PRELIMINARY DRAINAGE STUDY

All Peoples Church

PTS#: 636444

APN: 463-010-10-00
Northeast Corner of Interstate 8 and College Avenue
San Diego, California 92120

Prepared By:

8/2/2021

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Prepared for:
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San Diego, CA 92105

June 29th, 2021

TABLE OF CONTENTS

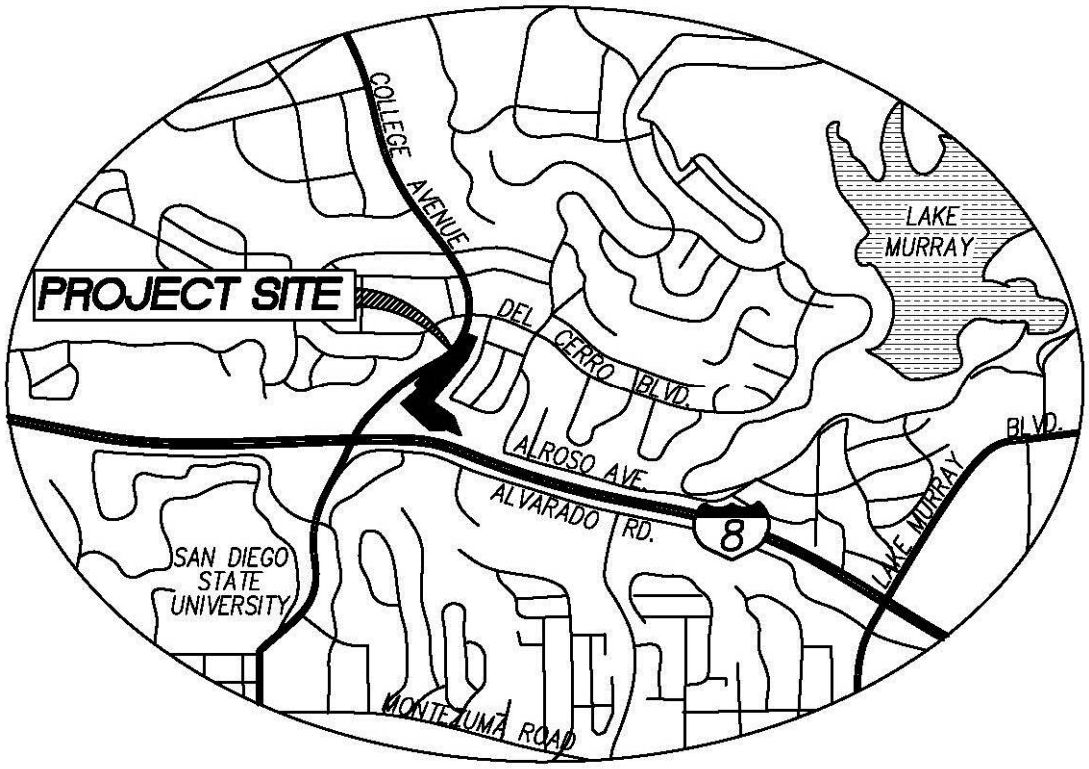

Figure 1 Vicinity Map

1. INTRODUCTION

1.1 Project Description

The All Peoples Church project is a church and associated parking garage located on a vacant 5.99 acre parcel at the northeast corner of Interstate 8 and College Avenue in the City of San Diego, California, and is currently undeveloped in its existing condition. The APN for the project site is 463-010-10-00. The subject property is a corner parcel within the City of San Diego and is bordered to the west by College Avenue, to the south by Interstate 8, to the east by Single-Family Residential Homes, and to the north by a Chevron Gas Station. All of the surrounding area has been developed and is mainly comprised of Single-Family Residential and Commercial land uses. The FEMA Map shows that the subject property is not located in an existing floodplain.

The project is designed in accordance with the January 2017 Edition of the Drainage Design Manual, the 2018 San Diego Storm Water Standards Manual and complies with the Regional Water Quality Control Board Region 9 MS4 Permit, Order No. R9-2015-0100. The project does not propose work adjacent regulated waters therefore 401 and 404 permits are not applicable. There are no negative impacts to any adjacent properties.

1.2 Existing Conditions

The project site is currently vacant, undeveloped land in the existing condition. The drainage generally sheet flows across the site from the northeast to the southern PL and tends toward a natural drainage flowline at the bottom of the slope adjacent to College Avenue. There are three locations where offsite run-on enters the project site. An existing 36-inch reinforced concrete pipe (RCP) public storm drain main enters the project site at the northern boundary of the property (via an easement for storm drains to the City of San Diego per document recorded 2/10/1959, per Book 7491, Page 4). Runoff from this drainage is conveyed in a southerly direction through the project site and into Caltrans ROW via a natural earthen drainage pathway prior to discharging to an existing 48-inch RCP (in Caltrans ROW) which conveys flow under the Interstate 8 off-ramp. An existing 18-inch RCP public stormdrain (per a 10' easement for stormdrains to the City of San Diego per document recorded 11/17/1955, per Book 5873, Page 468) also discharges storm water onto the project site at the eastern boundary of the project site, coming from Marne Avenue. This particular runoff flows westerly, confluences with the earthen drainage channel mentioned previously and continues in a southerly direction towards the Caltrans headwall and 48" public RCP pipe, as well. In addition, an existing 30-inch RCP discharges storm water onto the project site at the southwestern boundary of the project site. The runoff comes from underground infrastructure and a grated inlet along College Avenue (in Caltrans ROW) and flows through an 18" public RCP pipe, outletting at a headwall on Caltrans ROW, adjacent to the All Peoples Church project site, and flows onto the project site where it enters the existing 15' wide easement for storm drains to the City of San Diego (per document recorded 9/2/1964, Instrument 160682). Runoff flows southeasterly and confluences with the earthen drainage channel flow line, flowing from the project site into Caltrans ROW and ultimately discharging to the existing Caltrans 48-inch RCP which continues under the I-8 off-ramp.

All of the existing onsite storm water that is generated by the project site flows toward the existing 48-inch storm drain near the southwest corner of the project site.

Refer to the Existing Hydrology Exhibit in Appendix 2 for further information regarding the drainage patterns of the project site and adjacent properties. Refer to the Proposed Hydrology Exhibit for a better picture of the existing easements on-site. The existing hydrology exhibit has to account for a large area of

off-site run-on and thus is at a much larger scale, making the Proposed Hydrology Exhibit much clearer in terms of clarity of the existing easements.

1.3 Proposed Conditions

The project proposes to fill in a portion the site to create 1 building PAD for a church, a 2-story parking garage, a private drive and a second northern driveway from College Avenue, permeable pavement parking and drive aisles, public and private utilities and associated improvements, with 4 biofiltration basins that will provide storm water mitigation of the 100-year storm event peak flow rate.

A 36-inch public offsite stormdrain main is proposed to connect to the existing 36-inch RCP stormdrain (38.8 linear feet to be removed) that discharges into the site at the northern portion of the lot currently, but that will be rerouted underground down College Avenue (with no adverse effects to neighboring properties). In doing so, the easement for storm drains to the City of San Diego per document recorded 2/10/1959, per Book 7491, Page 4, is to be vacated per the Tentative Map. This main 36-inch trunk line will be re-routed down northbound College Avenue and will turn on-site just before the Caltrans ROW begins. This 36" RCP public stormdrain will be centered on a 15' proposed drainage easement to the City of San Diego as it goes underground below the slope on-site. It will then transition to a public 48" RCP line (a portion of which will be in a new 15' stormdrain easement on-site) after it turns on-site and enters the first public cleanout on the project site. It will then parallel the Caltrans ROW on-site, where it will transition from the proposed 15' public storm drain easement into the existing 15' wide easement for storm drains to the City of San Diego (per document recorded 9/2/1964, Instrument 160682).

Additionally, at the southwest corner of the site, an 18-inch public storm drain (with a proposed 15-foot public stormdrain easement) is proposed within the private road on-site to re-route (requiring removal of approximately 80 linear feet of 18" public RCP stormdrain—no adverse effects to neighboring properties) the existing 18-inch RCP stormdrain (per a 10' easement for stormdrains to the City of San Diego per document recorded 11/17/1955, per Book 5873, Page 468—a portion of which is to be vacated per the Tentative Map). This will convey offsite stormwater runoff from the existing 18-inch public RCP stormdrain downstream (from the neighborhood above at Marne Avenue), through the proposed 15' public stormdrain easement to the City of San Diego, to the proposed 48-inch public storm trunk line, mentioned above.

The new 48-inch public RCP will capture and convey off-site storm runoff that is discharged onto the project site in the existing condition and transport treated water from the new proposed development (via private drainage structures and pipe networks) per Biofiltration Basins 1-3, into a 10' wide engineered earthen channel per SDD-109, dissipated by rip-rap per SDD-105. This engineered channel will be within the existing 15' wide easement for storm drains to the City of San Diego (per document recorded 9/2/1964, Instrument 160682) that will run along the existing drainage route (adjacent to the proposed wall) at the southwest corner of the site, before entering the 19.87' wide proposed drainage easement, where it is dissipated via rip-rap (per SDD-105) and discharges along the existing flowline on-site. This overland flow-line then picks up the treated stormwater of Biofiltration Basin 4 (per private drainage infrastructure), before flowing over the property line into Caltrans ROW (mimicking the existing condition) and follows the natural overland drainage pathway before being picked up by the existing headwall and 48" stormdrain in Caltrans ROW that flows beneath Interstate 8. All on-site and off-site runoff will have an ultimate discharge point at the off-site 48-inch RCP Caltrans stormdrain that goes under the I-8 offramp to College Avenue, which matches the existing condition.

Approximately 4.91 acres of the developed site will drain to the 4 proposed biofiltration basins located throughout the project site, to detain and mitigate the 100-year storm event post-development. The 4 biofiltration basins will provide mitigation of the 100-year storm event peak flow rate prior to discharging

on-site before the stormwater moves further downstream to the existing off-site Caltrans 48-inch public storm drain system at the south end of the project site. The remaining 1.08 acres of slopes and self-mitigated areas will follow natural drainage paths or be conveyed via concrete brow ditches to the ultimate discharge site at the south end of the project site as well.

Refer to the Proposed Hydrology Exhibit in Appendix 2 for further information regarding the drainage patterns of the project site, the existing stormdrain infrastructure to be removed and re-routed, existing easement to remain or vacated, and the newly proposed drainage easements.

2. METHODOLOGY

The proposed project has been analyzed to determine the peak runoff flow for 100 year, 6 hour rainfall event using the Rational Method per the City of San Diego Drainage Design Manual (Section 1-102.3). The Runoff Coefficient, C, for the existing and proposed conditions were selected using Table 2 of page 82 of the City of San Diego Drainage Design Manual, Revised C Method. The time of concentration for all existing and proposed drainage areas were calculated using the minimum TC of 5 min which yields an intensity of 4.4 inches per hour.

The proposed LID best management practices have been sized and located such that all runoff will be directed to landscape planters or through pervious areas where feasible before ultimately discharging to the downstream storm drain system.

2.1 Rational Method

As mentioned above, runoff from the project site was calculated for the 100-year storm events. Runoff was calculated using the Rational Method which is given by the following equation:
$Q = C \times I \times A$

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient (Determined from Table A-1, P.A-3 in the City of San Diego Drainage Design Manual)
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)
Rational Method calculations were performed using the City of San Diego Drainage Design Manual (Section 1-102.3)

2.2 Runoff Coefficient

The runoff coefficients for the hydrologic analysis were calculated using Table A-1 from the City of San Diego Drainage Design Manual January 2017. A natural/rural land coefficient of 0.45 was used. A coefficient of 0.85 has been used per Table A-1 of the Drainage Design Manual. The proposed project is a church and thus is best represented by the Commercial Runoff Coefficient of 0.85 where the revised/weighted C is calculated using the formula shown beneath Table A-1

Runoff Coefficient (Table A-1):

Permeable Pavement	C = 0.45
Pervious	C = 0.45
Commercial	C = 0.85

Weighted Runoff Coefficient: Commercial Land Use

(Actual Impervious/Tabulated Impervious=0.80) x 0.85=Revised C ≥ Minimum C value 0.50

Table 2.1 below summarizes the on-site percent impervious and runoff coefficient, “C”, in the existing and proposed condition. Please refer to the Existing Hydrology Exhibit for weighted C-values of off-site drainage basin areas (listed for each sub-area on the exhibit itself), using the same commercial calculation for the weight C, calculated as a ratio of actual imperviousness percentage off-site to the tabulated imperviousness percentage of 80 percent, multiplied by the commercial runoff coefficient of 0.85 per Table A-1. See Appendix 1 for the runoff coeffiecnt calculation and the Existing Hydrology Exhibit in Appendix 2 for the weighted C values of all the off-site drainage. The weighted C-values for the on-site area are

included in Tables 3.2 and 3.3 on the next page. The existing site has no imperviousness and retains the rural weighted C-value of 0.45 per Table A-1 and Table 3.2 below.

Each of the 5 drainage basins in the proposed on-site condition is broken down to show percent impervious, pervious and permeable pavement in Table 3.3. The detailed weighted runoff coefficients per the commercial land use (for a proposed church) are calculated in the last column of Table 3.3, where the minimum weight C is 0.50 per Table A-1. See table 3.3 below for more information on the proposed site breakdown.

Table 3.2 – Summary of Onsite Impervious Area-Pre & Post

	Total Impervious Area (ac)	Total Pervious Area (ac)	Total Project Area (ac)	Percent Impervious (%)	Percent Permeable Pavement (%)	Runoff Coefficient "C"
Existing	0.00	5.99	5.99	0%	0%	0.45
Proposed	2.46	3.53	5.99	41%	19%	0.50

Weighted runoff coefficients were calculated where appropriate and are calculated as shown on the Post-Hydrology Exhibit in Appendix 2.

Table 3.3 –Detailed Summary of Proposed On-site Impervious Area

BMP Location	Basin Description	Total Area (Ac)	Total Area (sq-ft)	Total Impervious Area (Sq-Ft)	% Impervious	% Pervious	%Permeable Pavement	Weighted Runoff Coefficient
Basin-1	WESTERLY UPPER PARKING TO BASIN #1	0.55	**23775.00**	**0.00**	0%	100%	52%	0.50
Basin-2	EASTERLY UPPER PARKING TO BASIN#2	0.63	**27352.00**	**1709.00**	6%	94%	80%	0.50
Basin-3	ROAD, PARKING GARAGE, AND PLAZA AREA TO BASIN#3	1.30	**56780.00**	**40542.00**	71%	29%	14%	0.75
Basin-4	CHURCH, ROAD TO BASIN #4	2.44	**106108.00**	**64936.00**	61%	39%	7%	0.65
Basin-5	SELF-RETAINING	1.08	**46929.00**	**0.00**	0%	100%	0%	0.45
Totals:		**5.99**	**260944**	**107187**	**41%**	**38%**	**31%**	**0.50**

APPENDIX A: RATIONAL METHOD AND MODIFIED RATIONAL METHOD

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A-1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

2.3 Rainfall Intensity

Rainfall intensity was determined using the Rainfall Intensity Duration Frequency Curves from page 83 of the City of San Diego Drainage Design Manual (April, 1984). Based on a 5 min time of concentration, an intensity of 4.4 inches per hour is used.

2.4 Tributary Areas

Drainage basins are delineated in the Post-Project Hydrology Exhibit in Appendix 2 and graphically portray the tributary area for each drainage basin.

3. HYDROLOGIC RESULTS

3.1 Existing and Proposed Peak Flow Rate Comparison

Table 3.1 below summarizes the overall (offsite and onsite) existing and proposed hydrologic results at the outfall of the project site, Node 160. Detailed AES computer output is provided in the Appendix 2.

Table 3.1 – Summary of the Overall 100-Year Storm Event Peak Flow Rates

Overall		Existing Condition			Proposed Condition (Unmitigated)			Proposed Condition (Mitigated)		
Basin	Node	Total Drainage Area Offsite and Onsite	Q100 (cfs)	Tc (min)	Total Drainage Area Offsite and Onsite (ac)	Q100 (cfs)	Tc (min)	Total Drainage Area Offsite and Onsite (ac)	Q100 (cfs)	Tc (min)
	160	64.4	118.26	13.07	64.4	116.80	13.05	64.4	115.23	13.05
			V100 (fps)			V100 (fps)			V100 (fps)	
			13.92			9.86			9.77	

For the proposed unmitigated and mitigated condition, AES models were created to analyze only the onsite and offsite proposed drainage areas that end at the same POC (the Caltrans headwall and 48" RCP line that flows beneath Interstate-8). The onsite proposed unmitigated condition consists of analysis of the proposed project drainage characteristics without considering the detention provided by the 4 biofiltration basins. The onsite proposed unmitigated results were then input into the overall AES model to create the overall unmitigated proposed condition. Combined onsite and offsite unmitigated condition AES output is located in Appendix 1.

For the onsite proposed mitigated condition, the effects of the detention provided by the 4 biofiltration basins was included in the analysis. Because the proposed condition has a peak flow Q100 that is less than the existing condition Q100, the site meets the hydrology requirements without even taking into account the mitigated condition. However, the mitigated Q is even lower once the routing of the basins is taken into account. The longer routing of the proposed condition, in conjunction with utilizing permeable pavement, leads to a proposed condition with a similar time of concentration and a lower overall peak flow. Therefore, the site has brought the proposed condition to a peak flow beneath that of the existing condition, thus meeting required drainage standards for the 100-year storm.

3.2 Existing Downstream System

In the existing and proposed condition, storm water runoff from the project site flows to an existing Caltrans 48-inch RCP which continues under the I-8 off-ramp. Please see Appendix 3 for the pre-developed and post-developed headwall calculations for the Caltrans receiving headwall off-site.

The headwall calculation results are as follows:
Existing Condition: Pre-AES 118.26 CFS – Headwall Height 6.13' (EL 357.09)
Post-Mitigated: Post-Mitigated AES 115.05 CFS – Headwall Height 5.97' (EL 356.93)

The headwater level lowers in the developed condition and does not reach the bottom of wall elevation of FG 357 (the lowest FG for the entire wall length), thus the headwater will not impact the retaining wall (15'+ distance away).

In addition, the headwall height (Post-Mitigated) divided by the diameter of receiving pipe should be less than 1.5 for the 100-year design flows (to avoid pressurizing the pipe and ensuring the flow can adequately enter the pipe). Per calculation below, this works.

HW/D= 5.97'/ 4'=1.4925 < 1.5

The proposed biofiltration basins will provide mitigation for increased runoff and detain the 100-year storm event peak flow rate back below to the existing condition. Therefore, the proposed project has no adverse impacts to the existing downstream system.

4. CONCLUSION

This report presents the drainage analysis for the proposed All Peoples Church project located at the northeast corner of Interstate 8 and College Avenue in the City of San Diego. The project consists of the construction of 1 church, 1 two-story parking garage, a private drive and associated permeable parking area, public and private utilities and associated improvements, and 4 biofiltration basins which will provide mitigation of the 100-year storm event peak flow. As a result of the detention provided by the 4 proposed biofiltration basins and the vault, the proposed All Peoples Church project mitigates the 100-year storm event peak flow rate back below the existing condition. The proposed storm drain mainline is sized to sufficiently convey the onsite and offsite 100-year storm event peak flow rate in the post development condition. There are no negative impacts to any adjacent properties.

		ON-SITE AND OFF-SITE	
	EXISTING CONDITION	**PROPOSED CONDITION (UNMITIGATED)**	**PROPOSED CONDITION (MITIGATED)**
Area (Acres)	64.4	64.4	64.4
Q100 (cfs)	118.26	116.80	115.23
Tc (min)	13.07	13.05	13.05
V100 (fps)	13.92	9.86	9.77
Weighted C	0.59	0.61	0.61

Appendix 1
Pre and Post Hydrology Calculations

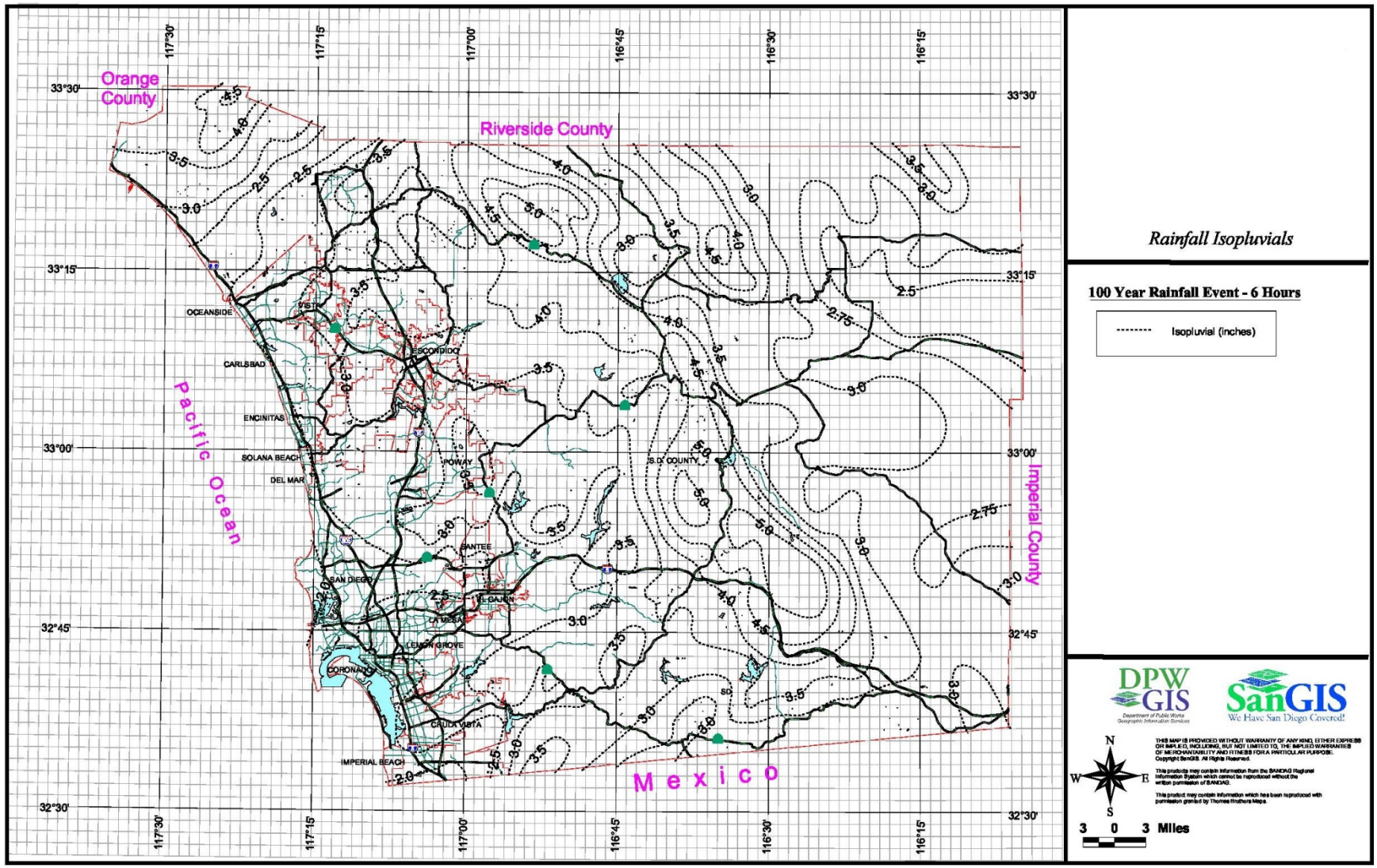

Figure B-2. 100-Year 6-Hour Isopluvials.

Map Scale: 1:2,050 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

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

Date(s) aerial images were photographed: Aug 22, 2018—Aug 31, 2018

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
DcF	Diablo-Urban land complex, 15 to 50 percent slopes	D	1.5	21.8%
EsD2	Escondido very fine sandy loam, 9 to 15 percent slopes, eroded	C	5.1	76.4%
FxE	Friant rocky fine sandy loam, 9 to 30 percent slopes	D	0.1	1.8%
Totals for Area of Interest			**6.7**	**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

ALL PEOPLES CHURCH
J-2936
6/24/2021

100 YR ON-SITE PRE-PROJECT HYDROLOGY

Drainage Area	Area Description	Total Area (Ac)	Total Area (sq-ft)	Total Impervious Area (Sq-Ft)	% Impervious	% Pervious		Weighted Runoff Coefficient	Peak Runoff Q: (CFS)	Peak Runoff Volume: (cu-ft)
EX-1	Existing Site	5.99	260944	0	0%	100%		0.45	11.96	24464

100 YR ON-SITE POST-PROJECT HYDROLOGY

BMP Location	Basin Description	Total Area (Ac)	Total Area (sq-ft)	Total Impervious Area (Sq-Ft)	% Impervious	% Pervious	%Permeable Pavement	Weighted Runoff Coefficient	Peak Runoff Q: (CFS)	Peak Runoff Volume: (cu-ft)
Basin-1	WESTERLY UPPER PARKING TO BASIN #1	0.55	**23775.00**	**0.00**	0%	100%	52%	0.50	1.21	2477
Basin-2	EASTERLY UPPER PARKING TO BASIN#2	0.63	**27352.00**	**1709.00**	6%	94%	80%	0.50	1.39	2849
Basin-3	ROAD, PARKING GARAGE, AND PLAZA AREA TO BASIN#3	1.30	**56780.00**	**40542.00**	71%	29%	14%	0.75	4.34	8872
Basin-4	CHURCH, ROAD TO BASIN #4	2.44	**106108.00**	**64936.00**	61%	39%	7%	0.65	7.02	14369
Basin-5	SELF-RETAINING	1.08	**46929.00**	**0.00**	0%	100%	0%	0.45	2.15	4400
Totals:		**5.99**	**260944**	**107187**	**41%**	**38%**	**31%**	**0.50**	**16.12**	**32966**

Note:
1

100 Yr Storm at 5 Min TC		
Intensity:	4.40	in/hr
Precip:	2.50	in

Runoff Coefficient	
Impervious	0.85
Permeable Pavement	0.45
Existing C Coefficient	0.45

Runoff Detention Calculations:	
Pre-project Volume (cu-ft)	24464
Post-Project Volume (cu-ft)	32966
BMP Volume (cu-ft)	10230
Net volume retained (cu-ft)	**1727**
Post-Project Vol (adjusted)	**22736**

Results: 22736cf < 24464cf
Therefore, detention requirements are met.

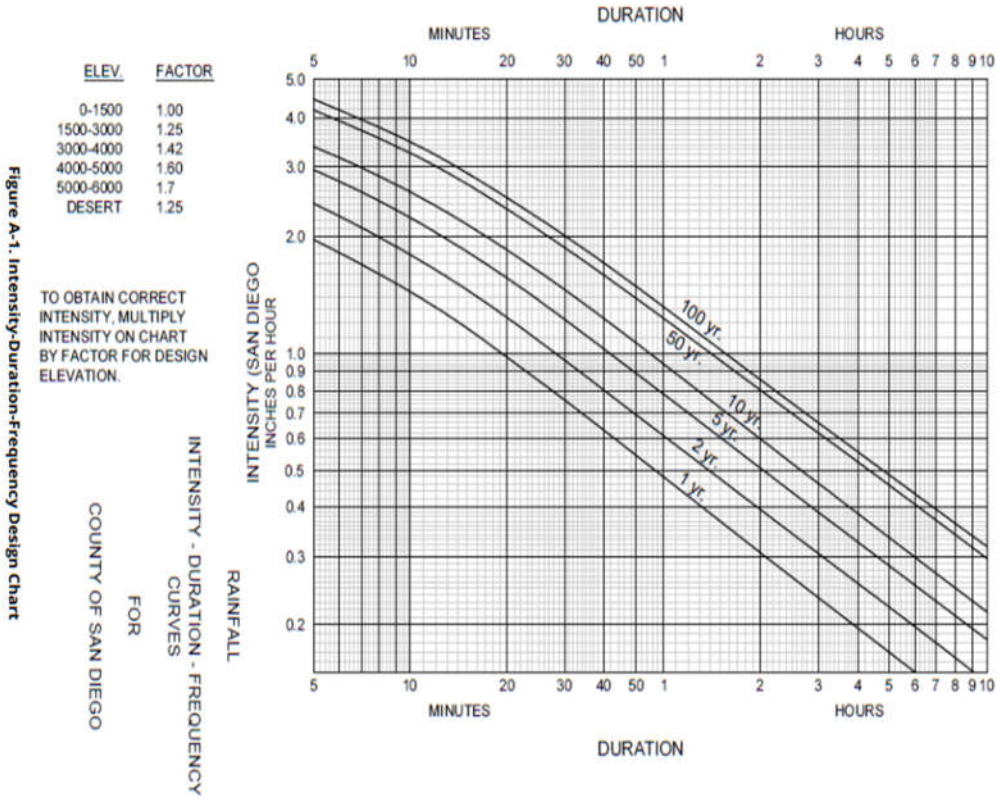

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
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80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A-1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_c for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_c calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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                              Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* 2936 ALL PEOPLES CHURCH PRE-DEVELOPMENT CONDITION 100-YEAR              *
* FEBRUARY 2, 2021                                                        *
* C=0.45 PERVIOUS C=0.85 COMMERCIAL                                       *
 *************************************************************************

  FILE NAME: 1075EX.DAT
  TIME/DATE OF STUDY: 13:50 02/02/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
```

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  2   13.0      8.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  3   15.0     10.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180
  4   30.0     25.0    0.020/0.020/0.020   0.50    1.50 0.0100 0.125 0.0180

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth = -0.10 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE   1000.00 TO NODE   1005.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    720.00
  DOWNSTREAM ELEVATION(FEET) =    716.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.713
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.265
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE   1005.00 TO NODE   1010.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    716.00  DOWNSTREAM(FEET) =    648.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   315.00   CHANNEL SLOPE =  0.2159
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.851
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.41
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   2.18
  Tc(MIN.) =    7.89
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.69
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.483
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.12
```

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  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.67
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1010.00 =     405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1010.00 TO NODE   1015.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  648.00  DOWNSTREAM ELEVATION(FEET) =  616.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.32
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    9.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.575
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.554
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =   13.61
  TOTAL AREA(ACRES) =        7.4        PEAK FLOW RATE(CFS) =      14.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.21
  FLOW VELOCITY(FEET/SEC.) =  5.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.80
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1015.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1015.00 TO NODE   1020.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  616.00  DOWNSTREAM ELEVATION(FEET) =  542.00
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  STREET LENGTH(FEET) =   572.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.14
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.74
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.369
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.553
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    2.78
  TOTAL AREA(ACRES) =        8.9        PEAK FLOW RATE(CFS) =      16.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.59
  FLOW VELOCITY(FEET/SEC.) =  6.87   DEPTH*VELOCITY(FT*FT/SEC.) =   2.18
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1020.00 =    1392.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1020.00 TO NODE   1025.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  542.00  DOWNSTREAM ELEVATION(FEET) =  464.00
  STREET LENGTH(FEET) =   938.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  25.00
  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
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    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   16.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    7.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.07
  STREET FLOW TRAVEL TIME(MIN.) =   2.20   Tc(MIN.) =   12.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.127
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.552
  SUBAREA AREA(ACRES) =    3.60      SUBAREA RUNOFF(CFS) =    6.19
  TOTAL AREA(ACRES) =       12.5        PEAK FLOW RATE(CFS) =      21.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  16.96
  FLOW VELOCITY(FEET/SEC.) =  7.28   DEPTH*VELOCITY(FT*FT/SEC.) =   3.24
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1025.00 =    2330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1025.00 TO NODE   1025.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.94
  RAINFALL INTENSITY(INCH/HR) =   3.13
  TOTAL STREAM AREA(ACRES) =    12.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.58

****************************************************************************
  FLOW PROCESS FROM NODE   1030.00 TO NODE   1035.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    98.00
  UPSTREAM ELEVATION(FEET) =    508.00
  DOWNSTREAM ELEVATION(FEET) =    502.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.358
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.332
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      0.30   TOTAL RUNOFF(CFS) =      0.71
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1035.00 TO NODE   1040.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  464.00
  STREET LENGTH(FEET) =   768.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
  STREET FLOW TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =    8.72
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.694
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.550
  SUBAREA AREA(ACRES) =    5.90      SUBAREA RUNOFF(CFS) =   11.99
  TOTAL AREA(ACRES) =        6.2        PEAK FLOW RATE(CFS) =      12.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  11.52
  FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.49
  LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1040.00 =     866.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1040.00 TO NODE   1025.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   460.90  DOWNSTREAM(FEET) =   458.90
  FLOW LENGTH(FEET) =   138.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.51
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
```

```
 AT DEPTH = 0.94 * DIAMETER)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.59
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.02
 LONGEST FLOWPATH FROM NODE   1030.00 TO NODE   1025.00 =    1004.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1025.00 TO NODE   1025.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.02
 RAINFALL INTENSITY(INCH/HR) =   3.64
 TOTAL STREAM AREA(ACRES) =     6.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.59

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       21.58    12.94        3.127         12.50
     2       12.59     9.02        3.635          6.20

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       27.65     9.02       3.635
     2       32.42    12.94       3.127

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.42   Tc(MIN.) =   12.94
 TOTAL AREA(ACRES) =       18.7
 LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1025.00 =    2330.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1025.00 TO NODE   1042.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.10  DOWNSTREAM(FEET) =   452.60
 FLOW LENGTH(FEET) =    76.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.18
 (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
```

```
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.42
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   13.02
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1042.00 =    2406.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.02
  RAINFALL INTENSITY(INCH/HR) =   3.12
  TOTAL STREAM AREA(ACRES) =    18.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.42

****************************************************************************
  FLOW PROCESS FROM NODE   1045.00 TO NODE   1050.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    468.00
  DOWNSTREAM ELEVATION(FEET) =    464.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.597
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.75
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.75

****************************************************************************
  FLOW PROCESS FROM NODE   1050.00 TO NODE   1060.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.80
  STREET LENGTH(FEET) =   690.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  25.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
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  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) =      16.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.57
    HALFSTREET FLOOD WIDTH(FEET) =   27.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   3.93   Tc(MIN.) =    6.53
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.109
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.781
  SUBAREA AREA(ACRES) =    9.90      SUBAREA RUNOFF(CFS) =   31.73
  TOTAL AREA(ACRES) =       10.1        PEAK FLOW RATE(CFS) =      32.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.70   HALFSTREET FLOOD WIDTH(FEET) =  39.76
  FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   2.28
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  690.0 FT WITH ELEVATION-DROP =   6.2 FT, IS   34.0 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE   1060.00
  LONGEST FLOWPATH FROM NODE   1045.00 TO NODE   1060.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1060.00 TO NODE   1042.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.00  DOWNSTREAM(FEET) =   448.30
  FLOW LENGTH(FEET) =   751.90   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.30
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.43
  PIPE TRAVEL TIME(MIN.) =   2.36    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE   1045.00 TO NODE   1042.00 =    1531.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1042.00 TO NODE   1042.00 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) =   3.66
  TOTAL STREAM AREA(ACRES) =    10.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.43

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       32.42    13.02        3.118         18.70
      2       32.43     8.89        3.660         10.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       60.04     8.89       3.660
      2       60.04    13.02       3.118

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      60.04   Tc(MIN.) =    8.89
  TOTAL AREA(ACRES) =       28.8
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1042.00 =    2406.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1042.00 TO NODE   1065.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.30  DOWNSTREAM(FEET) =   441.10
  FLOW LENGTH(FEET) =   315.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.32
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    9.26
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1065.00 =    2721.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1065.00 TO NODE   1070.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    441.10  DOWNSTREAM(FEET) =    374.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   835.00   CHANNEL SLOPE =  0.0804
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.361
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      62.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.99
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =   10.81
  SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    5.29
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.612
  TOTAL AREA(ACRES) =       32.3         PEAK FLOW RATE(CFS) =      66.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   9.12
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1070.00 =    3556.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1070.00 TO NODE   1070.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1090.00 TO NODE   1095.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    460.00
  DOWNSTREAM ELEVATION(FEET) =    457.50
  ELEVATION DIFFERENCE(FEET) =      2.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.913
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    82.78
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      0.40   TOTAL RUNOFF(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE   1095.00 TO NODE   1100.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  457.50  DOWNSTREAM ELEVATION(FEET) =  419.50
  STREET LENGTH(FEET) =  1815.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  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) =      13.65
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.41   FLOOD WIDTH(FEET) =   15.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    3.39
    SPLIT DEPTH(FEET) =    0.37   SPLIT FLOOD WIDTH(FEET) =   13.16
    SPLIT FLOW(CFS) =    5.72   SPLIT VELOCITY(FEET/SEC.) =    3.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   8.91   Tc(MIN.) =   11.83
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.249
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.579
  SUBAREA AREA(ACRES) =   12.50      SUBAREA RUNOFF(CFS) =   23.15
  TOTAL AREA(ACRES) =       12.9        PEAK FLOW RATE(CFS) =      24.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  4.01   DEPTH*VELOCITY(FT*FT/SEC.) =   1.81
  LONGEST FLOWPATH FROM NODE   1090.00 TO NODE   1100.00 =    1905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1100.00 TO NODE   1105.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =    95.10   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.83
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.25
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   12.03
  LONGEST FLOWPATH FROM NODE   1090.00 TO NODE   1105.00 =    2000.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1105.00 TO NODE   1105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.03
  RAINFALL INTENSITY(INCH/HR) =   3.23
  TOTAL STREAM AREA(ACRES) =    12.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.25

****************************************************************************
  FLOW PROCESS FROM NODE   1110.00 TO NODE   1115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    463.00
  DOWNSTREAM ELEVATION(FEET) =    461.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.793
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
  FLOW PROCESS FROM NODE   1115.00 TO NODE   1105.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =  1157.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  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) =      10.79
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.41   FLOOD WIDTH(FEET) =   15.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.57
    SPLIT DEPTH(FEET) =    0.14   SPLIT FLOOD WIDTH(FEET) =    1.53
    SPLIT FLOW(CFS) =    0.11   SPLIT VELOCITY(FEET/SEC.) =    0.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   4.22   Tc(MIN.) =    6.01
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.208
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.584
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =   20.75
  TOTAL AREA(ACRES) =        8.6        PEAK FLOW RATE(CFS) =      21.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.85
  LONGEST FLOWPATH FROM NODE   1110.00 TO NODE   1105.00 =    1257.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1105.00 TO NODE   1105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.01
  RAINFALL INTENSITY(INCH/HR) =   4.21
  TOTAL STREAM AREA(ACRES) =     8.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.15

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.25    12.03        3.227         12.90
      2       21.15     6.01        4.208          8.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       33.26     6.01       4.208
      2       40.47    12.03       3.227

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.47   Tc(MIN.) =   12.03
  TOTAL AREA(ACRES) =       21.5
  LONGEST FLOWPATH FROM NODE   1090.00 TO NODE   1105.00 =    2000.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1105.00 TO NODE   1120.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   366.00
  FLOW LENGTH(FEET) =   291.60   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.10
  (PIPE FLOW VELOCITY CORRESPONDING TO NORMAL-DEPTH FLOW
   AT DEPTH = 0.94 * DIAMETER)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.47
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   12.24
  LONGEST FLOWPATH FROM NODE   1090.00 TO NODE   1120.00 =    2291.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1120.00 TO NODE   1070.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    382.00  DOWNSTREAM(FEET) =    374.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0500
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.154
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      40.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.92
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.45
  Tc(MIN.) =   12.69
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.43
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.579
  TOTAL AREA(ACRES) =       21.8         PEAK FLOW RATE(CFS) =      40.47

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   5.89
  LONGEST FLOWPATH FROM NODE   1090.00 TO NODE   1070.00 =    2451.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1070.00 TO NODE   1070.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       40.47    12.69       3.154       21.80
  LONGEST FLOWPATH FROM NODE   1090.00 TO NODE   1070.00 =    2451.70 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       66.48    10.81       3.361       32.30
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1070.00 =    3556.90 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     100.95      10.81        3.361
      2     102.85      12.69        3.154

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     102.85   Tc(MIN.) =   12.69
  TOTAL AREA(ACRES) =       54.1

****************************************************************************
  FLOW PROCESS FROM NODE   1070.00 TO NODE   1070.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1070.00 TO NODE   1140.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    374.00  DOWNSTREAM(FEET) =    361.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   187.00   CHANNEL SLOPE =  0.0695
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.125
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     103.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.75
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   0.27
  Tc(MIN.) =   12.96
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    1.83
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.595
  TOTAL AREA(ACRES) =       55.4         PEAK FLOW RATE(CFS) =     103.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =  11.70
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1140.00 =    3743.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1140.00 TO NODE   1140.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.96
  RAINFALL INTENSITY(INCH/HR) =   3.12
  TOTAL STREAM AREA(ACRES) =    55.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    103.09

****************************************************************************
  FLOW PROCESS FROM NODE   1125.00 TO NODE   1127.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    95.00
  UPSTREAM ELEVATION(FEET) =    476.00
  DOWNSTREAM ELEVATION(FEET) =    468.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.156
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE   1127.00 TO NODE   1130.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    452.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.1143
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.23
  AVERAGE FLOW DEPTH(FEET) =   0.01   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =    3.20
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.02   FLOW VELOCITY(FEET/SEC.) =   2.03
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1130.00 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1130.00 TO NODE   1135.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    452.00  DOWNSTREAM(FEET) =    388.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   930.00   CHANNEL SLOPE =  0.0688
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.68
  AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   1.79
  Tc(MIN.) =    4.99
  SUBAREA AREA(ACRES) =     4.00       SUBAREA RUNOFF(CFS) =    8.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.517
```

```
  TOTAL AREA(ACRES) =        4.2         PEAK FLOW RATE(CFS) =       9.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.34   FLOW VELOCITY(FEET/SEC.) =  10.53
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1135.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1135.00 TO NODE   1140.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.00  DOWNSTREAM(FEET) =   361.00
  FLOW LENGTH(FEET) =   116.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.08
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.55
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.08
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1140.00 =    1281.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1140.00 TO NODE   1140.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.08
  RAINFALL INTENSITY(INCH/HR) =   4.38
  TOTAL STREAM AREA(ACRES) =     4.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.55

****************************************************************************
  FLOW PROCESS FROM NODE   1175.00 TO NODE   1176.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    467.00
  DOWNSTREAM ELEVATION(FEET) =    461.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.477
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1176.00 TO NODE   1140.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  393.00
  STREET LENGTH(FEET) =  1280.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 33.00

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

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  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) =       3.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   5.52   Tc(MIN.) =    8.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.830
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.850
  SUBAREA AREA(ACRES) =    1.60      SUBAREA RUNOFF(CFS) =    5.21
  TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       5.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.62
  FLOW VELOCITY(FEET/SEC.) =  4.44   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
  LONGEST FLOWPATH FROM NODE   1175.00 TO NODE   1140.00 =    1380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1176.00 TO NODE   1140.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.00
  RAINFALL INTENSITY(INCH/HR) =   3.83
```

```
  TOTAL STREAM AREA(ACRES) =     1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.53

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      103.09    12.96        3.125         55.40
      2        9.55     5.08        4.384          4.20
      3        5.53     8.00        3.830          1.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       53.51     5.08       4.384
      2       77.51     8.00       3.830
      3      114.41    12.96       3.125

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     114.41   Tc(MIN.) =   12.96
  TOTAL AREA(ACRES) =       61.3
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1140.00 =    3743.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1140.00 TO NODE   1075.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    361.00  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    97.00   CHANNEL SLOPE =  0.1031
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  20.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.112
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     114.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  13.92
  AVERAGE FLOW DEPTH(FEET) =   1.13   TRAVEL TIME(MIN.) =   0.12
  Tc(MIN.) =   13.07
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.56
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.596
  TOTAL AREA(ACRES) =       61.7         PEAK FLOW RATE(CFS) =     114.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =  13.92
  LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1075.00 =    3840.90 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1180.00 TO NODE   1075.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.112
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5901
  SUBAREA AREA(ACRES) =    2.70   SUBAREA RUNOFF(CFS) =    3.78
  TOTAL AREA(ACRES) =       64.4   TOTAL RUNOFF(CFS) =     118.26
  TC(MIN.) =   13.07
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       64.4  TC(MIN.) =     13.07
  PEAK FLOW RATE(CFS)   =     118.26
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                              Analysis prepared by:

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                             SOLANA BEACH, CA 92075
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 ************************* DESCRIPTION OF STUDY *************************
* 2936 ALL PEOPLES CHURCH HYDROLOGY 100-YEAR UNMITIGATED                 *
* JUNE 1,2021                                                            *
* C=0.45 PERV C=0.85 IMPERVIOUS                                          *
 **************************************************************************

  FILE NAME: 2936P100.DAT
  TIME/DATE OF STUDY: 12:10 06/01/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
```

```
  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   1065.00 TO NODE   1065.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.26   RAIN INTENSITY(INCH/HOUR) =  3.59
  TOTAL AREA(ACRES) =    28.80   TOTAL RUNOFF(CFS) =     60.04

****************************************************************************
  FLOW PROCESS FROM NODE   1065.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.90  DOWNSTREAM(FEET) =   429.90
  FLOW LENGTH(FEET) =   255.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.72
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    100.00 =     255.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    120.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   429.90  DOWNSTREAM(FEET) =   418.70
  FLOW LENGTH(FEET) =   226.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.08
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.70
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    120.00 =     482.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.70  DOWNSTREAM(FEET) =   402.50
  FLOW LENGTH(FEET) =   245.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.54
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    130.00 =     728.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   397.00  DOWNSTREAM(FEET) =   382.10
  FLOW LENGTH(FEET) =    66.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.92
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    140.00 =     794.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    140.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.465
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5802
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =       28.9   TOTAL RUNOFF(CFS) =      60.04
  TC(MIN.) =    9.92
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   156.70
  UPSTREAM ELEVATION(FEET) =    449.00
  DOWNSTREAM ELEVATION(FEET) =    440.30
  ELEVATION DIFFERENCE(FEET) =      8.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.962
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.55
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.217
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    440.30  DOWNSTREAM(FEET) =    428.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   232.80   CHANNEL SLOPE =  0.0507
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.839
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.95
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   1.99
  Tc(MIN.) =    7.95
  SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.500
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.60
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     389.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    510.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.50  DOWNSTREAM(FEET) =   419.90
  FLOW LENGTH(FEET) =    80.10   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.15
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.10
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    510.00 =     469.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    520.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   419.90  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =   100.90   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.15
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    520.00 =     570.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    520.00 TO NODE    520.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.24
  RAINFALL INTENSITY(INCH/HR) =   3.78
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    99.00
  UPSTREAM ELEVATION(FEET) =    453.00
  DOWNSTREAM ELEVATION(FEET) =    446.90
  ELEVATION DIFFERENCE(FEET) =      6.10
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.777
```

```
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    96.16
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.252
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    446.90  DOWNSTREAM(FEET) =    428.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   407.80   CHANNEL SLOPE =  0.0463
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.563
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.87
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   3.63
  Tc(MIN.) =    9.41
  SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.89
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.500
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     506.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 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) =   423.20  DOWNSTREAM(FEET) =   417.70
  FLOW LENGTH(FEET) =    64.30   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.95
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =     571.10 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) =  3.542
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5000
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.18
 TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.24
 TC(MIN.) =    9.51

****************************************************************************
 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) =   417.70  DOWNSTREAM(FEET) =   417.20
 FLOW LENGTH(FEET) =    31.80   MANNING'S N =  0.011
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.24
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.61
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    216.00 =     602.90 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    225.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.524
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5000
 SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.18
 TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       1.41
 TC(MIN.) =    9.61

****************************************************************************
 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) =   408.70  DOWNSTREAM(FEET) =   408.60
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.011
```

```
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.41
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.62
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    226.00 =     607.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    521.00 TO NODE    226.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.521
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4900
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       1.73
  TC(MIN.) =    9.62

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    520.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.50  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    17.80   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.24
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.73
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.65
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    520.00 =     625.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    520.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.65
  RAINFALL INTENSITY(INCH/HR) =   3.52
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.73

  ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.15     8.24        3.785          0.60
      2        1.73     9.65        3.517          1.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.62     8.24       3.785
      2        2.80     9.65       3.517

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.80   Tc(MIN.) =    9.65
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    520.00 =     625.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    520.00 TO NODE    525.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   383.00
  FLOW LENGTH(FEET) =   173.20   MANNING'S N =  0.011
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.98
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.80
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    9.84
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    525.00 =     798.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    525.00 TO NODE    525.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.84
  RAINFALL INTENSITY(INCH/HR) =   3.48
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.80

****************************************************************************
  FLOW PROCESS FROM NODE   1120.00 TO NODE    525.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
```

```
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.24   RAIN INTENSITY(INCH/HOUR) =  3.20
  TOTAL AREA(ACRES) =    21.50   TOTAL RUNOFF(CFS) =     40.47

******************************************************************************
  FLOW PROCESS FROM NODE   1120.00 TO NODE    525.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.24
  RAINFALL INTENSITY(INCH/HR) =   3.20
  TOTAL STREAM AREA(ACRES) =    21.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.47

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.80     9.84        3.480          1.60
      2       40.47    12.24        3.204         21.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       35.33     9.84       3.480
      2       43.04    12.24       3.204

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.04   Tc(MIN.) =   12.24
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    525.00 =     798.90 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    525.00 TO NODE    530.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   382.90  DOWNSTREAM(FEET) =   381.80
  FLOW LENGTH(FEET) =   124.60   MANNING'S N =  0.011
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.31
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.04
```

```
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   12.44
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    530.00 =     923.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    525.00 TO NODE    530.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    605.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   538.50
  UPSTREAM ELEVATION(FEET) =    452.90
  DOWNSTREAM ELEVATION(FEET) =    423.00
  ELEVATION DIFFERENCE(FEET) =     29.90
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.459
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.55
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.123
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    610.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    423.00  DOWNSTREAM(FEET) =    392.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   289.40   CHANNEL SLOPE =  0.1068
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   0.500
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.980
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.40
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.75
  Tc(MIN.) =    7.21
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.554
```

```
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   7.68
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    610.00 =     827.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    610.00 TO NODE    620.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    392.10  DOWNSTREAM(FEET) =    388.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =    95.90   CHANNEL SLOPE =  0.0344
  CHANNEL BASE(FEET) =    0.50   "Z" FACTOR =   0.500
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.928
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.87
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   0.27
  Tc(MIN.) =    7.49
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.53
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.515
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   6.20
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    620.00 =     923.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    620.00 TO NODE    530.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   386.30  DOWNSTREAM(FEET) =   381.80
  FLOW LENGTH(FEET) =    52.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.71
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.62
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.57
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    530.00 =     975.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    530.00 TO NODE    530.00 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        1.62     7.57       3.911        0.80
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    530.00 =     975.90 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       43.04    12.44       3.181       23.10
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    530.00 =     923.50 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      27.82       7.57        3.911
      2      44.36      12.44        3.181

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.36   Tc(MIN.) =   12.44
  TOTAL AREA(ACRES) =       23.9

****************************************************************************
  FLOW PROCESS FROM NODE    530.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   384.80  DOWNSTREAM(FEET) =   380.30
  FLOW LENGTH(FEET) =   146.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.92
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.36
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   12.60
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    140.00 =    1121.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 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       44.36    12.60       3.163       23.90
```

```
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    140.00 =    1121.90 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       60.04     9.92       3.465       28.90
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    140.00 =     794.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      94.96       9.92        3.465
      2      99.18      12.60        3.163

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      99.18   Tc(MIN.) =   12.60
  TOTAL AREA(ACRES) =       52.8

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.30  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.64
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      99.18
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.65
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    145.00 =    1212.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    145.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.65
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =    52.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     99.18

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    310.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   172.20
  UPSTREAM ELEVATION(FEET) =    434.00
  DOWNSTREAM ELEVATION(FEET) =    416.30
  ELEVATION DIFFERENCE(FEET) =     17.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.924
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    416.30  DOWNSTREAM(FEET) =    392.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   254.30   CHANNEL SLOPE =  0.0924
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.54
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.20
  Tc(MIN.) =    4.12
  SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    2.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.750
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       2.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   4.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    320.00 =     426.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   389.30  DOWNSTREAM(FEET) =   388.90
  FLOW LENGTH(FEET) =    38.90   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.97
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    4.23
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =     465.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    340.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.80  DOWNSTREAM(FEET) =   388.50
  FLOW LENGTH(FEET) =    36.10   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.28
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.97
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    4.35
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    340.00 =     501.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7500
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.96
  TC(MIN.) =    4.35

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.50  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =    47.80   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       3.96
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.48
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =     549.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    360.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7500
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.33
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.29
  TC(MIN.) =    4.48

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.30  DOWNSTREAM(FEET) =   367.10
  FLOW LENGTH(FEET) =    12.50   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.39
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.29
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    4.49
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    145.00 =     561.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    145.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.49
  RAINFALL INTENSITY(INCH/HR) =   4.40
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.29

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

```
     1       99.18    12.65        3.158         52.80
     2        4.29     4.49        4.400          1.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       39.46     4.49       4.400
     2      102.26    12.65       3.158

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     102.26   Tc(MIN.) =   12.65
  TOTAL AREA(ACRES) =       54.1
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    145.00 =    1212.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    147.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   366.30
  FLOW LENGTH(FEET) =    42.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.14
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     102.26
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.70
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    147.00 =    1255.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    147.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.153
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5827
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =       54.5   TOTAL RUNOFF(CFS) =     102.26
  TC(MIN.) =   12.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    150.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    366.20  DOWNSTREAM(FEET) =    363.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =    93.10   CHANNEL SLOPE =  0.0333
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.500
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.135
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     102.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.35
  AVERAGE FLOW DEPTH(FEET) =   1.51   TRAVEL TIME(MIN.) =   0.17
  Tc(MIN.) =   12.87
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.582
  TOTAL AREA(ACRES) =       54.7         PEAK FLOW RATE(CFS) =     102.26

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.51   FLOW VELOCITY(FEET/SEC.) =   9.34
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    150.00 =    1348.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.87
  RAINFALL INTENSITY(INCH/HR) =   3.13
  TOTAL STREAM AREA(ACRES) =    54.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    102.26

****************************************************************************
  FLOW PROCESS FROM NODE   1140.00 TO NODE    150.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.08   RAIN INTENSITY(INCH/HOUR) =  4.38
  TOTAL AREA(ACRES) =     5.90   TOTAL RUNOFF(CFS) =     11.32

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.08
  RAINFALL INTENSITY(INCH/HR) =   4.38
  TOTAL STREAM AREA(ACRES) =     5.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.32

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      102.26    12.87        3.135         54.70
      2       11.32     5.08        4.385          5.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       84.42     5.08       4.385
      2      110.35    12.87       3.135

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     110.35   Tc(MIN.) =   12.87
  TOTAL AREA(ACRES) =       60.6
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    150.00 =    1348.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.00  DOWNSTREAM(FEET) =    360.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =    21.60   CHANNEL SLOPE =  0.1019
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.500
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.132
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     110.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.17
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   0.03
  Tc(MIN.) =   12.89
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.568
  TOTAL AREA(ACRES) =       60.7         PEAK FLOW RATE(CFS) =     110.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =  14.16
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    155.00 =    1370.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    160.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.80  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.80   CHANNEL SLOPE =  0.1079
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.115
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     110.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.88
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.15
  Tc(MIN.) =   13.05
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.42
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.567
  TOTAL AREA(ACRES) =       61.0         PEAK FLOW RATE(CFS) =     110.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =   9.86
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    160.00 =    1461.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.05
  RAINFALL INTENSITY(INCH/HR) =   3.11
  TOTAL STREAM AREA(ACRES) =    61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    110.35

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    410.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   193.70
```

```
  UPSTREAM ELEVATION(FEET) =    431.60
  DOWNSTREAM ELEVATION(FEET) =    408.00
  ELEVATION DIFFERENCE(FEET) =     23.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.760
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    420.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    407.90  DOWNSTREAM(FEET) =    389.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   483.90   CHANNEL SLOPE =  0.0372
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.046
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.60
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   3.10
  Tc(MIN.) =    6.86
  SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    2.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
  TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       2.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.12
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    420.00 =     677.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    421.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.046
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.05
```

```
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.68
  TC(MIN.) =    6.86

****************************************************************************
  FLOW PROCESS FROM NODE    420.00 TO NODE    430.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.50  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   106.30   MANNING'S N =  0.011
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.68
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    7.25
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =     783.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.972
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
  SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    3.36
  TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =       6.97
  TC(MIN.) =    7.25

****************************************************************************
  FLOW PROCESS FROM NODE    440.00 TO NODE    450.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   369.00
  FLOW LENGTH(FEET) =    39.60   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.89
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.29
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    450.00 =     823.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    451.00 TO NODE    450.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.964
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6362
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =       7.31
  TC(MIN.) =    7.29

****************************************************************************
  FLOW PROCESS FROM NODE    450.00 TO NODE    460.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.90  DOWNSTREAM(FEET) =   356.80
  FLOW LENGTH(FEET) =     2.20   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.31
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    7.30
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    460.00 =     825.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    461.00 TO NODE    460.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.964
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.6136
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.71
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       8.03
  TC(MIN.) =    7.30

****************************************************************************
  FLOW PROCESS FROM NODE    460.00 TO NODE    160.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    359.00  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.40   CHANNEL SLOPE =  0.3922
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.954
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.12
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.06
 AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.05
 Tc(MIN.) =    7.35
 SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.18
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.609
 TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       8.19

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   7.13
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    160.00 =     846.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.35
 RAINFALL INTENSITY(INCH/HR) =   3.95
 TOTAL STREAM AREA(ACRES) =     3.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.19

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      110.35    13.05        3.115         61.00
     2        8.19     7.35        3.954          3.40

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       95.11     7.35       3.954
     2      116.80    13.05       3.115

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     116.80   Tc(MIN.) =   13.05
 TOTAL AREA(ACRES) =       64.4
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    160.00 =    1461.20 FEET.
============================================================================
 END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)     =       64.4  TC(MIN.) =     13.05
  PEAK FLOW RATE(CFS)   =     116.80
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1452

                              Analysis prepared by:

                        PASCO LARET SUITER & ASSOCIATES
                          535 N. HIGHWAY 101, SUITE A
                             SOLANA BEACH, CA 92075
                                  858.259.8212

 ************************* DESCRIPTION OF STUDY *************************
* 2936 ALL PEOPLES CHURCH HYDROLOGY 100-YEAR MITIGATED                   *
* JUNE 1,2021                                                              *
* C=0.45 PERV C=0.85 IMPERVIOUS                                            *
 **************************************************************************

  FILE NAME: 2936P100.DAT
  TIME/DATE OF STUDY: 11:22 06/01/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  *USER SPECIFIED:
  NUMBER OF [TIME,INTENSITY] DATA PAIRS =  9
   1)   5.000;  4.400
   2)  10.000;  3.450
   3)  15.000;  2.900
   4)  20.000;  2.500
   5)  25.000;  2.200
   6)  30.000;  2.000
   7)  40.000;  1.700
   8)  50.000;  1.500
   9)  60.000;  1.300
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: ONLY PEAK CONFLUENCE VALUES CONSIDERED
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
```

```
  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   1065.00 TO NODE   1065.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   9.26   RAIN INTENSITY(INCH/HOUR) =  3.59
  TOTAL AREA(ACRES) =    28.80   TOTAL RUNOFF(CFS) =     60.04

****************************************************************************
  FLOW PROCESS FROM NODE   1065.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.90  DOWNSTREAM(FEET) =   429.90
  FLOW LENGTH(FEET) =   255.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.72
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    100.00 =     255.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    120.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   429.90  DOWNSTREAM(FEET) =   418.70
  FLOW LENGTH(FEET) =   226.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.08
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.70
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    120.00 =     482.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.70  DOWNSTREAM(FEET) =   402.50
  FLOW LENGTH(FEET) =   245.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.54
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    130.00 =     728.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   397.00  DOWNSTREAM(FEET) =   382.10
  FLOW LENGTH(FEET) =    66.20   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.04
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.92
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    140.00 =     794.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    140.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.465
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5802
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.16
  TOTAL AREA(ACRES) =       28.9   TOTAL RUNOFF(CFS) =      60.04
  TC(MIN.) =    9.92
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   156.70
  UPSTREAM ELEVATION(FEET) =    449.00
  DOWNSTREAM ELEVATION(FEET) =    440.30
  ELEVATION DIFFERENCE(FEET) =      8.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.962
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.55
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.217
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    440.30  DOWNSTREAM(FEET) =    428.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   232.80   CHANNEL SLOPE =  0.0507
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.839
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.95
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   1.99
  Tc(MIN.) =    7.95
  SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.500
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.60
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     389.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
```

```
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  10.95   RAIN INTENSITY(INCH/HOUR) =  3.35
  TOTAL AREA(ACRES) =     0.60   TOTAL RUNOFF(CFS) =      0.95

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    510.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   425.50  DOWNSTREAM(FEET) =   419.90
  FLOW LENGTH(FEET) =    80.10   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.93
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.95
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    510.00 =     469.60 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    510.00 TO NODE    520.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   419.90  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =   100.90   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.34
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.95
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.25
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    520.00 =     570.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    520.00 TO NODE    520.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.25
  RAINFALL INTENSITY(INCH/HR) =   3.31
  TOTAL STREAM AREA(ACRES) =     0.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.95

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    99.00
  UPSTREAM ELEVATION(FEET) =    453.00
  DOWNSTREAM ELEVATION(FEET) =    446.90
  ELEVATION DIFFERENCE(FEET) =      6.10
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.777
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    96.16
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.252
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    446.90  DOWNSTREAM(FEET) =    428.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   407.80   CHANNEL SLOPE =  0.0463
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.563
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.87
  AVERAGE FLOW DEPTH(FEET) =   0.03   TRAVEL TIME(MIN.) =   3.63
  Tc(MIN.) =    9.41
  SUBAREA AREA(ACRES) =     0.50       SUBAREA RUNOFF(CFS) =    0.89
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.500
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.04   FLOW VELOCITY(FEET/SEC.) =   2.41
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    210.00 =     506.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 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) =   423.20  DOWNSTREAM(FEET) =   417.70
```

```
  FLOW LENGTH(FEET) =    64.30   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.95
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.07
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    215.00 =     571.10 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) =  3.542
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5000
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       1.24
  TC(MIN.) =    9.51

****************************************************************************
  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) =   417.70  DOWNSTREAM(FEET) =   417.20
  FLOW LENGTH(FEET) =    31.80   MANNING'S N =  0.011
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.24
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.61
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    216.00 =     602.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    225.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.524
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5000
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =        0.8   TOTAL RUNOFF(CFS) =       1.41
  TC(MIN.) =    9.61
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  11.62   RAIN INTENSITY(INCH/HOUR) =  3.27
  TOTAL AREA(ACRES) =     0.80   TOTAL RUNOFF(CFS) =      1.11

****************************************************************************
  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) =   408.70  DOWNSTREAM(FEET) =   408.60
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.11
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.63
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    226.00 =     607.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    521.00 TO NODE    226.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.270
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4293
  SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        1.0   TOTAL RUNOFF(CFS) =       1.40
  TC(MIN.) =   11.63

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    520.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.50  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    17.80   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.75
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       1.40
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.66
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    520.00 =     625.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    520.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.66
  RAINFALL INTENSITY(INCH/HR) =   3.27
  TOTAL STREAM AREA(ACRES) =     1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.95    11.25        3.313          0.60
      2        1.40    11.66        3.267          1.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.30    11.25       3.313
      2        2.34    11.66       3.267

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.34   Tc(MIN.) =   11.66
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    520.00 =     625.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    520.00 TO NODE    525.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   383.00
  FLOW LENGTH(FEET) =   173.20   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.81
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.34
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   11.87
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    525.00 =     798.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    525.00 TO NODE    525.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.87
  RAINFALL INTENSITY(INCH/HR) =   3.24
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.34

****************************************************************************
  FLOW PROCESS FROM NODE   1120.00 TO NODE    525.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  12.24   RAIN INTENSITY(INCH/HOUR) =  3.20
  TOTAL AREA(ACRES) =    21.50   TOTAL RUNOFF(CFS) =     40.47

****************************************************************************
  FLOW PROCESS FROM NODE   1120.00 TO NODE    525.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.24
  RAINFALL INTENSITY(INCH/HR) =   3.20
  TOTAL STREAM AREA(ACRES) =    21.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     40.47

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.34    11.87        3.244          1.60
      2       40.47    12.24        3.204         21.50

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       41.58    11.87       3.244
      2       42.78    12.24       3.204
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      42.78   Tc(MIN.) =   12.24
  TOTAL AREA(ACRES) =       23.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    525.00 =     798.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    525.00 TO NODE    530.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   382.90  DOWNSTREAM(FEET) =   381.80
  FLOW LENGTH(FEET) =   124.60   MANNING'S N =  0.011
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.78
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   12.44
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    530.00 =     923.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    525.00 TO NODE    530.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    605.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   538.50
  UPSTREAM ELEVATION(FEET) =    452.90
  DOWNSTREAM ELEVATION(FEET) =    423.00
  ELEVATION DIFFERENCE(FEET) =     29.90
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.459
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    95.55
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.123
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    610.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    423.00  DOWNSTREAM(FEET) =    392.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   289.40   CHANNEL SLOPE =  0.1068
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   0.500
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.980
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.40
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   0.75
  Tc(MIN.) =    7.21
  SUBAREA AREA(ACRES) =     0.40       SUBAREA RUNOFF(CFS) =    0.92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.554
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   7.68
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    610.00 =     827.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    610.00 TO NODE    620.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    392.10  DOWNSTREAM(FEET) =    388.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =    95.90   CHANNEL SLOPE =  0.0344
  CHANNEL BASE(FEET) =    0.50   "Z" FACTOR =   0.500
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.928
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.37
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.87
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   0.27
  Tc(MIN.) =    7.49
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.53
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.515
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   6.20
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    620.00 =     923.80 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    620.00 TO NODE    530.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   386.30  DOWNSTREAM(FEET) =   381.80
  FLOW LENGTH(FEET) =    52.10   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.71
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.62
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.57
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    530.00 =     975.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    530.00 TO NODE    530.00 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        1.62     7.57       3.911        0.80
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    530.00 =     975.90 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       42.78    12.44       3.181       23.10
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    530.00 =     923.50 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      27.66       7.57        3.911
      2      44.10      12.44        3.181

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.10   Tc(MIN.) =   12.44
  TOTAL AREA(ACRES) =       23.9

****************************************************************************
  FLOW PROCESS FROM NODE    530.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   384.80  DOWNSTREAM(FEET) =   380.30
```

```
  FLOW LENGTH(FEET) =   146.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.91
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.10
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   12.60
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    140.00 =    1121.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 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       44.10    12.60       3.163       23.90
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    140.00 =    1121.90 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       60.04     9.92       3.465       28.90
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    140.00 =     794.30 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      94.75       9.92        3.465
      2      98.91      12.60        3.163

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      98.91   Tc(MIN.) =   12.60
  TOTAL AREA(ACRES) =       52.8

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   380.30  DOWNSTREAM(FEET) =   367.00
  FLOW LENGTH(FEET) =    91.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.62
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.91
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.65
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    145.00 =    1212.90 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    145.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.65
  RAINFALL INTENSITY(INCH/HR) =   3.16
  TOTAL STREAM AREA(ACRES) =    52.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     98.91

****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    310.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   172.20
  UPSTREAM ELEVATION(FEET) =    434.00
  DOWNSTREAM ELEVATION(FEET) =    416.30
  ELEVATION DIFFERENCE(FEET) =     17.70
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.924
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    320.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    416.30  DOWNSTREAM(FEET) =    392.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   254.30   CHANNEL SLOPE =  0.0924
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.54
  AVERAGE FLOW DEPTH(FEET) =   0.04   TRAVEL TIME(MIN.) =   1.20
  Tc(MIN.) =    4.12
  SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    2.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.750
  TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       2.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   4.57
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    320.00 =     426.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    330.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   389.30  DOWNSTREAM(FEET) =   388.90
  FLOW LENGTH(FEET) =    38.90   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.97
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    4.23
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    330.00 =     465.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    340.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.80  DOWNSTREAM(FEET) =   388.50
  FLOW LENGTH(FEET) =    36.10   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.28
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.97
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    4.35
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    340.00 =     501.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    340.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
```

```
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7500
  SUBAREA AREA(ACRES) =    0.30   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        1.2   TOTAL RUNOFF(CFS) =       3.96
  TC(MIN.) =    4.35

****************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    350.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   388.50  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =    47.80   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.96
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    4.48
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    350.00 =     549.30 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    350.00 TO NODE    360.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7500
  SUBAREA AREA(ACRES) =    0.10   SUBAREA RUNOFF(CFS) =    0.33
  TOTAL AREA(ACRES) =        1.3   TOTAL RUNOFF(CFS) =       4.29
  TC(MIN.) =    4.48

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    360.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.48   RAIN INTENSITY(INCH/HOUR) =  4.31
  TOTAL AREA(ACRES) =     1.30   TOTAL RUNOFF(CFS) =      3.29

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    145.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   373.30  DOWNSTREAM(FEET) =   367.10
  FLOW LENGTH(FEET) =    12.50   MANNING'S N =  0.011
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.26
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.29
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    145.00 =     561.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    145.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
  RAINFALL INTENSITY(INCH/HR) =   4.31
  TOTAL STREAM AREA(ACRES) =     1.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.29

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       98.91    12.65        3.158         52.80
      2        3.29     5.49        4.307          1.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       46.20     5.49       4.307
      2      101.33    12.65       3.158

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     101.33   Tc(MIN.) =   12.65
  TOTAL AREA(ACRES) =       54.1
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    145.00 =    1212.90 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    147.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   367.00  DOWNSTREAM(FEET) =   366.30
  FLOW LENGTH(FEET) =    42.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.14
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     101.33
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.70
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    147.00 =    1255.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    147.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.153
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5774
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =       54.5   TOTAL RUNOFF(CFS) =     101.33
  TC(MIN.) =   12.70
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    150.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    366.20  DOWNSTREAM(FEET) =    363.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =    93.10   CHANNEL SLOPE =  0.0333
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.500
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.135
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     101.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.33
  AVERAGE FLOW DEPTH(FEET) =   1.50   TRAVEL TIME(MIN.) =   0.17
  Tc(MIN.) =   12.87
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.28
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.577
  TOTAL AREA(ACRES) =       54.7         PEAK FLOW RATE(CFS) =     101.33

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.50   FLOW VELOCITY(FEET/SEC.) =   9.32
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    150.00 =    1348.80 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.87
  RAINFALL INTENSITY(INCH/HR) =   3.13
  TOTAL STREAM AREA(ACRES) =    54.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    101.33

****************************************************************************
  FLOW PROCESS FROM NODE   1140.00 TO NODE    150.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.08   RAIN INTENSITY(INCH/HOUR) =  4.38
  TOTAL AREA(ACRES) =     5.90   TOTAL RUNOFF(CFS) =     11.32

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.08
  RAINFALL INTENSITY(INCH/HR) =   4.38
  TOTAL STREAM AREA(ACRES) =     5.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.32

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      101.33    12.87        3.135         54.70
      2       11.32     5.08        4.385          5.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       83.75     5.08       4.385
      2      109.42    12.87       3.135

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =     109.42   Tc(MIN.) =   12.87
  TOTAL AREA(ACRES) =       60.6
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    150.00 =    1348.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    363.00  DOWNSTREAM(FEET) =    360.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =    21.60   CHANNEL SLOPE =  0.1019
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   1.500
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.67
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.132
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     109.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.17
  AVERAGE FLOW DEPTH(FEET) =   1.15   TRAVEL TIME(MIN.) =   0.03
  Tc(MIN.) =   12.89
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.563
  TOTAL AREA(ACRES) =       60.7         PEAK FLOW RATE(CFS) =     109.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =  14.16
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    155.00 =    1370.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    160.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    360.80  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    90.80   CHANNEL SLOPE =  0.1079
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.115
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     109.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.79
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.15
  Tc(MIN.) =   13.05
  SUBAREA AREA(ACRES) =     0.30       SUBAREA RUNOFF(CFS) =    0.42
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.563
```

```
  TOTAL AREA(ACRES) =       61.0         PEAK FLOW RATE(CFS) =     109.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =   9.77
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    160.00 =    1461.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.05
  RAINFALL INTENSITY(INCH/HR) =   3.11
  TOTAL STREAM AREA(ACRES) =    61.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    109.42

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    410.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   193.70
  UPSTREAM ELEVATION(FEET) =    431.60
  DOWNSTREAM ELEVATION(FEET) =    408.00
  ELEVATION DIFFERENCE(FEET) =     23.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.760
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.20   TOTAL RUNOFF(CFS) =      0.57

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    420.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    407.90  DOWNSTREAM(FEET) =    389.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   483.90   CHANNEL SLOPE =  0.0372
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.046
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.60
AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   3.10
Tc(MIN.) =    6.86
SUBAREA AREA(ACRES) =     0.80       SUBAREA RUNOFF(CFS) =    2.10
AREA-AVERAGE RUNOFF COEFFICIENT =  0.650
TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       2.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   3.12
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    420.00 =     677.60 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    421.00 TO NODE    420.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.046
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .6500
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.05
TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.68
TC(MIN.) =    6.86

****************************************************************************
FLOW PROCESS FROM NODE    420.00 TO NODE    430.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   388.50  DOWNSTREAM(FEET) =   388.00
FLOW LENGTH(FEET) =   106.30   MANNING'S N =  0.011
DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       3.68
PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    7.25
LONGEST FLOWPATH FROM NODE    400.00 TO NODE    430.00 =     783.90 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.972
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .6500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.6500
 SUBAREA AREA(ACRES) =    1.30   SUBAREA RUNOFF(CFS) =    3.36
 TOTAL AREA(ACRES) =        2.7   TOTAL RUNOFF(CFS) =       6.97
 TC(MIN.) =    7.25

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    440.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   9.25   RAIN INTENSITY(INCH/HOUR) =  3.59
 TOTAL AREA(ACRES) =     2.70   TOTAL RUNOFF(CFS) =      5.57

****************************************************************************
 FLOW PROCESS FROM NODE    440.00 TO NODE    450.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   373.00  DOWNSTREAM(FEET) =   369.00
 FLOW LENGTH(FEET) =    39.60   MANNING'S N =  0.011
 DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.55
 ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.57
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.29
 LONGEST FLOWPATH FROM NODE    400.00 TO NODE    450.00 =     823.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    451.00 TO NODE    450.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.584
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .4500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5657
 SUBAREA AREA(ACRES) =    0.20   SUBAREA RUNOFF(CFS) =    0.32
 TOTAL AREA(ACRES) =        2.9   TOTAL RUNOFF(CFS) =       5.88
 TC(MIN.) =    9.29

****************************************************************************
 FLOW PROCESS FROM NODE    450.00 TO NODE    460.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   356.90  DOWNSTREAM(FEET) =   356.80
  FLOW LENGTH(FEET) =     2.20   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.95
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.88
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    9.30
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    460.00 =     825.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    461.00 TO NODE    460.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.584
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.5517
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.65
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       6.52
  TC(MIN.) =    9.30

****************************************************************************
  FLOW PROCESS FROM NODE    460.00 TO NODE    160.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    359.00  DOWNSTREAM(FEET) =    351.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    20.40   CHANNEL SLOPE =  0.3922
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.574
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .4500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.48
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.05
  Tc(MIN.) =    9.35
  SUBAREA AREA(ACRES) =     0.10       SUBAREA RUNOFF(CFS) =    0.16
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.549
  TOTAL AREA(ACRES) =        3.4         PEAK FLOW RATE(CFS) =       6.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   6.55
```

```
  LONGEST FLOWPATH FROM NODE    400.00 TO NODE    160.00 =     846.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    160.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   3.57
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.67

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      109.42    13.05        3.115         61.00
      2        6.67     9.35        3.574          3.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      102.03     9.35       3.574
      2      115.23    13.05       3.115

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     115.23   Tc(MIN.) =   13.05
  TOTAL AREA(ACRES) =       64.4
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    160.00 =    1461.20 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       64.4  TC(MIN.) =     13.05
  PEAK FLOW RATE(CFS)   =     115.23
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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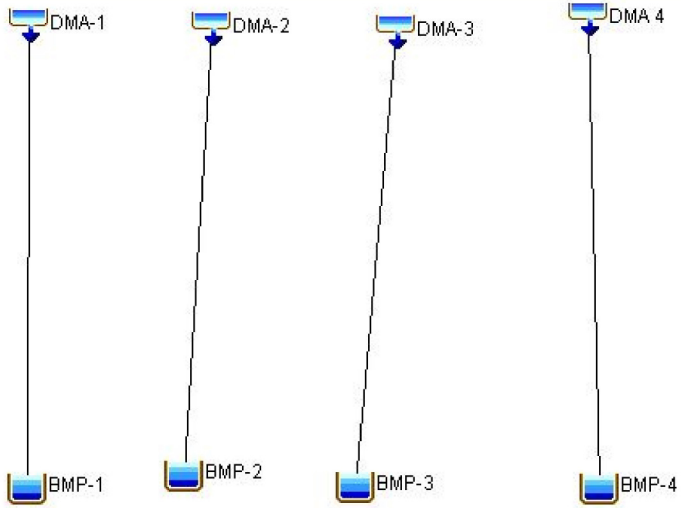
mpute Results Tools Help

--None Selected-- Run: Q100 --None Selected--

Basin Model [Post_Dev] Current Run [Q100]



Summary Results for Reservoir "BMP-1"

Project: All Peoples Church Simulation Run: Q100
Reservoir: BMP-1

Start of Run:	01Jan2000, 00:00	Basin Model:	Post_Dev
End of Run:	01Jan2000, 06:05	Meteorologic Model:	Met 1
Compute Time:	03Feb2021, 11:01:44	Control Specifications:	Control 1

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Inflow:	1.1 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:10
Peak Discharge:	0.9 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:13
Inflow Volume:	n/a	Peak Storage:	0.0 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	0.5 (FT)

Summary Results for Reservoir "BMP-3"

Project: All Peoples Church Simulation Run: Q100
Reservoir: BMP-3

Start of Run:	01Jan2000, 00:00	Basin Model:	Post_Dev
End of Run:	01Jan2000, 06:05	Meteorologic Model:	Met 1
Compute Time:	03Feb2021, 11:01:44	Control Specifications:	Control 1

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Inflow:	4.3 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:05
Peak Discharge:	3.3 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:06
Inflow Volume:	n/a	Peak Storage:	0.1 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	0.7 (FT)

Summary Results for Reservoir "BMP-2"

Project: All Peoples Church Simulation Run: Q100
Reservoir: BMP-2

Start of Run:	01Jan2000, 00:00	Basin Model:	Post_Dev
End of Run:	01Jan2000, 06:05	Meteorologic Model:	Met 1
Compute Time:	03Feb2021, 11:01:44	Control Specifications:	Control 1

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Inflow:	1.4 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:10
Peak Discharge:	1.1 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:12
Inflow Volume:	n/a	Peak Storage:	0.0 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	0.4 (FT)

Summary Results for Reservoir "BMP-4"

Project: All Peoples Church Simulation Run: Q100
Reservoir: BMP-4

Start of Run:	01Jan2000, 00:00	Basin Model:	Post_Dev
End of Run:	01Jan2000, 06:05	Meteorologic Model:	Met 1
Compute Time:	03Feb2021, 11:01:44	Control Specifications:	Control 1

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Inflow:	7.0 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:10
Peak Discharge:	5.6 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:12
Inflow Volume:	n/a	Peak Storage:	0.1 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	0.4 (FT)

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 2/1/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2.5 INCHES
BASIN AREA 0.6 ACRES
RUNOFF COEFFICIENT 0.5
PEAK DISCHARGE 1.15 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0
TIME (MIN) = 20	DISCHARGE (CFS) = 0
TIME (MIN) = 30	DISCHARGE (CFS) = 0
TIME (MIN) = 40	DISCHARGE (CFS) = 0
TIME (MIN) = 50	DISCHARGE (CFS) = 0.1
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
TIME (MIN) = 110	DISCHARGE (CFS) = 0.1
TIME (MIN) = 120	DISCHARGE (CFS) = 0.1
TIME (MIN) = 130	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 150	DISCHARGE (CFS) = 0.1
TIME (MIN) = 160	DISCHARGE (CFS) = 0.1
TIME (MIN) = 170	DISCHARGE (CFS) = 0.1
TIME (MIN) = 180	DISCHARGE (CFS) = 0.1
TIME (MIN) = 190	DISCHARGE (CFS) = 0.1
TIME (MIN) = 200	DISCHARGE (CFS) = 0.1
TIME (MIN) = 210	DISCHARGE (CFS) = 0.1
TIME (MIN) = 220	DISCHARGE (CFS) = 0.2
TIME (MIN) = 230	DISCHARGE (CFS) = 0.3
TIME (MIN) = 240	DISCHARGE (CFS) = 0.5
TIME (MIN) = 250	DISCHARGE (CFS) = 1.15
TIME (MIN) = 260	DISCHARGE (CFS) = 0.2
TIME (MIN) = 270	DISCHARGE (CFS) = 0.1
TIME (MIN) = 280	DISCHARGE (CFS) = 0.1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.1
TIME (MIN) = 310	DISCHARGE (CFS) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0.1
TIME (MIN) = 350	DISCHARGE (CFS) = 0
TIME (MIN) = 360	DISCHARGE (CFS) = 0
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Outlet Structure for Discharge of BMP-1

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	1		Invert:	0.50 ft
Invert:	0 ft		L:	6.0 ft
Slot height	0.25 ft		C_w:	3.1
Slot width	0.5 ft			
A	0.125	0.125		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.037	0.000	0.037	
0.667	0.167	0.105	0.000	0.105	
0.750	0.250	0.194	0.000	0.194	
0.833	0.333	0.549	0.000	0.549	
0.917	0.417	0.576	0.000	0.576	
1.000	0.500	0.602	0.000	0.602	RISER STRUCTURE
1.083	0.583	0.626	0.447	1.074	
1.167	0.667	0.650	1.266	1.916	
1.250	0.750	0.673	2.325	2.998	
1.333	0.833	0.695	3.580	4.275	
1.417	0.917	0.716	5.003	5.719	
1.500	1.000	0.737	6.576	7.313	
1.583	1.083	0.757	8.287	9.044	
1.667	1.167	0.777	10.125	10.902	
1.750	1.250	0.796	12.081	12.877	
1.833	1.333	0.815	14.149	14.964	
1.917	1.417	0.833	16.324	17.157	
2.000	1.500	0.851	18.600	19.451	

Note:

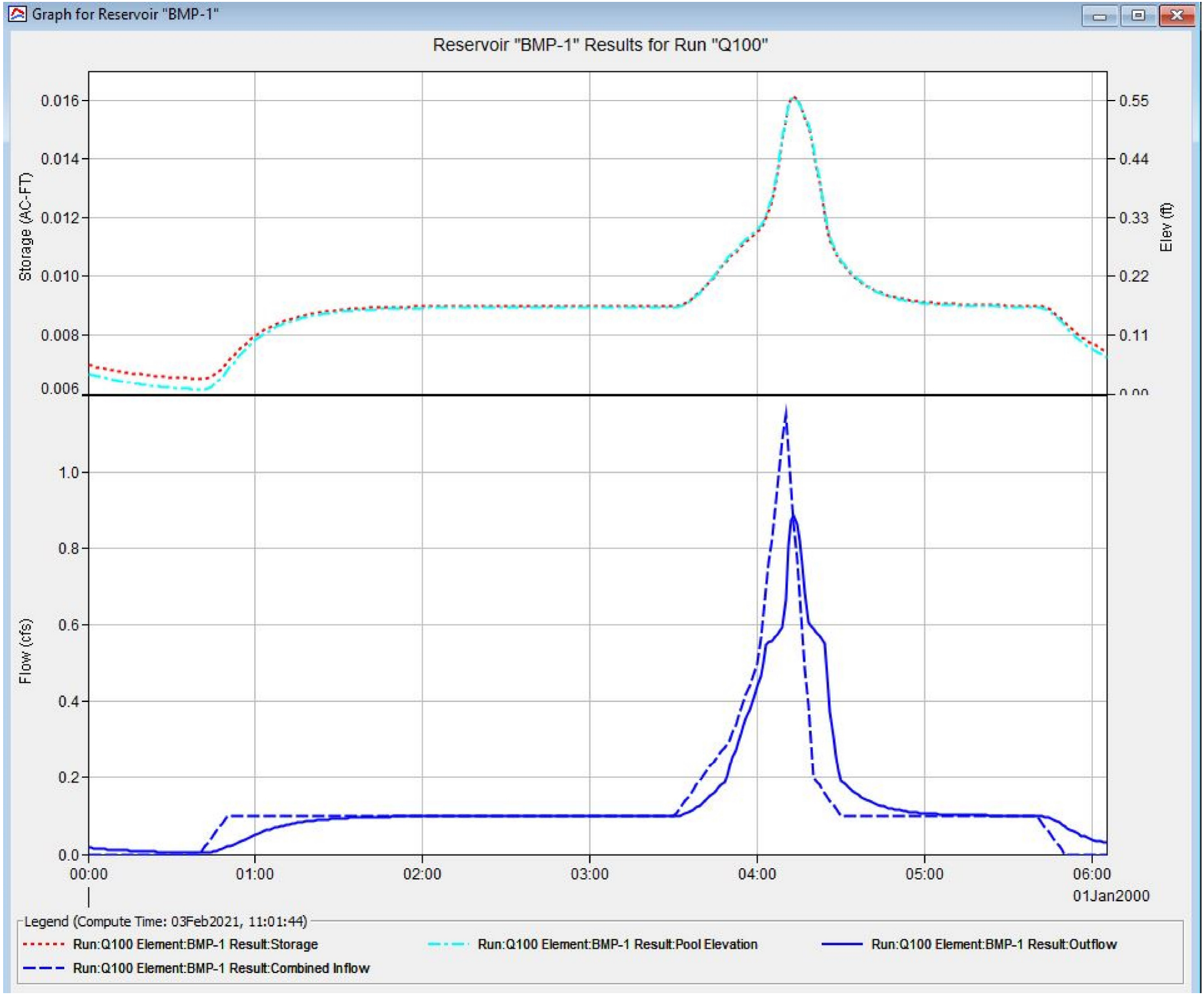
1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts as an orifice when $h^* \geq h_{slot}$

Stage Area for BMP-1

Elevation (ft)	Area (ft^2)	Volume (ft^3)
0.000	473	0
0.083	488	40
0.167	504	83
0.250	519	128
0.333	535	176
0.417	551	226
0.500	567	280
0.583	584	336
0.667	600	395
0.750	617	456
0.833	634	521
0.917	651	589
1.000	668	660
1.083	685	733
1.167	702	809
1.250	719	888
1.333	736	970
1.417	753	1055
1.500	770	1142

Stage-Storage-Discharge of BMP-1

Elevation (ft)	Storage (ac-ft)	Discharge (cfs)
0.000	0.0064	0.000
0.083	0.0077	0.037
0.167	0.0091	0.105
0.250	0.0105	0.194
0.333	0.0120	0.549
0.417	0.0135	0.576
0.500	0.0151	0.602
0.583	0.0168	1.074
0.667	0.0186	1.916
0.750	0.0204	2.998
0.833	0.0223	4.275
0.917	0.0242	5.719
1.000	0.0262	7.313


Graph for Reservoir "BMP-1"
Reservoir "BMP-1" Results for Run "Q100"
Storage (AC-FT)
Elev (ft)
0.016
0.014
0.012
0.010
0.008
0.006
0.55
0.44
0.33
0.22
0.11
Flow (cfs)
1.0
0.8
0.6
0.4
0.2
0.0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: 03Feb2021, 11:01:44)
Run:Q100 Element:BMP-1 Result:Storage
Run:Q100 Element:BMP-1 Result:Pool Elevation
Run:Q100 Element:BMP-1 Result:Outflow
Run:Q100 Element:BMP-1 Result:Combined Inflow

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 2/1/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2.5 INCHES
BASIN AREA 0.8 ACRES
RUNOFF COEFFICIENT 0.5
PEAK DISCHARGE 1.41 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.1
TIME (MIN) = 20	DISCHARGE (CFS) = 0.1
TIME (MIN) = 30	DISCHARGE (CFS) = 0.1
TIME (MIN) = 40	DISCHARGE (CFS) = 0.1
TIME (MIN) = 50	DISCHARGE (CFS) = 0.1
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
TIME (MIN) = 110	DISCHARGE (CFS) = 0.1
TIME (MIN) = 120	DISCHARGE (CFS) = 0.1
TIME (MIN) = 130	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 150	DISCHARGE (CFS) = 0.1
TIME (MIN) = 160	DISCHARGE (CFS) = 0.1
TIME (MIN) = 170	DISCHARGE (CFS) = 0.1
TIME (MIN) = 180	DISCHARGE (CFS) = 0.1
TIME (MIN) = 190	DISCHARGE (CFS) = 0.2
TIME (MIN) = 200	DISCHARGE (CFS) = 0.2
TIME (MIN) = 210	DISCHARGE (CFS) = 0.2
TIME (MIN) = 220	DISCHARGE (CFS) = 0.2
TIME (MIN) = 230	DISCHARGE (CFS) = 0.3
TIME (MIN) = 240	DISCHARGE (CFS) = 0.7
TIME (MIN) = 250	DISCHARGE (CFS) = 1.41
TIME (MIN) = 260	DISCHARGE (CFS) = 0.3
TIME (MIN) = 270	DISCHARGE (CFS) = 0.2
TIME (MIN) = 280	DISCHARGE (CFS) = 0.1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.1
TIME (MIN) = 310	DISCHARGE (CFS) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0.1
TIME (MIN) = 350	DISCHARGE (CFS) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Outlet Structure for Discharge of BMP-2

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	1		Invert:	0.50 ft
Invert:	0 ft		L:	6.0 ft
Slot height	0.25 ft		C_w:	3.1
Slot width	1 ft			
A	0.250	0.25		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.075	0.000	0.075	
0.667	0.167	0.211	0.000	0.211	
0.750	0.250	0.388	0.000	0.388	
0.833	0.333	1.099	0.000	1.099	
0.917	0.417	1.152	0.000	1.152	
1.000	0.500	1.204	0.000	1.204	RISER STRUCTURE
1.083	0.583	1.253	0.447	1.700	
1.167	0.667	1.300	1.266	2.566	
1.250	0.750	1.346	2.325	3.671	
1.333	0.833	1.390	3.580	4.970	
1.417	0.917	1.433	5.003	6.435	
1.500	1.000	1.474	6.576	8.050	
1.583	1.083	1.515	8.287	9.802	
1.667	1.167	1.554	10.125	11.679	
1.750	1.250	1.592	12.081	13.673	
1.833	1.333	1.630	14.149	15.779	
1.917	1.417	1.667	16.324	17.991	
2.000	1.500	1.702	18.600	20.302	

Note:

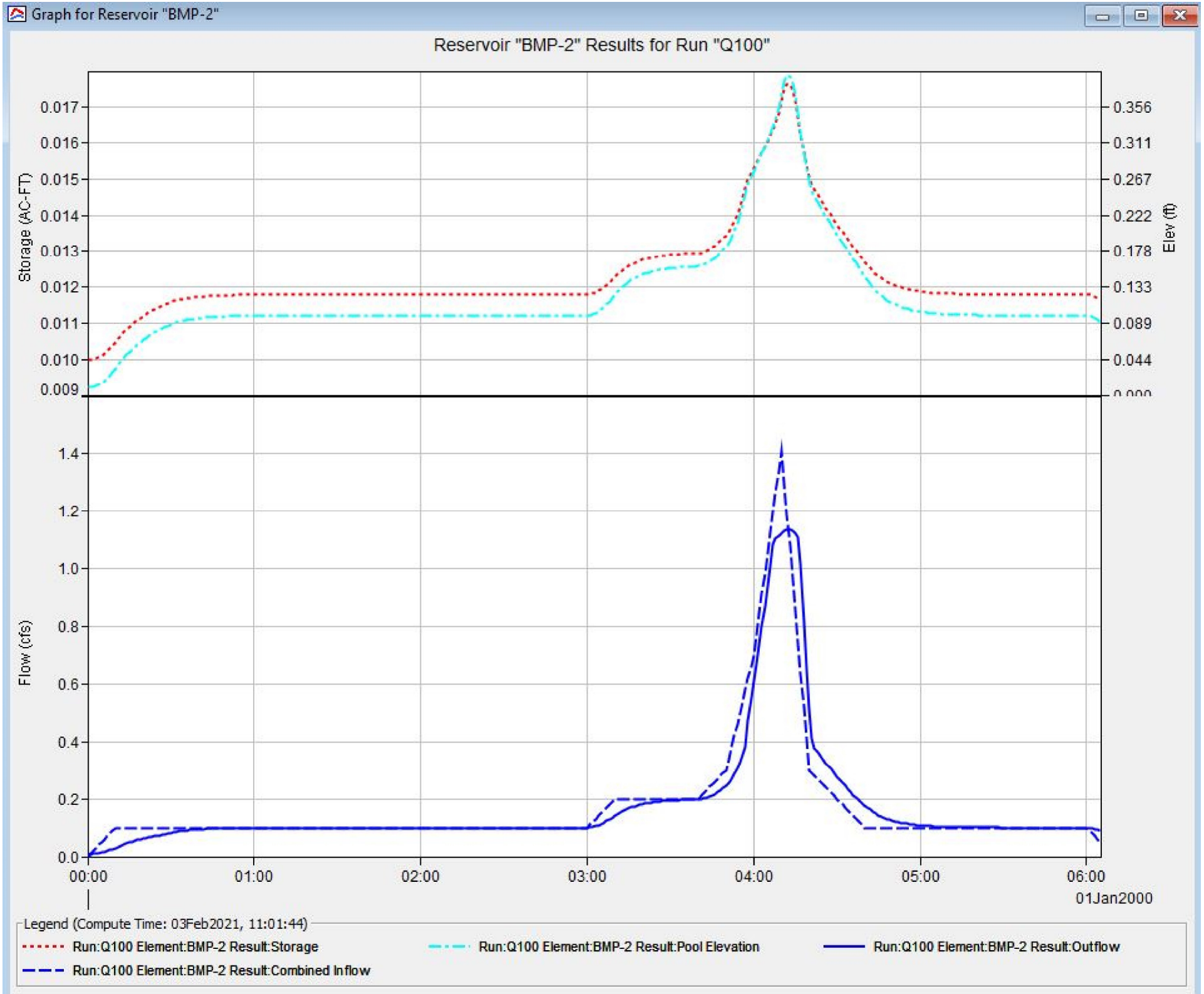
1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts as an orifice when $h^* \geq h_{slot}$

Stage Area for BMP-2

Elevation (ft)	Area (ft^2)	Volume (ft^3)
0.000	858	0
0.083	858	72
0.167	858	143
0.250	858	215
0.333	858	286
0.417	858	358
0.500	858	429
0.583	858	501
0.667	858	572
0.750	858	644
0.833	858	715
0.917	858	787
1.000	858	858
1.083	858	930
1.167	858	1001
1.250	858	1073
1.333	858	1144
1.417	858	1216
1.500	858	1287

Stage-Storage-Discharge of BMP-2

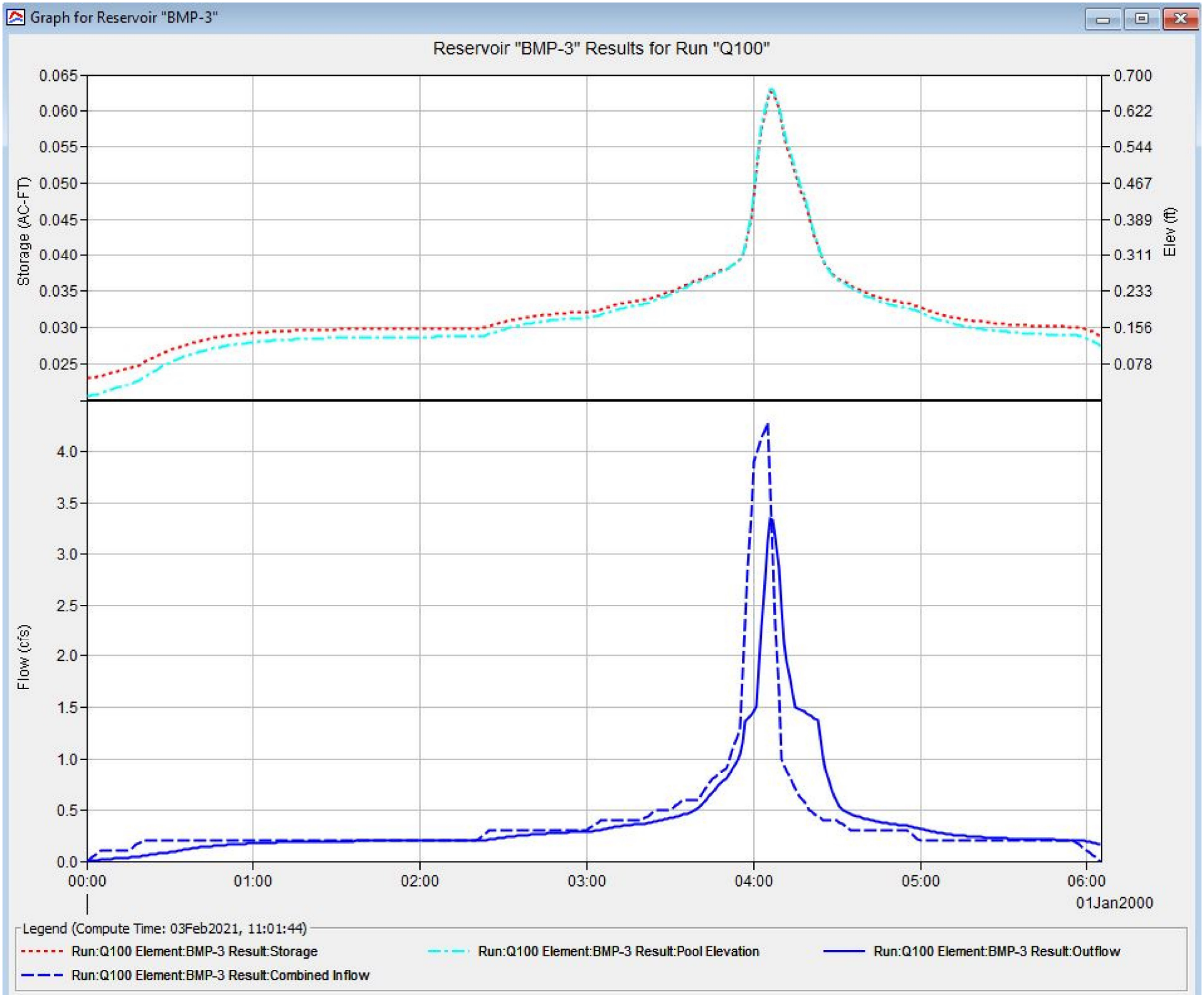
Elevation (ft)	Storage (ac-ft)	Discharge (cfs)
0.000	0.0098	0.000
0.083	0.0115	0.075
0.167	0.0131	0.211
0.250	0.0148	0.388
0.333	0.0164	1.099
0.417	0.0181	1.152
0.500	0.0197	1.204
0.583	0.0213	1.700
0.667	0.0230	2.566
0.750	0.0246	3.671
0.833	0.0263	4.970
0.917	0.0279	6.435
1.000	0.0295	8.050


Graph for Reservoir "BMP-2"
Reservoir "BMP-2" Results for Run "Q100"
Storage (AC-FT)
0.017
0.016
0.015
0.014
0.013
0.012
0.011
0.010
0.009
Elev (ft)
0.356
0.311
0.267
0.222
0.178
0.133
0.089
0.044
Flow (cfs)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: 03Feb2021, 11:01:44)
Run:Q100 Element:BMP-2 Result:Storage
Run:Q100 Element:BMP-2 Result:Pool Elevation
Run:Q100 Element:BMP-2 Result:Outflow
Run:Q100 Element:BMP-2 Result:Combined Inflow

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 2/1/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.5 INCHES
BASIN AREA 1.3 ACRES
RUNOFF COEFFICIENT 0.75
PEAK DISCHARGE 4.29 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.1
TIME (MIN) = 10	DISCHARGE (CFS) = 0.1
TIME (MIN) = 15	DISCHARGE (CFS) = 0.1
TIME (MIN) = 20	DISCHARGE (CFS) = 0.2
TIME (MIN) = 25	DISCHARGE (CFS) = 0.2
TIME (MIN) = 30	DISCHARGE (CFS) = 0.2
TIME (MIN) = 35	DISCHARGE (CFS) = 0.2
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 45	DISCHARGE (CFS) = 0.2
TIME (MIN) = 50	DISCHARGE (CFS) = 0.2
TIME (MIN) = 55	DISCHARGE (CFS) = 0.2
TIME (MIN) = 60	DISCHARGE (CFS) = 0.2
TIME (MIN) = 65	DISCHARGE (CFS) = 0.2
TIME (MIN) = 70	DISCHARGE (CFS) = 0.2
TIME (MIN) = 75	DISCHARGE (CFS) = 0.2
TIME (MIN) = 80	DISCHARGE (CFS) = 0.2
TIME (MIN) = 85	DISCHARGE (CFS) = 0.2
TIME (MIN) = 90	DISCHARGE (CFS) = 0.2
TIME (MIN) = 95	DISCHARGE (CFS) = 0.2
TIME (MIN) = 100	DISCHARGE (CFS) = 0.2
TIME (MIN) = 105	DISCHARGE (CFS) = 0.2
TIME (MIN) = 110	DISCHARGE (CFS) = 0.2
TIME (MIN) = 115	DISCHARGE (CFS) = 0.2
TIME (MIN) = 120	DISCHARGE (CFS) = 0.2
TIME (MIN) = 125	DISCHARGE (CFS) = 0.2
TIME (MIN) = 130	DISCHARGE (CFS) = 0.2
TIME (MIN) = 135	DISCHARGE (CFS) = 0.2
TIME (MIN) = 140	DISCHARGE (CFS) = 0.2
TIME (MIN) = 145	DISCHARGE (CFS) = 0.3
TIME (MIN) = 150	DISCHARGE (CFS) = 0.3
TIME (MIN) = 155	DISCHARGE (CFS) = 0.3
TIME (MIN) = 160	DISCHARGE (CFS) = 0.3
TIME (MIN) = 165	DISCHARGE (CFS) = 0.3
TIME (MIN) = 170	DISCHARGE (CFS) = 0.3
TIME (MIN) = 175	DISCHARGE (CFS) = 0.3
TIME (MIN) = 180	DISCHARGE (CFS) = 0.3
TIME (MIN) = 185	DISCHARGE (CFS) = 0.4
TIME (MIN) = 190	DISCHARGE (CFS) = 0.4
TIME (MIN) = 195	DISCHARGE (CFS) = 0.4
TIME (MIN) = 200	DISCHARGE (CFS) = 0.4
TIME (MIN) = 205	DISCHARGE (CFS) = 0.5
TIME (MIN) = 210	DISCHARGE (CFS) = 0.5
TIME (MIN) = 215	DISCHARGE (CFS) = 0.6
TIME (MIN) = 220	DISCHARGE (CFS) = 0.6
TIME (MIN) = 225	DISCHARGE (CFS) = 0.8
TIME (MIN) = 230	DISCHARGE (CFS) = 0.9
TIME (MIN) = 235	DISCHARGE (CFS) = 1.3
TIME (MIN) = 240	DISCHARGE (CFS) = 3.9
TIME (MIN) = 245	DISCHARGE (CFS) = 4.29
TIME (MIN) = 250	DISCHARGE (CFS) = 1
TIME (MIN) = 255	DISCHARGE (CFS) = 0.7
TIME (MIN) = 260	DISCHARGE (CFS) = 0.5
TIME (MIN) = 265	DISCHARGE (CFS) = 0.4
TIME (MIN) = 270	DISCHARGE (CFS) = 0.4
TIME (MIN) = 275	DISCHARGE (CFS) = 0.3
TIME (MIN) = 280	DISCHARGE (CFS) = 0.3
TIME (MIN) = 285	DISCHARGE (CFS) = 0.3
TIME (MIN) = 290	DISCHARGE (CFS) = 0.3
TIME (MIN) = 295	DISCHARGE (CFS) = 0.3
TIME (MIN) = 300	DISCHARGE (CFS) = 0.2
TIME (MIN) = 305	DISCHARGE (CFS) = 0.2
TIME (MIN) = 310	DISCHARGE (CFS) = 0.2
TIME (MIN) = 315	DISCHARGE (CFS) = 0.2
TIME (MIN) = 320	DISCHARGE (CFS) = 0.2
TIME (MIN) = 325	DISCHARGE (CFS) = 0.2
TIME (MIN) = 330	DISCHARGE (CFS) = 0.2
TIME (MIN) = 335	DISCHARGE (CFS) = 0.2
TIME (MIN) = 340	DISCHARGE (CFS) = 0.2
TIME (MIN) = 345	DISCHARGE (CFS) = 0.2
TIME (MIN) = 350	DISCHARGE (CFS) = 0.2
TIME (MIN) = 355	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 365	DISCHARGE (CFS) = 0


Graph for Reservoir "BMP-3"
Reservoir "BMP-3" Results for Run "Q100"
Storage (AC-FT)
Elev (ft)
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030
0.025
0.700
0.622
0.544
0.467
0.389
0.311
0.233
0.156
0.078
Flow (cfs)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: 03Feb2021, 11:01:44)
Run:Q100 Element:BMP-3 Result:Storage
Run:Q100 Element:BMP-3 Result:Pool Elevation
Run:Q100 Element:BMP-3 Result:Outflow
Run:Q100 Element:BMP-3 Result:Combined Inflow

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 2/1/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2.5 INCHES
BASIN AREA 2.7 ACRES
RUNOFF COEFFICIENT 0.65
PEAK DISCHARGE 6.97 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.3
TIME (MIN) = 20	DISCHARGE (CFS) = 0.3
TIME (MIN) = 30	DISCHARGE (CFS) = 0.3
TIME (MIN) = 40	DISCHARGE (CFS) = 0.3
TIME (MIN) = 50	DISCHARGE (CFS) = 0.3
TIME (MIN) = 60	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.3
TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 90	DISCHARGE (CFS) = 0.3
TIME (MIN) = 100	DISCHARGE (CFS) = 0.4
TIME (MIN) = 110	DISCHARGE (CFS) = 0.4
TIME (MIN) = 120	DISCHARGE (CFS) = 0.4
TIME (MIN) = 130	DISCHARGE (CFS) = 0.4
TIME (MIN) = 140	DISCHARGE (CFS) = 0.4
TIME (MIN) = 150	DISCHARGE (CFS) = 0.5
TIME (MIN) = 160	DISCHARGE (CFS) = 0.5
TIME (MIN) = 170	DISCHARGE (CFS) = 0.5
TIME (MIN) = 180	DISCHARGE (CFS) = 0.6
TIME (MIN) = 190	DISCHARGE (CFS) = 0.7
TIME (MIN) = 200	DISCHARGE (CFS) = 0.7
TIME (MIN) = 210	DISCHARGE (CFS) = 0.9
TIME (MIN) = 220	DISCHARGE (CFS) = 1
TIME (MIN) = 230	DISCHARGE (CFS) = 1.5
TIME (MIN) = 240	DISCHARGE (CFS) = 2.5
TIME (MIN) = 250	DISCHARGE (CFS) = 6.97
TIME (MIN) = 260	DISCHARGE (CFS) = 1.2
TIME (MIN) = 270	DISCHARGE (CFS) = 0.8
TIME (MIN) = 280	DISCHARGE (CFS) = 0.6
TIME (MIN) = 290	DISCHARGE (CFS) = 0.5
TIME (MIN) = 300	DISCHARGE (CFS) = 0.4
TIME (MIN) = 310	DISCHARGE (CFS) = 0.4
TIME (MIN) = 320	DISCHARGE (CFS) = 0.4
TIME (MIN) = 330	DISCHARGE (CFS) = 0.3
TIME (MIN) = 340	DISCHARGE (CFS) = 0.3
TIME (MIN) = 350	DISCHARGE (CFS) = 0.3
TIME (MIN) = 360	DISCHARGE (CFS) = 0.3
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Outlet Structure for Discharge of BMP-3

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	1		Invert:	0.50 ft
Invert:	0 ft		L:	8.0 ft
Slot height	0.25 ft		C_w:	3.1
Slot width	1.25 ft			
A	0.313	0.3125		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.093	0.000	0.093	
0.667	0.167	0.264	0.000	0.264	
0.750	0.250	0.484	0.000	0.484	
0.833	0.333	1.374	0.000	1.374	
0.917	0.417	1.441	0.000	1.441	
1.000	0.500	1.505	0.000	1.505	RISER STRUCTURE
1.083	0.583	1.566	0.597	2.163	
1.167	0.667	1.625	1.687	3.313	
1.250	0.750	1.682	3.100	4.782	
1.333	0.833	1.737	4.773	6.510	
1.417	0.917	1.791	6.670	8.461	
1.500	1.000	1.843	8.768	10.611	
1.583	1.083	1.893	11.049	12.942	
1.667	1.167	1.943	13.499	15.442	
1.750	1.250	1.991	16.108	18.099	
1.833	1.333	2.037	18.866	20.903	
1.917	1.417	2.083	21.766	23.849	
2.000	1.500	2.128	24.800	26.928	

Note:

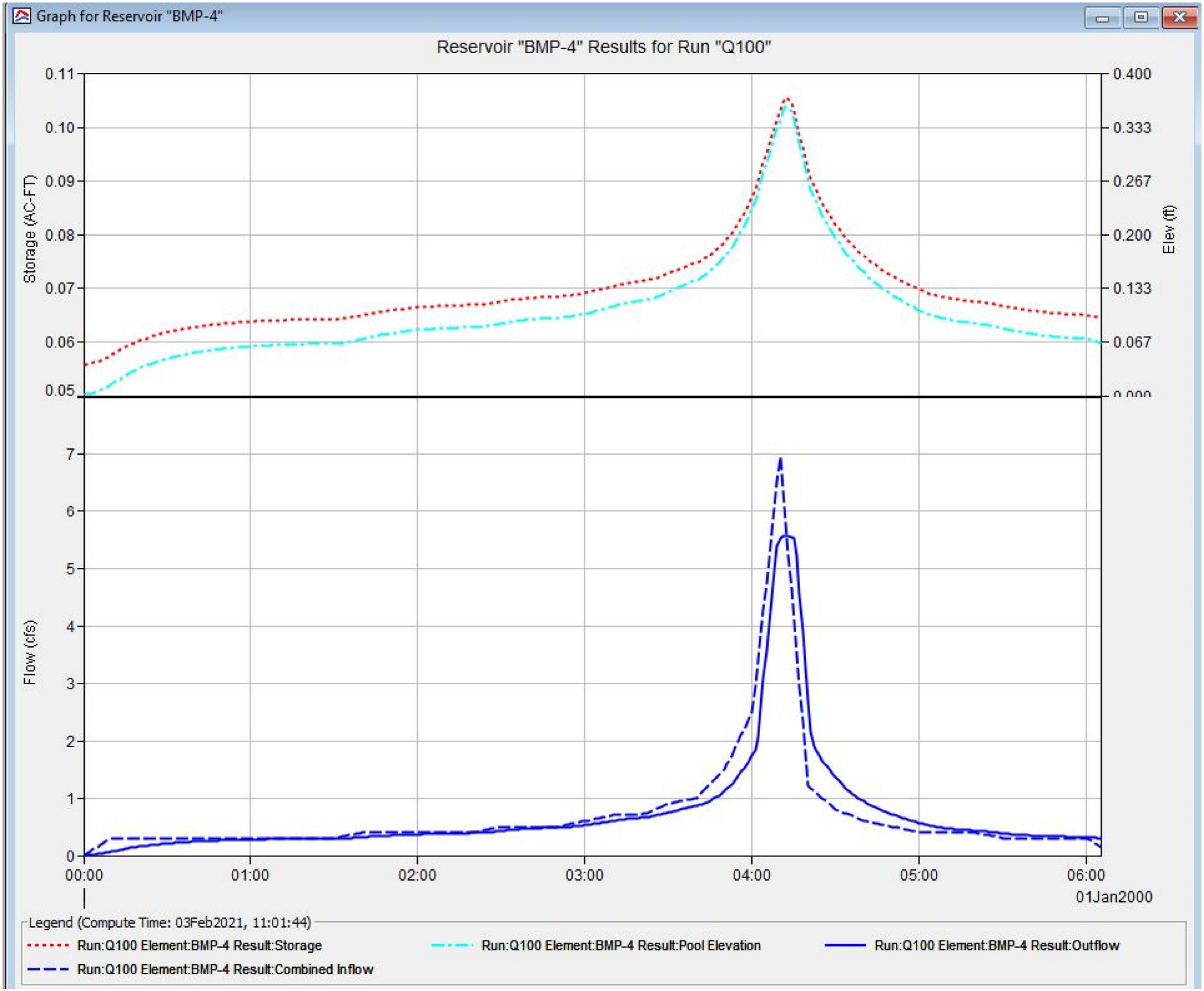
1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts as an orifice when $h^* \geq h_{slot}$

Stage Area for BMP-3

Elevation (ft)	Area (ft^2)	Volume (ft^3)
0.000	1725	0
0.083	1770	146
0.167	1815	299
0.250	1860	459
0.333	1905	628
0.417	1950	803
0.500	1995	986
0.583	2040	1177
0.667	2085	1375
0.750	2130	1581
0.833	2175	1794
0.917	2220	2014
1.000	2265	2243
1.083	2310	2478
1.167	2355	2721
1.250	2400	2972
1.333	2445	3230
1.417	2490	3496
1.500	2535	3769

Stage-Storage-Discharge of BMP-3

Elevation (ft)	Storage (ac-ft)	Discharge (cfs)
0.000	0.0226	0.000
0.083	0.0270	0.093
0.167	0.0316	0.264
0.250	0.0363	0.484
0.333	0.0412	1.374
0.417	0.0462	1.441
0.500	0.0515	1.505
0.583	0.0569	2.163
0.667	0.0625	3.313
0.750	0.0682	4.782
0.833	0.0742	6.510
0.917	0.0802	8.461
1.000	0.0865	10.611


Graph for Reservoir "BMP-4"
Reservoir "BMP-4" Results for Run "Q100"
Storage (AC-FT)
Elev (ft)
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.400
0.333
0.267
0.200
0.133
0.067
Flow (cfs)
7
6
5
4
3
2
1
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: 03Feb2021, 11:01:44)
Run:Q100 Element:BMP-4 Result:Storage
Run:Q100 Element:BMP-4 Result:Pool Elevation
Run:Q100 Element:BMP-4 Result:Outflow
Run:Q100 Element:BMP-4 Result:Combined Inflow

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 2/1/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2.5 INCHES
BASIN AREA 2.7 ACRES
RUNOFF COEFFICIENT 0.65
PEAK DISCHARGE 6.97 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.3
TIME (MIN) = 20	DISCHARGE (CFS) = 0.3
TIME (MIN) = 30	DISCHARGE (CFS) = 0.3
TIME (MIN) = 40	DISCHARGE (CFS) = 0.3
TIME (MIN) = 50	DISCHARGE (CFS) = 0.3
TIME (MIN) = 60	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.3
TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 90	DISCHARGE (CFS) = 0.3
TIME (MIN) = 100	DISCHARGE (CFS) = 0.4
TIME (MIN) = 110	DISCHARGE (CFS) = 0.4
TIME (MIN) = 120	DISCHARGE (CFS) = 0.4
TIME (MIN) = 130	DISCHARGE (CFS) = 0.4
TIME (MIN) = 140	DISCHARGE (CFS) = 0.4
TIME (MIN) = 150	DISCHARGE (CFS) = 0.5
TIME (MIN) = 160	DISCHARGE (CFS) = 0.5
TIME (MIN) = 170	DISCHARGE (CFS) = 0.5
TIME (MIN) = 180	DISCHARGE (CFS) = 0.6
TIME (MIN) = 190	DISCHARGE (CFS) = 0.7
TIME (MIN) = 200	DISCHARGE (CFS) = 0.7
TIME (MIN) = 210	DISCHARGE (CFS) = 0.9
TIME (MIN) = 220	DISCHARGE (CFS) = 1
TIME (MIN) = 230	DISCHARGE (CFS) = 1.5
TIME (MIN) = 240	DISCHARGE (CFS) = 2.5
TIME (MIN) = 250	DISCHARGE (CFS) = 6.97
TIME (MIN) = 260	DISCHARGE (CFS) = 1.2
TIME (MIN) = 270	DISCHARGE (CFS) = 0.8
TIME (MIN) = 280	DISCHARGE (CFS) = 0.6
TIME (MIN) = 290	DISCHARGE (CFS) = 0.5
TIME (MIN) = 300	DISCHARGE (CFS) = 0.4
TIME (MIN) = 310	DISCHARGE (CFS) = 0.4
TIME (MIN) = 320	DISCHARGE (CFS) = 0.4
TIME (MIN) = 330	DISCHARGE (CFS) = 0.3
TIME (MIN) = 340	DISCHARGE (CFS) = 0.3
TIME (MIN) = 350	DISCHARGE (CFS) = 0.3
TIME (MIN) = 360	DISCHARGE (CFS) = 0.3
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Outlet Structure for Discharge of BMP-4

Discharge vs. Elevation Table

Lower slot orifice			Emergency Weir	
No. of orif:	4		Invert:	0.50 ft
Invert:	0 ft		L:	8.0 ft
Slot height	0.25 ft		C_w:	3.1
Slot width	1.25 ft			
A	0.313	0.3125		
C_o:	0.60			

***Note: h = head above the invert of the lowest surface discharge opening.**

H (ft)	h* (ft)	$Q_{slot-low}$ (cfs)	Q_{emerg} (cfs)	Q_{tot} (cfs)	
0.500	0.000	0.000	0.000	0.000	LOWER OUTLET ORIFICE
0.583	0.083	0.373	0.000	0.373	
0.667	0.167	1.055	0.000	1.055	
0.750	0.250	1.938	0.000	1.938	
0.833	0.333	5.494	0.000	5.494	
0.917	0.417	5.762	0.000	5.762	
1.000	0.500	6.019	0.000	6.019	RISER STRUCTURE
1.083	0.583	6.264	0.597	6.861	
1.167	0.667	6.501	1.687	8.188	
1.250	0.750	6.729	3.100	9.829	
1.333	0.833	6.950	4.773	11.723	
1.417	0.917	7.164	6.670	13.834	
1.500	1.000	7.371	8.768	16.140	
1.583	1.083	7.573	11.049	18.622	
1.667	1.167	7.770	13.499	21.270	
1.750	1.250	7.962	16.108	24.070	
1.833	1.333	8.149	18.866	27.015	
1.917	1.417	8.333	21.766	30.098	
2.000	1.500	8.512	24.800	33.312	

Note:

1. Weir equation, $Q=C_wL_e(h)^{3/2}$
2. Orifice equation, $Q=C_oA_e(2gh)^{1/2}$
3. Slot orifice acts as a weir when $h^* < h_{slot}$; slot orifice acts as an orifice when $h^* \geq h_{slot}$

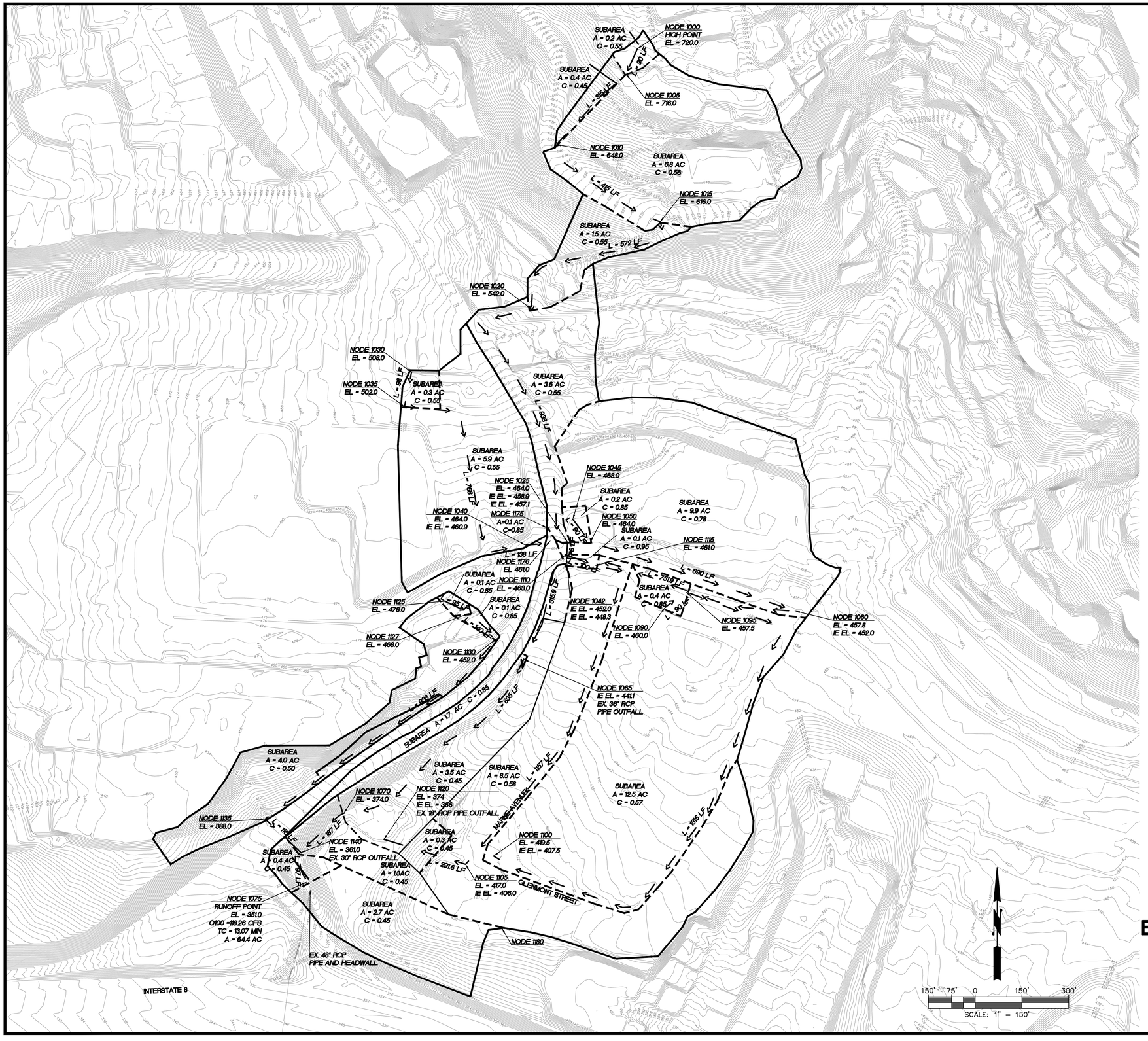
Stage Area for BMP-4

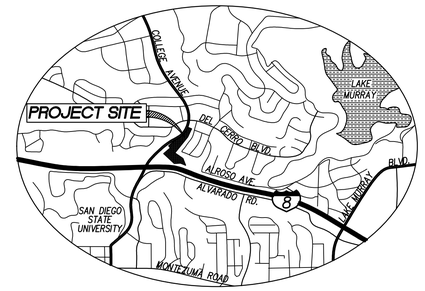
Elevation (ft)	Area (ft^2)	Volume (ft^3)
0.000	4252	0
0.083	4363	359
0.167	4472	736
0.250	4586	1132
0.333	4698	1547
0.417	4810	1981
0.500	4921	2433
0.583	5032.714286	2903
0.667	5144.392857	3392
0.750	5256.071429	3900
0.833	5367.75	4427
0.917	5479.428571	4972
1.000	5591	5535
1.083	5703	6118
1.167	5815	6719
1.250	5927	7339
1.333	6039	7977
1.417	6151	8635
1.500	6263	9311

Stage-Storage-Discharge of BMP-4

Elevation (ft)	Storage (ac-ft)	Discharge (cfs)
0.000	0.0558	0.000
0.083	0.0666	0.373
0.167	0.0779	1.055
0.250	0.0895	1.938
0.333	0.1016	5.494
0.417	0.1141	5.762
0.500	0.1271	6.019
0.583	0.1404	6.861
0.667	0.1542	8.188
0.750	0.1685	9.829
0.833	0.1831	11.723
0.917	0.1982	13.834
1.000	0.2137	16.140

Appendix 2
Existing and Proposed Drainage Exhibits





VICINITY MAP

NOT TO SCALE

LEGEND:

- MAJOR–BASIN BOUNDARY
- SUB–BASIN BOUNDARY
- FLOW PATH
- NODE 1060 / EL = 458.0 / IE EL = 452.0 — HYDROLOGIC NODE
- SUBAREA / A = 9.9 AC / C = 0.78 — HYDROLOGIC AREA

EXISTING HYDROLOGY

ALL PEOPLES CHURCH

INTERSTATE 8 • COLLEGE AVENUE, SAN DIEGO, CA

PROJECT NUMBER: PLSA 2936

SCALE: 1" = 150'

DATE: FEBRUARY 2021

SHEET 1 OF 1

PASCO LARET SUITER & ASSOCIATES

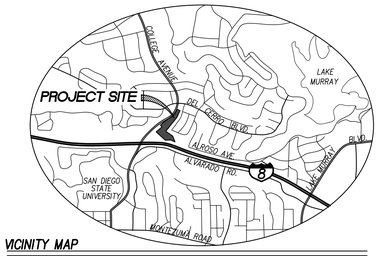
CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING

535 North Highwsy 101, Ste A, Solana Beach, CA 92075

ph 858.259.8212 | fx 858.259.4812 | plsaengineering.com

FILE:J:\ACTIVE JOBS\2936 ALL PEOPLE'S CHURCH\CIVIL\REPORTS\HYDROLOGY\2021-1-29\2936_HYDRO_EX.dwg DATE: Feb 02, 21 1:55pm by:glmudson

POST HYDROLOGY EXHIBIT



VICINITY MAP

NOT TO SCALE

LEGEND

- RIGHT-OF-WAY — R/W
- PROPERTY LINE — P/L
- DRAINAGE BOUNDARY
- DRAINAGE SUB-BOUNDARY
- PROPOSED PERMABLE PAVEMENT
- PROPOSED ROOF/HARDSCAPE AREA
- BIOFILTRATION BASIN
- PROPOSED STORM DRAIN PIPE
- FLOW PATH
- HYDROLOGY NODE Q100 (CFS)

SOIL INFORMATION

SOIL: TYPE D

LAND USE

COMMERCIAL (APPROXIMATELY 80% IMPERVIOUS)

RUNOFF COEFFICIENT

THE DEVELOPED CONDITION RUNOFF COEFFICIENT IS ESTIMATED BASED ON LAND USE AND SOIL TYPE IN ACCORDANCE WITH CITY OF SAN DIEGO STANDARDS. AN APPROPRIATE RUNOFF COEFFICIENT (C) FOR EACH TYPE OF LAND USE IN THE SUBAREA WAS SELECTED FROM TABLE A-1 OF THE CITY OF SAN DIEGO DRAINAGE DESIGN MANUAL (JANUARY 2017) AND MULTIPLIED BY THE PERCENTAGE OF TOTAL AREA (A) INCLUDED IN THAT CLASS. THE SUM OF PRODUCTS FOR ALL LAND USES IS THE WEIGHTED RUNOFF COEFFICIENT (Σ[C]).

BASIN 1: ACTUAL IMPERVIOUSNESS: 0% , PERMEABLE PAVEMENT 52%
BASIN 2: ACTUAL IMPERVIOUSNESS: 6% , PERMEABLE PAVEMENT 80%
BASIN 3: ACTUAL IMPERVIOUSNESS: 71% , PERMEABLE PAVEMENT 14%
BASIN 4: ACTUAL IMPERVIOUSNESS: 61% , PERMEABLE PAVEMENT 7%

TABULATED IMPERVIOUSNESS: 41%

C=0.45 PERVIOUS
C=0.85 IMPERVIOUS

BASIN 1: RUNOFF COEFFICIENT =0%/80% * 0.85=0 =MIN. VALUE 0.50
BASIN 2: RUNOFF COEFFICIENT = 6%/80% * 0.85 = 0.06 = MIN. VALUE 0.50
BASIN 3: RUNOFF COEFFICIENT = 71%/80% * 0.85 = 0.75
BASIN 4: RUNOFF COEFFICIENT = 61%/80% * 0.85= 0.65

PROPOSED CONDITION HYDROLOGY EXHIBIT

ALL PEOPLES CHURCH, PTS# 636444
INTERSTATE 8 + COLLEGE AVENUE
SAN DIEGO, CALIFORNIA
PLSA JOB # 2936
SCALE: 1" = 40'
DATE: AUGUST 2021
SHEET 1 OF 1

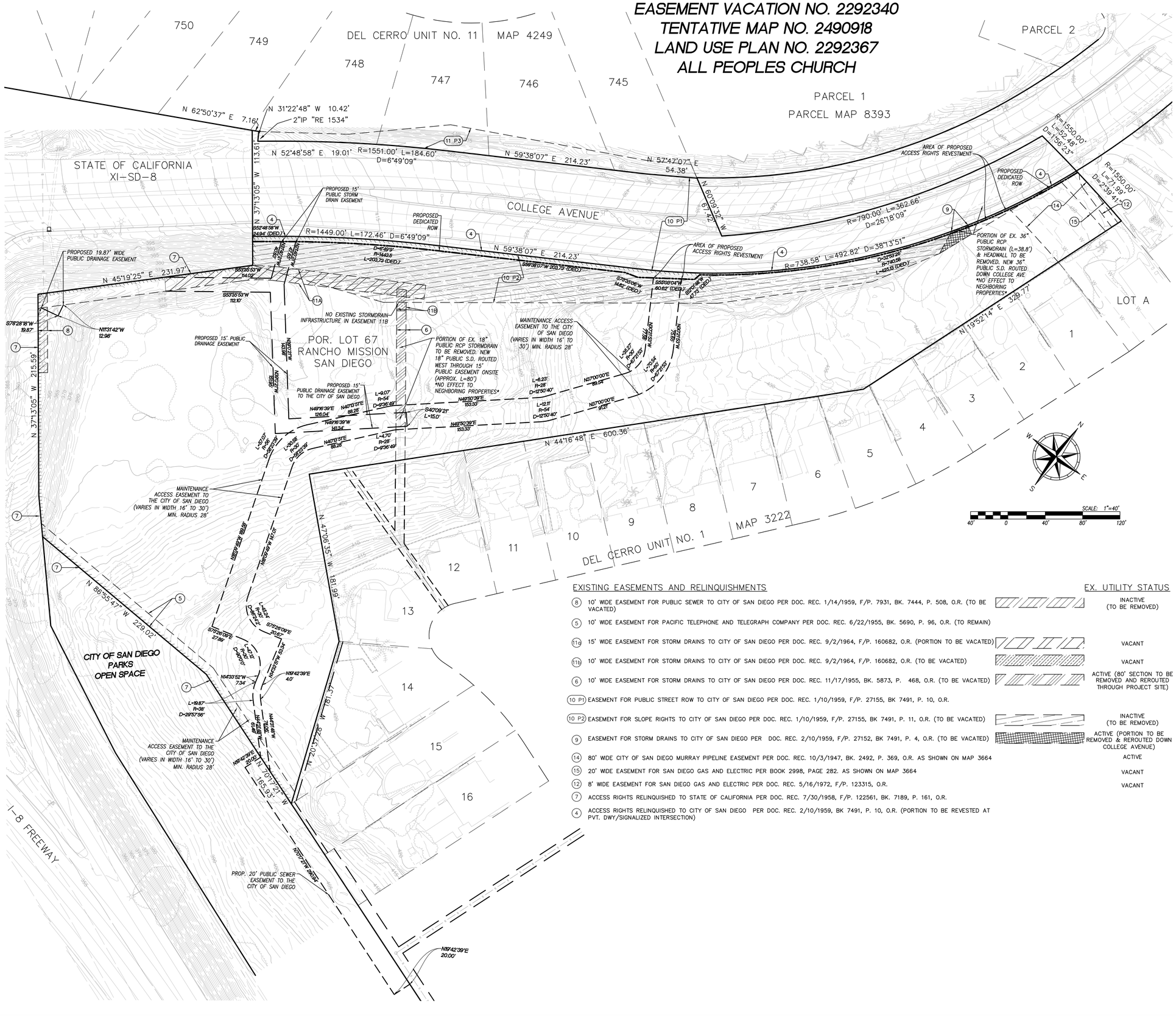
PREPARED BY:

PASCO LARET SUITER & ASSOCIATES

CIVIL ENGINEERING + LAND PLANNING + LAND SURVEYING
535 North Highway 101, Ste A, Solana Beach, CA 92075
ph 858.259.8212 | fx 858.259.4812 | plsaengineering.com

EXISTING + PROPOSED EASEMENTS, EASEMENT VACATIONS, DEDICATION, + REVESTMENT OF ACCESS RIGHTS

SITE DEVELOPMENT PERMIT NO. 2292338
PLANNED DEVELOPMENT PERMIT NO. 2292339
EASEMENT VACATION NO. 2292340
TENTATIVE MAP NO. 2490918
LAND USE PLAN NO. 2292367
ALL PEOPLES CHURCH



EXISTING EASEMENTS AND RELINQUISHMENTS

		EX. UTILITY STATUS
(8)	10' WIDE EASEMENT FOR PUBLIC SEWER TO CITY OF SAN DIEGO PER DOC. REC. 1/14/1959, F/P. 7931, BK. 7444, P. 508, O.R. (TO BE VACATED)	INACTIVE (TO BE REMOVED)
(5)	10' WIDE EASEMENT FOR PACIFIC TELEPHONE AND TELEGRAPH COMPANY PER DOC. REC. 6/22/1955, BK. 5690, P. 96, O.R. (TO REMAIN)	
(11a)	15' WIDE EASEMENT FOR STORM DRAINS TO CITY OF SAN DIEGO PER DOC. REC. 9/2/1964, F/P. 160682, O.R. (PORTION TO BE VACATED)	VACANT
(11b)	10' WIDE EASEMENT FOR STORM DRAINS TO CITY OF SAN DIEGO PER DOC. REC. 9/2/1964, F/P. 160682, O.R. (TO BE VACATED)	VACANT
(6)	10' WIDE EASEMENT FOR STORM DRAINS TO CITY OF SAN DIEGO PER DOC. REC. 11/17/1955, BK. 5873, P. 468, O.R. (TO BE VACATED)	ACTIVE (80' SECTION TO BE REMOVED AND REROUTED THROUGH PROJECT SITE)
(10 P1)	EASEMENT FOR PUBLIC STREET ROW TO CITY OF SAN DIEGO PER DOC. REC. 1/10/1959, F/P. 27155, BK 7491, P. 10, O.R.	
(10 P2)	EASEMENT FOR SLOPE RIGHTS TO CITY OF SAN DIEGO PER DOC. REC. 1/10/1959, F/P. 27155, BK 7491, P. 11, O.R. (TO BE VACATED)	INACTIVE (TO BE REMOVED)
(9)	EASEMENT FOR STORM DRAINS TO CITY OF SAN DIEGO PER DOC. REC. 2/10/1959, F/P. 27152, BK 7491, P. 4, O.R. (TO BE VACATED)	ACTIVE (PORTION TO BE REMOVED & REROUTED DOWN COLLEGE AVENUE)
(14)	80' WIDE CITY OF SAN DIEGO MURRAY PIPELINE EASEMENT PER DOC. REC. 10/3/1947, BK. 2492, P. 369, O.R. AS SHOWN ON MAP 3664	ACTIVE
(15)	20' WIDE EASEMENT FOR SAN DIEGO GAS AND ELECTRIC PER BOOK 2998, PAGE 282. AS SHOWN ON MAP 3664	VACANT
(12)	8' WIDE EASEMENT FOR SAN DIEGO GAS AND ELECTRIC PER DOC. REC. 5/16/1972, F/P. 123315, O.R.	VACANT
(7)	ACCESS RIGHTS RELINQUISHED TO STATE OF CALIFORNIA PER DOC. REC. 7/30/1958, F/P. 122561, BK. 7189, P. 161, O.R.	
(4)	ACCESS RIGHTS RELINQUISHED TO CITY OF SAN DIEGO PER DOC. REC. 2/10/1959, BK 7491, P. 10, O.R. (PORTION TO BE REVESTED AT PVT. DWY/SIGNALIZED INTERSECTION)	

SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE PROFESSIONAL LAND SURVEYORS' ACT ON MARCH 16, 2015.

GARY D. MELLOM, PLS 8537 12-31-2022

PROFESSIONAL LAND SURVEYOR — GARY D. MELLOM — LS 8537 — STATE OF CALIFORNIA

PROJECT INFORMATION

CLIENT: ALL PEOPLE'S CHURCH
ADDRESS: COLLEGE AVE AND I-8 FREEWAY, SAN DIEGO, CA
APN: 463-010-10

ABBREVIATED LEGAL DESCRIPTION

PORTION OF LOT 67 OF RANCHO MISSION OF SAN DIEGO, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AS DESCRIBED IN GRANT DEED RECORDED NOVEMBER 3, 1975 AS DOCUMENT NO. 75-306249, O.R.

SURVEY NOTES

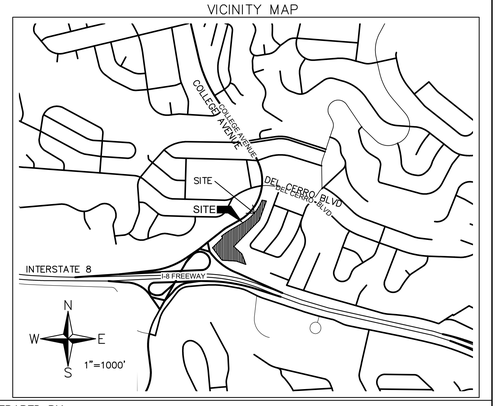
1. THE BOUNDARIES AND DIMENSIONS OF THE SURVEYED PARCEL(S) SHOWN HEREON ARE BASED ON A FIELD SURVEY. RECORD DIMENSIONS MAY VARY. THE BOUNDARIES OF ADJOINING PARCELS WERE COMPILED FROM RECORDED OR FILED DATA, AND ARE TO BE USED FOR PLANNING PURPOSES ONLY. BENCHMARK:

   BRASS PLUG LOCATED AT THE SOUTHWEST CURB RETURN AT THE INTERSECTION OF DEL CERRO BOULEVARD AND COLLEGE AVENUE AS SHOWN IN THE CITY OF SAN DIEGO BENCH MARK BOOK, ELEVATION 461.997 FEET. DATUM IS MEAN SEA LEVEL PER SAID BENCH MARK BOOK.
2. THE LOCATIONS OF UNDERGROUND UTILITY LINES AND/OR STRUCTURES AS SHOWN HEREON ARE BASED ON OBSERVED ABOVE GROUND EVIDENCE AND RECORD INFORMATION PROVIDED TO THE SURVEYOR. NO EXCAVATIONS WERE MADE DURING THE COURSE OF THIS SURVEY TO LOCATE UNDERGROUND UTILITIES. LOCATIONS OF UNDERGROUND UTILITIES MAY VARY FROM LOCATIONS SHOWN HEREON. ADDITIONAL UNDERGROUND UTILITIES MAY EXIST.
3. MAPPING DATA FLOWN ON FEBRUARY 26, 2015 AND PROVIDED BY AEROTECH MAPPING.
4. TITLE COMMITMENT PROVIDED BY FIRST AMERICAN TITLE INSURANCE COMPANY, ORDER NO. NCS-959140-SD WITH AN EFFECTIVE DATE OF JANUARY 20, 2021 AND AMENDED FEBRUARY 12, 2021..

LEGEND

- FOUND MONUMENT
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- CENTER LINE
- ADJOINING PROPERTY LINE
- EXISTING EASEMENT
- FENCE LINE
- WALL
- INDEX CONTOUR LINE
- INTERMEDIATE CONTOUR LINE
- VEGETATION LINE
- ACCESS RIGHTS RELENQUISHED
- SWIMMING POOL
- PALM TREE
- SINGLE TREE
- PEDESTRIAN SIGNAL
- POST- MISC
- SPOT ELEVATION
- BRIDGE SIGNS
- FIRE HYDRANT
- METER / UTILITY
- MANHOLE
- STREET LIGHT
- LIGHT POLE
- SIGNS
- GATE
- TRAFFIC SIGNAL
- VALVE
- BUILDING ROOFLINE

VICINITY MAP



PREPARED BY:

PASCO LARET SUITER & ASSOCIATES
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535 North Highway 101, Ste A, Solana Beach, CA 92075
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REGISTERED PROFESSIONAL ENGINEER — WILLIAM GREGG MACK — No. 73620 — CIVIL — STATE OF CALIFORNIA

WILLIAM GREGG MACK RCE 73620 DATE

PROJECT NAME: ALL PEOPLES CHURCH

PROJECT ADDRESS: NORTHEAST CORNER OF COLLEGE AVENUE & INTERSTATE 8, SAN DIEGO, CALIFORNIA 92120

PROJECT TRACKING SYSTEM NUMBER: 636444

INTERNAL ORDER NUMBER: 24008189

SHEET TITLE:

SHEET NUMBER: C 5.0 OF 7

DRAWN BY: GJK
CHECKED BY: W. MACK
ORIGINAL DATE: 04-22-2019

REVISIONS:
1. 03-17-2020
2. 08-28-2020
3. 2-12-2021
4. 6-18-2021
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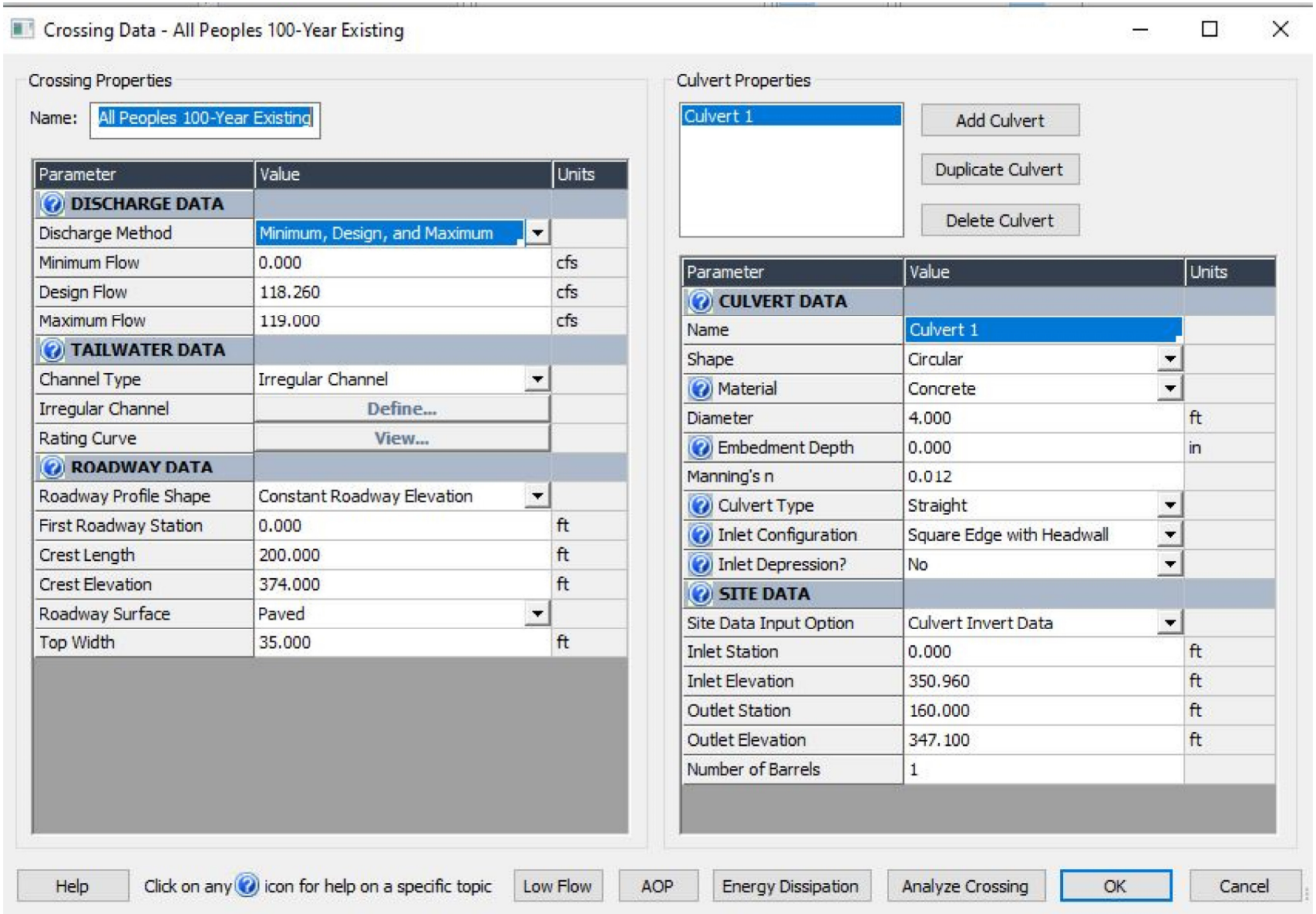
Appendix 3
Caltrans Headwall Calculations


Crossing Data - All Peoples 100-Year Existing
Crossing Properties
Name: All Peoples 100-Year Existing
Parameter | Value | Units
DISCHARGE DATA
Discharge Method | Minimum, Design, and Maximum
Minimum Flow | 0.000 | cfs
Design Flow | 118.260 | cfs
Maximum Flow | 119.000 | cfs
TAILWATER DATA
Channel Type | Irregular Channel
Irregular Channel | Define...
Rating Curve | View...
ROADWAY DATA
Roadway Profile Shape | Constant Roadway Elevation
First Roadway Station | 0.000 | ft
Crest Length | 200.000 | ft
Crest Elevation | 374.000 | ft
Roadway Surface | Paved
Top Width | 35.000 | ft
Culvert Properties
Culvert 1
Add Culvert
Duplicate Culvert
Delete Culvert
Parameter | Value | Units
CULVERT DATA
Name | Culvert 1
Shape | Circular
Material | Concrete
Diameter | 4.000 | ft
Embedment Depth | 0.000 | in
Manning's n | 0.012
Culvert Type | Straight
Inlet Configuration | Square Edge with Headwall
Inlet Depression? | No
SITE DATA
Site Data Input Option | Culvert Invert Data
Inlet Station | 0.000 | ft
Inlet Elevation | 350.960 | ft
Outlet Station | 160.000 | ft
Outlet Elevation | 347.100 | ft
Number of Barrels | 1
Help
Click on any icon for help on a specific topic
Low Flow
AOP
Energy Dissipation
Analyze Crossing
OK
Cancel

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: All Peoples 100-Year Existing

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
350.96	0.00	0.00	0.00	1
352.31	11.90	11.90	0.00	1
352.91	23.80	23.80	0.00	1
353.48	35.70	35.70	0.00	1
353.98	47.60	47.60	0.00	1
354.44	59.50	59.50	0.00	1
354.89	71.40	71.40	0.00	1
355.36	83.30	83.30	0.00	1
355.89	95.20	95.20	0.00	1
357.09	118.26	118.26	0.00	1
357.13	119.00	119.00	0.00	1
374.00	279.92	279.92	0.00	Overtopping

HY-8 Analysis Results

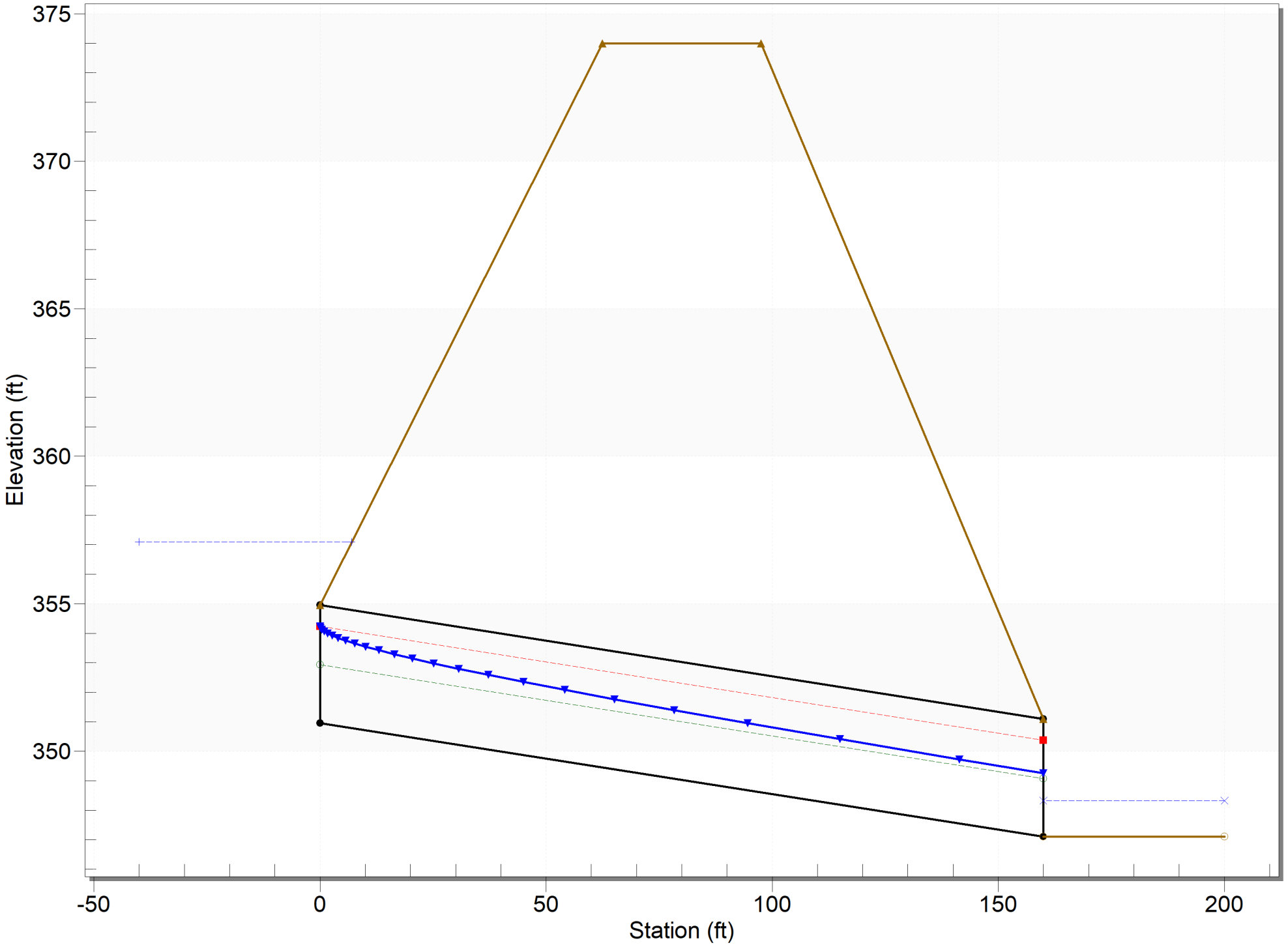
Culvert Summary Table - Culvert 1

Culvert Crossing: All Peoples 100-Year Existing

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	350.96	0.00	0.0	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
11.90	11.90	352.31	1.35	0.0*	1-S2n	0.60	1.01	0.60	0.33	10.01	15.43
23.80	23.80	352.91	1.95	0.0*	1-S2n	0.85	1.44	0.87	0.50	11.75	19.19
35.70	35.70	353.48	2.52	0.0*	1-S2n	1.04	1.78	1.07	0.63	13.13	21.66
47.60	47.60	353.98	3.02	0.0*	1-S2n	1.20	2.07	1.26	0.74	14.07	23.53
59.50	59.50	354.44	3.48	0.0*	1-S2n	1.35	2.32	1.42	0.84	14.86	25.06
71.40	71.40	354.89	3.93	0.0*	1-S2n	1.49	2.55	1.58	0.93	15.40	26.36
83.30	83.30	355.36	4.40	0.39	5-S2n	1.62	2.77	1.74	1.01	15.93	27.49
95.20	95.20	355.89	4.93	1.03	5-S2n	1.74	2.96	1.88	1.08	16.39	28.51
118.26	118.26	357.09	6.13	2.76	5-S2n	1.97	3.28	2.15	1.22	17.18	30.21
119.00	119.00	357.13	6.17	2.80	5-S2n	1.98	3.29	2.16	1.22	17.20	30.26

Crossing - All Peoples 100-Year Existing, Design Discharge - 118.3 cfs

Culvert - Culvert 1, Culvert Discharge - 118.3 cfs



Crossing Data - All Peoples 100-Year POST-MITIGATED

Crossing Properties

Name: s 100-Year POST-MITIGATED

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.000	cfs
Design Flow	115.230	cfs
Maximum Flow	115.500	cfs
TAILWATER DATA		
Channel Type	Irregular Channel	
Irregular Channel	Define...	
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	ft
Crest Length	200.000	ft
Crest Elevation	374.000	ft
Roadway Surface	Paved	
Top Width	35.000	ft

Culvert Properties

Culvert 1

Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	Culvert 1	
Shape	Circular	
Material	Concrete	
Diameter	4.000	ft
Embedment Depth	0.000	in
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	ft
Inlet Elevation	350.960	ft
Outlet Station	160.000	ft
Outlet Elevation	347.100	ft
Number of Barrels	1	

Help | Click on any icon for help on a specific topic | Low Flow | AOP | Energy Dissipation | Analyze Crossing | OK | Canc

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: All Peoples 100-Year POST-MITIGATED

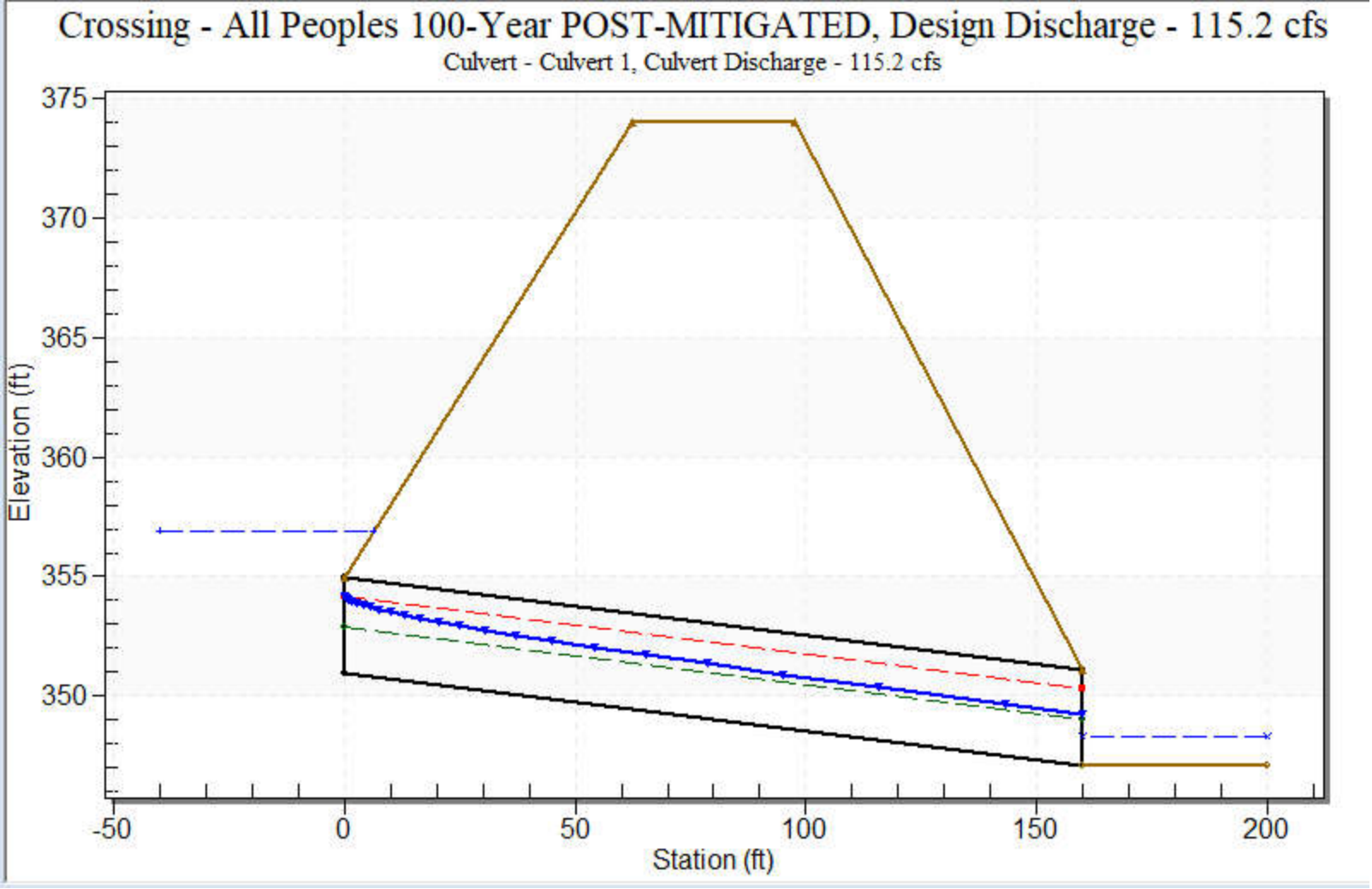
Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
350.96	0.00	0.00	0.00	1
352.29	11.55	11.55	0.00	1
352.88	23.10	23.10	0.00	1
353.44	34.65	34.65	0.00	1
353.92	46.20	46.20	0.00	1
354.37	57.75	57.75	0.00	1
354.81	69.30	69.30	0.00	1
355.26	80.85	80.85	0.00	1
355.76	92.40	92.40	0.00	1
356.92	115.23	115.23	0.00	1
356.93	115.50	115.50	0.00	1
374.00	279.92	279.92	0.00	Overtopping

HY-8 Analysis Results

Culvert Summary Table - Culvert 1

Culvert Crossing: All Peoples 100-Year POST-MITIGATED

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth(ft)	Outlet Control Depth(ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	350.96	0.00	0.0	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
11.55	11.55	352.29	1.33	0.0*	1-S2n	0.59	0.99	0.59	0.33	9.93	15.28
23.10	23.10	352.88	1.92	0.0*	1-S2n	0.83	1.42	0.86	0.49	11.59	19.01
34.65	34.65	353.44	2.48	0.0*	1-S2n	1.02	1.75	1.05	0.62	13.15	21.47
46.20	46.20	353.92	2.96	0.0*	1-S2n	1.18	2.04	1.23	0.73	14.03	23.33
57.75	57.75	354.37	3.41	0.0*	1-S2n	1.33	2.29	1.40	0.82	14.72	24.85
69.30	69.30	354.81	3.85	0.0*	1-S2n	1.46	2.52	1.56	0.91	15.32	26.14
80.85	80.85	355.26	4.30	0.26	5-S2n	1.59	2.72	1.71	0.99	15.82	27.27
92.40	92.40	355.76	4.80	0.87	5-S2n	1.71	2.91	1.85	1.07	16.28	28.28
115.23	115.23	356.92	5.96	2.59	5-S2n	1.94	3.24	2.12	1.20	17.08	30.00
115.50	115.50	356.93	5.97	2.61	5-S2n	1.95	3.24	2.12	1.20	17.09	30.02


Crossing - All Peoples 100-Year POST-MITIGATED, Design Discharge - 115.2 cfs
Culvert - Culvert 1, Culvert Discharge - 115.2 cfs
Elevation (ft)
375
370
365
360
355
350
-50
0
50
100
150
200
Station (ft)