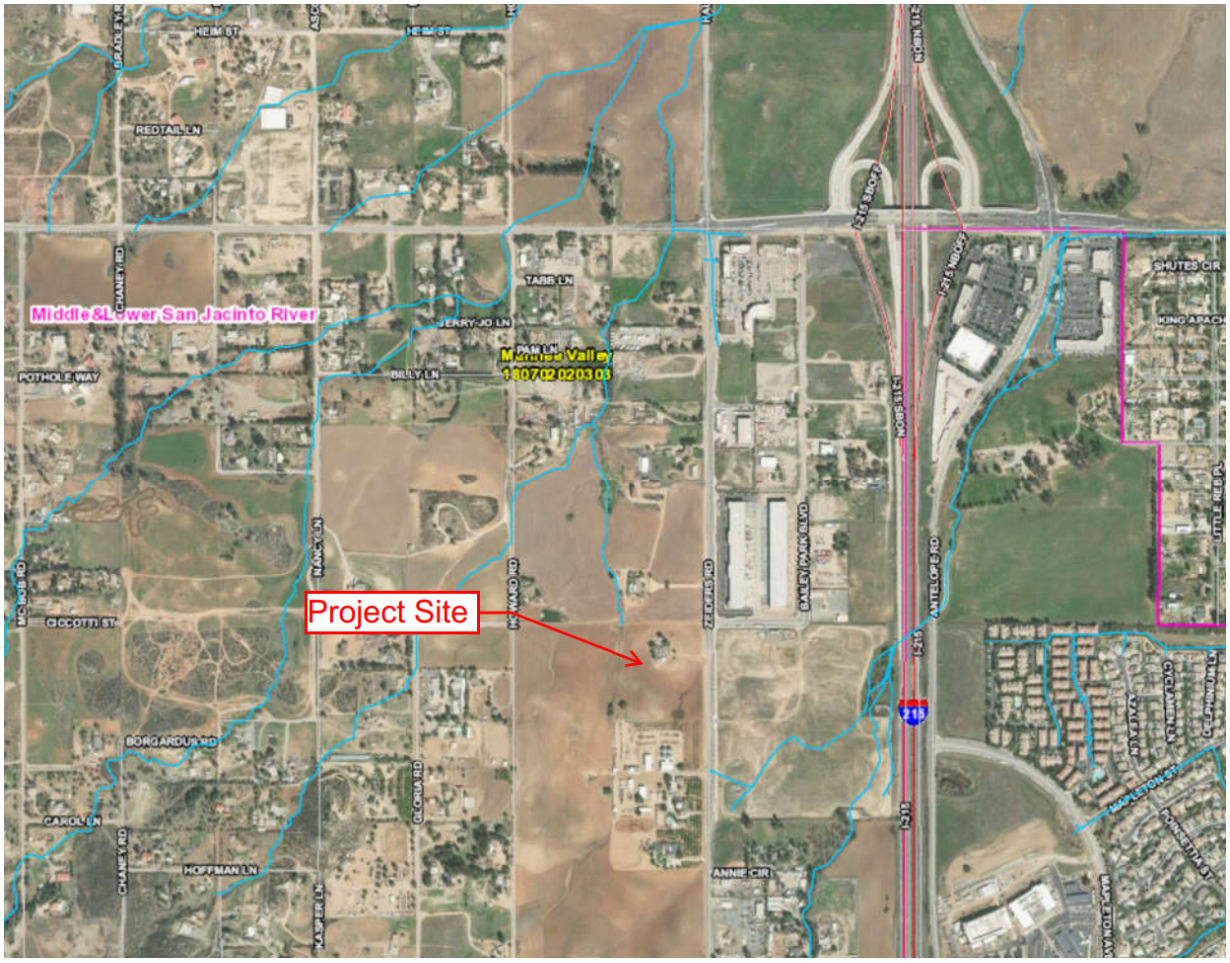
The property is geographically located at 33521 Zeiders Road, in Menifee, CA. The project site is bordered by Zeiders Road and a mass graded property to the east, a dirt road and single-family homes with open fields to the north, Howard Way and single-family homes with open fields to the and west, and an open field to the south.

The 20.03-acre property is currently undeveloped except for a single-family residence in the northeast corner of the property. Onsite storm water runoff generally flows northerly overland. Three offsite tributary drainage courses flow onto the project site along the southern property boundary and flow north.

The existing condition is divided into two (2) drainage basins, Drainage Basin 1 and 2, and two (2) discharge locations, POC-1 and POC-2. Drainage Basin 1 consists of the western and central portion of the property as well as the half width of Howard Way in the project vicinity. Runoff flows northerly overland to POC-1 located along the northern property boundary. Drainage Basin 2 consists of the eastern portion of the property as well as the half width of Zeiders Road in the project vicinity. Runoff flows northeasterly overland to an existing dirt swale along the unpaved portion of Zeiders Road to POC-2.

Per the United States Department of Agriculture Web Soil Survey, the project site is underlain with Hydrologic Soil Group C and D. Refer to Appendix A for soil information.

VICINITY MAP



The project is located in the San Jacinto Valley Hydrologic Unit, Perris Hydrologic Area, and Menifee Hydrologic Subarea (802.12). The study area is under the jurisdiction of the Riverside County Flood Control and Water Conservation District (RCFWCD). The RCFWCD Hydrology manual was used to develop the hydrological parameters for 100-year 1-hr storm event.

Pursuant to the RCFWCD Hydrology Manual, the Rational Method was used to calculate the existing condition onsite peak runoff for the 100-year 1-hr storm event. The results of the existing condition Rational Method peak runoff flows are summarized in the table below. Refer to Appendix B for calculations.

Table 1: 100-YR 1-HR ONSITE EXISTING PEAK DISCHARGE SUMMARY			
Drainage Basin	Area (ac)	TC (min)	Q100 (cfs)
1	15.1	22.03	24.63
2	5.5	19.79	10.13

1.3 Proposed Conditions

The project will include the construction of eleven (11) single-story industrial buildings, paved roadways and parking areas, retaining walls, and other associated improvements. The project will be accessed by two proposed driveways off Zeiders Road. Drainage improvements will consist of curb inlets, catch basins, ribbon gutters, brow ditches, and storm drain pipes. The project will also have two underground storm water storage facilities for peak flow attenuation as well as two proprietary Modular Wetland Systems (MWS) for storm water quality treatment.

The west half of Zeiders Road will be constructed to a total width of 76 feet. The road will be crowned in the center and runoff will flow evenly on both sides of the street. Proposed public improvements also consist of non-contiguous sidewalk and a decomposed granite trail.

The proposed site consists of two (2) major drainage basins, Drainage Basin 1 and 2, with two (2) discharge locations, POC-1 and POC-2, to mimic the existing conditions. Drainage Basin 1 consists of the majority of the site. Onsite runoff flows overland and in proposed storm drain to two underground storm water storage facilities which provide peak flow attenuation for the 100-yr 1-hr storm event as well as hydromodification management flow control for the 2-yr 24-hr storm event. Discharge from the underground storage facilities will be pumped to MWS for water quality treatment prior to discharging at POC-1.

Offsite storm water runoff that runs onto the site along the southern boundary from the three offsite tributary drainage courses will be captured in proposed brow ditches and conveyed to three proposed onsite headwalls and one catch basin and then conveyed in proposed onsite storm drain infrastructure separately from the proposed onsite flows to POC-1 at the northern property boundary. The offsite runoff will confluence with proposed onsite runoff (onsite

treated and hydromodified) immediately prior to discharging to POC-1. The storm drain will be discharged through a headwall where a riprap energy dissipator will spread and slow the flow to the existing drainage flow path.

Drainage Basin 2 consists of the eastern edge of the property and the half width of Zeiders Road in the project vicinity. Proposed storm drain runoff from the west half of Zeiders Road will flow to biofiltration basins located between the curb and sidewalk. Runoff will enter the biofiltration basins through curb cuts. Runoff that is unable to infiltrate will flow out of the basins through curb cuts and flow to POC-2.

Pursuant to the RCFWCD Hydrology Manual, the Rational Method was used to calculate the proposed condition onsite peak runoff for the 100-year 1-hr storm event. The underground storm water storage facilities provide mitigation for the 100-year 1-hr storm event peak discharge. Refer to Section 2.4 and Appendix C for detention information. The table below summarizes the onsite runoff flows for the existing and proposed conditions. Refer to Appendix B for calculations.

Table 2: 100-YR 1-HR ONSITE EXISTING AND PROPOSED PEAK DISCHARGE SUMMARY

Drainage Basin		Existing	Proposed	Mitigated
1	Area (ac)	15.1	18.9	18.9
	Tc (min)	22.03	8.96	15.58
	Q100 (cfs)	24.63	55.34	24.45
2	Area (ac)	5.5	1.7	1.7
	Tc (min)	19.79	13.42	13.42
	Q100 (cfs)	10.13	4.65	4.65

Additional Rational Method analyses were performed to quantify the offsite peak discharge that runs onto the site. Runoff to each proposed headwall and catch basin was analyzed and then routed through the site where it confluences with proposed onsite flow immediately prior to discharging to POC-1. Refer to Appendix B for calculations.

1.4 Summary Conclusions

Based upon the analyses included in this report, the proposed underground storage facilities are sized to mitigate the 100-year 1-hr storm event peak runoff to below the existing condition flow rates. Historical points of discharge were maintained and the proposed development and resulting mitigated peak runoff will not have an adverse effect on the downstream systems due to this mitigation.

1.5 References

"Riverside County Flood Control and Water Conservation District Hydrology Manual", April 1978, John W. Bryant, Riverside County Flood Control and Water Conservation District

"California Regional Water Quality Control Board Order No. R8-2010-0033," California Regional Water Quality Control Board, Riverside County Region (SDRWQCB).

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov.

Precipitation Frequency Data Server (PFDS), NOAA's National Weather Service, United States Department of Commerce. Available online at https://hdsc.nws.noaa.gov/pfds/.

2.0 METHODOLOGY

2.1 Rational Method

Pursuant to the RCFWCD Hydrology Manual dated April 1978, the Rational Method (RM) was used to analyze the peak discharge from the project site in the existing and proposed conditions.

The RM is based on the following equation:

$$Q = CIA$$

Where:

Q= peak discharge (cfs)
C = runoff coefficient, ratio of rainfall that produces storm water runoff (runoff vs. infiltration/evaporation/absorption/etc)
I = rainfall intensity corresponding to the Tc for the area (in/hr)
A = drainage area contributing to the basin (ac)

Using the Time of Concentration (Tc), which is the time required for a given element of water that originates at the most remote point of the basin being analyzed to reach the point at which the runoff from the basin is being analyzed, the RM equation determines the storm water runoff rate (Q) for a given basin in terms of flow (cfs).

2.2 Hydrologic Parameters

The following hydrologic parameters were utilized to perform the Rational Method analysis:

Design Storm:	100-year
Soil Type:	C and D
Rainfall:	10-yr 10 min (1.84 in/hr) and 60 min (0.892 in/hr) 100-yr 10 min (3.15 in/hr) and 60 min (1.52 in/hr)
Land Use:	Natural, Undeveloped (Existing Condition) Commercial (Proposed Condition)

Refer to Appendix A for the USDA Web Soil Survey information, NOAA Atlas 14 point precipitation frequencies, and RCFWCD Hydrology Manual pervious and impervious cover information.

2.3 AES Rational Method Computer Model

The Rational Method computer program developed by Advanced Engineering Software (AES 2016) was used to analyze the hydrologic characteristics of the project site.

The AES hydrologic model is developed by creating independent node-link models of each interior drainage basin and linking these sub-models together at confluence points. The AES program has the capability to perform calculations for 15 hydrologic processes. These processes are assigned code numbers that appear in the results. The code numbers and their significance are as follows:

Subarea Hydrologic Processes (Codes)

Code 1:	Confluence analysis at node
Code 2:	Initial subarea analysis
Code 3:	Pipe flow travel time (computer-estimate pipe sizes)
Code 4:	Pipe flow travel time (user-specified pipe size)
Code 5:	Trapezoidal channel travel time
Code 6:	Street flow analysis through a subarea
Code 7:	User-specified information at a node
Code 8:	Addition of the subarea runoff to mainline
Code 9:	V-Gutter flow through subarea
Code 10:	Copy mainstream data onto memory bank
Code 11:	Confluence a memory bank with the mainstream memory
Code 12:	Clear a memory bank
Code 13:	Clear the mainstream memory
Code 14:	Copy a memory bank onto the mainstream memory
Code 15:	Hydrologic data bank storage functions

To perform the hydrologic analysis, base information for the study area is required. This information includes the existing drainage facility locations and sizes, land uses, flow patterns, drainage basin boundaries, and topographic elevations. Drainage basin boundaries, flow patterns, and topographic elevations are shown on the drainage exhibits located in Appendix D.

2.4 Detention (100-Year Event)

The underground storm water storage facilities provide mitigation of the 100-year 1-hr storm event peak flow rate as well as hydromodification management (HMP) flow control for the 2-yr 24-hr storm event. The 100-year 1-hr storm event detention analysis was performed using HydroCAD Stormwater Modeling software. The inflow runoff hydrographs to the storage vaults were modeled per the RCFWCD Hydrology Manual. HydroCAD has the ability to route the inflow hydrographs through the underground storage facilities and based on the vault cross-sectional geometry, stage storage and outlet structure data, HydroCAD calculates the detained peak flow rate and detained time to peak.

Each underground storm water storage facility has a low-flow orifice to comply with HMP requirements and an overflow weir for larger storm events. Refer to the plans for facility details.

For the mitigated hydrologic analysis, the effects of the detention provided by the underground storage facilities were incorporated into the AES analysis. This was done by inserting the results from the HydroCAD analysis, detained peak flow rate and detained time to peak, into the proposed condition AES model to create the mitigated condition model. Refer to Appendix B for the detailed output.

Based on the results of the HydroCAD and AES analysis, the 100-year 1-hr storm event proposed peak flow rate is mitigated to below the existing condition. Refer to Appendix C for the HydroCAD detention detailed output.

APPENDIX A

HYDROLOGY SUPPORT MATERIAL

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

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IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

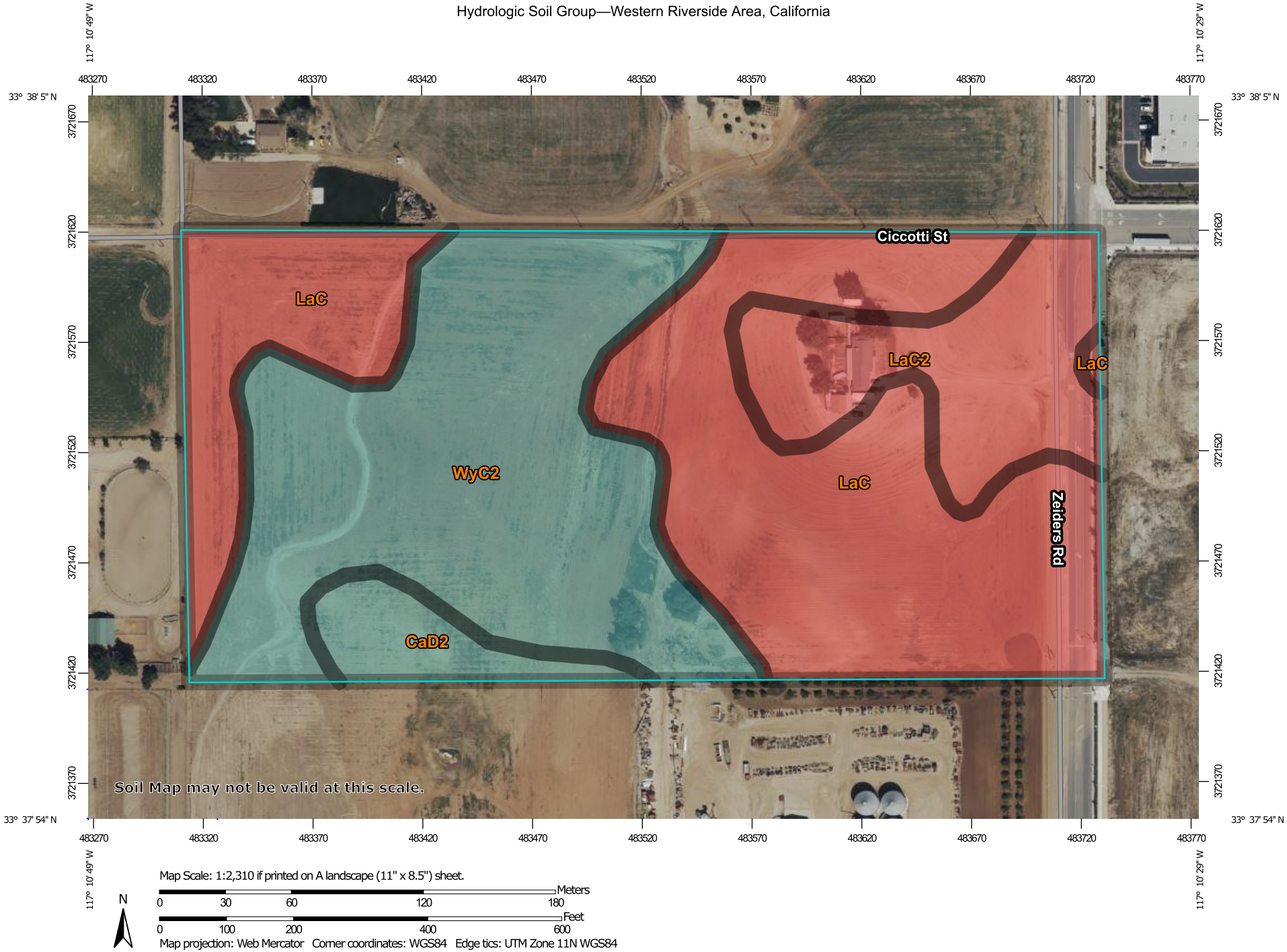
1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.



Map Scale: 1:2,310 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 15, Sep 6, 2022

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CaD2	Cajalco fine sandy loam, 8 to 15 percent slopes, eroded	C	1.0	4.6%
LaC	Las Posas loam, 2 to 8 percent slopes	D	9.5	44.9%
LaC2	Las Posas loam, 5 to 8 percent slopes, eroded	D	2.8	13.5%
WyC2	Wyman loam, 2 to 8 percent slopes, eroded	C	7.8	37.1%
Totals for Area of Interest			**21.1**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

NOAA Atlas 14, Volume 6, Version 2
Location name: Menifee, California, USA*
Latitude: 33.6333°, Longitude: -117.1776°
Elevation: 1570 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.08 (0.912-1.31)	1.51 (1.26-1.82)	2.09 (1.74-2.52)	2.58 (2.14-3.14)	3.26 (2.60-4.13)	3.82 (2.99-4.93)	4.39 (3.35-5.83)	5.02 (3.71-6.85)	5.88 (4.16-8.40)	6.58 (4.49-9.74)
10-min	0.774 (0.654-0.936)	1.08 (0.906-1.30)	1.49 (1.25-1.81)	1.84 (1.53-2.25)	2.34 (1.87-2.96)	2.74 (2.14-3.53)	3.15 (2.40-4.18)	3.59 (2.66-4.91)	4.22 (2.98-6.02)	4.72 (3.22-6.98)
15-min	0.628 (0.524-0.756)	0.872 (0.728-1.05)	1.20 (1.01-1.46)	1.49 (1.23-1.82)	1.89 (1.51-2.38)	2.20 (1.72-2.85)	2.54 (1.94-3.37)	2.90 (2.14-3.96)	3.40 (2.40-4.85)	3.80 (2.60-5.63)
30-min	0.498 (0.418-0.600)	0.692 (0.580-0.836)	0.958 (0.800-1.16)	1.18 (0.978-1.44)	1.50 (1.20-1.89)	1.75 (1.37-2.27)	2.02 (1.54-2.68)	2.30 (1.70-3.14)	2.70 (1.91-3.86)	3.02 (2.06-4.47)
60-min	0.375 (0.315-0.452)	0.522 (0.437-0.630)	0.723 (0.603-0.874)	0.892 (0.738-1.09)	1.13 (0.903-1.43)	1.32 (1.03-1.71)	1.52 (1.16-2.02)	1.74 (1.28-2.37)	2.04 (1.44-2.91)	2.28 (1.56-3.38)
2-hr	0.277 (0.232-0.334)	0.371 (0.311-0.448)	0.498 (0.416-0.603)	0.603 (0.499-0.736)	0.750 (0.599-0.948)	0.865 (0.676-1.12)	0.985 (0.750-1.31)	1.11 (0.820-1.52)	1.28 (0.908-1.83)	1.42 (0.969-2.10)
3-hr	0.227 (0.190-0.274)	0.301 (0.252-0.363)	0.399 (0.333-0.483)	0.480 (0.397-0.587)	0.593 (0.474-0.750)	0.681 (0.532-0.880)	0.771 (0.587-1.02)	0.866 (0.640-1.18)	0.996 (0.705-1.42)	1.10 (0.749-1.63)
6-hr	0.162 (0.135-0.195)	0.212 (0.178-0.256)	0.279 (0.233-0.338)	0.334 (0.277-0.408)	0.409 (0.327-0.518)	0.468 (0.365-0.605)	0.528 (0.402-0.700)	0.590 (0.436-0.806)	0.674 (0.477-0.963)	0.740 (0.505-1.10)
12-hr	0.105 (0.088-0.127)	0.140 (0.117-0.169)	0.185 (0.154-0.224)	0.222 (0.184-0.271)	0.272 (0.217-0.344)	0.311 (0.243-0.402)	0.351 (0.267-0.466)	0.392 (0.290-0.536)	0.447 (0.316-0.639)	0.491 (0.335-0.727)
24-hr	0.069 (0.061-0.079)	0.093 (0.082-0.107)	0.125 (0.110-0.145)	0.151 (0.132-0.177)	0.187 (0.158-0.226)	0.215 (0.178-0.264)	0.243 (0.197-0.306)	0.272 (0.215-0.353)	0.312 (0.237-0.421)	0.344 (0.252-0.479)
2-day	0.041 (0.036-0.047)	0.056 (0.050-0.065)	0.077 (0.068-0.090)	0.095 (0.083-0.110)	0.118 (0.100-0.143)	0.137 (0.114-0.169)	0.157 (0.127-0.197)	0.177 (0.139-0.229)	0.205 (0.155-0.276)	0.227 (0.166-0.316)
3-day	0.029 (0.025-0.033)	0.040 (0.036-0.047)	0.056 (0.049-0.065)	0.069 (0.060-0.081)	0.088 (0.074-0.106)	0.102 (0.085-0.126)	0.117 (0.095-0.148)	0.133 (0.105-0.172)	0.155 (0.118-0.210)	0.173 (0.127-0.242)
4-day	0.023 (0.020-0.027)	0.033 (0.029-0.038)	0.046 (0.040-0.053)	0.057 (0.050-0.067)	0.073 (0.061-0.088)	0.085 (0.070-0.105)	0.098 (0.079-0.123)	0.112 (0.088-0.145)	0.131 (0.099-0.177)	0.147 (0.107-0.204)
7-day	0.015 (0.013-0.017)	0.021 (0.019-0.025)	0.030 (0.027-0.035)	0.038 (0.033-0.044)	0.049 (0.041-0.059)	0.057 (0.048-0.071)	0.067 (0.054-0.084)	0.076 (0.060-0.099)	0.090 (0.068-0.122)	0.102 (0.074-0.142)
10-day	0.011 (0.009-0.013)	0.016 (0.014-0.018)	0.023 (0.020-0.026)	0.029 (0.025-0.033)	0.037 (0.031-0.045)	0.044 (0.036-0.054)	0.051 (0.041-0.064)	0.059 (0.046-0.076)	0.070 (0.053-0.094)	0.079 (0.058-0.110)
20-day	0.006 (0.005-0.007)	0.009 (0.008-0.011)	0.014 (0.012-0.016)	0.017 (0.015-0.020)	0.023 (0.019-0.028)	0.027 (0.023-0.034)	0.032 (0.026-0.041)	0.037 (0.029-0.049)	0.045 (0.034-0.061)	0.051 (0.038-0.072)
30-day	0.005 (0.004-0.006)	0.007 (0.006-0.008)	0.011 (0.009-0.012)	0.014 (0.012-0.016)	0.018 (0.015-0.022)	0.022 (0.018-0.027)	0.026 (0.021-0.032)	0.030 (0.024-0.039)	0.036 (0.027-0.049)	0.042 (0.030-0.058)
45-day	0.004 (0.003-0.004)	0.005 (0.005-0.006)	0.008 (0.007-0.009)	0.010 (0.009-0.012)	0.014 (0.012-0.017)	0.017 (0.014-0.021)	0.020 (0.016-0.025)	0.023 (0.018-0.030)	0.029 (0.022-0.039)	0.033 (0.024-0.046)
60-day	0.003 (0.003-0.004)	0.005 (0.004-0.005)	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.012 (0.010-0.014)	0.014 (0.012-0.018)	0.017 (0.014-0.021)	0.020 (0.016-0.026)	0.025 (0.018-0.033)	0.028 (0.021-0.040)

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

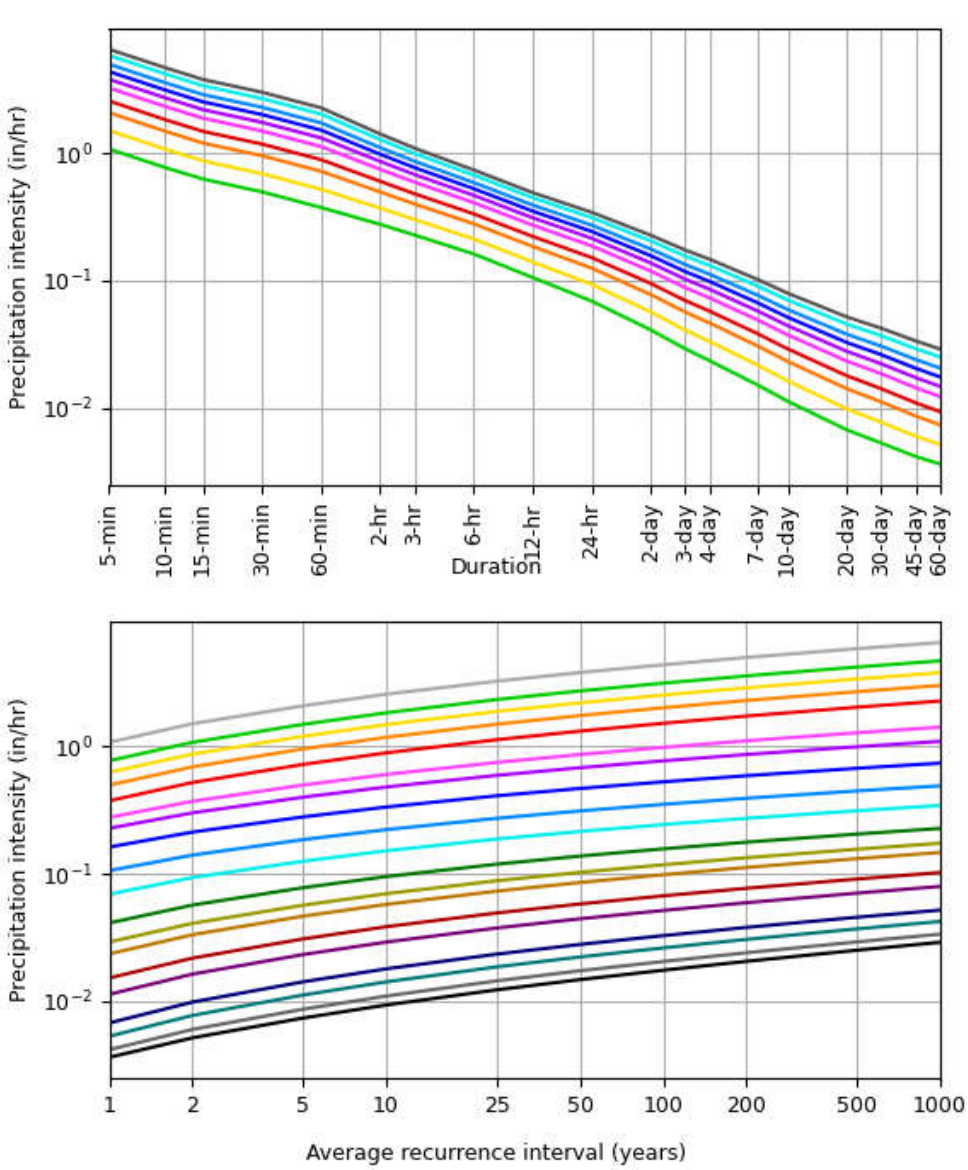
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 33.6333°, Longitude: -117.1776°



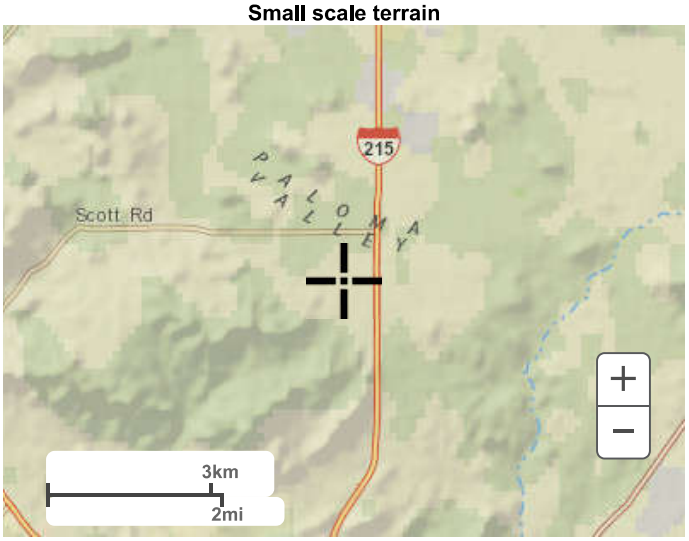
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Wed Nov 15 20:15:07 2023

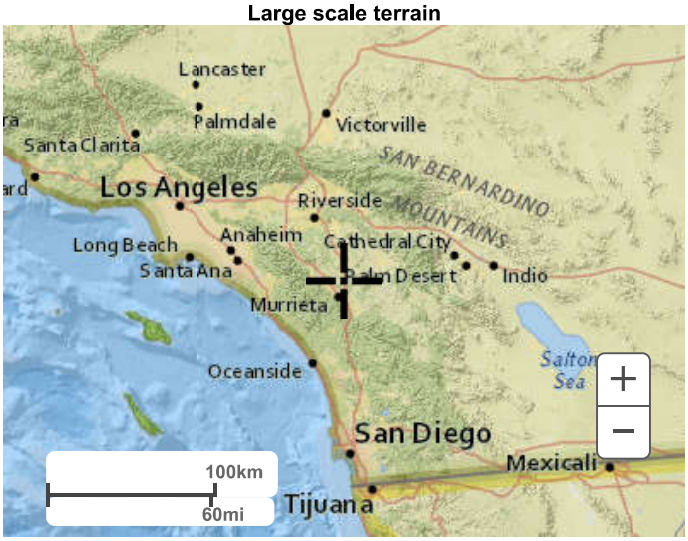
Back to Top

Maps & aerials

Small scale terrain



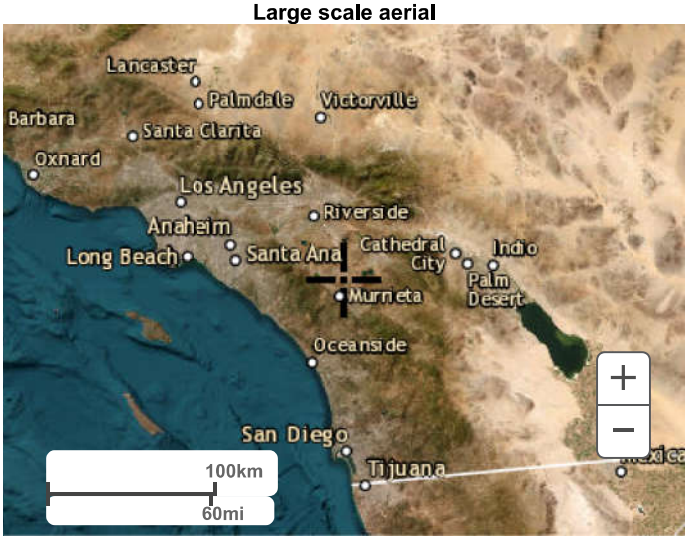
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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

APPENDIX B

AES RATIONAL METHOD OUTPUT

100-YR 1-HR EXISTING

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1452

                           Analysis prepared by:

                      PASCO LARET SUITER & ASSOCIATES
                        535 NORTH HIGHWAY 101, STE A
                           SOLANA BEACH, CA 92075
                                858-259-8212

 ************************* DESCRIPTION OF STUDY *************************
* 3983 ZEIDERS                                                          *
* EXISTING CONDITION                                                    *
* 100-YR                                                                *
 ************************************************************************

  FILE NAME: 3983E00.DAT
  TIME/DATE OF STUDY: 19:58 12/05/2023
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.840
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.892
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.150
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.520
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4041025
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4066907
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.520
  SLOPE OF INTENSITY DURATION CURVE = 0.4067
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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     10.00 TO NODE     11.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  UPSTREAM ELEVATION(FEET) =   1579.50
  DOWNSTREAM ELEVATION(FEET) =   1573.20
  ELEVATION DIFFERENCE(FEET) =      6.30
  TC = 0.937*[(  230.00**3)/(     6.30)]**.2 =   16.947
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.542
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7283
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.85
```

```
  TOTAL AREA(ACRES) =      0.46   TOTAL RUNOFF(CFS) =      0.85

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1573.20  DOWNSTREAM(FEET) =   1559.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1066.00   CHANNEL SLOPE =  0.0133
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.285
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7130
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.49
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   5.08
  Tc(MIN.) =   22.03
  SUBAREA AREA(ACRES) =    14.60       SUBAREA RUNOFF(CFS) =   23.78
  TOTAL AREA(ACRES) =       15.1         PEAK FLOW RATE(CFS) =      24.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   4.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =    1296.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  UPSTREAM ELEVATION(FEET) =   1574.20
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =      4.20
  TC = 0.937*[(  160.00**3)/(     4.20)]**.2 =   14.783
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.687
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7723
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.75
  TOTAL AREA(ACRES) =      0.36   TOTAL RUNOFF(CFS) =      0.75

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1570.00  DOWNSTREAM(FEET) =   1557.16
  CHANNEL LENGTH THRU SUBAREA(FEET) =   832.00   CHANNEL SLOPE =  0.0154
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.386
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7587
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.77
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   5.01
  Tc(MIN.) =   19.79
  SUBAREA AREA(ACRES) =     5.18       SUBAREA RUNOFF(CFS) =    9.38
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =      10.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   3.38
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     992.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        5.5  TC(MIN.) =     19.79
  PEAK FLOW RATE(CFS)   =      10.13
============================================================================
```

```
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

100-YR 1-HR PROPOSED

```
************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1452

                        Analysis prepared by:
```

```
------------------------------------------------------------------------
  FILE NAME: 3983P00.DAT
  TIME/DATE OF STUDY: 10:04 03/14/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.840
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.892
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.150
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.520
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4041025
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4066907
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.520
  SLOPE OF INTENSITY DURATION CURVE = 0.4067
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.00
  UPSTREAM ELEVATION(FEET) =   1571.25
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =      1.25
  TC = 0.303*[(   68.00**3)/(     1.25)]**.2 =    3.645
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.19
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1570.00  DOWNSTREAM ELEVATION(FEET) = 1568.80
  STREET LENGTH(FEET) =   147.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.28
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    6.93
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8902
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.52
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.30
  FLOW VELOCITY(FEET/SEC.) =  1.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.35
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8902
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.81
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.52
  TC(MIN.) =    6.93

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1564.80  DOWNSTREAM(FEET) =  1563.13
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.52
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     382.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.522
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8899
```

```
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    1.47
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.99
  TC(MIN.) =    7.60

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.96  DOWNSTREAM(FEET) =  1561.84
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.99
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     494.00 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) =  3.454
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.85
  TC(MIN.) =    7.98

****************************************************************************
  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) =  3.454
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.19
  TC(MIN.) =    7.98

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.51  DOWNSTREAM(FEET) =  1561.00
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.19
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.13
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.95
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.14
  TC(MIN.) =    8.13
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.50
  TC(MIN.) =    8.13

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.15
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.66
  TC(MIN.) =    8.13

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.00  DOWNSTREAM(FEET) =  1559.97
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.66
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    8.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =     648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.377
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8895
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.35
  TC(MIN.) =    8.43

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.377
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8895
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       6.59
  TC(MIN.) =    8.43

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1559.97  DOWNSTREAM(FEET) =  1559.04
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.59
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =     741.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.02   SUBAREA RUNOFF(CFS) =    6.00
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =      12.58
  TC(MIN.) =    8.68

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

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
  UPSTREAM ELEVATION(FEET) =   1569.21
  DOWNSTREAM ELEVATION(FEET) =   1567.84
  ELEVATION DIFFERENCE(FEET) =      1.37
  TC = 0.303*[(   89.00**3)/(     1.37)]**.2 =    4.206
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.84  DOWNSTREAM(FEET) =  1562.90
  FLOW LENGTH(FEET) =    94.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.69
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.86
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    5.42
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     183.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.040
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8911
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.43
  TC(MIN.) =    5.42
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.73  DOWNSTREAM(FEET) =  1561.54
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.43
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.91
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =     303.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    2.26
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.69
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.52
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       4.21
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       5.22
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.87
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       6.09
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.88  DOWNSTREAM(FEET) =  1556.63
```

```
  FLOW LENGTH(FEET) =   226.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.09
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    6.56
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    107.00 =     529.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 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        6.09     6.56       3.740        1.73
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    107.00 =     529.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       12.58     8.68       3.337        4.13
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =     741.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      15.59       6.56        3.740
      2      18.01       8.68        3.337

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.01   Tc(MIN.) =    8.68
  TOTAL AREA(ACRES) =        5.9

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

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =      18.61
  TC(MIN.) =    8.68

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.71
  TOTAL AREA(ACRES) =        6.3   TOTAL RUNOFF(CFS) =      19.32
  TC(MIN.) =    8.68
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1556.30  DOWNSTREAM(FEET) =  1555.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.06
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.32
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    114.00 =     866.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.297
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.85
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =      20.17
  TC(MIN.) =    8.94

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.297
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      20.49
  TC(MIN.) =    8.94

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    76.00
  UPSTREAM ELEVATION(FEET) =   1570.82
  DOWNSTREAM ELEVATION(FEET) =   1569.32
  ELEVATION DIFFERENCE(FEET) =      1.50
  TC = 0.303*[(   76.00**3)/(     1.50)]**.2 =    3.757
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
```

```
============================================================================
  UPSTREAM ELEVATION(FEET) = 1569.32  DOWNSTREAM ELEVATION(FEET) = 1565.50
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 62.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   4.40   Tc(MIN.) =    9.40
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.230
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.01
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.42
  FLOW VELOCITY(FEET/SEC.) =  1.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     496.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.50  DOWNSTREAM(FEET) =  1561.12
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.20
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.54
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =     534.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.212
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.60
  TC(MIN.) =    9.54

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.212
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.83
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.42
  TC(MIN.) =    9.54
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.79  DOWNSTREAM(FEET) =  1556.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.42
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     756.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 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        3.42    10.07       3.142        1.18
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     756.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       20.49     8.94       3.297        6.70
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    124.00 =     866.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)      (MIN.)   (INCH/HOUR)
      1      23.53       8.94        3.297
      2      22.95      10.07        3.142

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.53   Tc(MIN.) =    8.94
  TOTAL AREA(ACRES) =        7.9

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.50  DOWNSTREAM(FEET) =  1560.20
  FLOW LENGTH(FEET) =   206.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.73
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.53
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.23
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    231.00 =    1072.00 FEET.

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

```
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    48.00
  UPSTREAM ELEVATION(FEET) =   1571.08
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =      1.08
  TC = 0.303*[(   48.00**3)/(     1.08)]**.2 =    3.045
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1570.00  DOWNSTREAM(FEET) =   1569.54
  CHANNEL LENGTH THRU SUBAREA(FEET) =    80.00   CHANNEL SLOPE =  0.0057
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  25.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.857
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8879
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.24
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.08
  Tc(MIN.) =    6.08
  SUBAREA AREA(ACRES) =     0.29       SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     128.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.54  DOWNSTREAM(FEET) =  1563.61
  FLOW LENGTH(FEET) =   194.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.97
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.14
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    6.89
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     322.00 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) =  3.665
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8874
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.33
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.47
  TC(MIN.) =    6.89

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.44  DOWNSTREAM(FEET) =  1562.18
  FLOW LENGTH(FEET) =   127.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.80
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.47
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    7.33
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     449.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.98
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.46
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.67
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.12
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       4.57
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.85  DOWNSTREAM(FEET) =  1561.24
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.52
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =     510.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.78
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.35
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.51
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.95
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.24  DOWNSTREAM(FEET) =  1560.20
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.95
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.483
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    1.05
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       7.00
  TC(MIN.) =    7.81

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.20  DOWNSTREAM(FEET) =  1560.04
  FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.00
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.86
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =     630.00 FEET.

****************************************************************************
  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) =  3.475
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       7.58
  TC(MIN.) =    7.86

****************************************************************************
  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) =  3.475
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.31
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       7.89
  TC(MIN.) =    7.86

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1559.71  DOWNSTREAM(FEET) =  1558.83
  FLOW LENGTH(FEET) =    87.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.89
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.08
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =     717.00 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) =  3.435
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.72   SUBAREA RUNOFF(CFS) =    8.31
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      16.20
  TC(MIN.) =    8.08

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.59  DOWNSTREAM(FEET) =  1557.75
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.20
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.23
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    209.00 =     787.00 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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.61   SUBAREA RUNOFF(CFS) =    1.85
  TOTAL AREA(ACRES) =        5.8   TOTAL RUNOFF(CFS) =      18.05
  TC(MIN.) =    8.23

****************************************************************************
  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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        6.0   TOTAL RUNOFF(CFS) =      18.63
  TC(MIN.) =    8.23

****************************************************************************
  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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      19.78
  TC(MIN.) =    8.23

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =   1572.18
  DOWNSTREAM ELEVATION(FEET) =   1571.05
  ELEVATION DIFFERENCE(FEET) =      1.13
  TC = 0.303*[(   67.00**3)/(     1.13)]**.2 =    3.687
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1571.05  DOWNSTREAM(FEET) =   1570.64
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0054
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  25.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.874
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8879
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.25
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =    6.01
  SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1566.64  DOWNSTREAM(FEET) =  1565.79
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.92
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.37
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     228.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.783
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.12
  TC(MIN.) =    6.37

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.46  DOWNSTREAM(FEET) =  1564.65
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.12
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     309.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.715
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8875
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.05
  TC(MIN.) =    6.66
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1564.65  DOWNSTREAM(FEET) =  1563.83
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.05
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =     391.00 FEET.

****************************************************************************
  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) =  3.655
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8873
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       4.05
  TC(MIN.) =    6.94

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.50  DOWNSTREAM(FEET) =  1562.70
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.05
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    7.18
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =     471.00 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) =  3.604
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8872
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       5.04
  TC(MIN.) =    7.18

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.70  DOWNSTREAM(FEET) =  1561.28
  FLOW LENGTH(FEET) =   142.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.04
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =     613.00 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) =  3.522
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.45
  TC(MIN.) =    7.60

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.94  DOWNSTREAM(FEET) =  1560.32
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.45
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.78
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =     675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.489
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.32   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.44
  TC(MIN.) =    7.78

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.489
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.69
  TC(MIN.) =    7.78

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.32  DOWNSTREAM(FEET) =  1559.12
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.69
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    8.10
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    225.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

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

```
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    78.00
  UPSTREAM ELEVATION(FEET) =   1570.82
  DOWNSTREAM ELEVATION(FEET) =   1569.22
  ELEVATION DIFFERENCE(FEET) =      1.60
  TC = 0.303*[(   78.00**3)/(     1.60)]**.2 =    3.767
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1569.22  DOWNSTREAM ELEVATION(FEET) = 1568.73
  STREET LENGTH(FEET) =    64.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 62.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.34
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    5.80
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.931
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8881
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.94
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.21
  FLOW VELOCITY(FEET/SEC.) =  1.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     142.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1564.73  DOWNSTREAM(FEET) =  1563.62
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =     252.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.29  DOWNSTREAM(FEET) =  1562.33
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    224.00 =     347.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.716
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8875
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.44   SUBAREA RUNOFF(CFS) =    1.45
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.62
  TC(MIN.) =    6.66

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.33  DOWNSTREAM(FEET) =  1560.69
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.62
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    7.10
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 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        2.62     7.10       3.620        0.77
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     485.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.69     8.10       3.432        2.05
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    225.00 =     795.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       8.48       7.10        3.620
      2       9.17       8.10        3.432
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.17   Tc(MIN.) =    8.10
  TOTAL AREA(ACRES) =        2.8

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.79  DOWNSTREAM(FEET) =  1557.75
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.17
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.15
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    226.00 =     828.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1         9.17     8.15       3.423        2.82
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    226.00 =     828.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        19.78     8.23       3.410        6.37
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    226.00 =     787.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      28.78       8.15        3.423
      2      28.92       8.23        3.410

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.92   Tc(MIN.) =    8.23
  TOTAL AREA(ACRES) =        9.2

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.50  DOWNSTREAM(FEET) =  1559.80
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.08
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.92
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 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       28.92     8.89       3.305        9.19
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       23.53     9.23       3.255        7.88
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    231.00 =    1072.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      51.58       8.89        3.305
      2      52.01       9.23        3.255

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      51.58   Tc(MIN.) =    8.89
  TOTAL AREA(ACRES) =       17.1

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.305
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8862
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.43   SUBAREA RUNOFF(CFS) =    1.26
  TOTAL AREA(ACRES) =       17.5   TOTAL RUNOFF(CFS) =      52.84
  TC(MIN.) =    8.89

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1559.47  DOWNSTREAM(FEET) =  1559.25
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.50
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.84
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1264.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1577.62
  DOWNSTREAM ELEVATION(FEET) =   1576.19
  ELEVATION DIFFERENCE(FEET) =      1.43
  TC = 0.303*[(  100.00**3)/(     1.43)]**.2 =    4.472
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1576.19  DOWNSTREAM ELEVATION(FEET) = 1569.20
  STREET LENGTH(FEET) =   564.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   5.45   Tc(MIN.) =   10.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.094
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    1.32
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.61
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     664.00 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) =  3.094
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.70
  TC(MIN.) =   10.45

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    232.00 IS CODE =  51
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1569.20  DOWNSTREAM(FEET) =   1559.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   708.00   CHANNEL SLOPE =  0.0144
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.796
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   2.95
  Tc(MIN.) =   13.40
  SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    0.84
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       3.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   4.22
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    232.00 =    1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.796
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.20
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.74
  TC(MIN.) =   13.40

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 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         3.74    13.40       2.796        1.37
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    232.00 =    1372.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        52.84     8.96       3.294       17.50
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1264.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      55.34       8.96        3.294
      2      48.60      13.40        2.796

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      55.34   Tc(MIN.) =    8.96
  TOTAL AREA(ACRES) =       18.9

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1573.80
  DOWNSTREAM ELEVATION(FEET) =   1572.27
  ELEVATION DIFFERENCE(FEET) =      1.53
  TC = 0.303*[(  100.00**3)/(     1.53)]**.2 =    4.412
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1572.27  DOWNSTREAM ELEVATION(FEET) = 1557.80
  STREET LENGTH(FEET) =   877.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 38.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   6.31   Tc(MIN.) =   11.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.996
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    3.91
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.47
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     977.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.996
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       4.42
  TC(MIN.) =   11.31

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
```

```
==============================================================================
  UPSTREAM ELEVATION(FEET) = 1557.80  DOWNSTREAM ELEVATION(FEET) = 1557.16
  STREET LENGTH(FEET) =   189.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 38.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   16.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =   13.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.795
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       4.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  17.00
  FLOW VELOCITY(FEET/SEC.) =  1.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1166.00 FEET.
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.7  TC(MIN.) =     13.42
  PEAK FLOW RATE(CFS)   =       4.65
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

100-YR 1-HR MITIGATED

```
************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1452

                        Analysis prepared by:



------------------------------------------------------------------------
  FILE NAME: 3983PD00.DAT
  TIME/DATE OF STUDY: 15:12 03/14/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.840
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.892
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.150
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.520
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4041025
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4066907
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.520
  SLOPE OF INTENSITY DURATION CURVE = 0.4067
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

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

************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.00
  UPSTREAM ELEVATION(FEET) =   1571.25
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =      1.25
  TC = 0.303*[(   68.00**3)/(     1.25)]**.2 =    3.645
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.19
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1570.00  DOWNSTREAM ELEVATION(FEET) = 1568.80
  STREET LENGTH(FEET) =   147.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.28
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    6.93
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8902
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.52
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.30
  FLOW VELOCITY(FEET/SEC.) =  1.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.35
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8902
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.81
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.52
  TC(MIN.) =    6.93

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1564.80  DOWNSTREAM(FEET) =  1563.13
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.52
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     382.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.522
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8899
```

```
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    1.47
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.99
  TC(MIN.) =    7.60

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.96  DOWNSTREAM(FEET) =  1561.84
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.99
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     494.00 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) =  3.454
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.85
  TC(MIN.) =    7.98

****************************************************************************
  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) =  3.454
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.19
  TC(MIN.) =    7.98

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.51  DOWNSTREAM(FEET) =  1561.00
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.19
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.13
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.95
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.14
  TC(MIN.) =    8.13
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.50
  TC(MIN.) =    8.13

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.15
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.66
  TC(MIN.) =    8.13

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.00  DOWNSTREAM(FEET) =  1559.97
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.66
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    8.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =     648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.377
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8895
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    0.69
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.35
  TC(MIN.) =    8.43

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.377
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8895
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       6.59
  TC(MIN.) =    8.43

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1559.97  DOWNSTREAM(FEET) =  1559.04
  FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.59
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =     741.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.02   SUBAREA RUNOFF(CFS) =    6.00
  TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =      12.58
  TC(MIN.) =    8.68

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

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
  UPSTREAM ELEVATION(FEET) =   1569.21
  DOWNSTREAM ELEVATION(FEET) =   1567.84
  ELEVATION DIFFERENCE(FEET) =      1.37
  TC = 0.303*[(   89.00**3)/(     1.37)]**.2 =    4.206
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.84  DOWNSTREAM(FEET) =  1562.90
  FLOW LENGTH(FEET) =    94.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.69
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.86
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    5.42
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     183.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.040
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8911
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.43
  TC(MIN.) =    5.42
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.73  DOWNSTREAM(FEET) =  1561.54
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.43
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.91
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =     303.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    2.26
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.69
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.52
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       4.21
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       5.22
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.87
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       6.09
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.88  DOWNSTREAM(FEET) =  1556.63
```

```
  FLOW LENGTH(FEET) =   226.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.09
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    6.56
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    107.00 =     529.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 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        6.09     6.56       3.740        1.73
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    107.00 =     529.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       12.58     8.68       3.337        4.13
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =     741.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      15.59       6.56        3.740
      2      18.01       8.68        3.337

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.01   Tc(MIN.) =    8.68
  TOTAL AREA(ACRES) =        5.9

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

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =      18.61
  TC(MIN.) =    8.68

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.71
  TOTAL AREA(ACRES) =        6.3   TOTAL RUNOFF(CFS) =      19.32
  TC(MIN.) =    8.68
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1556.30  DOWNSTREAM(FEET) =  1555.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.06
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.32
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    114.00 =     866.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.297
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.85
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =      20.17
  TC(MIN.) =    8.94

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.297
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      20.49
  TC(MIN.) =    8.94

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    76.00
  UPSTREAM ELEVATION(FEET) =   1570.82
  DOWNSTREAM ELEVATION(FEET) =   1569.32
  ELEVATION DIFFERENCE(FEET) =      1.50
  TC = 0.303*[(   76.00**3)/(     1.50)]**.2 =    3.757
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
```

```
============================================================================
  UPSTREAM ELEVATION(FEET) = 1569.32  DOWNSTREAM ELEVATION(FEET) = 1565.50
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 62.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   4.40   Tc(MIN.) =    9.40
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.230
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.01
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.42
  FLOW VELOCITY(FEET/SEC.) =  1.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     496.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.50  DOWNSTREAM(FEET) =  1561.12
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.20
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.54
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =     534.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.212
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.60
  TC(MIN.) =    9.54

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.212
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.83
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.42
  TC(MIN.) =    9.54
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.79  DOWNSTREAM(FEET) =  1556.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.42
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     756.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 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        3.42    10.07       3.142        1.18
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     756.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       20.49     8.94       3.297        6.70
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    124.00 =     866.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      23.53       8.94        3.297
      2      22.95      10.07        3.142

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.53   Tc(MIN.) =    8.94
  TOTAL AREA(ACRES) =        7.9

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.24   RAIN INTENSITY(INCH/HOUR) =  2.73
  TOTAL AREA(ACRES) =     7.90   TOTAL RUNOFF(CFS) =      9.93

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.50  DOWNSTREAM(FEET) =  1560.20
```

```
  FLOW LENGTH(FEET) =   206.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.39
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.93
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   14.61
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    231.00 =    1072.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    48.00
  UPSTREAM ELEVATION(FEET) =   1571.08
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =      1.08
  TC = 0.303*[(   48.00**3)/(     1.08)]**.2 =    3.045
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1570.00  DOWNSTREAM(FEET) =   1569.54
  CHANNEL LENGTH THRU SUBAREA(FEET) =    80.00   CHANNEL SLOPE =  0.0057
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  25.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.857
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8879
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.24
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.08
  Tc(MIN.) =    6.08
  SUBAREA AREA(ACRES) =     0.29       SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     128.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.54  DOWNSTREAM(FEET) =  1563.61
  FLOW LENGTH(FEET) =   194.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.97
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.14
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    6.89
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     322.00 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) =  3.665
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8874
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.33
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.47
  TC(MIN.) =    6.89

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.44  DOWNSTREAM(FEET) =  1562.18
  FLOW LENGTH(FEET) =   127.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.80
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.47
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    7.33
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     449.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.98
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.46
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.67
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.12
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       4.57
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1561.85  DOWNSTREAM(FEET) =  1561.24
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.52
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.78
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.35
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.51
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.95
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.24  DOWNSTREAM(FEET) =  1560.20
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.95
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.483
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    1.05
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       7.00
  TC(MIN.) =    7.81
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.20  DOWNSTREAM(FEET) =  1560.04
  FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.00
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.86
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =     630.00 FEET.

****************************************************************************
  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) =  3.475
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       7.58
  TC(MIN.) =    7.86

****************************************************************************
  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) =  3.475
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.31
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       7.89
  TC(MIN.) =    7.86

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1559.71  DOWNSTREAM(FEET) =  1558.83
  FLOW LENGTH(FEET) =    87.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.89
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.08
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =     717.00 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) =  3.435
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.72   SUBAREA RUNOFF(CFS) =    8.31
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      16.20
  TC(MIN.) =    8.08

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.59  DOWNSTREAM(FEET) =  1557.75
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.20
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.23
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    209.00 =     787.00 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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.61   SUBAREA RUNOFF(CFS) =    1.85
  TOTAL AREA(ACRES) =        5.8   TOTAL RUNOFF(CFS) =      18.05
  TC(MIN.) =    8.23

****************************************************************************
  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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        6.0   TOTAL RUNOFF(CFS) =      18.63
  TC(MIN.) =    8.23

****************************************************************************
  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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      19.78
  TC(MIN.) =    8.23

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =   1572.18
  DOWNSTREAM ELEVATION(FEET) =   1571.05
  ELEVATION DIFFERENCE(FEET) =      1.13
  TC = 0.303*[(   67.00**3)/(     1.13)]**.2 =    3.687
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
```

```
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1571.05  DOWNSTREAM(FEET) =   1570.64
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0054
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  25.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.874
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8879
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.25
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =    6.01
  SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1566.64  DOWNSTREAM(FEET) =  1565.79
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.92
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.37
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     228.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.783
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.12
  TC(MIN.) =    6.37

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.46  DOWNSTREAM(FEET) =  1564.65
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.12
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     309.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.715
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8875
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.92
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.05
  TC(MIN.) =    6.66

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1564.65  DOWNSTREAM(FEET) =  1563.83
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.05
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =     391.00 FEET.

****************************************************************************
  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) =  3.655
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8873
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       4.05
  TC(MIN.) =    6.94

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.50  DOWNSTREAM(FEET) =  1562.70
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.05
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    7.18
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =     471.00 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) =  3.604
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8872
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       5.04
  TC(MIN.) =    7.18

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.70  DOWNSTREAM(FEET) =  1561.28
  FLOW LENGTH(FEET) =   142.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.04
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =     613.00 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) =  3.522
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.45
  TC(MIN.) =    7.60

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.94  DOWNSTREAM(FEET) =  1560.32
  FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.45
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.78
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =     675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.489
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.32   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.44
  TC(MIN.) =    7.78

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.489
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.69
  TC(MIN.) =    7.78

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.32  DOWNSTREAM(FEET) =  1559.12
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.69
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    8.10
```

```
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    225.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    78.00
  UPSTREAM ELEVATION(FEET) =   1570.82
  DOWNSTREAM ELEVATION(FEET) =   1569.22
  ELEVATION DIFFERENCE(FEET) =      1.60
  TC = 0.303*[(   78.00**3)/(     1.60)]**.2 =    3.767
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1569.22  DOWNSTREAM ELEVATION(FEET) = 1568.73
  STREET LENGTH(FEET) =    64.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 62.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.34
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    5.80
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.931
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8881
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.94
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.21
  FLOW VELOCITY(FEET/SEC.) =  1.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     142.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1564.73  DOWNSTREAM(FEET) =  1563.62
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =     252.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.29  DOWNSTREAM(FEET) =  1562.33
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.17
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    224.00 =     347.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.716
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8875
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.44   SUBAREA RUNOFF(CFS) =    1.45
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.62
  TC(MIN.) =    6.66

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.33  DOWNSTREAM(FEET) =  1560.69
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.62
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    7.10
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 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        2.62     7.10       3.620        0.77
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     485.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.69     8.10       3.432        2.05
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    225.00 =     795.00 FEET.

 ****************************WARNING*********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
```

```
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       8.48       7.10        3.620
      2       9.17       8.10        3.432

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.17   Tc(MIN.) =    8.10
  TOTAL AREA(ACRES) =        2.8

************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.79  DOWNSTREAM(FEET) =  1557.75
  FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.17
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.15
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    226.00 =     828.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    226.00 IS CODE =  11
------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        9.17     8.15       3.423        2.82
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    226.00 =     828.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       19.78     8.23       3.410        6.37
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    226.00 =     787.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      28.78       8.15        3.423
      2      28.92       8.23        3.410

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.92   Tc(MIN.) =    8.23
  TOTAL AREA(ACRES) =        9.2

************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    226.00 IS CODE =   7
------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
========================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.63   RAIN INTENSITY(INCH/HOUR) =  2.70
  TOTAL AREA(ACRES) =     9.20   TOTAL RUNOFF(CFS) =     10.23
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.50  DOWNSTREAM(FEET) =  1559.80
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.75
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.23
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   15.49
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 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       10.23    15.49       2.636        9.20
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        9.93    14.61       2.700        7.90
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    231.00 =    1072.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      19.58      14.61        2.700
      2      19.93      15.49        2.636

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.93   Tc(MIN.) =   15.49
  TOTAL AREA(ACRES) =       17.1

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 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.) =   15.49
  RAINFALL INTENSITY(INCH/HR) =   2.64
  TOTAL STREAM AREA(ACRES) =    17.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.93

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    231.00 IS CODE =   7
----------------------------------------------------------------------------
```

```
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
================================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   8.89   RAIN INTENSITY(INCH/HOUR) =  3.30
  TOTAL AREA(ACRES) =     0.43   TOTAL RUNOFF(CFS) =      1.26

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.89
  RAINFALL INTENSITY(INCH/HR) =   3.30
  TOTAL STREAM AREA(ACRES) =     0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.26

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       19.93    15.49        2.636         17.10
      2        1.26     8.89        3.304          0.43

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       12.70     8.89       3.304
      2       20.93    15.49       2.636

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.93   Tc(MIN.) =   15.49
  TOTAL AREA(ACRES) =       17.5
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1559.47  DOWNSTREAM(FEET) =  1559.25
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.71
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.93
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   15.58
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1264.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1577.62
  DOWNSTREAM ELEVATION(FEET) =   1576.19
  ELEVATION DIFFERENCE(FEET) =      1.43
  TC = 0.303*[(  100.00**3)/(     1.43)]**.2 =    4.472
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1576.19  DOWNSTREAM ELEVATION(FEET) = 1569.20
  STREET LENGTH(FEET) =   564.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   5.45   Tc(MIN.) =   10.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.094
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    1.32
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.61
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     664.00 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) =  3.094
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.70
  TC(MIN.) =   10.45

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    232.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1569.20  DOWNSTREAM(FEET) =   1559.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   708.00   CHANNEL SLOPE =  0.0144
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.796
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   2.95
  Tc(MIN.) =   13.40
  SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    0.84
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       3.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   4.22
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    232.00 =    1372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.796
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.20
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.74
  TC(MIN.) =   13.40

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 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        3.74    13.40       2.796        1.37
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    232.00 =    1372.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       20.93    15.58       2.630       17.53
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1264.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      21.75      13.40        2.796
      2      24.45      15.58        2.630

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.45   Tc(MIN.) =   15.58
  TOTAL AREA(ACRES) =       18.9

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1573.80
  DOWNSTREAM ELEVATION(FEET) =   1572.27
  ELEVATION DIFFERENCE(FEET) =      1.53
  TC = 0.303*[(  100.00**3)/(     1.53)]**.2 =    4.412
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1572.27  DOWNSTREAM ELEVATION(FEET) = 1557.80
  STREET LENGTH(FEET) =   877.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 38.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   6.31   Tc(MIN.) =   11.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.996
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    3.91
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.47
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     977.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.996
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       4.42
  TC(MIN.) =   11.31

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1557.80  DOWNSTREAM ELEVATION(FEET) = 1557.16
  STREET LENGTH(FEET) =   189.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 38.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   16.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =   13.42
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.795
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.22
  TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       4.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  17.00
  FLOW VELOCITY(FEET/SEC.) =  1.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1166.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.7  TC(MIN.) =     13.42
  PEAK FLOW RATE(CFS)   =       4.65
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

100-YR 1-HR OFFSITE

```
************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1452

                        Analysis prepared by:



------------------------------------------------------------------------
  FILE NAME: 3983OFF.DAT
  TIME/DATE OF STUDY: 12:19 03/14/2024
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.840
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.892
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.150
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.520
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4041025
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4066907
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.520
  SLOPE OF INTENSITY DURATION CURVE = 0.4067
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    502.00 TO NODE    503.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   268.00
  UPSTREAM ELEVATION(FEET) =   1722.00
  DOWNSTREAM ELEVATION(FEET) =   1640.00
  ELEVATION DIFFERENCE(FEET) =     82.00
  TC = 0.937*[(  268.00**3)/(    82.00)]**.2 =   11.118
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.017
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7844
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      1.66
  TOTAL AREA(ACRES) =      0.70   TOTAL RUNOFF(CFS) =      1.66

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

```
 FLOW PROCESS FROM NODE    503.00 TO NODE    504.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1640.00  DOWNSTREAM(FEET) =   1574.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1348.00   CHANNEL SLOPE =  0.0486
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.537
 SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7927
 SOIL CLASSIFICATION IS "D"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.40
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.80
 AVERAGE FLOW DEPTH(FEET) =   0.28   TRAVEL TIME(MIN.) =   5.91
 Tc(MIN.) =   17.03
 SUBAREA AREA(ACRES) =    14.59       SUBAREA RUNOFF(CFS) =   29.34
 TOTAL AREA(ACRES) =       15.3         PEAK FLOW RATE(CFS) =      31.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   4.53
 LONGEST FLOWPATH FROM NODE    502.00 TO NODE    504.00 =    1616.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    504.00 TO NODE    506.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1570.50  DOWNSTREAM(FEET) =  1567.44
 FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  33.55
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.00
 PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =   17.03
 LONGEST FLOWPATH FROM NODE    502.00 TO NODE    506.00 =    1625.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    506.00 TO NODE    507.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1567.11  DOWNSTREAM(FEET) =  1566.97
 FLOW LENGTH(FEET) =    28.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.90
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.00
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   17.10
 LONGEST FLOWPATH FROM NODE    502.00 TO NODE    507.00 =    1653.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    507.00 TO NODE    512.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1566.64  DOWNSTREAM(FEET) =  1566.27
 FLOW LENGTH(FEET) =    73.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.00
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   17.28
 LONGEST FLOWPATH FROM NODE    502.00 TO NODE    512.00 =    1726.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    512.00 TO NODE    512.00 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.) =   17.28
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =    15.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.00

****************************************************************************
  FLOW PROCESS FROM NODE    500.00 TO NODE    505.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   382.00
  UPSTREAM ELEVATION(FEET) =   1900.00
  DOWNSTREAM ELEVATION(FEET) =   1780.00
  ELEVATION DIFFERENCE(FEET) =    120.00
  TC = 0.937*[(  382.00**3)/(   120.00)]**.2 =   12.745
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.854
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7787
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      2.44
  TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      2.44

****************************************************************************
  FLOW PROCESS FROM NODE    505.00 TO NODE    510.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1780.00  DOWNSTREAM(FEET) =   1574.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2722.00   CHANNEL SLOPE =  0.0755
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.355
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7857
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      45.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.90
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   7.69
  Tc(MIN.) =   20.44
  SUBAREA AREA(ACRES) =    45.71       SUBAREA RUNOFF(CFS) =   84.59
  TOTAL AREA(ACRES) =       46.8         PEAK FLOW RATE(CFS) =      87.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   7.04
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    510.00 =    3104.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    511.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1570.50  DOWNSTREAM(FEET) =  1566.72
  FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  46.96
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.04
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =   20.44
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    511.00 =    3113.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    511.00 TO NODE    511.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.355
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7571
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =       47.0   TOTAL RUNOFF(CFS) =      87.31
  TC(MIN.) =   20.44

****************************************************************************
  FLOW PROCESS FROM NODE    511.00 TO NODE    512.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1566.39  DOWNSTREAM(FEET) =  1566.27
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.75
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.31
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   20.49
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    512.00 =    3138.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    512.00 TO NODE    512.00 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.) =   20.49
  RAINFALL INTENSITY(INCH/HR) =   2.35
  TOTAL STREAM AREA(ACRES) =    46.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     87.31

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       31.00    17.28        2.522         15.29
      2       87.31    20.49        2.353         46.96

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1      104.61    17.28       2.522
      2      116.22    20.49       2.353

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     116.22   Tc(MIN.) =   20.49
  TOTAL AREA(ACRES) =       62.2
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    512.00 =    3138.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    512.00 TO NODE    513.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.86  DOWNSTREAM(FEET) =  1563.94
  FLOW LENGTH(FEET) =   388.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.6 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.56
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     116.22
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   21.16
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    513.00 =    3526.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    513.00 TO NODE    513.00 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.) =   21.16
  RAINFALL INTENSITY(INCH/HR) =   2.32
  TOTAL STREAM AREA(ACRES) =    62.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    116.22

****************************************************************************
  FLOW PROCESS FROM NODE    515.00 TO NODE    520.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   380.00
  UPSTREAM ELEVATION(FEET) =   1586.00
  DOWNSTREAM ELEVATION(FEET) =   1571.70
  ELEVATION DIFFERENCE(FEET) =     14.30
  TC = 0.937*[(  380.00**3)/(    14.30)]**.2 =   19.441
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.404
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7596
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      2.56
  TOTAL AREA(ACRES) =      1.40   TOTAL RUNOFF(CFS) =      2.56

****************************************************************************
  FLOW PROCESS FROM NODE    520.00 TO NODE    521.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1571.70  DOWNSTREAM(FEET) =   1570.58
  CHANNEL LENGTH THRU SUBAREA(FEET) =    13.00   CHANNEL SLOPE =  0.0862
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.400
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7594
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.64
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.08
  Tc(MIN.) =   19.52
  SUBAREA AREA(ACRES) =     0.15       SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       2.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.71
  LONGEST FLOWPATH FROM NODE    515.00 TO NODE    521.00 =     393.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    521.00 TO NODE    513.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1566.58  DOWNSTREAM(FEET) =  1563.94
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.30
```

```
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.83
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   19.57
  LONGEST FLOWPATH FROM NODE    515.00 TO NODE    513.00 =     423.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    513.00 TO NODE    513.00 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.) =   19.57
  RAINFALL INTENSITY(INCH/HR) =   2.40
  TOTAL STREAM AREA(ACRES) =     1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.83

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      116.22    21.16        2.322         62.25
      2        2.83    19.57        2.397          1.55

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

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      110.28    19.57       2.397
      2      118.96    21.16       2.322

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     118.96   Tc(MIN.) =   21.16
  TOTAL AREA(ACRES) =       63.8
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    513.00 =    3526.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    513.00 TO NODE    522.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.94  DOWNSTREAM(FEET) =  1562.99
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.63
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     118.96
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   21.49
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    522.00 =    3716.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    522.00 TO NODE    522.00 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.) =   21.49
  RAINFALL INTENSITY(INCH/HR) =   2.31
  TOTAL STREAM AREA(ACRES) =    63.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    118.96
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    525.00 TO NODE    530.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY(1-ACRE LOTS)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   380.00
  UPSTREAM ELEVATION(FEET) =   1660.00
  DOWNSTREAM ELEVATION(FEET) =   1630.00
  ELEVATION DIFFERENCE(FEET) =     30.00
  TC = 0.469*[(  380.00**3)/(    30.00)]**.2 =    8.393
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.383
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .8164
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      3.04
  TOTAL AREA(ACRES) =      1.10   TOTAL RUNOFF(CFS) =      3.04

****************************************************************************
  FLOW PROCESS FROM NODE    530.00 TO NODE    535.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1630.00  DOWNSTREAM(FEET) =   1571.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2528.00   CHANNEL SLOPE =  0.0230
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.383
  SINGLE-FAMILY(1-ACRE LOT) RUNOFF COEFFICIENT = .7868
  SOIL CLASSIFICATION IS "D"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.67
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =  11.47
  Tc(MIN.) =   19.86
  SUBAREA AREA(ACRES) =    36.98       SUBAREA RUNOFF(CFS) =   69.34
  TOTAL AREA(ACRES) =       38.1         PEAK FLOW RATE(CFS) =      72.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   4.34
  LONGEST FLOWPATH FROM NODE    525.00 TO NODE    535.00 =    2908.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    535.00 TO NODE    536.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1568.80  DOWNSTREAM(FEET) =  1566.41
  FLOW LENGTH(FEET) =     9.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.57
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.38
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =   19.86
  LONGEST FLOWPATH FROM NODE    525.00 TO NODE    536.00 =    2917.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    536.00 TO NODE    536.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.383
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7585
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.23
  TOTAL AREA(ACRES) =       38.2   TOTAL RUNOFF(CFS) =      72.61
  TC(MIN.) =   19.86

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

```
 FLOW PROCESS FROM NODE    536.00 TO NODE    522.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1566.08  DOWNSTREAM(FEET) =  1562.99
 FLOW LENGTH(FEET) =   102.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.85
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      72.61
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   19.96
 LONGEST FLOWPATH FROM NODE    525.00 TO NODE    522.00 =    3019.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    522.00 TO NODE    522.00 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.) =   19.96
 RAINFALL INTENSITY(INCH/HR) =   2.38
 TOTAL STREAM AREA(ACRES) =    38.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     72.61

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      118.96    21.49        2.308         63.80
     2       72.61    19.96        2.378         38.21

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

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      183.11    19.96       2.378
     2      189.43    21.49       2.308

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     189.43   Tc(MIN.) =   21.49
 TOTAL AREA(ACRES) =      102.0
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    522.00 =    3716.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    522.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1562.66  DOWNSTREAM(FEET) =  1559.80
 FLOW LENGTH(FEET) =   569.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.77
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     189.43
 PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   22.37
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    231.00 =    4285.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      102.0  TC(MIN.) =     22.37
 PEAK FLOW RATE(CFS)   =     189.43
```

==========
==========
END OF RATIONAL METHOD ANALYSIS

100-YR 1-HR ONSITE MITIGATED WITH OFFSITE

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******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                      (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                      (Rational Tabling Version 23.0)
                  Release Date: 07/01/2016  License ID 1452

                           Analysis prepared by:




------------------------------------------------------------------------------
  FILE NAME: 3983DOFF.DAT
  TIME/DATE OF STUDY: 15:12 03/14/2024
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  1.840
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.892
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.150
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.520
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.4041025
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.4066907
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.520
  SLOPE OF INTENSITY DURATION CURVE = 0.4067
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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    100.00 TO NODE    101.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    68.00
  UPSTREAM ELEVATION(FEET) =   1571.25
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =      1.25
```

```
  TC = 0.303*[(   68.00**3)/(     1.25)]**.2 =    3.645
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1570.00  DOWNSTREAM ELEVATION(FEET) = 1568.80
  STREET LENGTH(FEET) =   147.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 40.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.83
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.28
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    6.93
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8902
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.52
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       0.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.30
  FLOW VELOCITY(FEET/SEC.) =  1.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.35
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.657
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8902
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.81
  TOTAL AREA(ACRES) =        0.5   TOTAL RUNOFF(CFS) =       1.52
  TC(MIN.) =    6.93

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1564.80  DOWNSTREAM(FEET) =  1563.13
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.52
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     382.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.522
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8899
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.47   SUBAREA RUNOFF(CFS) =    1.47
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.99
  TC(MIN.) =    7.60

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.96  DOWNSTREAM(FEET) =  1561.84
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.99
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =     494.00 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) =  3.454
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.85
  TC(MIN.) =    7.98

****************************************************************************
  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) =  3.454
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.34
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.19
  TC(MIN.) =    7.98

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.51  DOWNSTREAM(FEET) =  1561.00
  FLOW LENGTH(FEET) =    51.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.19
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.13
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.95
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.14
  TC(MIN.) =    8.13

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.12   SUBAREA RUNOFF(CFS) =    0.37
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.50
  TC(MIN.) =    8.13

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.427
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.15
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.66
  TC(MIN.) =    8.13

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.00  DOWNSTREAM(FEET) =  1559.97
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.66
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    8.43
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =     648.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.377
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8895
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.23   SUBAREA RUNOFF(CFS) =    0.69
 TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.35
 TC(MIN.) =    8.43

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.377
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8895
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.24
 TOTAL AREA(ACRES) =        2.1   TOTAL RUNOFF(CFS) =       6.59
 TC(MIN.) =    8.43

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1559.97  DOWNSTREAM(FEET) =  1559.04
 FLOW LENGTH(FEET) =    93.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.16
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.59
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    8.68
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =     741.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    2.02   SUBAREA RUNOFF(CFS) =    6.00
 TOTAL AREA(ACRES) =        4.1   TOTAL RUNOFF(CFS) =      12.58
 TC(MIN.) =    8.68

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

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
```

```
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    89.00
  UPSTREAM ELEVATION(FEET) =   1569.21
  DOWNSTREAM ELEVATION(FEET) =   1567.84
  ELEVATION DIFFERENCE(FEET) =      1.37
  TC = 0.303*[(   89.00**3)/(     1.37)]**.2 =    4.206
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.23   TOTAL RUNOFF(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.84  DOWNSTREAM(FEET) =  1562.90
  FLOW LENGTH(FEET) =    94.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.69
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.86
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    5.42
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     183.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.040
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8911
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.16   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.43
  TC(MIN.) =    5.42

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1562.73  DOWNSTREAM(FEET) =  1561.54
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.11
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.43
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.91
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    113.00 =     303.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
```

```
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.65   SUBAREA RUNOFF(CFS) =    2.26
  TOTAL AREA(ACRES) =       1.0   TOTAL RUNOFF(CFS) =       3.69
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.52
  TOTAL AREA(ACRES) =       1.2   TOTAL RUNOFF(CFS) =       4.21
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =       1.5   TOTAL RUNOFF(CFS) =       5.22
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8908
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.87
  TOTAL AREA(ACRES) =       1.7   TOTAL RUNOFF(CFS) =       6.09
  TC(MIN.) =    5.91

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.88  DOWNSTREAM(FEET) =  1556.63
  FLOW LENGTH(FEET) =   226.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.09
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    6.56
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    107.00 =     529.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 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        6.09     6.56       3.740        1.73
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    107.00 =     529.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       12.58     8.68       3.337        4.13
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =     741.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF      Tc      INTENSITY
 NUMBER     (CFS)    (MIN.)   (INCH/HOUR)
     1      15.59       6.56       3.740
     2      18.01       8.68       3.337

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.01   Tc(MIN.) =    8.68
 TOTAL AREA(ACRES) =        5.9

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

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.59
 TOTAL AREA(ACRES) =        6.1   TOTAL RUNOFF(CFS) =      18.61
 TC(MIN.) =    8.68

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.337
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8894
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.71
 TOTAL AREA(ACRES) =        6.3   TOTAL RUNOFF(CFS) =      19.32
 TC(MIN.) =    8.68

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =  1556.30  DOWNSTREAM(FEET) =  1555.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.06
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.32
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    114.00 =     866.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.297
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.85
  TOTAL AREA(ACRES) =        6.6   TOTAL RUNOFF(CFS) =      20.17
  TC(MIN.) =    8.94

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.297
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8893
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.11   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        6.7   TOTAL RUNOFF(CFS) =      20.49
  TC(MIN.) =    8.94

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    76.00
  UPSTREAM ELEVATION(FEET) =   1570.82
  DOWNSTREAM ELEVATION(FEET) =   1569.32
  ELEVATION DIFFERENCE(FEET) =      1.50
  TC = 0.303*[(   76.00**3)/(     1.50)]**.2 =    3.757
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1569.32  DOWNSTREAM ELEVATION(FEET) = 1565.50
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 62.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   4.40   Tc(MIN.) =    9.40
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.230
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.01
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.42
  FLOW VELOCITY(FEET/SEC.) =  1.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     496.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.50  DOWNSTREAM(FEET) =  1561.12
  FLOW LENGTH(FEET) =    38.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.20
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.54
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =     534.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.212
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.40
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.60
  TC(MIN.) =    9.54

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.212
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8891
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.83
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.42
  TC(MIN.) =    9.54

********************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.79  DOWNSTREAM(FEET) =  1556.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.42
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     756.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 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        3.42    10.07       3.142        1.18
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     756.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       20.49     8.94       3.297        6.70
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    124.00 =     866.00 FEET.

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

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF      Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      23.53       8.94        3.297
      2      22.95      10.07        3.142

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.53   Tc(MIN.) =    8.94
  TOTAL AREA(ACRES) =        7.9

********************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 IS CODE =  12
--------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
================================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    124.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  14.24   RAIN INTENSITY(INCH/HOUR) =  2.73
  TOTAL AREA(ACRES) =     7.90   TOTAL RUNOFF(CFS) =      9.93

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.50  DOWNSTREAM(FEET) =  1560.20
  FLOW LENGTH(FEET) =   206.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.39
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.93
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   14.61
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    231.00 =    1072.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    48.00
  UPSTREAM ELEVATION(FEET) =   1571.08
  DOWNSTREAM ELEVATION(FEET) =   1570.00
  ELEVATION DIFFERENCE(FEET) =      1.08
  TC = 0.303*[(   48.00**3)/(     1.08)]**.2 =    3.045
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.15
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.15

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1570.00  DOWNSTREAM(FEET) =   1569.54
  CHANNEL LENGTH THRU SUBAREA(FEET) =    80.00   CHANNEL SLOPE =  0.0057
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  25.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.857
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8879
```

```
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.24
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.08
  Tc(MIN.) =    6.08
  SUBAREA AREA(ACRES) =     0.29       SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     128.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.54  DOWNSTREAM(FEET) =  1563.61
  FLOW LENGTH(FEET) =   194.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.97
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.14
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    6.89
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     322.00 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) =  3.665
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8874
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.33
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.47
  TC(MIN.) =    6.89

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1563.44  DOWNSTREAM(FEET) =  1562.18
  FLOW LENGTH(FEET) =   127.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.80
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.47
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    7.33
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     449.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.98
```

```
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       3.46
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.67
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.12
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.573
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8871
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       4.57
  TC(MIN.) =    7.33

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.85  DOWNSTREAM(FEET) =  1561.24
  FLOW LENGTH(FEET) =    61.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.52
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    205.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.78
  TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.35
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.16
```

```
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.51
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.538
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8870
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.44
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.95
  TC(MIN.) =    7.52

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1561.24  DOWNSTREAM(FEET) =  1560.20
  FLOW LENGTH(FEET) =   104.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.95
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    7.81
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    206.00 =     614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.483
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    1.05
  TOTAL AREA(ACRES) =        2.2   TOTAL RUNOFF(CFS) =       7.00
  TC(MIN.) =    7.81

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.20  DOWNSTREAM(FEET) =  1560.04
  FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.00
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.86
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =     630.00 FEET.

****************************************************************************
  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) =  3.475
```

```
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.59
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       7.58
  TC(MIN.) =    7.86

****************************************************************************
  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) =  3.475
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.31
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       7.89
  TC(MIN.) =    7.86

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    208.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1559.71  DOWNSTREAM(FEET) =  1558.83
  FLOW LENGTH(FEET) =    87.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.89
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.08
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    208.00 =     717.00 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) =  3.435
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8897
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    2.72   SUBAREA RUNOFF(CFS) =    8.31
  TOTAL AREA(ACRES) =        5.2   TOTAL RUNOFF(CFS) =      16.20
  TC(MIN.) =    8.08

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1558.59  DOWNSTREAM(FEET) =  1557.75
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.20
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.23
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    209.00 =     787.00 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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.61   SUBAREA RUNOFF(CFS) =    1.85
  TOTAL AREA(ACRES) =        5.8   TOTAL RUNOFF(CFS) =      18.05
  TC(MIN.) =    8.23

****************************************************************************
  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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.19   SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        6.0   TOTAL RUNOFF(CFS) =      18.63
  TC(MIN.) =    8.23

****************************************************************************
  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) =  3.410
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8896
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =        6.4   TOTAL RUNOFF(CFS) =      19.78
  TC(MIN.) =    8.23

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    209.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    211.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =   1572.18
  DOWNSTREAM ELEVATION(FEET) =   1571.05
  ELEVATION DIFFERENCE(FEET) =      1.13
  TC = 0.303*[(   67.00**3)/(     1.13)]**.2 =    3.687
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1571.05  DOWNSTREAM(FEET) =   1570.64
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0054
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  25.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.874
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8879
  SOIL CLASSIFICATION IS "C"
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.25
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =    6.01
  SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       1.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     143.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1566.64  DOWNSTREAM(FEET) =  1565.79
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.92
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.37
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    213.00 =     228.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    213.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.783
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.12
  TC(MIN.) =    6.37

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1565.46  DOWNSTREAM(FEET) =  1564.65
  FLOW LENGTH(FEET) =    81.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.12
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.66
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    214.00 =     309.00 FEET.

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

```
 FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.715
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8875
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.28   SUBAREA RUNOFF(CFS) =    0.92
 TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.05
 TC(MIN.) =    6.66

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1564.65  DOWNSTREAM(FEET) =  1563.83
 FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.05
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    6.94
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =     391.00 FEET.

****************************************************************************
 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) =  3.655
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8873
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    1.01
 TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       4.05
 TC(MIN.) =    6.94

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1563.50  DOWNSTREAM(FEET) =  1562.70
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.05
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    7.18
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    216.00 =     471.00 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) =  3.604
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8872
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.31   SUBAREA RUNOFF(CFS) =    0.99
 TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       5.04
```

```
 TC(MIN.) =    7.18

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1562.70  DOWNSTREAM(FEET) =  1561.28
 FLOW LENGTH(FEET) =   142.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.04
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    7.60
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    217.00 =     613.00 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) =  3.522
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.13   SUBAREA RUNOFF(CFS) =    0.41
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       5.45
 TC(MIN.) =    7.60

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1560.94  DOWNSTREAM(FEET) =  1560.32
 FLOW LENGTH(FEET) =    62.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.45
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.78
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    218.00 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.489
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.32   SUBAREA RUNOFF(CFS) =    0.99
 TOTAL AREA(ACRES) =        2.0   TOTAL RUNOFF(CFS) =       6.44
 TC(MIN.) =    7.78

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.489
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.25
  TOTAL AREA(ACRES) =       2.0   TOTAL RUNOFF(CFS) =       6.69
  TC(MIN.) =    7.78

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1560.32  DOWNSTREAM(FEET) =  1559.12
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.69
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    8.10
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    225.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    78.00
  UPSTREAM ELEVATION(FEET) =   1570.82
  DOWNSTREAM ELEVATION(FEET) =   1569.22
  ELEVATION DIFFERENCE(FEET) =      1.60
  TC = 0.303*[(   78.00**3)/(     1.60)]**.2 =    3.767
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1569.22  DOWNSTREAM ELEVATION(FEET) = 1568.73
  STREET LENGTH(FEET) =    64.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 62.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
```

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.35
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.34
 STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    5.80
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.931
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8881
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.94
 TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.17

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.21
 FLOW VELOCITY(FEET/SEC.) =  1.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.43
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     142.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    223.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1564.73  DOWNSTREAM(FEET) =  1563.62
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.17
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.26
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    223.00 =     252.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1563.29  DOWNSTREAM(FEET) =  1562.33
 FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.98
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.17
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    6.66
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    224.00 =     347.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    224.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.716
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8875
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.44   SUBAREA RUNOFF(CFS) =    1.45
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       2.62
 TC(MIN.) =    6.66

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

```
 FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1562.33  DOWNSTREAM(FEET) =  1560.69
 FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.62
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    7.10
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 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        2.62     7.10       3.620        0.77
 LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     485.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        6.69     8.10       3.432        2.05
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    225.00 =     795.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       8.48       7.10        3.620
     2       9.17       8.10        3.432

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.17   Tc(MIN.) =    8.10
 TOTAL AREA(ACRES) =        2.8

****************************************************************************
 FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1558.79  DOWNSTREAM(FEET) =  1557.75
 FLOW LENGTH(FEET) =    33.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.17
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.15
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    226.00 =     828.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        9.17     8.15       3.423        2.82
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    226.00 =     828.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       19.78     8.23       3.410        6.37
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    226.00 =     787.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      28.78       8.15       3.423
     2      28.92       8.23       3.410

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      28.92   Tc(MIN.) =    8.23
 TOTAL AREA(ACRES) =        9.2

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    226.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  14.63   RAIN INTENSITY(INCH/HOUR) =  2.70
 TOTAL AREA(ACRES) =     9.20   TOTAL RUNOFF(CFS) =     10.23

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1565.50  DOWNSTREAM(FEET) =  1559.80
 FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.75
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.23
 PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   15.49
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 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       10.23    15.49       2.636        9.20
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        9.93    14.61       2.700        7.90
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    231.00 =    1072.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      19.58      14.61        2.700
     2      19.93      15.49        2.636

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      19.93   Tc(MIN.) =   15.49
 TOTAL AREA(ACRES) =       17.1

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 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.) =   15.49
 RAINFALL INTENSITY(INCH/HR) =   2.64
 TOTAL STREAM AREA(ACRES) =    17.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.93

+----------------------------------------------------------------------------+
| ADDITION OF OFFSITE FLOW                                                   |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    522.00 TO NODE    231.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  22.37   RAIN INTENSITY(INCH/HOUR) =  2.27
 TOTAL AREA(ACRES) =   102.00   TOTAL RUNOFF(CFS) =    189.43

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

```
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 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.) =   22.37
 RAINFALL INTENSITY(INCH/HR) =   2.27
 TOTAL STREAM AREA(ACRES) =   102.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    189.43

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       19.93    15.49        2.636         17.10
     2      189.43    22.37        2.270        102.00

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

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      151.09    15.49       2.636
     2      206.59    22.37       2.270

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     206.59   Tc(MIN.) =   22.37
 TOTAL AREA(ACRES) =      119.1
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    231.00 =    1228.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1559.47  DOWNSTREAM(FEET) =  1559.25
 FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  47.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.85
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     206.59
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   22.42
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1264.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1577.62
  DOWNSTREAM ELEVATION(FEET) =   1576.19
  ELEVATION DIFFERENCE(FEET) =      1.43
  TC = 0.303*[(  100.00**3)/(     1.43)]**.2 =    4.472
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1576.19  DOWNSTREAM ELEVATION(FEET) = 1569.20
  STREET LENGTH(FEET) =   564.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   5.45   Tc(MIN.) =   10.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.094
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    1.32
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.61
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     664.00 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) =  3.094
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8887
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    0.38   SUBAREA RUNOFF(CFS) =    1.04
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.70
```

```
 TC(MIN.) =   10.45

****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    232.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1569.20  DOWNSTREAM(FEET) =   1559.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   708.00   CHANNEL SLOPE =  0.0144
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.796
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
 SOIL CLASSIFICATION IS "D"
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.00
 AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   2.95
 Tc(MIN.) =   13.40
 SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    0.84
 TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       3.54

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   4.22
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    232.00 =    1372.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.796
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.08   SUBAREA RUNOFF(CFS) =    0.20
 TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.74
 TC(MIN.) =   13.40

****************************************************************************
 FLOW PROCESS FROM NODE    232.00 TO NODE    232.00 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         3.74    13.40       2.796        1.37
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    232.00 =    1372.00 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       206.59    22.42       2.268      119.10
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    232.00 =    1264.00 FEET.

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

 ** PEAK FLOW RATE TABLE **
```

```
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     127.22      13.40        2.796
      2     209.62      22.42        2.268

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     209.62   Tc(MIN.) =   22.42
  TOTAL AREA(ACRES) =      120.5

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    401.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =   1573.80
  DOWNSTREAM ELEVATION(FEET) =   1572.27
  ELEVATION DIFFERENCE(FEET) =      1.53
  TC = 0.303*[(  100.00**3)/(     1.53)]**.2 =    4.412
  COMPUTED TIME OF CONCENTRATION INCREASED TO 5 MIN.
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.176
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8913
  SOIL CLASSIFICATION IS "D"
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 1572.27  DOWNSTREAM ELEVATION(FEET) = 1557.80
  STREET LENGTH(FEET) =   877.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 38.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   6.31   Tc(MIN.) =   11.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.996
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
  SOIL CLASSIFICATION IS "D"
  SUBAREA AREA(ACRES) =    1.47      SUBAREA RUNOFF(CFS) =    3.91
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  11.47
```

```
 FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    402.00 =     977.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.996
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.15   SUBAREA RUNOFF(CFS) =    0.40
 TOTAL AREA(ACRES) =        1.6   TOTAL RUNOFF(CFS) =       4.42
 TC(MIN.) =   11.31

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1557.80  DOWNSTREAM ELEVATION(FEET) = 1557.16
 STREET LENGTH(FEET) =   189.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 38.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.53
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.50
   HALFSTREET FLOOD WIDTH(FEET) =   16.87
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.49
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
 STREET FLOW TRAVEL TIME(MIN.) =   2.11   Tc(MIN.) =   13.42
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.795
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8877
 SOIL CLASSIFICATION IS "D"
 SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.22
 TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       4.65

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  17.00
 FLOW VELOCITY(FEET/SEC.) =  1.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.75
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    403.00 =    1166.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.7  TC(MIN.) =     13.42
 PEAK FLOW RATE(CFS)   =       4.65
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

DETENTION ANALYSIS

Proposed Condition
100-yr Storm Event

Tributary Drainage Area to Vault-1

Total Area		%Imp	Fp (infiltration rate based on RI, Plate E-6.2)
7.86		0.92	0.31

Constant Loss Rate

F= Fp(1-0.9Ai)

F= 0.0547

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD UNIT HYDROGRAPH AND EFFECTIVE RAIN CALCULATION FORM	PROJECT: Zeiders JOB #: 3983 Drainage to Vault-1

[1] CONCENTRATION POINT						[2] AREA DESIGNATION						
[3] DRAINAGE AREA - ACRES			7.86	ACRES		[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])				N/A		
[5] UNIT TIME - MINUTES			5	MIN PER E-1.2		[6] LAG TIME-MINUTES						MIN
[7] UNIT TIME-PERCENT OF LAG			N/A			[8] S-CURVE				N/A		
[9] STORM FREQUENCY & DURATION			100 YEAR	1 HOUR		[10] TOTAL ADJUSTED STORM RAIN-INCHES				1.52		IN
[11] VARIABLE LOSS RATE (AVG) -IN/HR			N/A			[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR				N/A		
[13] CONSTANT LOSS RATE-IN/HR			0.0547		IN/HR	[14] LOW LOSS RATE-PERCENT				0.8		

[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]		[23]	[24]	
UNIT TIME PERIOD m	TIME PERCENT OF LAG [7]*[15]	CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	DISTRIB GRAPH PERCENT [17]m-[17]m-1	UNIT HYDROGRAPH CFS HRS/IN [4]*[18]/100	PATTERN PERCENT (PL E-5.9)	STORM RAIN IN/HR 60[10][20]/100[5]	LOSS RATE IN/HR		EFFECTIVE RAIN IN/HR [21] - [22]	FLOW CFS [3]*[23]	VOLUME CF
							MAX	LOW			
0					0	0	0.00	0	0.000	0.00	
5					4.2	0.766	0.05	0.613	0.711	5.64	1691.413
10					4.3	0.784	0.05	0.627	0.730	5.78	1734.781
15					5	0.912	0.05	0.730	0.857	6.79	2038.359
20					5	0.912	0.05	0.730	0.857	6.79	2038.359
25					5.8	1.058	0.05	0.846	1.003	7.95	2385.306
30					6.5	1.186	0.05	0.948	1.131	8.96	2688.884
35					7.4	1.350	0.05	1.080	1.295	10.26	3079.199
40					8.6	1.569	0.05	1.255	1.514	12.00	3599.619
45					12.3	2.244	0.05	1.795	2.189	17.35	5204.248
50					29.1	5.308	0.05	4.246	5.253	41.63	12490.13
55					6.8	1.240	0.05	0.992	1.186	9.40	2818.989
60					5	0.912	0.05	0.730	0.857	6.79	2038.359
				Σ[20] -	100			Σ[23] -	17.58	139.36	41807.65

Proposed Condition
100-yr Storm Event

Tributary Drainage Area to Vault-2

Total Area		%Imp	Fp (infiltration rate based on RI, Plate E-6.2)
9.19		0.93	0.31

Constant Loss Rate

F= Fp(1-0.9Ai)

F= 0.0519

RCFC & WCD HYDROLOGY MANUAL	SYNTHETIC UNIT HYDROGRAPH METHOD UNIT HYDROGRAPH AND EFFECTIVE RAIN CALCULATION FORM	PROJECT: Zeiders JOB #: 3983 Drainage to Vault-2

[1] CONCENTRATION POINT						[2] AREA DESIGNATION						
[3] DRAINAGE AREA - ACRES			9.19	ACRES		[4] ULTIMATE DISCHARGE-CFS-HRS/IN (645*[3])				N/A		
[5] UNIT TIME - MINUTES			5	MIN PER E-1.2		[6] LAG TIME-MINUTES						MIN
[7] UNIT TIME-PERCENT OF LAG			N/A			[8] S-CURVE				N/A		
[9] STORM FREQUENCY & DURATION			100 YEAR	1 HOUR		[10] TOTAL ADJUSTED STORM RAIN-INCHES				1.52		IN
[11] VARIABLE LOSS RATE (AVG) -IN/HR			N/A			[12] MINIMUM LOSS RATE (FOR VAR. LOSS)-IN/HR				N/A		
[13] CONSTANT LOSS RATE-IN/HR			0.0519		IN/HR	[14] LOW LOSS RATE-PERCENT				0.8		

[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]		[23]	[24]	
UNIT TIME PERIOD m	TIME PERCENT OF LAG [7]*[15]	CUMULATIVE AVERAGE PERCENT OF ULTIMATE DISCHARGE (S-GRAPH)	DISTRIB GRAPH PERCENT [17]m-[17]m-1	UNIT HYDROGRAPH CFS HRS/IN [4]*[18]/100	PATTERN PERCENT (PL E-5.9)	STORM RAIN IN/HR 60[10][20]/100[5]	LOSS RATE IN/HR		EFFECTIVE RAIN IN/HR [21] - [22]	FLOW CFS [3]*[23]	VOLUME CF
							MAX	LOW			
0					0	0	0.00	0	0.000	0.00	
5					4.2	0.766	0.05	0.613	0.714	6.62	1985.403
10					4.3	0.784	0.05	0.627	0.732	6.79	2036.109
15					5	0.912	0.05	0.730	0.860	7.97	2391.056
20					5	0.912	0.05	0.730	0.860	7.97	2391.056
25					5.8	1.058	0.05	0.846	1.006	9.32	2796.71
30					6.5	1.186	0.05	0.948	1.134	10.51	3151.658
35					7.4	1.350	0.05	1.080	1.298	12.03	3608.018
40					8.6	1.569	0.05	1.255	1.517	14.05	4216.499
45					12.3	2.244	0.05	1.795	2.192	20.31	6092.649
50					29.1	5.308	0.05	4.246	5.256	48.70	14611.38
55					6.8	1.240	0.05	0.992	1.188	11.01	3303.778
60					5	0.912	0.05	0.730	0.860	7.97	2391.056
				Σ[20] -	100			Σ[23] -	17.62	163.25	48975.38

NOAA Atlas 14, Volume 6, Version 2
Location name: Menifee, California, USA*
Latitude: 33.6333°, Longitude: -117.1776°
Elevation: 1570 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.090** (0.076-0.109)	**0.126** (0.105-0.152)	**0.174** (0.145-0.210)	**0.215** (0.178-0.262)	**0.272** (0.217-0.344)	**0.318** (0.249-0.411)	**0.366** (0.279-0.486)	**0.418** (0.309-0.571)	**0.490** (0.347-0.700)	**0.548** (0.374-0.812)
10-min	**0.129** (0.109-0.156)	**0.180** (0.151-0.217)	**0.249** (0.208-0.301)	**0.307** (0.255-0.375)	**0.390** (0.312-0.493)	**0.456** (0.356-0.589)	**0.525** (0.400-0.697)	**0.599** (0.443-0.818)	**0.703** (0.497-1.00)	**0.786** (0.536-1.16)
15-min	**0.157** (0.131-0.189)	**0.218** (0.182-0.263)	**0.301** (0.252-0.365)	**0.372** (0.308-0.454)	**0.472** (0.377-0.596)	**0.551** (0.431-0.713)	**0.635** (0.484-0.842)	**0.724** (0.535-0.989)	**0.850** (0.601-1.21)	**0.951** (0.649-1.41)
30-min	**0.249** (0.209-0.300)	**0.346** (0.290-0.418)	**0.479** (0.400-0.579)	**0.591** (0.489-0.721)	**0.749** (0.599-0.947)	**0.876** (0.685-1.13)	**1.01** (0.769-1.34)	**1.15** (0.851-1.57)	**1.35** (0.956-1.93)	**1.51** (1.03-2.24)
60-min	**0.375** (0.315-0.452)	**0.522** (0.437-0.630)	**0.723** (0.603-0.874)	**0.892** (0.738-1.09)	**1.13** (0.903-1.43)	**1.32** (1.03-1.71)	**1.52** (1.16-2.02)	**1.74** (1.28-2.37)	**2.04** (1.44-2.91)	**2.28** (1.56-3.38)
2-hr	**0.554** (0.465-0.668)	**0.743** (0.622-0.897)	**0.996** (0.832-1.21)	**1.21** (0.999-1.47)	**1.50** (1.20-1.90)	**1.73** (1.35-2.24)	**1.97** (1.50-2.61)	**2.22** (1.64-3.03)	**2.57** (1.82-3.66)	**2.84** (1.94-4.21)
3-hr	**0.684** (0.573-0.823)	**0.905** (0.758-1.09)	**1.20** (1.00-1.45)	**1.44** (1.20-1.76)	**1.78** (1.42-2.25)	**2.05** (1.60-2.64)	**2.32** (1.76-3.07)	**2.60** (1.92-3.56)	**2.99** (2.12-4.27)	**3.30** (2.25-4.88)
6-hr	**0.971** (0.814-1.17)	**1.27** (1.07-1.54)	**1.68** (1.40-2.03)	**2.00** (1.66-2.44)	**2.46** (1.96-3.10)	**2.80** (2.19-3.62)	**3.16** (2.41-4.20)	**3.53** (2.61-4.83)	**4.04** (2.86-5.77)	**4.44** (3.03-6.57)
12-hr	**1.28** (1.07-1.54)	**1.69** (1.41-2.04)	**2.23** (1.86-2.70)	**2.68** (2.22-3.27)	**3.29** (2.63-4.16)	**3.76** (2.94-4.86)	**4.23** (3.22-5.62)	**4.73** (3.50-6.46)	**5.40** (3.82-7.70)	**5.92** (4.04-8.76)
24-hr	**1.66** (1.46-1.91)	**2.24** (1.98-2.59)	**3.01** (2.65-3.49)	**3.64** (3.18-4.25)	**4.50** (3.81-5.42)	**5.16** (4.28-6.35)	**5.84** (4.74-7.36)	**6.55** (5.16-8.47)	**7.51** (5.69-10.1)	**8.26** (6.06-11.5)
2-day	**1.97** (1.74-2.28)	**2.72** (2.41-3.15)	**3.73** (3.28-4.32)	**4.56** (3.99-5.33)	**5.71** (4.83-6.88)	**6.61** (5.48-8.13)	**7.54** (6.11-9.49)	**8.51** (6.71-11.0)	**9.85** (7.47-13.3)	**10.9** (8.00-15.2)
3-day	**2.10** (1.85-2.42)	**2.94** (2.60-3.40)	**4.07** (3.59-4.72)	**5.02** (4.39-5.86)	**6.34** (5.37-7.65)	**7.39** (6.13-9.09)	**8.47** (6.87-10.7)	**9.62** (7.59-12.4)	**11.2** (8.51-15.1)	**12.5** (9.18-17.4)
4-day	**2.25** (1.99-2.60)	**3.19** (2.81-3.68)	**4.45** (3.92-5.16)	**5.52** (4.82-6.44)	**7.01** (5.93-8.45)	**8.20** (6.80-10.1)	**9.44** (7.65-11.9)	**10.8** (8.49-13.9)	**12.6** (9.57-17.0)	**14.1** (10.4-19.7)
7-day	**2.55** (2.25-2.94)	**3.65** (3.22-4.22)	**5.16** (4.55-5.98)	**6.44** (5.63-7.53)	**8.26** (6.99-9.96)	**9.72** (8.07-12.0)	**11.3** (9.13-14.2)	**12.9** (10.2-16.7)	**15.3** (11.6-20.6)	**17.2** (12.6-23.9)
10-day	**2.70** (2.39-3.12)	**3.90** (3.45-4.51)	**5.56** (4.90-6.44)	**6.97** (6.09-8.14)	**8.99** (7.61-10.8)	**10.6** (8.81-13.1)	**12.4** (10.0-15.6)	**14.2** (11.2-18.4)	**16.9** (12.8-22.8)	**19.1** (14.0-26.6)
20-day	**3.22** (2.85-3.72)	**4.71** (4.16-5.44)	**6.79** (5.98-7.87)	**8.59** (7.50-10.0)	**11.2** (9.48-13.5)	**13.4** (11.1-16.4)	**15.7** (12.7-19.7)	**18.2** (14.4-23.5)	**21.8** (16.6-29.4)	**24.9** (18.2-34.6)
30-day	**3.81** (3.36-4.39)	**5.55** (4.90-6.42)	**8.02** (7.06-9.30)	**10.2** (8.90-11.9)	**13.4** (11.3-16.1)	**16.0** (13.3-19.7)	**18.8** (15.3-23.7)	**22.0** (17.3-28.4)	**26.6** (20.1-35.8)	**30.4** (22.3-42.3)
45-day	**4.47** (3.96-5.16)	**6.46** (5.70-7.46)	**9.30** (8.19-10.8)	**11.8** (10.3-13.8)	**15.5** (13.2-18.7)	**18.7** (15.5-23.0)	**22.1** (17.9-27.8)	**25.9** (20.4-33.5)	**31.5** (23.9-42.4)	**36.2** (26.6-50.4)
60-day	**5.20** (4.59-6.00)	**7.40** (6.53-8.55)	**10.6** (9.31-12.2)	**13.4** (11.7-15.6)	**17.6** (14.9-21.2)	**21.2** (17.6-26.1)	**25.1** (20.4-31.6)	**29.5** (23.3-38.2)	**36.1** (27.3-48.6)	**41.7** (30.6-58.0)

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

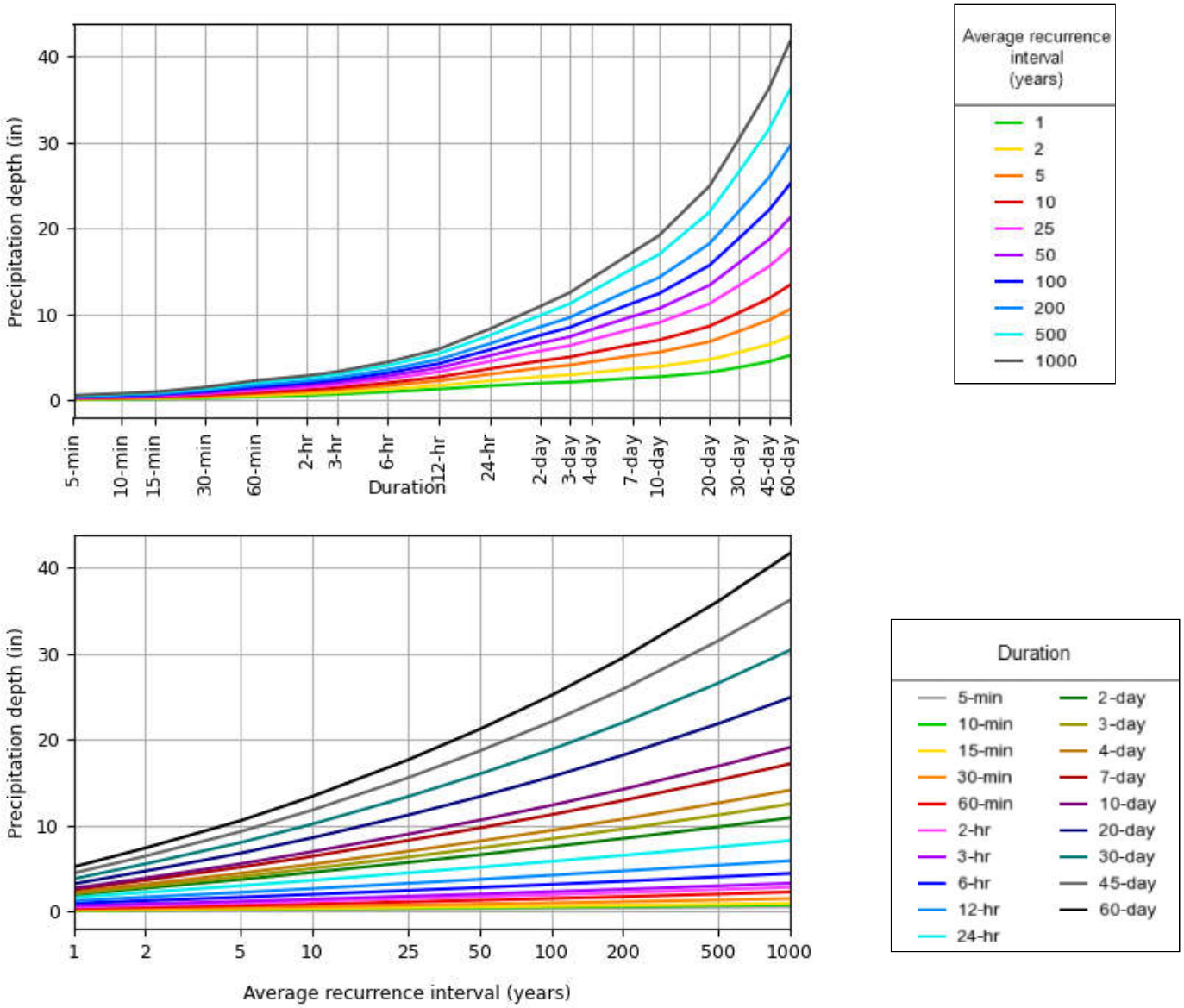
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.6333°, Longitude: -117.1776°



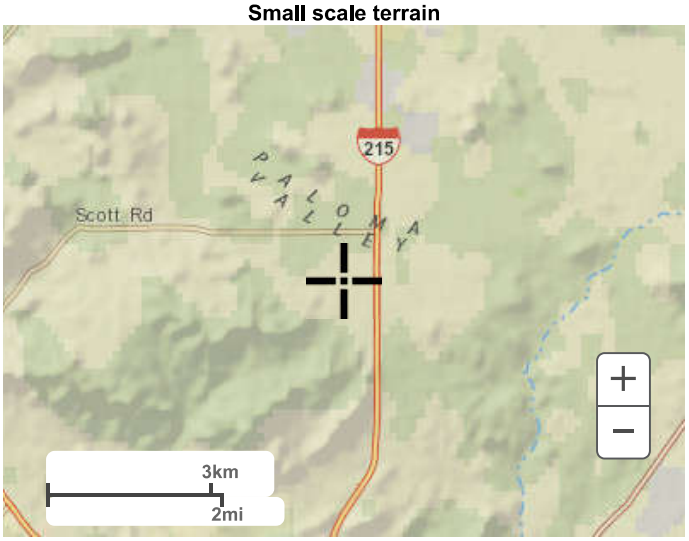
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Created (GMT): Wed Dec 6 04:29:30 2023

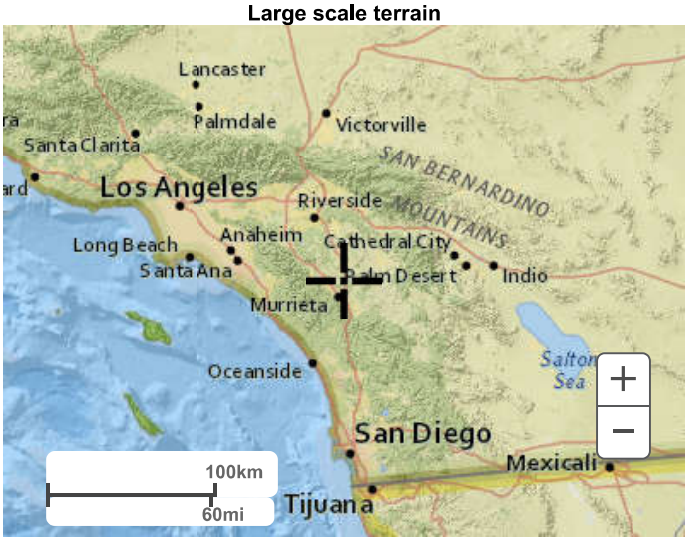
Back to Top

Maps & aerials

Small scale terrain



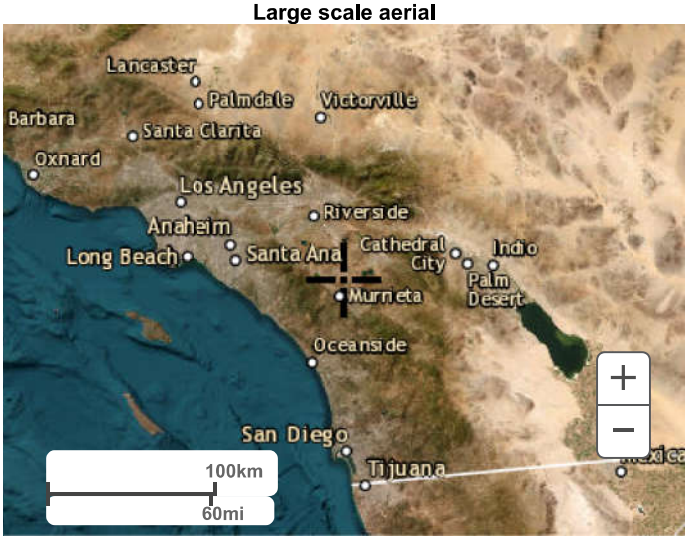
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

Proposed Condition

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

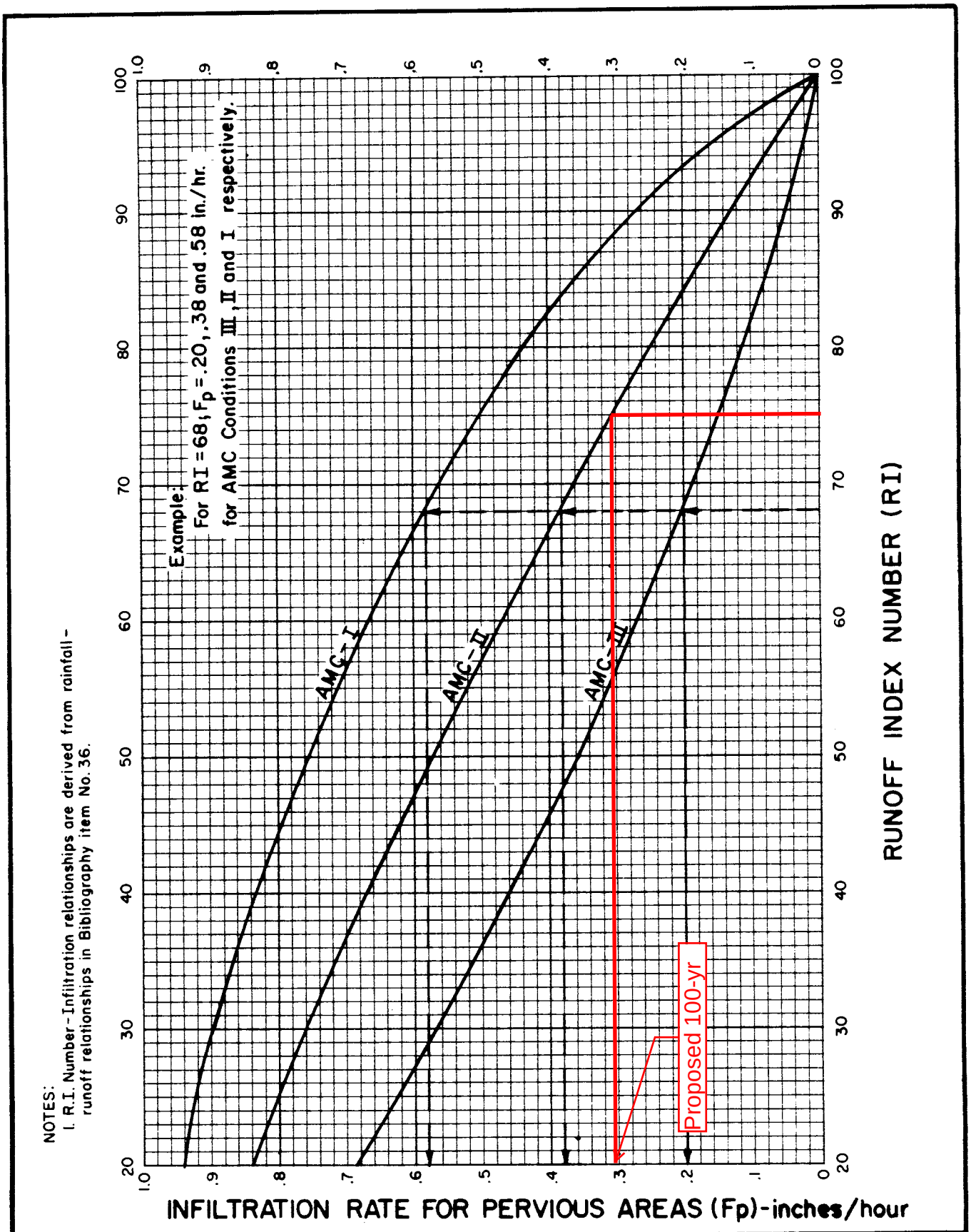
1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.



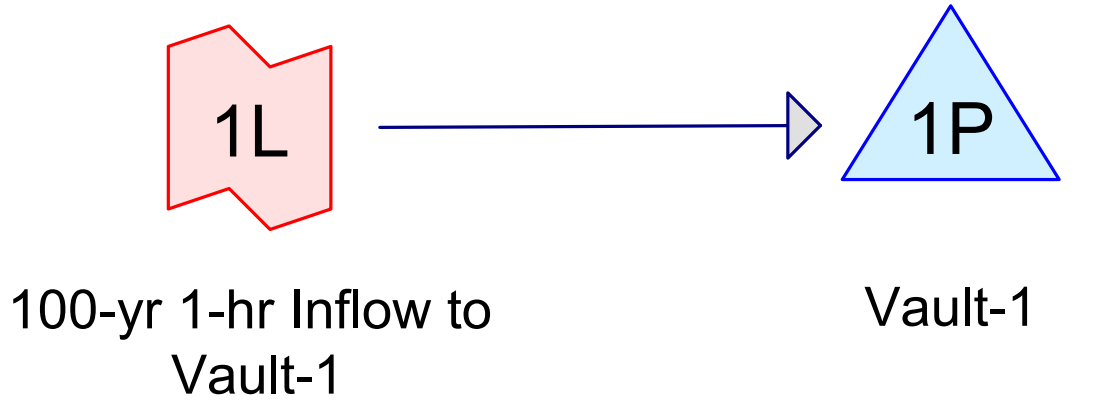
NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

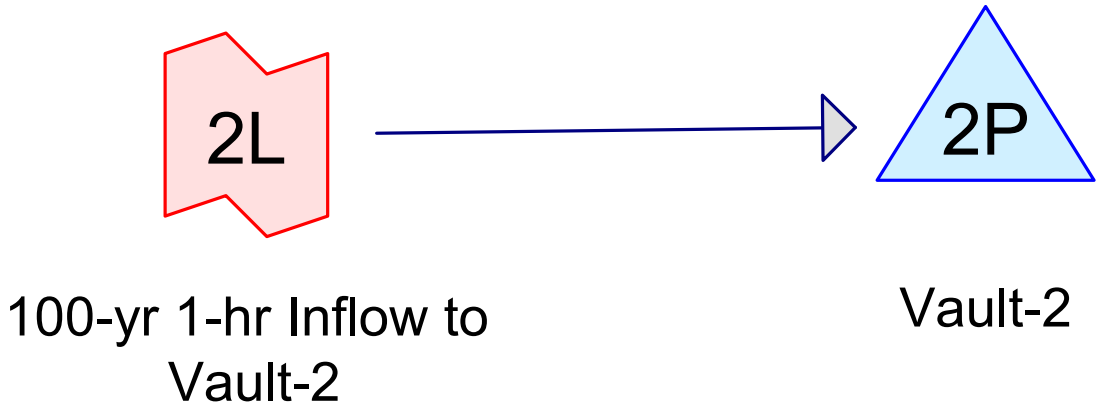
RCFC & WCD

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2





Subcat Reach Pond Link

Routing Diagram for 3983
Prepared by Pasco Laret Suiter & Assoc, Printed 12/11/2023
HydroCAD® 10.20-3g s/n 10097 © 2023 HydroCAD Software Solutions LLC

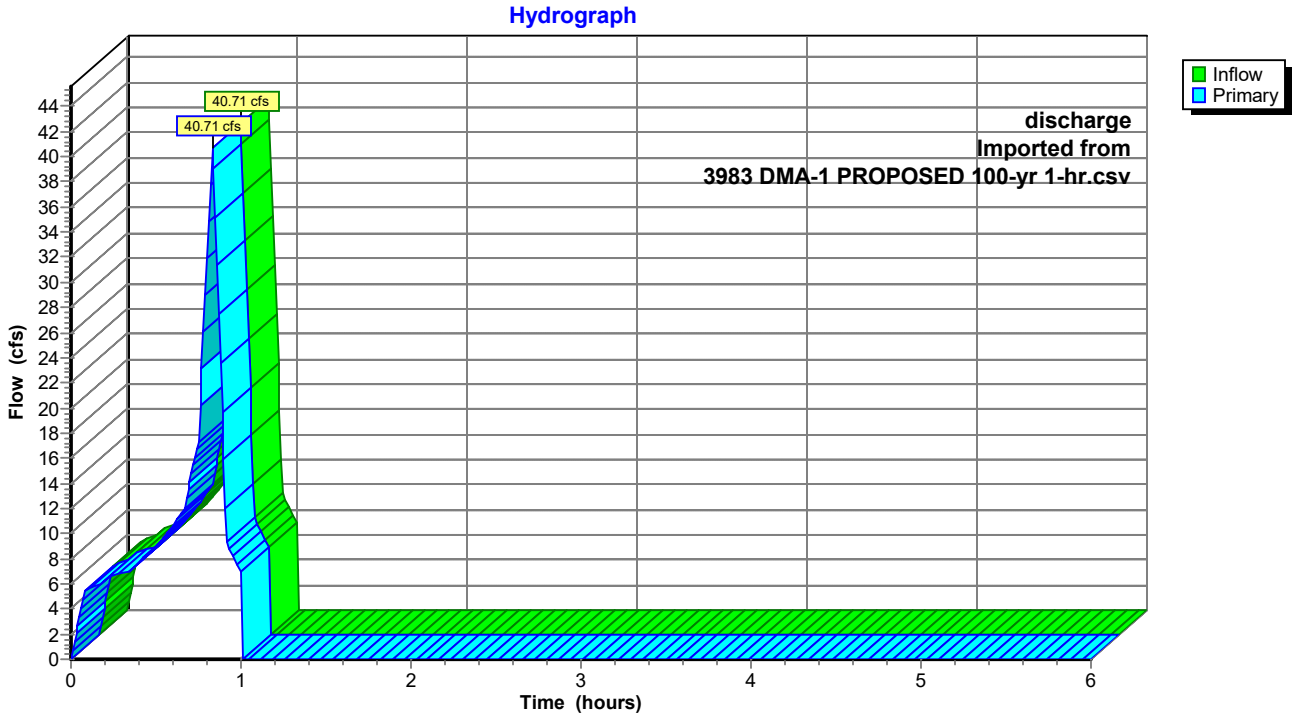
Summary for Link 1L: 100-yr 1-hr Inflow to Vault-1

Inflow = 40.71 cfs @ 0.83 hrs, Volume= 0.939 af
Primary = 40.71 cfs @ 0.83 hrs, Volume= 0.939 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 1P : Vault-1

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

discharge Imported from 3983 DMA-1 PROPOSED 100-yr 1-hr.csv

Link 1L: 100-yr 1-hr Inflow to Vault-1



Summary for Pond 1P: Vault-1

Inflow = 40.71 cfs @ 0.83 hrs, Volume= 0.939 af
Outflow = 9.93 cfs @ 0.92 hrs, Volume= 0.743 af, Atten= 76%, Lag= 5.3 min
Primary = 9.93 cfs @ 0.92 hrs, Volume= 0.743 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 110.48' @ 0.92 hrs Surf.Area= 3,000.00 sf Storage= 31,426.84 cf

Plug-Flow detention time= 67.0 min calculated for 0.743 af (79% of inflow)
Center-of-Mass det. time= 62.9 min (101.3 - 38.4)

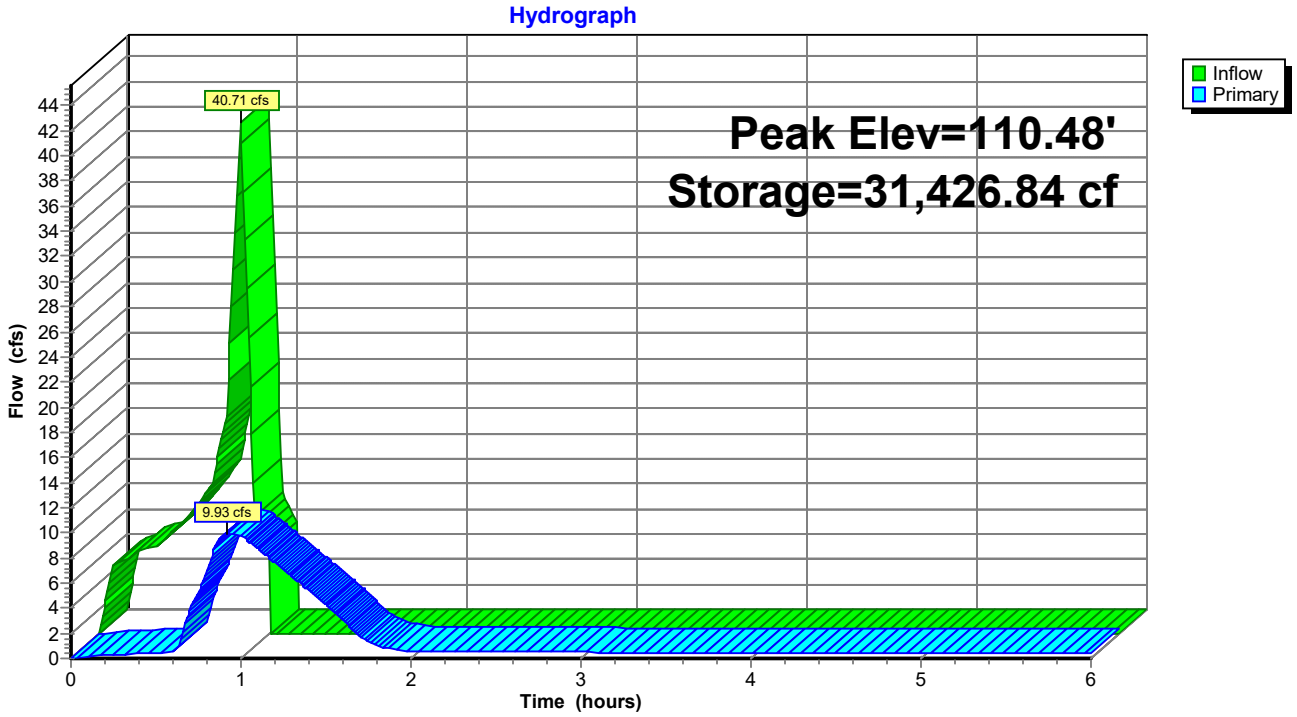
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	33,990.00 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	3,000.00	0.0	0.00	0.00	3,000.00
101.00	3,000.00	100.0	3,000.00	3,000.00	3,194.16
102.00	3,000.00	100.0	3,000.00	6,000.00	3,388.33
103.00	3,000.00	100.0	3,000.00	9,000.00	3,582.49
104.00	3,000.00	100.0	3,000.00	12,000.00	3,776.65
105.00	3,000.00	100.0	3,000.00	15,000.00	3,970.81
106.00	3,000.00	100.0	3,000.00	18,000.00	4,164.98
107.00	3,000.00	100.0	3,000.00	21,000.00	4,359.14
108.00	3,000.00	100.0	3,000.00	24,000.00	4,553.30
109.00	3,000.00	100.0	3,000.00	27,000.00	4,747.46
110.00	3,000.00	100.0	3,000.00	30,000.00	4,941.63
110.83	3,000.00	100.0	2,490.00	32,490.00	5,102.78
111.33	3,000.00	100.0	1,500.00	33,990.00	5,199.86

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**24.00" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 100.00' / 99.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	100.00'	**3.00" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	105.00'	**20.00" W x 6.00" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	110.83'	**Custom Weir, Cv= 3.10 (C= 3.88)** Head (feet) 0.00 0.50 0.50 Width (feet) 22.00 22.00 0.00

Primary OutFlow Max=9.93 cfs @ 0.92 hrs HW=110.48' (Free Discharge)
└**1=Culvert** (Passes 9.93 cfs of 46.56 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.76 cfs @ 15.49 fps)
  ├**3=Orifice** (Orifice Controls 9.17 cfs @ 11.01 fps)
  └**4=Custom Weir** (Controls 0.00 cfs)

Pond 1P: Vault-1



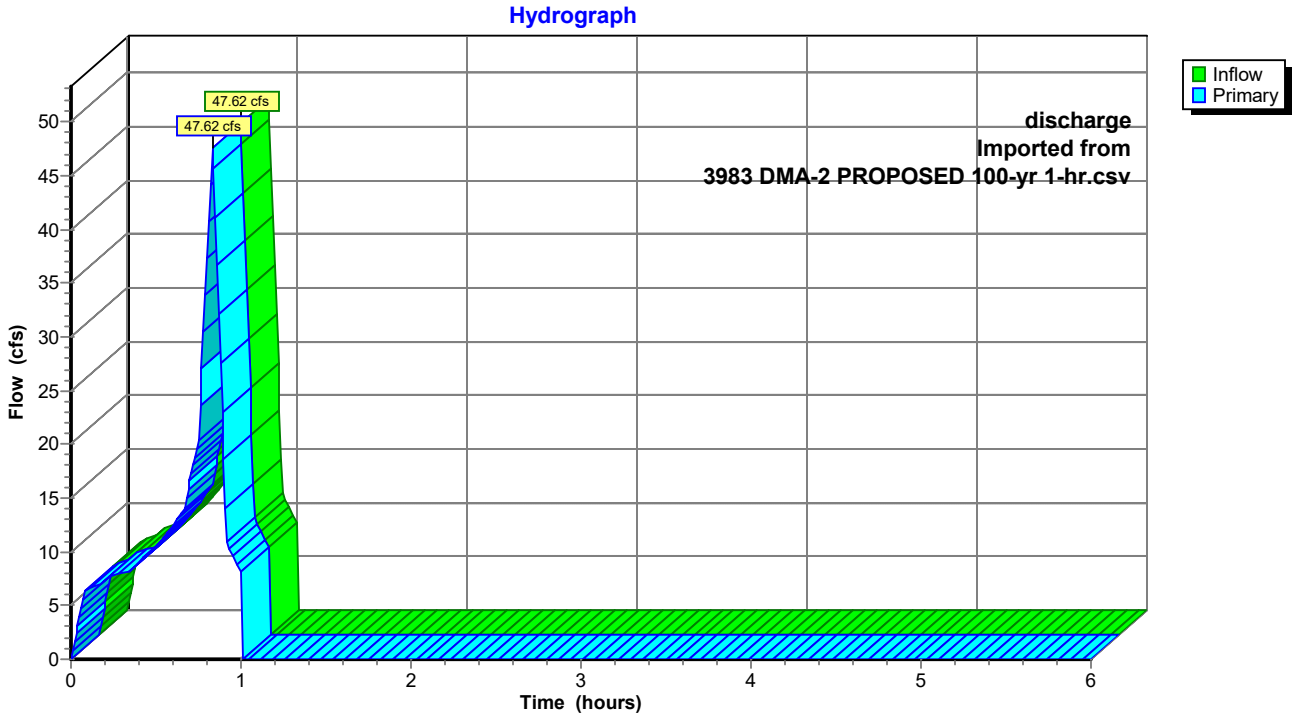
Summary for Link 2L: 100-yr 1-hr Inflow to Vault-2

Inflow = 47.62 cfs @ 0.83 hrs, Volume= 1.100 af
Primary = 47.62 cfs @ 0.83 hrs, Volume= 1.100 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 2P : Vault-2

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

discharge Imported from 3983 DMA-2 PROPOSED 100-yr 1-hr.csv

Link 2L: 100-yr 1-hr Inflow to Vault-2



Summary for Pond 2P: Vault-2

Inflow = 47.62 cfs @ 0.83 hrs, Volume= 1.100 af
Outflow = 10.23 cfs @ 0.94 hrs, Volume= 0.843 af, Atten= 79%, Lag= 6.4 min
Primary = 10.23 cfs @ 0.94 hrs, Volume= 0.843 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 110.80' @ 0.94 hrs Surf.Area= 3,500.00 sf Storage= 37,806.30 cf

Plug-Flow detention time= 67.4 min calculated for 0.843 af (77% of inflow)
Center-of-Mass det. time= 62.8 min (101.1 - 38.4)

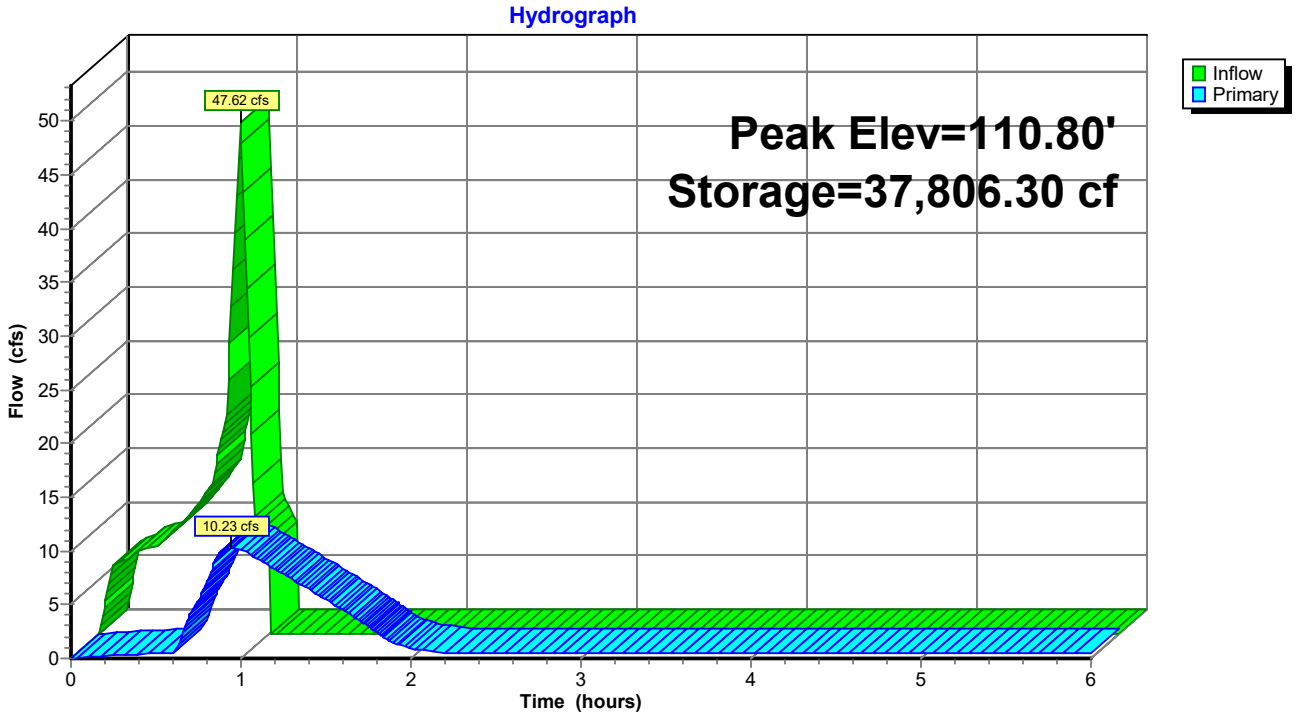
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	39,655.00 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
100.00	3,500.00	0.0	0.00	0.00	3,500.00
101.00	3,500.00	100.0	3,500.00	3,500.00	3,709.72
102.00	3,500.00	100.0	3,500.00	7,000.00	3,919.44
103.00	3,500.00	100.0	3,500.00	10,500.00	4,129.16
104.00	3,500.00	100.0	3,500.00	14,000.00	4,338.88
105.00	3,500.00	100.0	3,500.00	17,500.00	4,548.60
106.00	3,500.00	100.0	3,500.00	21,000.00	4,758.32
107.00	3,500.00	100.0	3,500.00	24,500.00	4,968.04
108.00	3,500.00	100.0	3,500.00	28,000.00	5,177.76
109.00	3,500.00	100.0	3,500.00	31,500.00	5,387.48
110.00	3,500.00	100.0	3,500.00	35,000.00	5,597.20
110.83	3,500.00	100.0	2,905.00	37,905.00	5,771.26
111.00	3,500.00	100.0	595.00	38,500.00	5,806.92
111.33	3,500.00	100.0	1,155.00	39,655.00	5,876.12

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**24.00" Round Culvert** L= 10.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 100.00' / 99.90' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Device 1	100.00'	**3.00" Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	105.00'	**20.00" W x 6.00" H Vert. Orifice** C= 0.600 Limited to weir flow at low heads
#4	Device 1	110.83'	**Custom Weir, Cv= 3.10 (C= 3.88)** Head (feet) 0.00 0.50 0.50 Width (feet) 27.00 27.00 0.00

Primary OutFlow Max=10.23 cfs @ 0.94 hrs HW=110.80' (Free Discharge)
└**1=Culvert** (Passes 10.23 cfs of 47.36 cfs potential flow)
  ├**2=Orifice** (Orifice Controls 0.77 cfs @ 15.73 fps)
  ├**3=Orifice** (Orifice Controls 9.45 cfs @ 11.34 fps)
  └**4=Custom Weir** (Controls 0.00 cfs)

Pond 2P: Vault-2



APPENDIX D

HYDROLOGIC MAPS
EXISTING AND PROPOSED

LEGEND

DESCRIPTION	SYMBOL
HYDROLOGY NODE Q100 (CFS)	10 1.00
SUB-BASIN AREA	A=0.10
RIGHT-OF-WAY	R/W
PROPERTY LINE	P/L
BASIN BOUNDARY	
SUB-BASIN BOUNDARY	
FLOWLINE	
EXISTING STORM DRAIN	

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL TYPE: C & D

DEPTH TO GROUNDWATER

DEPTH TO GROUNDWATER > 20 FT

PROJECT CHARACTERISTICS

PARCEL AREA:	20.03 AC
DRAINAGE BOUNDARY:	20.60 AC
EXISTING IMPERVIOUS AREA:	0.00 AC
EXISTING PERVIOUS AREA:	20.60 AC

NOTE: EXISTING IMPERVIOUS AREA + EXISTING PERVIOUS AREA = DRAINAGE BOUNDARY

POC-1
12
24.6
1559.00 FL
P/L
R/W
C/L
HOWARD WAY
ZEIDERS ROAD
Drainage Basin 1
A=14.60
L=1080'
Drainage Basin 2
A=5.18
L=802'
11
0.85
1573.20 FL
A=0.46
L=230'
1579.50 FL
10
21
0.75
1570.00 FL
L=160'
A=0.36
1574.20 FL
20

0 50' 100' 150'
GRAPHIC SCALE: 1" = 50'

EXISTING CONDITION HYDROLOGY MAP
SCALE : 1" = 50'

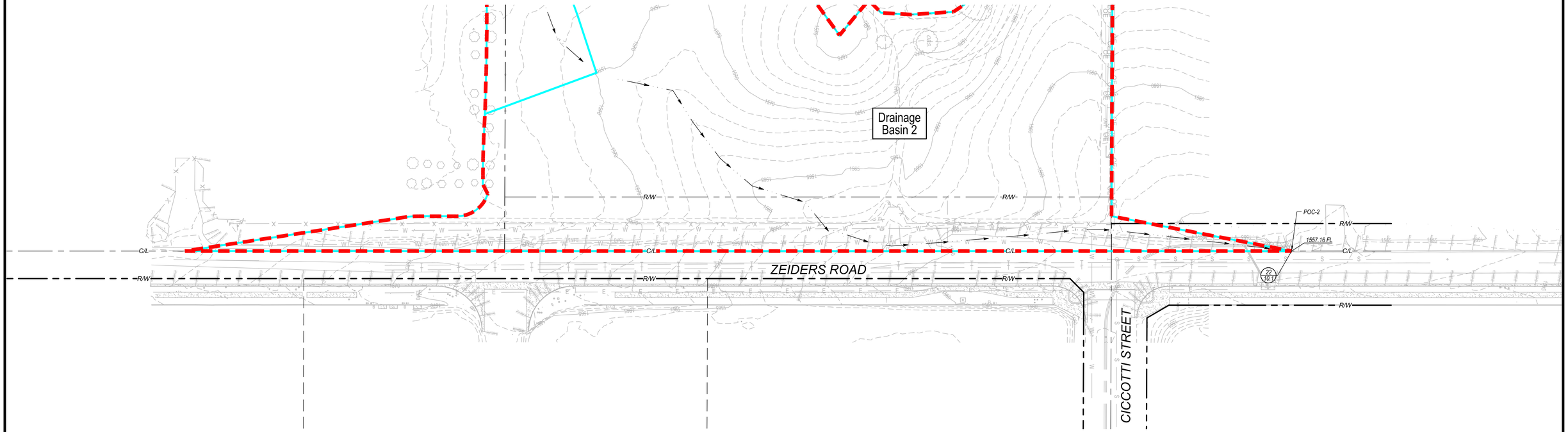
PLSA
PLSAENGINEERING.COM

EXISTING CONDITION HYDROLOGY MAP
33521 ZEIDERS ROAD

PLSA JOB JUMBER : 3983
SCALE : 1" = 50'
DATE : 11/27/2023

SHEET 1 OF 2

J:\ACTIVE JOBS\3983 PEMCOR ZEIDERS ROAD\CIVIL\REPORTS\HYDROLOGY\CAD



EXISTING CONDITION HYDROLOGY MAP

SCALE : 1" = 50'

PLSA

PLSAENGINEERING.COM

0 50' 100' 150'

GRAPHIC SCALE: 1" = 50'

EXISTING CONDITION HYDROLOGY MAP
33521 ZEIDERS ROAD

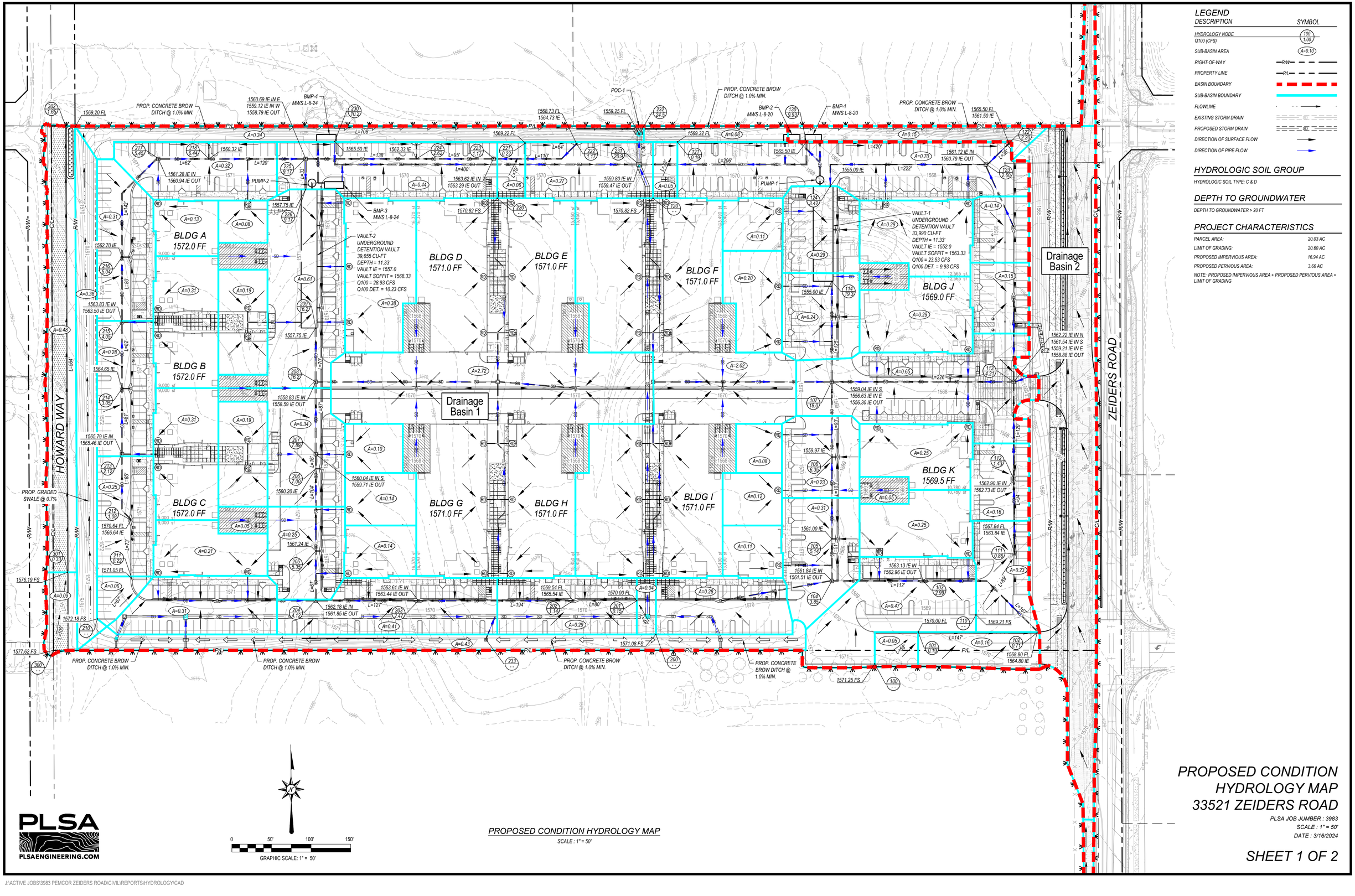
PLSA JOB JUMBER : 3983

SCALE : 1" = 50'

DATE : 12/14/2023

SHEET 2 OF 2

J:\ACTIVE JOBS\3983 PEMCOR ZEIDERS ROAD\CIVIL\REPORTS\HYDROLOGY\CAD



LEGEND

DESCRIPTION	SYMBOL
HYDROLOGY NODE Q100 (CFS)	100 1.00
SUB-BASIN AREA	A=0.10
RIGHT-OF-WAY	R/W
PROPERTY LINE	P/L
BASIN BOUNDARY	
SUB-BASIN BOUNDARY	
FLOWLINE	
EXISTING STORM DRAIN	SD
PROPOSED STORM DRAIN	SD
DIRECTION OF SURFACE FLOW	
DIRECTION OF PIPE FLOW	

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL TYPE: C & D

DEPTH TO GROUNDWATER

DEPTH TO GROUNDWATER > 20 FT

PROJECT CHARACTERISTICS

PARCEL AREA:	20.03 AC
LIMIT OF GRADING:	20.60 AC
PROPOSED IMPERVIOUS AREA:	16.94 AC
PROPOSED PERVIOUS AREA:	3.66 AC

NOTE: PROPOSED IMPERVIOUS AREA + PROPOSED PERVIOUS AREA = LIMIT OF GRADING

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0 50' 100' 150'
GRAPHIC SCALE: 1" = 50'

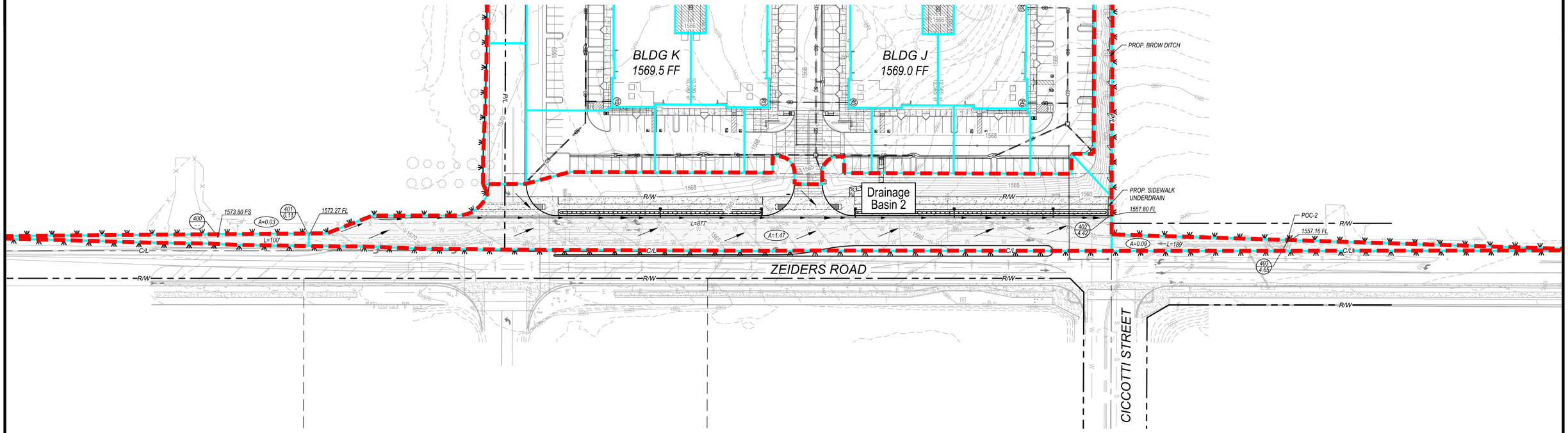
PROPOSED CONDITION HYDROLOGY MAP
SCALE : 1" = 50'

PROPOSED CONDITION HYDROLOGY MAP
33521 ZEIDERS ROAD

PLSA JOB JUMBER : 3983
SCALE : 1" = 50'
DATE : 3/16/2024

SHEET 1 OF 2

J:\ACTIVE JOBS\3983 PEMCOR ZEIDERS ROAD\CIVIL\REPORTS\HYDROLOGY\CAD



PROPOSED CONDITION HYDROLOGY MAP

SCALE : 1" = 50'

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0 50' 100' 150'

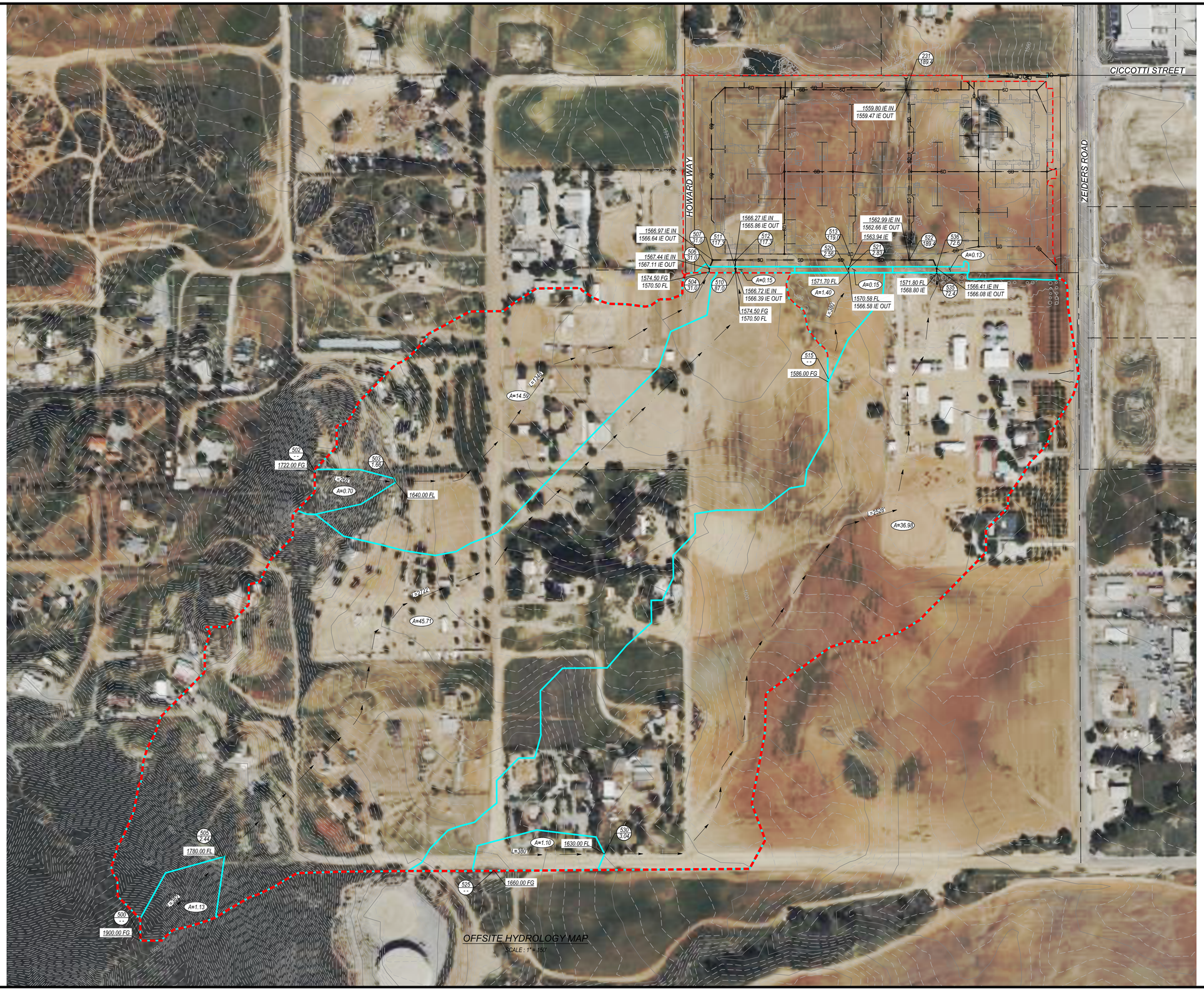
GRAPHIC SCALE: 1" = 50'

PROPOSED CONDITION HYDROLOGY MAP
33521 ZEIDERS ROAD

PLSA JOB JUMBER : 3983
SCALE : 1" = 50'
DATE : 3/16/2024

SHEET 2 OF 2

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OFFSITE HYDROLOGY MAP

SCALE : 1" = 150'

LEGEND

DESCRIPTION	SYMBOL
HYDROLOGY NODE Q100 (CFS)	100 1.00
SUB-BASIN AREA	A=0.10
RIGHT-OF-WAY	R/W
PROPERTY LINE	P/L
BASIN BOUNDARY	
SUB-BASIN BOUNDARY	
FLOWLINE	
EXISTING STORM DRAIN	

HYDROLOGIC SOIL GROUP

HYDROLOGIC SOIL TYPE: C & D

N

0 150' 300' 450'

GRAPHIC SCALE: 1" = 150'

OFFSITE HYDROLOGY MAP 33521 ZEIDERS ROAD

PLSA JOB JUMBER : 3983

SCALE : 1" = 150'

DATE : 3/15/2024

SHEET 1 OF 1

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