DRAINAGE STUDY
for
BDM Mixed Use

City of San Diego, California

City Project No.:
APN No.:
645-080-18, 645-090-51
Prepared on:
September 08, 2020
Re.: June 02, 2021
Re.: September 24, 2021

Prepared by:
Hunsaker & Associates - San Diego, Inc.
9707 Waples Street
San Diego, CA 92121
Telephone: (858) 558-4500

Prepared for:
BDM Investments, LLC.
9523 La Jolla Farms Road
La Jolla, CA 92037
Telephone: (858) 245-5258

WO: 3592-0002

Alisa S. Vialpando, RCE # 47945
Hunsaker & Associates
San Diego, Inc.

January 18, 2022
Date

Table of Contents

List of Appendices

1. EXECUTIVE SUMMARY

1.1 Introduction

This drainage study presents hydrologic and hydraulic analyses for the proposed BDM Mixed Use project (herein referred to as "*the project*"). *The project* is located in the City of San Diego, bounded on two sides by public thoroughfares: Otay Mesa Road on the north and State Route 905 on the south. (see Vicinity Map below).

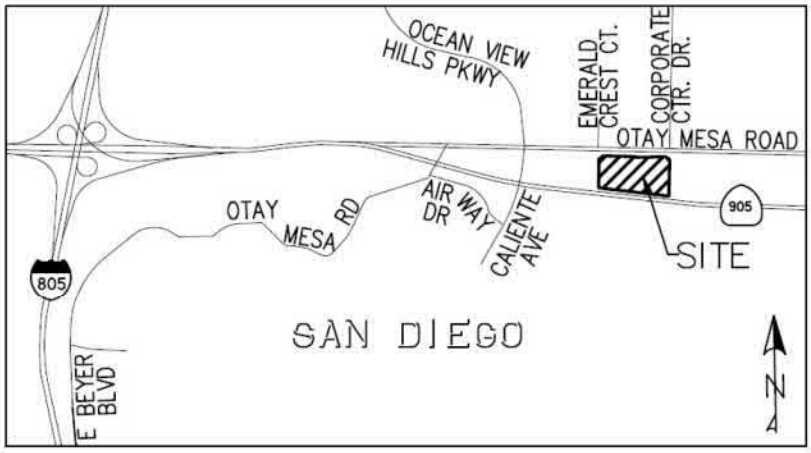
The project consists of approximately 13.6 acres and includes two (2) main components:

1- The ultimate design of a mixed use site includes retail building, residential building structures, pool/spa and recreational area with associated landscape, private roads, public streets, and utility infrastructure. The *project* also proposes removing and replacing existing sidewalk and curb with minor road widening to accommodate a turn pocket at Otay Mesa Road.

2- The construction of a biofiltration (detention) basin and underground detention vault including detailed outlet structures designed for hydromodification management, 5-,10-,25-,50-, and 100-year detention, and 100- year conveyance.

In addition, the *project* includes two modular wetland units to address the water quality requirements for the area that doesn't drain to the biofiltration basin.

Treatment of storm water runoff and hydromodification management related to the site have been addressed in a separate report. Refer to the Storm Water Quality Management Plan for BDM Mixed Used (July 2021) prepared by Hunsaker & Associates San Diego, Inc.



VICINITY MAP

NO SCALE

It is not anticipated that this *project* will have direct impact on any federal, state, or City jurisdictional waters or wetlands. The *project* footprint has been designed with a buffer between the edge of development and the adjacent natural canyon. Therefore, a 401/404 permit is not anticipated to be required.

The *project* site lies outside any FEMA 100-year floodplain zone. Please see Appendix 6 for FEMA Firm Map.

Project does not propose to increase or discharge any flows onto Caltrans ROW.

Design calculations for inlets as well as storm drain hydraulics will be conducted as part of the final engineering drainage study

1.2 Existing Conditions

The *project* site currently consists of two mass-graded pads with two built-in desilting basins. The runoff from the northern small pad- approximate 1.1 acres- flows from southwest into northeast of the pad at where the small desilting basin is located. The basin then discharge into the existing storm drain system located in the northern part of the site, which then flows north across Otay Mesa Road, then discharges to a canyon that flows toward the Otay River and eventually to the San Diego Bay.

The runoff from the rest of the site mass-graded pad -approximate 10-acres-flows from northwest to southeast of the pad at where the big desilting basin is located. The basin then drains in easterly direction toward an existing canyon which conveys drainage south across the Mexico border to the Tijuana River and eventually to the Pacific Ocean.

Section 1.3 below explained the reason that existing condition study is not necessary in this report. The pre-project flows from the eastern discharge point towards Tijuana River are per the approved Drainage Study for Handler Commercial and Otay Mesa Road prepared by Rick Engineering (PTS# 618357) and dated October 18, 2018.

The pre-project flows from the northern discharge point at Otay Mesa Road is per The drainage Study for PA-16 Drainage Study addendum prepared by Chang Consultant and dated October 9, 2020.

1.3 Proposed Conditions

The *project* site proposes to be developed with market rate & affordable apartment building structures, retail building structure, a pool, spa, leasing building and recreation areas. The development includes construction of parking stall, sidewalks, landscaped areas, private roads and one public road to the east, building the eastern portion of Emerald Crest public road to the west of the site, and removing and replacing existing sidewalk and curb with minor road widening to accommodate a turn pocket at Otay Mesa Road. The development of the site includes adding the storm drains, curb inlets, cleanouts along the proposed onsite private roads and parking spaces to collect and convey the storm runoff to the north and east public storm drains. (Design calculations for inlets as well as storm drain hydraulics will be conducted as part of the final engineering drainage study.)

The *project* is comprised of two major drainage basins, which drain to major watersheds. Basin 100 drains in easterly direction toward an existing canyon which conveys drainage south across the Mexico border to the Tijuana River and eventually to the Pacific Ocean. Basin 200 drains towards an existing storm drain system located in the northern part of the site, which then flows north across Otay Mesa Road, then discharges to a canyon that flows toward the Otay River and eventually to the San Diego Bay. Refer to the Map pockets for visual representation of the drainage patterns of the site.

The project's storm drain network will collect, convey, treat and detain storm water runoff throughout the development area prior to discharging to each drainage basin's respective outfall. The basin 100 storm drain system drains to the east, collects runoff from approximate 14 acres of the developed area, and conveys it to the vault at the west border. The vault which includes a detailed outlet structure is proposed for detention and hydromodification purposes. The required water quality flow from basin 100 is routed to a modular wetland unit (MWS) to address the water quality requirements before connecting to a storm drain that conveys flows in easterly direction toward a flow spreader located at the outfall designed to disperse flows and mimic historic drainage conditions. The storm drain outfall will be located outside of the designated MHPA Boundary.

Basin 200 includes: 0.65-ac drains to a biofiltration basin at the northern border of the site to address water quality and hydromodifcation requirements, and 1.81 acres from Otay Mesa road that drains to a curb inlet. The runoff captured by the inlet is comingled with basin's discharge and flows from PA-16 development west of the site and conveyed north via exiting 30" RCP crosses Otay Mesa Road toward a canyon that flows to the Otay River and eventually to the San Diego Bay. Detention from basin 200 is not required, because this area is not discharging runoff south across the US Mexico Border.

The detained and treated flows from basin100 are less than or same as the flows at the basin's respective outfall per Drainage Study for Handler Commercial and Otay Mesa Road (Final Engineering) PTS #618357, prepared by Rick Engineering Company and dated October 2018. The detained and treated flows from basin 200 is less than or same as the flow at the basin's respective outfall per Drainage Study Addendum for PA-16 prepared by Change Consultants dated October 9, 2020. Therefore, the existing condition study is not necessary in this report.

For more information regarding the offsite and existing drainage, please refer to the Drainage Study for Handler Commercial and Otay Mesa Road (Final Engineering) PTS #618357, prepared by Rick Engineering Company and dated October, 2018, and Drainage Study Addendum for PA-16 prepared by Change Consultants dated October 9, 2020.

Development of the project will create more impervious surfaces that result in an increase in storm water runoff and potential urban pollutants typically associated

with developed land uses; therefore, the project will include a comprehensive storm water management design that will combine low impact design (LID), water quality pollutant control, detention / hydromodification management, and flood control design features. The detention of project flows will comply with requirements set forth in the City of San Diego Drainage Design Manual, dated January 2017, and Detention Criteria for Watersheds Tributary to the Mexico / U.S.A. border pursuant the City of San Diego Notice, dated August 7, 1987. The notice requires detention for the 5-year, 10-year, 25-year, and 50-year storm events. Because the facilities for this development are sized to convey the 100-year storm event, 100-year detention will also be provided.

Table 1 below shows the 5-, 10-, 25-, 50- and 100-year peak flows from basin 100 in the proposed project.

TABLE 1 – Hydrologic Summary for Basin 100 at Node 150

Storm Event	Proposed Condition				
	Drainage Area (acres)	Time of Concentration (minutes)		Peak Flow Rate (CFS)	
		Unmitigated	mitigated	Unmitigated	mitigated
100-year	14.3	11.92	23.67	34.31	17.96
50-year		12.39	24.65	32.45	15.94
25-year		12.09	23.69	29.59	13.77
10-year		12.67	25.19	25.21	10.43
5-year		12.46	24.80	21.59	6.26

Table 2 below shows the 100-year peak flow from basin 200 in the proposed project.

TABLE 2 - Hydrologic Summary for Basin 200 at Node 78

Storm Event	Proposed Condition				
	Drainage Area (acres)	Time of Concentration (minutes)		Peak Flow Rate (CFS)	
		Unmitigated	Mitigated	Unmitigated	Mitigated
100-year	13	16.98	16.98	26.98	26.21

Supporting calculations for the information presented in Table 2 is located in Appendix 3 and 4 of this report. The corresponding hydrology map is in the Map pocket in Appendix 5.

Note:
1: Results at node 78 include the routing of flows from PA-16 property to the west of the site per Drainage Study for PA-16, prepared by Chang Consultand and dated October, 2018
2: cfs= cubic feet per second.
3: flows reflect the peak discharge rates after detention.

2. METHODOLOGY

2.1 Hydrology

The City of San Diego Drainage Design Manual, dated January 2017, requires that the Modified Rational Method be used for hydrologic analysis of a watershed up to, but not exceeding, 1.0 square-mile (640 acres). The 5-, 10-, 25-, 50-, and 100-year storm event peak flow rates have been computed in this report to meet the City of San Diego's criteria, including drainage criteria in Otay Mesa. The Rational Method computer program developed by Advanced Engineering Software (AES 2015) was used for this study because it satisfies the City of San Diego's design criteria.

Computer Software Package – AES-2015

Design Storm –5-,10-, 25-, 50-, and100-Year for detention

Land Use – Mixed Use

Soil Type - Hydrologic soil group D was assumed for all areas. Group D soils have very slow infiltration rates when thoroughly wetted. Consisting chiefly of clay soils with a high swelling potential, soils with a high permanent water table, soils with clay pan or clay layer at or near the surface, and shallow soils over nearly impervious materials, Group D soils have a very slow rate of water transmission.

Runoff Coefficient – In accordance with the City of San Diego design criteria, a runoff coefficient of 0.70 was used for Multi-Units area, 0.85 for the commercial area and 0.95 for the roads. Where actual conditions deviate significantly from the tabulated imperviousness value 90%, the value given for coefficient C, was revised by multiplying 90% by the ratio of actual imperviousness to the tabulated imperviousness.

Rainfall Intensity - Based on time-intensity criteria per City of San Diego

Method of Analysis – The Rational Method is the most widely used hydrologic model for estimating peak runoff rates. Applied to small urban and semi-urban areas with drainage areas less than 1.0 square mile, the Rational Method relates storm rainfall intensity, a runoff coefficient, and drainage area to peak runoff rate. This relationship is expressed by the equation:

-

Q = CIA, where:

Q = The peak runoff rate in cubic feet per second at the point of analysis.

C = A runoff coefficient representing the area - averaged ratio of runoff to rainfall intensity.

I = The time-averaged rainfall intensity in inches per hour corresponding to the time of concentration.

A = The drainage basin area in acres.

To perform a node-link study, the total watershed area is divided into subareas which discharge at designated nodes.

The procedure for the subarea summation model is as follows:

(1) Subdivide the watershed into an initial subarea (generally 1 lot) and subsequent subareas, which are generally less than 10 acres in size. Assign upstream and downstream node numbers to each subarea.

(2) Estimate an initial T_c by using the appropriate nomograph or overland flow velocity estimation.

(3) Using the initial T_c, determine the corresponding values of I. Then Q = C I A.

(4) Using Q, estimate the travel time between this node and the next by Manning's equation as applied to the particular channel or conduit linking the two nodes. Then, repeat the calculation for Q based on the revised intensity (which is a function of the revised time of concentration)

The nodes are joined together by links, which may be street gutter flows, drainage swales, drainage ditches, pipe flow, or various channel flows. The AES-2015 computer subarea menu is as follows:

SUBAREA HYDROLOGIC PROCESS (Codes)

1. Confluence analysis at node.
2. Initial subarea analysis (including time of concentration calculation).
3. Pipeflow travel time (computer estimated).
4. Pipeflow travel time (user specified).
5. Trapezoidal channel travel time.
6. Street flow analysis through subarea.
7. User - specified information at node.
8. Addition of subarea runoff to main line.
9. V-gutter flow through area.
10. Copy main stream data to memory bank
11. Confluence main stream data with a memory bank
12. Clear a memory bank

At the confluence point of two or more basins, the following procedure is used to combine peak flow rates to account for differences in the basin's times of concentration. This adjustment is based on the assumption that each basin's hydrographs are triangular in shape.

(1). If the collection streams have the same times of concentration, then the Q values are directly summed,

$Q_p = Q_a + Q_b$; $T_p = T_a = T_b$

(2). If the collection streams have different times of concentration, the smaller of the tributary Q values may be adjusted as follows:

(i). The most frequent case is where the collection stream with the longer time of concentration has the larger Q. The smaller Q value is adjusted by the ratio of rainfall intensities.

$Q_p = Q_a + Q_b\ (I_a/I_b)$; $T_p = T_a$

(ii). In some cases, the collection stream with the shorter time of concentration has the larger Q. Then the smaller Q is adjusted by a ratio of the T values.

$Q_p = Q_b + Q_a\ (T_b/T_a)$; $T_p = T_b$

2.2 Detention

As described in the executive summary of the proposed condition in this report, the project proposes one vault for detention and hydromodification purposes and one biofiltration basin (detention/ hydromodification). In accordance with the Detention Criteria for Watersheds Tributary to the Mexico / U.S.A. border pursuant to the City of San Diego Notice, dated August 7, 1987, projects within the watershed that drains into Mexico shall provide facilities to detain the post-project flow rates for the 5-year, 10-year, 25-year, 50-, and 100-year storm events back to the pre-project flow rates. The project proposes one underground vault (detention) to meet the above detention requirements. One of the biofiltration basins is located on the northern portion of the site lies within drainage basin 200 and is therefore exempt from detention requirements as these flows will not be tributary to a watershed draining into Mexico. Also, the vault and the biofiltration basin is designed to meet the hydromodification management plan (HMP) requirements.

In order to comply with the hydromodification management plan (HMP) requirements pursuant to the City of San Diego Stormwater Standards Manual, dated January, 2018, the proposed biofiltration (detention) basins were designed to mitigate the post-project flow rates and durations for the storm events from 10% of the 2-year up to the 10-year.

2.2.1 Rational Method Hydrograph Synthesizing Procedure Methodology and Criteria (RickRatHydro)

The sizing of a detention facility requires an inflow hydrograph to obtain the necessary storage volume. The Modified Rational Method only yields a peak discharge and time of concentration, and does not yield a hydrograph. In order to convert the peak discharge and time of concentration into a hydrograph, a Modified Rational Method hydrograph synthesizing procedure was used. The Modified Rational Method hydrograph synthesizing procedure methodology and criteria that were used are based on Section 6.0, Rational Method Hydrograph Procedure and Detention Basin Design, of the San Diego County Hydrology Manual June 2003.

RickRatHydro was used to produce a hydrograph for the project drainage areas, based on the area, time of concentration, P6 value, runoff coefficient, and peak flow rate which was provided by the hydrology calculations discussed above (AES results).

In meeting the aforementioned detention requirements, detention analyses for the 5-, 10-, 25-, 50-, and 100-year storm events were performed using the HEC-HMS program; to ensure that the post-project peak flow rates were detained back to the peak flow rates for those storm events per the approved *Drainage Study for Handler Commercial and Otay Mesa Road, dated December 8th, 2017*. The modified rational method hydrologic analyses were performed to determine the 5-, 10-, 25-, 50-, and 100-year flow rates for the post-project condition.
The post-project rational method output for the project is provided in Appendix B.

2.2.2 Rating Curve Methodology and Criteria

In order to model the Vault and the biofiltration (detention) basin in the HEC-HMS hydrologic model, the storage volume of the vault and the basin and outflow characteristics of the discharge pipe and emergency spillway structure are input at

incremental elevations. These values comprise a rating curve, which the HEC-HMS hydrologic model uses in conjunction with the inflow hydrograph to produce the outflow and storage hydrographs. A Microsoft Excel spreadsheet was used to determine the storage volume of the vault and the basin at incremental elevations and outflow characteristics of the discharge pipes and spillway. Standard "Weir" and "Orifice" equations are used to determine the outflow characteristics of the discharge pipe and spillway.

2.2.3 HEC-HMS Methodology and Criteria

For the proposed vault, the 5-, 10-, 25-, 50-, and 100-year hydrographs and elevation-storage-outflow rating curves were used in the HEC-HMS hydrologic model to perform routing calculations for the detention Vault, and to determine the 5-, 10-, 25-, 50-, and 100-year detention volumes required for the basin to reduce the post-project peak discharge rate back to the pre-project peak discharge rate for each storm event at each point of interest.

For the proposed biofiltration basin (detention), just the 100-year event was recognized.

3.1 Results and Conclusions

BDM Mixed Use project can be developed without increasing existing flows and adversely impacting the existing downstream drainage facilities.

Please refer to the *Storm Water Quality Management Plan for BDM Mixed Use* dated (July 2021) for complete stormwater treatment discussion and calculations as well as hydromodification management related to the site.

Table 4 below compares the 5-, 10-, 25-, 50- and 100-year peak flows from basin 100 from The *Drainage Study for Handler Commercial and Otay Mesa Road, dated October, 2018* and the -, 10-, 25-, 50- and 100-year peak flows from basin 100 from the proposed *project* in this report.

TABLE 4 – Hydrologic Summary for Basin 100

Storm Event	*From Drainage Study for Handler Commercial and Otay Mesa Road (Final Engineering) PTS #618357, prepared by Rick Engineering Company and dated December 8th, 2017*			Proposed Condition (Mitigated)		
	Drainage Area (acres)	Time of Concentration (minutes)	Peak Flow Rate (CFS)	Drainage Area (acres)	Time of Concentration (minutes)	Peak Flow Rate (CFS)
100-year	14.0	20.0	18.7	14.3	23.67	17.96
50-year		20.2	17.4		24.65	15.94
25-year		20.5	15.7		23.69	13.77
10-year		21.1	13.4		25.19	10.43
5-year		15.5	6.7		24.80	6.26

Table 5 below compares the 100-year peak flows from basin 200 per the *Drainage Study for Addendum for PA-16, dated October, 2020* and 100-year peak flows from basin 200 from the proposed project in this report.

TABLE 5 - Hydrologic Summary for Basin 200

Storm Event	*From Drainage Study for PA-61 prepared by Chang Consultant Dated October 2020*			Proposed Condition (Mitigated)		
	Drainage Area (acres)	Time of Concentration (minutes)	Peak Flow Rate (CFS)	Drainage Area (acres)	Time of Concentration (minutes)	Peak Flow Rate (CFS)
100-year	13.18	16.90	27.759	13	16.98	26.21

As shown on the summary table above the overall project will reduce peak flows in the 5-, 10-, 25-, 50- and 100-year event, comparing to the flows per the approved *Drainage Study for Handler Commercial and Otay Mesa Road*. The 100-year peak flows from basin 200 from the proposed project in this report will be reduced as well.

4.1 References

San Diego County Hydrology Manual, County of San Diego Department of Public Works Flood Control Division, June 2003.

The City of San Diego Drainage Design Manual, Transportation and Storm Water Design manuals, January 2017

Stormwater Quality Management Plan BDM Mixed Use, Hunsaker & Associates San Diego, Inc., September 2021

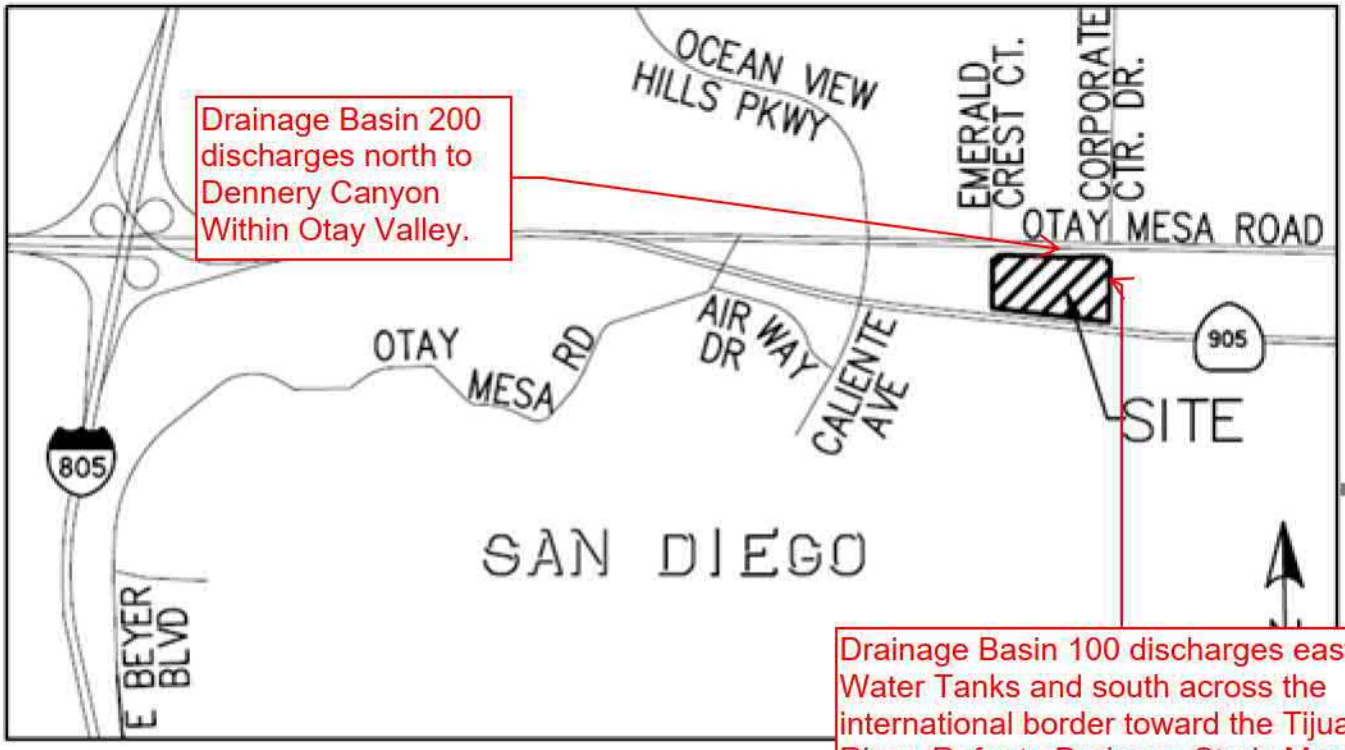
Geotechnical Investigation of Handler Commercial Drawing No 39191-19-D Otay Mesa Road and Corporate Center Drive by GeoSoils, Inc., dated December 29, 2017.

Drainage Study for Handler Commercial and Otay Mesa Road, PTS #618357 Prepared by Rick Engineering and dated December 8th, 2017

PA-61 Drainage Study Addendum prepared by chang Consultant and dated October 9, 2020

5. Appendices

Appendix 1 – Vicinity Map and Miscellaneous Project Location Information



VICINITY MAP

NO SCALE

Appendix A

Rational Method and Modified Rational Method

A.1. Rational Method (RM)

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and drainage structures. The RM is recommended for analyzing the runoff response from drainage areas for watersheds less than 0.5 square miles. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 0.5 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section A.2); or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Appendix B).

A.1.1. Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed in Equation A-1.

Equation A-1. RM Formula Expression

$$Q = C\ I\ A$$

where:

Q	=	peak discharge, in cubic feet per second (cfs)
C	=	runoff coefficient expressed as that percentage of rainfall which becomes surface runoff (no units); Refer to Appendix A.1.2
I	=	average rainfall intensity for a storm duration equal to the time of concetrnatation (T_c) of the contributing draiange area, in inches per hour; Refer to Appendix A.1.3 and Appendix A.1.4
A	=	drainage area contributing to the design location, in acres

Combining the units for the expression CIA yields:

$$\left(\frac{1\,\text{acre}\times\text{inch}}{\text{hour}}\right)\left(\frac{43{,}560\,\text{ft}^2}{\text{acre}}\right)\left(\frac{1\,\text{foot}}{12\,\text{inches}}\right)\left(\frac{1\,\text{hour}}{3{,}600\,\text{seconds}}\right) \Rightarrow 1.008\,\text{cfs}$$

For practical purposes, the unit conversion coefficient difference of 0.8% can be ignored.

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Unlike the MRM (discussed in Appendix A.2) or the NRCS hydrologic method (discussed in Appendix B), the RM does not create hydrographs and therefore does not add separate subarea hydrographs at collection points. Instead, the RM develops peak discharges in the main line by increasing the T_c as flow travels downstream.

Characteristics of, or assumptions inherent to, the RM are listed below:

1. The discharge resulting from any I is maximum when the I lasts as long as or longer than the T_c.
2. The storm frequency of peak discharges is the same as that of I for the given T_c.
3. The fraction of rainfall that becomes runoff (or the runoff coefficient, C) is independent of I or precipitation zone number (PZN) condition (PZN Condition is discussed in the NRCS method).
4. The peak rate of runoff is the only information produced by using the RM.

A.1.2. Runoff Coefficient

The runoff coefficients are based on land use (see Table A–1). Soil type "D" is used throughout the City of San Diego for storm drain conveyance design. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient (Σ[CA]). Good engineering judgment should be used when applying the values presented in Table A–1, as adjustments to these values may be appropriate based on site-specific characteristics.

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).

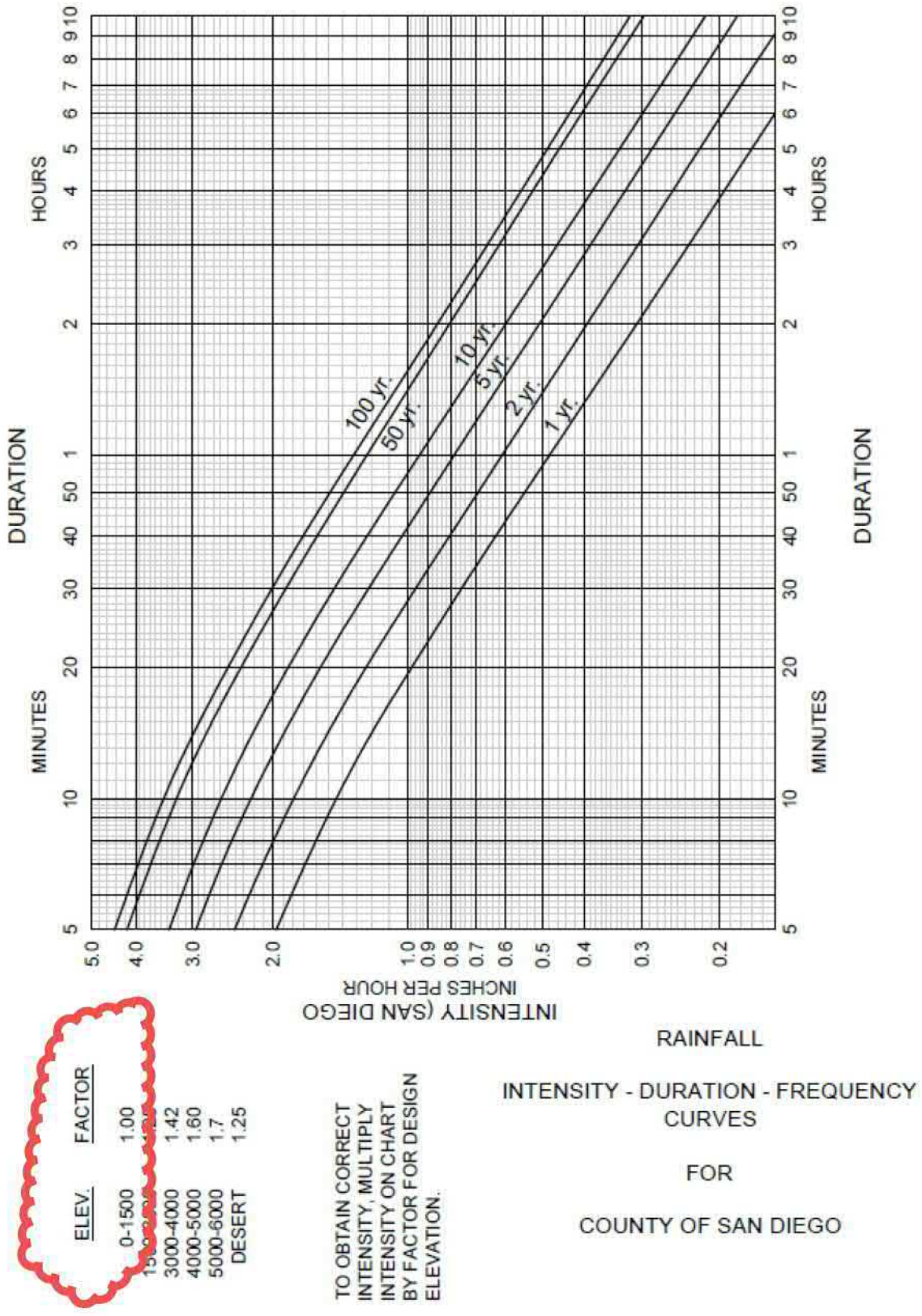


Figure A-1. Intensity-Duration-Frequency Design Chart

A.1.4. Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration.

Methods of calculation differ for natural watersheds (non-urbanized) and for urban drainage systems. Also, when designing storm drain systems, the designer must consider the possibility that an existing natural watershed may become urbanized during the useful life of the storm drain system. Future land uses must be used for Tc and runoff calculations, and can be determined from the Community Plans.

a. Natural watersheds: Obtain Tc from Figures A.2 and A.3

b. Urban drainage systems: In the case of urban drainage systems, the time of concentration at any point within the drainage area is given by:

   $T_c = T_i + T_t$ where

   T_i is the inlet time or the time required for the storm water to flow to the first inlet in the system. It is the sum of time in overland flow across lots and in the street gutter.

   T_t is the travel time or the time required for the storm water to flow in the storm drain from the most upstream inlet to the point in question.

   Travel Time, T_t is computed by dividing the length of storm drain by the computed flow velocity. Since the velocity normally changes at each inlet because of changes in flow rate or slope, total travel time must be computed as the sum of the travel times for each section of the storm drain.

   The overland flow component of inlet time, T_i, may be estimated by the use of the chart shown in Figure A-4. Use Figure A-5 to estimate time of travel for street gutter flow.

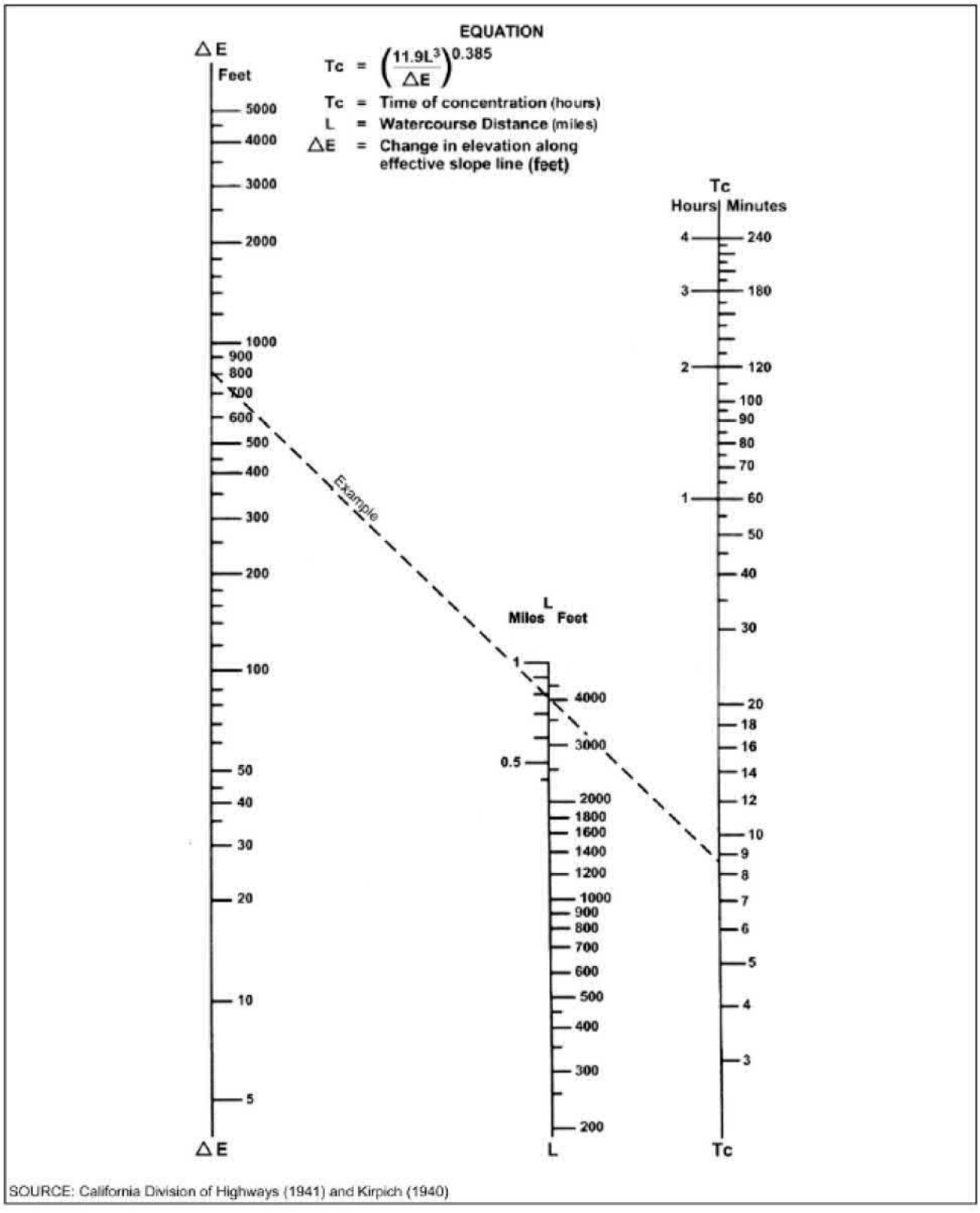


Figure A-2. Nomograph for Determination of T_c for Natural Watersheds

Note: Add ten minutes to the computed time of concentration from Figure A–2.

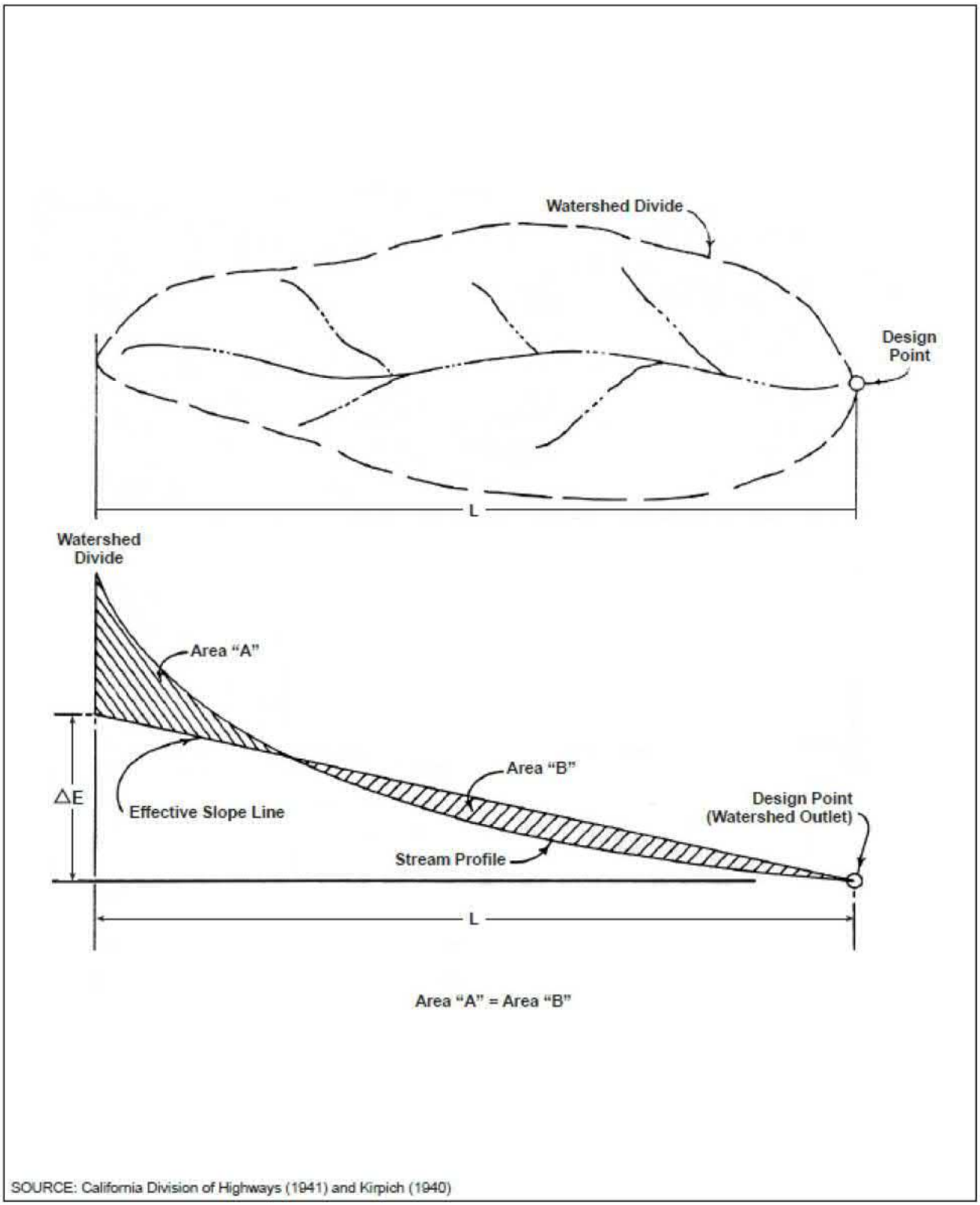


Figure A-3. Computation of Effective Slope for Natural Watersheds

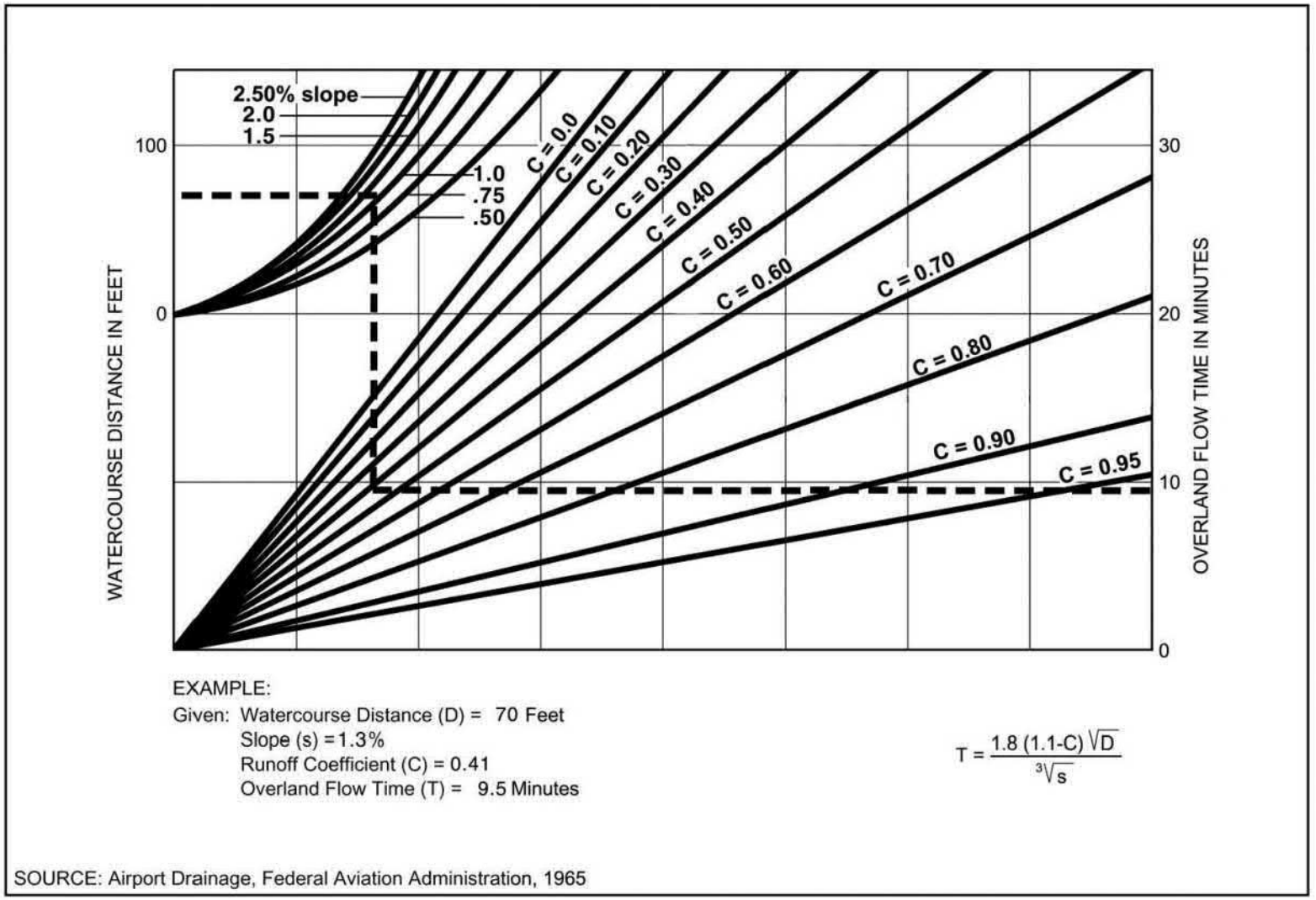
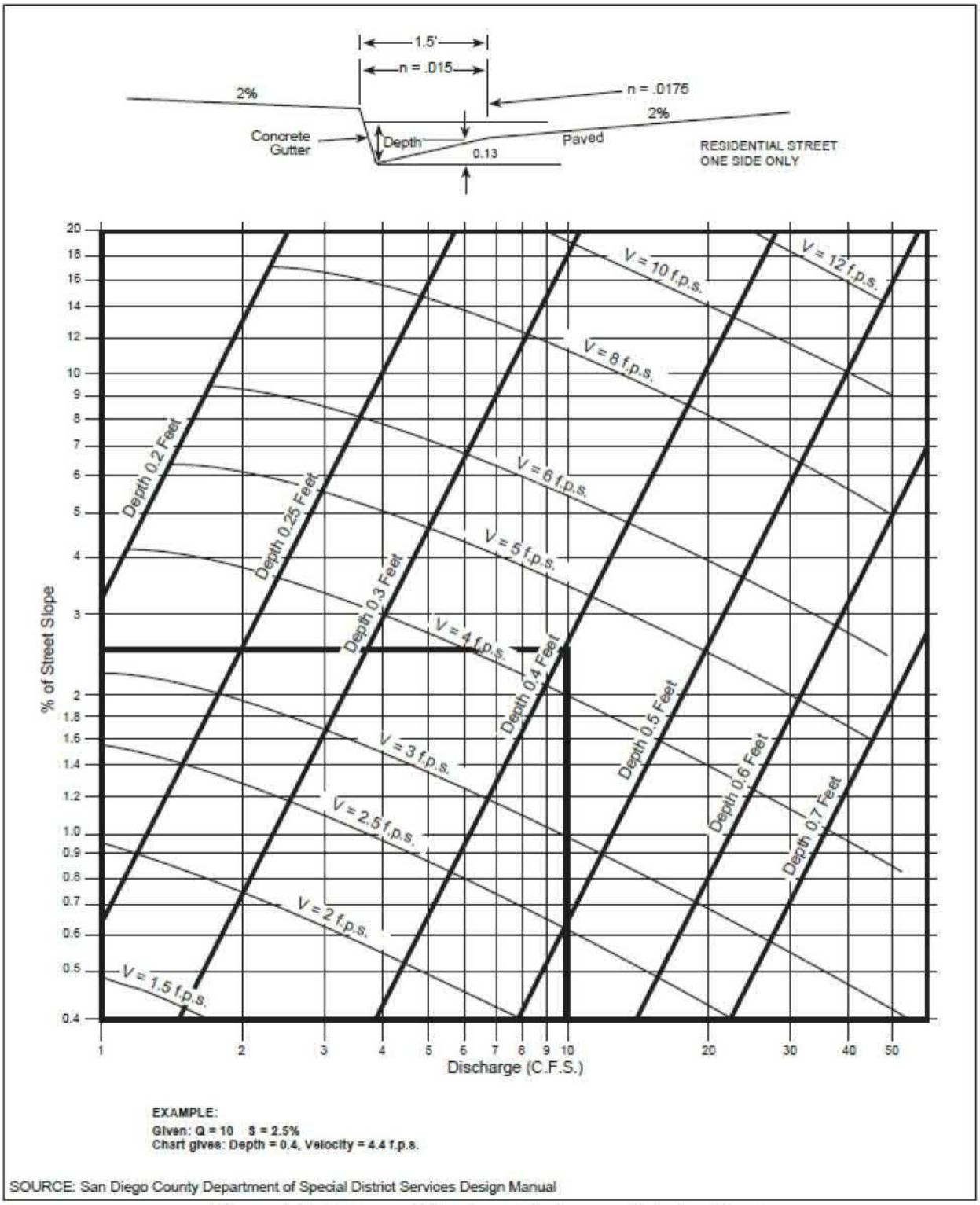


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.



SOURCE: San Diego County Department of Special District Services Design Manual

Figure A-5. Gutter and Roadway Discharge – Velocity Chart

THIS PAGE INTENTIONALLY LEFT BLANK FOR DOUBLE-SIDED PRINTING

A.2. Modified Rational Method (MRM; for Junction Analysis)

The purpose of this section is to describe the steps necessary to develop a hydrology report for a small watershed using the MRM. It is necessary to use the MRM if the watershed contains junctions of independent drainage systems. The process is based on the design manuals of the City/County of San Diego. The general process description for using this method is described below.

The engineer should only use the MRM for drainage areas up to approximately 1 square mile in size. If the watershed will significantly exceed 1 square mile then the NRCS method described in Appendix B should be used.

A.2.1. Modified Rational Method General Process Description

The general process for the MRM differs from the RM only when a junction of independent drainage systems is reached. The peak Q, T_c, and I for each of the independent drainage systems at the point of the junction are calculated by the RM. The independent drainage systems are then combined using the MRM procedure described below. The peak Q, T_c, and I for each of the independent drainage systems at the point of the junction must be calculated prior to using the MRM procedure to combine the independent drainage systems, as these values will be used for the MRM calculations. After the independent drainage systems have been combined, RM calculations are continued to the next point of interest.

A.2.2. Procedure for Combining Independent Drainage Systems at a Junction

1. Calculate the peak Q, T_c, and I for each of the independent drainage systems at the point of the junction. These values will be used for the MRM calculations.
2. At the junction of two or more independent drainage systems, the respective peak flows are combined to obtain the maximum flow out of the junction at T_c. Based on the approximation that total runoff increases directly in proportion to time, a general equation may be written to determine the maximum Q and its corresponding T_c using the peak Q, T_c, and I for each of the independent drainage systems at the point immediately before the junction. The general equation requires that contributing Qs be numbered in order of increasing T_c.
3. Let Q_1, T_1, and I_1 correspond to the tributary area with the shortest T_c. Likewise, let Q_2, T_2, and I_2 correspond to the tributary area with the next longer T_c, Q_3, T_3, and I_3 correspond to the tributary area with the next longer T_c, and so on. When only two independent drainage systems are combined, leave Q_3, T_3, and I_3 out of the equation. Combine the independent drainage systems using the junction equation (see Equation A-2).

Equation A-2. Junction Equation

$$T_1 < T_2 < T_3$$

$$Q_{T1} = Q_1 + \frac{T_1}{T_2} Q_2 + \frac{T_1}{T_3} Q_3$$

$$Q_{T2} = Q_2 + \frac{I_2}{I_1} Q_1 + \frac{T_2}{T_3} Q_3$$

$$Q_{T3} = Q_3 + \frac{I_3}{I_1} Q_1 + \frac{I_3}{I_2} Q_2$$

4. Calculate Q_{T1}, Q_{T2}, and Q_{T3}. Select the largest Q and use the T_c associated with that Q for further calculations (see the three Notes for options). If the largest calculated Q's are equal (e.g., $Q_{T1} = Q_{T2} > Q_{T3}$), use the shorter of the T_cs associated with that Q.
5. This equation may be expanded for a junction of more than three independent drainage systems using the same concept. The concept is that when Q from a selected subarea (e.g., Q_2) is combined with Q from another subarea with a shorter T_c (e.g., Q_1), the Q from the subarea with the shorter T_c is reduced by the ratio of the I's (I_2/I_1); and when Q from a selected subarea (e.g., Q_2) is combined with Q from another subarea with a longer T_c (e.g., Q_3), the Q from the subarea with the longer T_c is reduced by the ratio of the T_cs (T_2/T_3).

The following notes should be considered:

Note #1: At a junction of two independent drainage systems that have the same T_c, the tributary flows may be added to obtain the Q_p.

$$Q_p = Q_1 + Q_2 \text{ ; when } T_1 = T_2 \text{; and } T_c = T_1 = T_2$$

This can be verified by using the junction equation above. Let Q_3, T_3, and $I_3 = 0$. When T_1 and T_2 are the same, I_1 and I_2 are also the same, and T_1/T_2 and $I_2/I_1 = 1$. T_1/T_2 and I_2/I_1 are cancelled from the equations. At this point, $Q_{T1} = Q_{T2} = Q_1 + Q_2$.

Note #2: In the upstream part of a watershed, a conservative computation is acceptable. When the times of concentration are relatively close in magnitude (within 10%), use the shorter T_c for the intensity and the equation $Q = \Sigma(CA)I$.

Appendix 2 – Soils Map

Map Scale: 1:2,380 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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 18, 2018—Aug 22, 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
OhC	Olivenhain cobbly loam, 2 to 9 percent slopes	D	0.5	3.0%
SuB	Stockpen gravelly clay loam, 2 to 5 percent slopes	D	16.9	97.0%
Totals for Area of Interest			**17.5**	**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

BDM Mixed Use
Drainage Study

Appendix 3 - Hydrology Calculations

5-year Storm Event
Basin 100
[Post-project]

5-year Storm Event
Basin 100
[Post-project]
UNMITIGATED FLOWS

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2015 Advanced Engineering Software (aes)
            Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                        *
* 5 YEAR PROPOSED CONDITIONS - UNMITIGATED                             *
* BY JANET KHABBAZ                                                     *
 ************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\5YR\PR5-UN.DAT
  TIME/DATE OF STUDY: 09:02 01/19/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  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;  3.000
   2)  10.000;  2.200
   3)  15.000;  1.850
   4)  20.000;  1.580
   5)  25.000;  1.400
   6)  30.000;  1.230
   7)  40.000;  1.050
   8)  50.000;  0.860
   9)  60.000;  0.780
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150
  6   10.0      5.0    0.500/0.500/0.051   0.50    1.50 0.0313 0.125 0.1000

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
```



```
  DOWNSTREAM ELEVATION(FEET) =    520.60
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.908
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.33

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
  STREET LENGTH(FEET) =   460.00   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 =  2
  STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   4.78   Tc(MIN.) =   10.35
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.175
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    1.80
  TOTAL AREA(ACRES) =       1.3        PEAK FLOW RATE(CFS) =       2.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.81
  FLOW VELOCITY(FEET/SEC.) =  1.75   DEPTH*VELOCITY(FT*FT/SEC.) =   0.46
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.35
  RAINFALL INTENSITY(INCH/HR) =   2.18
  TOTAL STREAM AREA(ACRES) =     1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.04

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
  FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.04
  PIPE TRAVEL TIME(MIN.) =   3.76    Tc(MIN.) =   14.12
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.26
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.84
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.12
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    4.24
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.860
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.16
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.98
 FLOW VELOCITY(FEET/SEC.) =  1.88   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
 FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
```



```
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.01
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.42
 PIPE TRAVEL TIME(MIN.) =   2.07    Tc(MIN.) =    6.30
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.30
 RAINFALL INTENSITY(INCH/HR) =   2.79
 TOTAL STREAM AREA(ACRES) =     0.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.42

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.04    10.35        2.175          1.34
     2        1.42     6.30        2.791          0.55

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        2.66     6.30        2.791
     2        3.15    10.35        2.175

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.15   Tc(MIN.) =   10.35
 TOTAL AREA(ACRES) =       1.9
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.00
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.15
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   10.69
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.152
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7364
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    0.80
 TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       3.83
 TC(MIN.) =   10.69

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.83
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   11.26
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.112
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7238
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    1.89
 TOTAL AREA(ACRES) =       3.7   TOTAL RUNOFF(CFS) =       5.66
 TC(MIN.) =   11.26

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.87
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.66
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   11.64
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.64
 RAINFALL INTENSITY(INCH/HR) =   2.08
 TOTAL STREAM AREA(ACRES) =     3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.66

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.25

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



```
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.54
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.62
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.38
 STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    6.38
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.780
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    0.88
 TOTAL AREA(ACRES) =       0.6       PEAK FLOW RATE(CFS) =       1.11

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.10
 FLOW VELOCITY(FEET/SEC.) =  1.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.75
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.11
 PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    7.44
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.44
 RAINFALL INTENSITY(INCH/HR) =   2.61
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.11

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)      (MIN.)    (INCH/HOUR)     (ACRE)
     1         5.66      11.64         2.085          3.70
     2         1.11       7.44         2.609          0.57
```

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        5.63     7.44       2.609
     2        6.54    11.64       2.085

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.54   Tc(MIN.) =   11.64
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.54
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   12.24
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.043
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7096
  SUBAREA AREA(ACRES) =     4.90   SUBAREA RUNOFF(CFS) =    7.01
  TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =     13.29
  TC(MIN.) =   12.24

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.24
 RAINFALL INTENSITY(INCH/HR) =   2.04
 TOTAL STREAM AREA(ACRES) =     9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.29

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.40
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.40
```


Input for RatHydro to generate the inflow hydrograph


```
****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.64
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
 STREET FLOW TRAVEL TIME(MIN.) =   4.06   Tc(MIN.) =    8.48
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.443
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    4.50
 TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       4.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.39
 FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
 LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.48
 RAINFALL INTENSITY(INCH/HR) =   2.44
 TOTAL STREAM AREA(ACRES) =     2.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.82

 ** CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY      AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
     1       13.29    12.24        2.043         9.17
     2        4.82     8.48        2.443         2.82

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       15.94     8.48        2.443
     2       17.33    12.24        2.043

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      17.33   Tc(MIN.) =   12.24
 TOTAL AREA(ACRES) =       12.0
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.
```

Tc in HEC-HMS was rounded to 10 min because the software has limited values of Tc

```
************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.33
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   12.46
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    517.00
 DOWNSTREAM ELEVATION(FEET) =    515.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.295
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

************************************************************************
 FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
========================================================================
 UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 56.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.72
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
 STREET FLOW TRAVEL TIME(MIN.) =   5.82   Tc(MIN.) =    8.12
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.501
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.908
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.86
```



```
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.09

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.89
 FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.97
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.09
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    8.74
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    8.74
 RAINFALL INTENSITY(INCH/HR) =   2.40
 TOTAL STREAM AREA(ACRES) =     1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.09

************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    508.50
 DOWNSTREAM ELEVATION(FEET) =    507.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.22
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
========================================================================
 UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
 STREET LENGTH(FEET) =   100.00   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
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
```

```
  HALFSTREET FLOOD WIDTH(FEET) =    6.20
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =    5.18
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.971
*USER SPECIFIED(SUBAREA):
NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
S.C.S. CURVE NUMBER (AMC II) =  91
AREA-AVERAGE RUNOFF COEFFICIENT =  0.738
SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    1.95
TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       2.17

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.26
FLOW VELOCITY(FEET/SEC.) =  2.71   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    5.18
 RAINFALL INTENSITY(INCH/HR) =   2.97
 TOTAL STREAM AREA(ACRES) =     0.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.17

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.09     8.74        2.402          1.36
     2        2.17     5.18        2.971          0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        4.00     5.18        2.971
     2        4.84     8.74        2.402

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.84   Tc(MIN.) =    8.74
 TOTAL AREA(ACRES) =        2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.34
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.84
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    9.36
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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        4.84     9.36        2.303          2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       17.33    12.46        2.028         11.99
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       17.86     9.36        2.303
     2       21.59    12.46        2.028

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      21.59   Tc(MIN.) =   12.46
 TOTAL AREA(ACRES) =       14.3

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

Unmitigated flow
Basin 100
5 Year Event

5-year Storm Event
Basin 100
[Post-project]
MITIGATED FLOWS

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2015 Advanced Engineering Software (aes)
            Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* BDM Mixed Use                                                       *
* 5 YEAR PROPOSED CONDITIONS                                          *
* BY JANET KHABBAZ                                                    *
 **********************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\5YR\PR100.DAT
  TIME/DATE OF STUDY: 15:05 06/02/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  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;  3.000
   2)  10.000;  2.200
   3)  15.000;  1.850
   4)  20.000;  1.580
   5)  25.000;  1.400
   6)  30.000;  1.230
   7)  40.000;  1.050
   8)  50.000;  0.860
   9)  60.000;  0.780
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150
  6   10.0      5.0    0.500/0.500/0.051   0.50    1.50 0.0313 0.125 0.1000

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

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

```
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.60
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.908
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
 STREET LENGTH(FEET) =   460.00   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 =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.23
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.23
   HALFSTREET FLOOD WIDTH(FEET) =    5.15
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.60
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
 STREET FLOW TRAVEL TIME(MIN.) =   4.78   Tc(MIN.) =   10.35
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.175
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    1.80
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       2.04

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.81
 FLOW VELOCITY(FEET/SEC.) =  1.75   DEPTH*VELOCITY(FT*FT/SEC.) =   0.46
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.35
 RAINFALL INTENSITY(INCH/HR) =   2.18
```

```
 TOTAL STREAM AREA(ACRES) =     1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.04

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
 FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.04
 PIPE TRAVEL TIME(MIN.) =   3.76    Tc(MIN.) =   14.12
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.26
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.84
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.12
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.70
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    4.24
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.860
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.16
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.98
 FLOW VELOCITY(FEET/SEC.) =  1.88   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
 FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.01
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.42
 PIPE TRAVEL TIME(MIN.) =   2.07    Tc(MIN.) =    6.30
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.30
 RAINFALL INTENSITY(INCH/HR) =   2.79
 TOTAL STREAM AREA(ACRES) =     0.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.42

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.04    10.35        2.175          1.34
     2        1.42     6.30        2.791          0.55

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        2.66     6.30       2.791
     2        3.15    10.35       2.175

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.15   Tc(MIN.) =   10.35
 TOTAL AREA(ACRES) =        1.9
```

```
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.00
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.15
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   10.69
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.152
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7364
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    0.80
 TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       3.83
 TC(MIN.) =   10.69

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.83
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   11.26
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.112
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7238
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    1.89
 TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       5.66
 TC(MIN.) =   11.26

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
  FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.87
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.66
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   11.64
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.64
  RAINFALL INTENSITY(INCH/HR) =   2.08
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.66

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    520.20
  DOWNSTREAM ELEVATION(FEET) =    519.00
  ELEVATION DIFFERENCE(FEET) =      1.20
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
  STREET LENGTH(FEET) =   190.00   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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.69
```

```
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.24
  HALFSTREET FLOOD WIDTH(FEET) =    5.54
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.62
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.38
 STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    6.38
   5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.780
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    0.88
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.11

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.10
 FLOW VELOCITY(FEET/SEC.) =  1.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.75
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.11
 PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    7.44
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.44
 RAINFALL INTENSITY(INCH/HR) =   2.61
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.11

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        5.66    11.64        2.085          3.70
     2        1.11     7.44        2.609          0.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        5.63     7.44       2.609
     2        6.54    11.64       2.085

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =       6.54   Tc(MIN.) =   11.64
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.54
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   12.24
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.043
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7096
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    7.01
 TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      13.29
 TC(MIN.) =   12.24

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.24
 RAINFALL INTENSITY(INCH/HR) =   2.04
 TOTAL STREAM AREA(ACRES) =     9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.29

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.40
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.40
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
  STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   4.06   Tc(MIN.) =    8.48
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.443
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    4.50
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       4.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.39
  FLOW VELOCITY(FEET/SEC.) =  2.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.48
  RAINFALL INTENSITY(INCH/HR) =   2.44
  TOTAL STREAM AREA(ACRES) =     2.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.29    12.24        2.043          9.17
      2        4.82     8.48        2.443          2.82

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
```

```
      1       15.94     8.48       2.443
      2       17.33    12.24       2.043

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.33   Tc(MIN.) =   12.24
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

+----------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE DETAINED FLOW FROM THE STORAGE VAULT           |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  24.48   RAIN INTENSITY(INCH/HOUR) =  1.42
  TOTAL AREA(ACRES) =    11.97   TOTAL RUNOFF(CFS) =      3.30

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.30
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   24.80
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    515.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.295
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```


Input for RatHydro to generate the inflow hydrograph

Tc in HEC-HMS was rounded to 10 min be-cause the software has limited values of Tc

From detention analysis

```
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 56.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.72
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    8.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
 STREET FLOW TRAVEL TIME(MIN.) =   5.82   Tc(MIN.) =    8.12
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.501
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.908
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.86
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.09

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.89
 FLOW VELOCITY(FEET/SEC.) =  2.37   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.97
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.09
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    8.74
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    8.74
```

```
 RAINFALL INTENSITY(INCH/HR) =   2.40
 TOTAL STREAM AREA(ACRES) =     1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.09

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    508.50
 DOWNSTREAM ELEVATION(FEET) =    507.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.22
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
 STREET LENGTH(FEET) =   100.00   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
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.20
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.20
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
 STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =    5.18
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.971
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.738
 SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    1.95
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.17

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.26
 FLOW VELOCITY(FEET/SEC.) =  2.71   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    5.18
  RAINFALL INTENSITY(INCH/HR) =   2.97
  TOTAL STREAM AREA(ACRES) =     0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.17

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.09     8.74        2.402          1.36
      2        2.17     5.18        2.971          0.99

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.00     5.18       2.971
      2        4.84     8.74       2.402

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.84   Tc(MIN.) =    8.74
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.84
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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        4.84     9.36       2.303        2.35
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.30    24.80       1.407       11.97
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
```

NUMBER	(CFS)	(MIN.)	(INCH/HOUR)
1	6.09	9.36	2.303
2	6.26	24.80	1.407

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 6.26 Tc(MIN.) = 24.80
TOTAL AREA(ACRES) = 14.3

****
FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 12

>>>>>CLEAR MEMORY BANK # 1 <<<<<
==========

END OF RATIONAL METHOD ANALYSIS

10-year Storm Event
Basin 100
[Post-project]

10-year Storm Event
Basin 100
[Post-project]
Unmitigated Flows

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2015 Advanced Engineering Software (aes)
             Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                        Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                        *
* 10 Year Proposed Conditions Unmitigated Flows                        *
* BY JANET KHABBAZ                                                     *
 ************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\10\PR10-UN.DAT
  TIME/DATE OF STUDY: 09:13 01/19/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
```



```
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
  STREET LENGTH(FEET) =   460.00   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 =  2
  STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
  STREET FLOW TRAVEL TIME(MIN.) =   4.66   Tc(MIN.) =   10.66
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.518
  *USER SPECIFIED(SUBAREA):
  WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.08
  TOTAL AREA(ACRES) =       1.3        PEAK FLOW RATE(CFS) =       2.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.39
  FLOW VELOCITY(FEET/SEC.) =  1.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =     1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.43

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
  FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.43
  PIPE TRAVEL TIME(MIN.) =   3.59    Tc(MIN.) =   14.24
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
```

```
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.22
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =    6.90
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.017
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.17
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.44

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.08
 FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
 FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.02
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.44
 PIPE TRAVEL TIME(MIN.) =   2.06    Tc(MIN.) =    8.95
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.95
 RAINFALL INTENSITY(INCH/HR) =   2.71
```



```
 TOTAL STREAM AREA(ACRES) =      0.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.44

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         2.43    10.66        2.518          1.34
    2         1.44     8.95        2.707          0.55

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1         3.70     8.95        2.707
    2         3.77    10.66        2.518

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.77   Tc(MIN.) =   10.66
 TOTAL AREA(ACRES) =        1.9
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.25
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.77
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.97
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.483
 *USER SPECIFIED(SUBAREA):
 ROAD(DIRT) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    0.92
 TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       4.69
 TC(MIN.) =   10.97

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.69
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   11.52
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.428
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    2.18
 TOTAL AREA(ACRES) =       3.7   TOTAL RUNOFF(CFS) =      6.87
 TC(MIN.) =   11.52

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.87
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   11.89
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.89
 RAINFALL INTENSITY(INCH/HR) =   2.39
 TOTAL STREAM AREA(ACRES) =     3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.87

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.72
```



```
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.24
  HALFSTREET FLOOD WIDTH(FEET) =    5.63
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.65
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
 STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =    7.92
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.861
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    0.90
 TOTAL AREA(ACRES) =       0.6        PEAK FLOW RATE(CFS) =       1.17

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.29
 FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.79
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.17
 PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    8.98
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.98
 RAINFALL INTENSITY(INCH/HR) =   2.70
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        6.87    11.89        2.391          3.70
     2        1.17     8.98        2.703          0.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        7.24     8.98        2.703
     2        7.90    11.89        2.391

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.90   Tc(MIN.) =   11.89
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.90
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   12.46
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.334
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    8.01
 TOTAL AREA(ACRES) =       9.2   TOTAL RUNOFF(CFS) =     15.91
 TC(MIN.) =   12.46

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.46
 RAINFALL INTENSITY(INCH/HR) =   2.33
 TOTAL STREAM AREA(ACRES) =     9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.91

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.82
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```


Input for RatHydro to generate the inflow hydrograph


```
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.87
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
 STREET FLOW TRAVEL TIME(MIN.) =   4.01   Tc(MIN.) =   10.01
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.589
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    4.77
 TOTAL AREA(ACRES) =       2.8       PEAK FLOW RATE(CFS) =       5.19

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.74
 FLOW VELOCITY(FEET/SEC.) =  2.98   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
 LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.01
 RAINFALL INTENSITY(INCH/HR) =   2.59
 TOTAL STREAM AREA(ACRES) =     2.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.19

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       15.91    12.46        2.334         9.17
     2        5.19    10.01        2.589         2.82

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       19.53    10.01        2.589
     2       20.58    12.46        2.334

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.58   Tc(MIN.) =   12.46
 TOTAL AREA(ACRES) =       12.0
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.53
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      20.58
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   12.67
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
```

```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    515.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.376
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 56.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   5.92   Tc(MIN.) =   11.92
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.388
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =  91
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.73
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.79
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.02
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   12.54
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =   12.54
  RAINFALL INTENSITY(INCH/HR) =   2.33
  TOTAL STREAM AREA(ACRES) =     1.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.02

************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  BARREN COVER RUNOFF COEFFICIENT = .7380
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    508.50
  DOWNSTREAM ELEVATION(FEET) =    507.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
  STREET LENGTH(FEET) =   100.00   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
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =    6.70
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.048
  *USER SPECIFIED(SUBAREA):
  BARREN COVER RUNOFF COEFFICIENT = .7380
  S.C.S. CURVE NUMBER (AMC II) =  91
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.00
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.37
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   3.05
  TOTAL STREAM AREA(ACRES) =     0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.24
```

```
 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         3.02    12.54        2.326          1.36
    2         2.24     6.70        3.048          0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1         4.54     6.70        3.048
    2         4.72    12.54        2.326

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.72   Tc(MIN.) =   12.54
 TOTAL AREA(ACRES) =        2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        4.72
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   13.17
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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         4.72    13.17        2.267         2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
    1        20.58    12.67        2.313        11.99
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1        25.21     12.67        2.313
    2        24.89     13.17        2.267

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      25.21   Tc(MIN.) =   12.67
 TOTAL AREA(ACRES) =       14.3

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     12.67
```

Unmitigated flow
Basin 100
10 Year Event


```
 PEAK FLOW RATE(CFS)   =      25.21
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

10-year Storm Event
Basin 100
[Post-project]
Mitigated Flows

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                            Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                         *
* 10 Year Prposed Condition                                             *
* BY JANET KHABBAZ                                                      *
 *************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\10YR\PR100.DAT
  TIME/DATE OF STUDY: 15:34 06/02/2021
-------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
```

```
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.35
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
 STREET LENGTH(FEET) =   460.00   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 =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.40
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.54
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.65
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
 STREET FLOW TRAVEL TIME(MIN.) =   4.66   Tc(MIN.) =   10.66
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.518
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.08
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       2.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.39
 FLOW VELOCITY(FEET/SEC.) =  1.83   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.66
 RAINFALL INTENSITY(INCH/HR) =   2.52
 TOTAL STREAM AREA(ACRES) =     1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.43

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
```

```
 FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.43
 PIPE TRAVEL TIME(MIN.) =   3.59    Tc(MIN.) =   14.24
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.86
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.22
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
 STREET FLOW TRAVEL TIME(MIN.) =   0.90   Tc(MIN.) =    6.90
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.017
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.17
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.44

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.08
 FLOW VELOCITY(FEET/SEC.) =  1.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.44
  PIPE TRAVEL TIME(MIN.) =   2.06    Tc(MIN.) =    8.95
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.95
  RAINFALL INTENSITY(INCH/HR) =   2.71
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.44

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.43    10.66        2.518          1.34
      2        1.44     8.95        2.707          0.55

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        3.70     8.95       2.707
      2        3.77    10.66       2.518

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.77   Tc(MIN.) =   10.66
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.77
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.97
```

```
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.483
 *USER SPECIFIED(SUBAREA):
 ROAD(DIRT) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    0.92
 TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       4.69
 TC(MIN.) =   10.97

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.69
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   11.52
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.428
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    2.18
 TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       6.87
 TC(MIN.) =   11.52

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.87
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   11.89
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.89
 RAINFALL INTENSITY(INCH/HR) =   2.39
 TOTAL STREAM AREA(ACRES) =     3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.87

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.27
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.72
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    5.63
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.65
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.39
 STREET FLOW TRAVEL TIME(MIN.) =   1.92   Tc(MIN.) =    7.92
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.861
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    0.90
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.17

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.29
 FLOW VELOCITY(FEET/SEC.) =  1.79   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

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

```
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.79
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.17
 PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    8.98
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.98
 RAINFALL INTENSITY(INCH/HR) =   2.70
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.17

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        6.87    11.89        2.391          3.70
     2        1.17     8.98        2.703          0.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        7.24     8.98       2.703
     2        7.90    11.89       2.391

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.90   Tc(MIN.) =   11.89
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.90
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   12.46
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

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

```
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.334
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    8.01
 TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      15.91
 TC(MIN.) =   12.46

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.46
 RAINFALL INTENSITY(INCH/HR) =   2.33
 TOTAL STREAM AREA(ACRES) =     9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.91

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.42
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.82
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
```

```
  HALFSTREET FLOOD WIDTH(FEET) =    9.87
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
STREET FLOW TRAVEL TIME(MIN.) =   4.01   Tc(MIN.) =   10.01
  10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.589
*USER SPECIFIED(SUBAREA):
WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    4.77
TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.19

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.74
FLOW VELOCITY(FEET/SEC.) =  2.98   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   10.01
RAINFALL INTENSITY(INCH/HR) =   2.59
TOTAL STREAM AREA(ACRES) =     2.82
PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.19

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       15.91    12.46        2.334          9.17
    2        5.19    10.01        2.589          2.82

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF       Tc      INTENSITY
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       19.53    10.01        2.589
    2       20.58    12.46        2.334

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      20.58   Tc(MIN.) =   12.46
TOTAL AREA(ACRES) =       12.0
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

+--------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE DETAINED FLOW FROM THE STORAGE VAULT         |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   7
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) =  24.92   RAIN INTENSITY(INCH/HOUR) =  1.62
TOTAL AREA(ACRES) =    11.97   TOTAL RUNOFF(CFS) =      7.07
```

Input for RatHydro to generate the inflow hydrograph

From detention analysis

```
****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.07
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   25.19
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    515.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.376
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 56.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   5.92   Tc(MIN.) =   11.92
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.388
```

```
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.73
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.02

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.79
 FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.02
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   12.54
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =   12.54
 RAINFALL INTENSITY(INCH/HR) =   2.33
 TOTAL STREAM AREA(ACRES) =     1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.02

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 BARREN COVER RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    508.50
 DOWNSTREAM ELEVATION(FEET) =    507.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.160
 SUBAREA RUNOFF(CFS) =      0.23
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
```

```
 STREET LENGTH(FEET) =   100.00   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
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.23
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.31
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.39
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
 STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =    6.70
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.048
 *USER SPECIFIED(SUBAREA):
 BARREN COVER RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.00
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.24

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.37
 FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    6.70
 RAINFALL INTENSITY(INCH/HR) =   3.05
 TOTAL STREAM AREA(ACRES) =     0.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.24

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.02    12.54        2.326          1.36
     2        2.24     6.70        3.048          0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        4.54     6.70       3.048
     2        4.72    12.54       2.326

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.72   Tc(MIN.) =   12.54
 TOTAL AREA(ACRES) =        2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
```

```
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.72
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   13.17
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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        4.72    13.17       2.267        2.35
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.07    25.19       1.614       11.97
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.76      13.17        2.267
      2      10.43      25.19        1.614

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.43   Tc(MIN.) =   25.19
  TOTAL AREA(ACRES) =       14.3

************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
========================================================================
```

25-year Storm Event
Basin 100
[Post-project]

25-year Storm Event
Basin 100
[Post-project]
Unmitigated Flows

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2015 Advanced Engineering Software (aes)
            Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                        Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                        *
* 25 YEAR Proposed Conditions                                          *
* BY JANET KHABBAZ                                                     *
 ************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\25\PR25-UN.DAT
  TIME/DATE OF STUDY: 09:20 01/19/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  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;  3.800
   2)  10.000;  3.000
   3)  15.000;  2.500
   4)  20.000;  2.100
   5)  25.000;  1.900
   6)  30.000;  1.700
   7)  40.000;  1.450
   8)  50.000;  1.300
   9)  60.000;  1.150
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
```



```
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.708
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.42

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
  STREET LENGTH(FEET) =   460.00   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 =  2
  STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   4.56   Tc(MIN.) =   10.14
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.986
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.47
  TOTAL AREA(ACRES) =       1.3        PEAK FLOW RATE(CFS) =       2.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.98
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.14
  RAINFALL INTENSITY(INCH/HR) =   2.99
  TOTAL STREAM AREA(ACRES) =     1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.80

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
  FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.80
  PIPE TRAVEL TIME(MIN.) =   3.45    Tc(MIN.) =   13.58
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.
```

```
************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 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    181.00 TO NODE    182.00 IS CODE =  62
------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.06
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
 STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =    4.22
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.860
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.47
 TOTAL AREA(ACRES) =       0.6        PEAK FLOW RATE(CFS) =       1.80

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.86
 FLOW VELOCITY(FEET/SEC.) =  1.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
 FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.28
```



```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.80
 PIPE TRAVEL TIME(MIN.) =   1.93    Tc(MIN.) =    6.15
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
========================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.15
 RAINFALL INTENSITY(INCH/HR) =   3.62
 TOTAL STREAM AREA(ACRES) =     0.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.80

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         2.80    10.14         2.986          1.34
     2         1.80     6.15         3.616          0.55

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF        Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1         3.50     6.15         3.616
     2         4.29    10.14         2.986

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.29   Tc(MIN.) =   10.14
 TOTAL AREA(ACRES) =        1.9
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.29
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   10.45
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.955
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7364
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    1.10
 TOTAL AREA(ACRES) =       2.4   TOTAL RUNOFF(CFS) =       5.27
 TC(MIN.) =   10.45

************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.72
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.27
 PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   10.97
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.903
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7238
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    2.60
 TOTAL AREA(ACRES) =       3.7   TOTAL RUNOFF(CFS) =      7.77
 TC(MIN.) =   10.97

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.77
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   11.33
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.33
 RAINFALL INTENSITY(INCH/HR) =   2.87
 TOTAL STREAM AREA(ACRES) =      3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.77

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON TC = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
```



```
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.89
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.25
  HALFSTREET FLOOD WIDTH(FEET) =    6.32
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    6.28
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.596
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =       0.6        PEAK FLOW RATE(CFS) =       1.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.98
 FLOW VELOCITY(FEET/SEC.) =  1.90   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.03
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.43
 PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    7.27
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.27
 RAINFALL INTENSITY(INCH/HR) =   3.44
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.43

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         7.77     11.33        2.867          3.70
     2         1.43      7.27        3.437          0.57

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        7.92     7.27       3.437
     2        8.97    11.33       2.867

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.97   Tc(MIN.) =   11.33
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.97
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   11.89
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.811
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7096
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    9.64
 TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =     18.29
 TC(MIN.) =   11.89

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.89
 RAINFALL INTENSITY(INCH/HR) =   2.81
 TOTAL STREAM AREA(ACRES) =      9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.29

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.51
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
```



```
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.54
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.87
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.73
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   3.79   Tc(MIN.) =    8.22
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.285
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    6.05
 TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.97
 FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
 LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.22
 RAINFALL INTENSITY(INCH/HR) =   3.29
 TOTAL STREAM AREA(ACRES) =     2.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.49

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       18.29    11.89        2.811         9.17
     2        6.49     8.22        3.285         2.82

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       22.14     8.22        3.285
     2       23.84    11.89        2.811

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.84   Tc(MIN.) =   11.89
 TOTAL AREA(ACRES) =       12.0
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
```

Input for RatHydro to generate the inflow hydrograph

```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.84
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   12.09
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    517.00
 DOWNSTREAM ELEVATION(FEET) =    515.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.295
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.35
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
 FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 56.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.27
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.51
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.22
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
 STREET FLOW TRAVEL TIME(MIN.) =   5.47   Tc(MIN.) =    7.77
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.357
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.908
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    3.84
 TOTAL AREA(ACRES) =       1.4        PEAK FLOW RATE(CFS) =       4.15

 END OF SUBAREA STREET FLOW HYDRAULICS:
```



```
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.28
 FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.38
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.15
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    8.34
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    8.34
 RAINFALL INTENSITY(INCH/HR) =   3.27
 TOTAL STREAM AREA(ACRES) =     1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.15

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    508.50
 DOWNSTREAM ELEVATION(FEET) =    507.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
 STREET LENGTH(FEET) =   100.00   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
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.52
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.98
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   0.66   Tc(MIN.) =    5.14
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.777
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.738
 SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.48
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.76

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.21
 FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =    175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    5.14
 RAINFALL INTENSITY(INCH/HR) =   3.78
 TOTAL STREAM AREA(ACRES) =     0.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.76

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         4.15     8.34        3.265          1.36
     2         2.76     5.14        3.777          0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1         5.32     5.14        3.777
     2         6.53     8.34        3.265

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.53   Tc(MIN.) =    8.34
 TOTAL AREA(ACRES) =        2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.53
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    8.92
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY     AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1         6.53     8.92        3.173         2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.
```



```
 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY     AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1        23.84    12.09        2.791        11.99
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        24.12     8.92        3.173
     2        29.59    12.09        2.791

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      29.59   Tc(MIN.) =   12.09
 TOTAL AREA(ACRES) =       14.3

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     12.09
 PEAK FLOW RATE(CFS)   =      29.59
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Unmitigated flow
Basin 100
25 Year Event

25-year Storm Event
Basin 100
[Post-project]
Mitigated Flows

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2015 Advanced Engineering Software (aes)
            Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                         *
* 25 YEAR Proposed Conditions                                           *
* BY JANET KHABBAZ                                                      *
 *************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\25-YR\PR100.DAT
  TIME/DATE OF STUDY: 15:48 06/02/2021
-------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  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;  3.800
   2)  10.000;  3.000
   3)  15.000;  2.500
   4)  20.000;  2.100
   5)  25.000;  1.900
   6)  30.000;  1.700
   7)  40.000;  1.450
   8)  50.000;  1.300
   9)  60.000;  1.150
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

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

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.708
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.42

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
  STREET LENGTH(FEET) =   460.00   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 =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.12
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.42
  STREET FLOW TRAVEL TIME(MIN.) =   4.56   Tc(MIN.) =   10.14
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.986
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.47
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       2.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.98
  FLOW VELOCITY(FEET/SEC.) =  1.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.14
  RAINFALL INTENSITY(INCH/HR) =   2.99
  TOTAL STREAM AREA(ACRES) =     1.34
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.80

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
 FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.80
 PIPE TRAVEL TIME(MIN.) =   3.45    Tc(MIN.) =   13.58
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 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    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.06
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.75
```

```
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
STREET FLOW TRAVEL TIME(MIN.) =   0.87   Tc(MIN.) =    4.22
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
*USER SPECIFIED(SUBAREA):
GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
S.C.S. CURVE NUMBER (AMC II) =   0
AREA-AVERAGE RUNOFF COEFFICIENT =  0.860
SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.47
TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.80

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.86
FLOW VELOCITY(FEET/SEC.) =  1.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.28
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       1.80
PIPE TRAVEL TIME(MIN.) =   1.93    Tc(MIN.) =    6.15
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    6.15
RAINFALL INTENSITY(INCH/HR) =   3.62
TOTAL STREAM AREA(ACRES) =     0.55
PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.80

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1        2.80    10.14        2.986          1.34
    2        1.80     6.15        3.616          0.55

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF      Tc      INTENSITY
NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
    1        3.50     6.15       3.616
    2        4.29    10.14       2.986

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       4.29   Tc(MIN.) =   10.14
TOTAL AREA(ACRES) =        1.9
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.29
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.955
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7364
  SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    1.10
  TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       5.27
  TC(MIN.) =   10.45

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.27
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.903
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7238
  SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    2.60
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       7.77
  TC(MIN.) =   10.97

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.77
 PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   11.33
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.33
 RAINFALL INTENSITY(INCH/HR) =   2.87
 TOTAL STREAM AREA(ACRES) =     3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.77

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
```

```
  HALFSTREET FLOOD WIDTH(FEET) =    6.32
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =    6.28
  25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.596
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.98
 FLOW VELOCITY(FEET/SEC.) =  1.90   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.03
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.43
 PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    7.27
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.27
 RAINFALL INTENSITY(INCH/HR) =   3.44
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.43

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.77    11.33        2.867          3.70
     2        1.43     7.27        3.437          0.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        7.92     7.27       3.437
     2        8.97    11.33       2.867

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.97   Tc(MIN.) =   11.33
 TOTAL AREA(ACRES) =        4.3
```

```
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.97
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   11.89
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.811
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7096
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =    9.64
 TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      18.29
 TC(MIN.) =   11.89

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.89
 RAINFALL INTENSITY(INCH/HR) =   2.81
 TOTAL STREAM AREA(ACRES) =     9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.29

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.51
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.54
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.87
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.73
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   3.79   Tc(MIN.) =    8.22
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.285
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    6.05
 TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.97
 FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
 LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.22
 RAINFALL INTENSITY(INCH/HR) =   3.29
 TOTAL STREAM AREA(ACRES) =     2.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.49

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       18.29    11.89        2.811          9.17
     2        6.49     8.22        3.285          2.82

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       22.14     8.22       3.285
     2       23.84    11.89       2.811
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.84   Tc(MIN.) =   11.89
 TOTAL AREA(ACRES) =       12.0
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

+----------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE DETAINED FLOW FROM THE STORAGE VAULT           |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  23.44   RAIN INTENSITY(INCH/HOUR) =  1.96
 TOTAL AREA(ACRES) =    11.97   TOTAL RUNOFF(CFS) =      9.75

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.75
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   23.69
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    517.00
 DOWNSTREAM ELEVATION(FEET) =    515.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.295
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.35
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.35

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

Input for RatHydro to generate the inflow hydrograph

From detention analysis

```
 FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 56.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.27
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    9.51
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.22
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
 STREET FLOW TRAVEL TIME(MIN.) =   5.47   Tc(MIN.) =    7.77
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.357
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.908
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    3.84
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.15

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.28
 FLOW VELOCITY(FEET/SEC.) =  2.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.38
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.15
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    8.34
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    8.34
 RAINFALL INTENSITY(INCH/HR) =   3.27
 TOTAL STREAM AREA(ACRES) =     1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.15
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    508.50
 DOWNSTREAM ELEVATION(FEET) =    507.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.800
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.28
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
 STREET LENGTH(FEET) =   100.00   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
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.52
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.98
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
 STREET FLOW TRAVEL TIME(MIN.) =   0.66   Tc(MIN.) =    5.14
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.777
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.738
 SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.48
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.76

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.21
 FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    5.14
```

```
 RAINFALL INTENSITY(INCH/HR) =   3.78
 TOTAL STREAM AREA(ACRES) =     0.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.76

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        4.15     8.34        3.265          1.36
     2        2.76     5.14        3.777          0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        5.32     5.14       3.777
     2        6.53     8.34       3.265

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.53   Tc(MIN.) =    8.34
 TOTAL AREA(ACRES) =        2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.53
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    8.92
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        6.53     8.92       3.173        2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        9.75    23.69       1.952       11.97
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      10.20       8.92       3.173
     2      13.77      23.69       1.952

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      13.77   Tc(MIN.) =   23.69
  TOTAL AREA(ACRES) =       14.3

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

50-year Storm Event
Basin 100
[Post-project]

50-year Storm Event
Basin 100
[Post-project]
Unmitigated Flows

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2015 Advanced Engineering Software (aes)
             Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                        *
* 50 year Proposed conditions- Unmitigated Flows                       *
* BY JANET KHABBAZ                                                     *
 ************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\50\PR50-UN.DAT
  TIME/DATE OF STUDY: 09:33 01/19/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.44

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
```



```
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
  STREET LENGTH(FEET) =   460.00   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 =  2
  STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
  STREET FLOW TRAVEL TIME(MIN.) =   4.49   Tc(MIN.) =   10.49
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.199
  *USER SPECIFIED(SUBAREA):
  WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.64
  TOTAL AREA(ACRES) =       1.3        PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.27
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   3.20
  TOTAL STREAM AREA(ACRES) =     1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.08

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
  FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.08
  PIPE TRAVEL TIME(MIN.) =   3.36    Tc(MIN.) =   13.85
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
```

```
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.34
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.06
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.90
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
 STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =    6.85
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.748
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.45
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.79

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.86
 FLOW VELOCITY(FEET/SEC.) =  1.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
 FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.27
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.79
 PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =    8.79
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.79
 RAINFALL INTENSITY(INCH/HR) =   3.43
```



```
 TOTAL STREAM AREA(ACRES) =     0.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.79

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         3.08    10.49        3.199          1.34
    2         1.79     8.79        3.434          0.55

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1         4.66     8.79        3.434
    2         4.75    10.49        3.199

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.75   Tc(MIN.) =   10.49
 TOTAL AREA(ACRES) =        1.9
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.75
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.79
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.159
 *USER SPECIFIED(SUBAREA):
 ROAD(DIRT) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    1.17
 TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       5.92
 TC(MIN.) =   10.79

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.92
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   11.30
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.103
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    2.78
 TOTAL AREA(ACRES) =       3.7   TOTAL RUNOFF(CFS) =      8.70
 TC(MIN.) =   11.30

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.70
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.65
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.65
 RAINFALL INTENSITY(INCH/HR) =   3.07
 TOTAL STREAM AREA(ACRES) =     3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.70

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
  50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.89
```



```
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.25
  HALFSTREET FLOOD WIDTH(FEET) =    6.42
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.69
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
 STREET FLOW TRAVEL TIME(MIN.) =   1.88   Tc(MIN.) =    7.88
  50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.580
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =       0.6       PEAK FLOW RATE(CFS) =       1.46

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.08
 FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.05
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.46
 PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    8.86
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.86
 RAINFALL INTENSITY(INCH/HR) =   3.42
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.46

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.70    11.65        3.071          3.70
     2        1.46     8.86        3.422          0.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1        9.26     8.86        3.422
     2       10.00    11.65        3.071

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.00   Tc(MIN.) =   11.65
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.00
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   12.20
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.022
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =   10.37
 TOTAL AREA(ACRES) =       9.2   TOTAL RUNOFF(CFS) =     20.37
 TC(MIN.) =   12.20

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.20
 RAINFALL INTENSITY(INCH/HR) =   3.02
 TOTAL STREAM AREA(ACRES) =     9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.37

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.52
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.56
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```



```
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.72
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
 STREET FLOW TRAVEL TIME(MIN.) =   3.80   Tc(MIN.) =    9.80
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.291
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    6.06
 TOTAL AREA(ACRES) =       2.8       PEAK FLOW RATE(CFS) =       6.58

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.03
 FLOW VELOCITY(FEET/SEC.) =  3.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
 LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.80
 RAINFALL INTENSITY(INCH/HR) =   3.29
 TOTAL STREAM AREA(ACRES) =     2.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.58

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       20.37    12.20        3.022          9.17
     2        6.58     9.80        3.291          2.82

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       25.29     9.80        3.291
     2       26.41    12.20        3.022

   COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
   PEAK FLOW RATE(CFS) =      26.41   Tc(MIN.) =   12.20
   TOTAL AREA(ACRES) =       12.0
   LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.41
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   12.39
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
```


Input for RatHydro to generate the

```
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    515.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.376
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 56.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   5.56   Tc(MIN.) =   11.56
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.080
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =  91
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    3.52
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.96
  FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.88
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.14
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =   12.14
  RAINFALL INTENSITY(INCH/HR) =   3.03
  TOTAL STREAM AREA(ACRES) =     1.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.88

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  BARREN COVER RUNOFF COEFFICIENT = .7380
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    508.50
  DOWNSTREAM ELEVATION(FEET) =    507.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.29
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
  STREET LENGTH(FEET) =   100.00   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
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    6.67
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.783
  *USER SPECIFIED(SUBAREA):
  BARREN COVER RUNOFF COEFFICIENT = .7380
  S.C.S. CURVE NUMBER (AMC II) =  91
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.48
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.27
  FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    6.67
  RAINFALL INTENSITY(INCH/HR) =   3.78
  TOTAL STREAM AREA(ACRES) =     0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.77
```

```
 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1         3.88     12.14        3.027         1.36
    2         2.77      6.67        3.783         0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1         5.88      6.67        3.783
    2         6.10     12.14        3.027

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.10   Tc(MIN.) =   12.14
 TOTAL AREA(ACRES) =         2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.10
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.73
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
    1         6.10     12.73        2.974        2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
    1        26.41     12.39        3.005       11.99
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       32.45      12.39        3.005
    2       32.24      12.73        2.974

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.45   Tc(MIN.) =   12.39
 TOTAL AREA(ACRES) =       14.3

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =     12.39
 PEAK FLOW RATE(CFS)   =      32.45
```


Unmitigated flow
Basin 100
50 Year Event


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

50-year Storm Event
Basin 100
[Post-project]
Mitigated Flows

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                            Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                         *
* 50 YEAR PROPOSED CONDITIONS                                           *
* BY JANET KHABBAZ                                                      *
 ************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\50YR\PR100.DAT
  TIME/DATE OF STUDY: 15:58 06/02/2021
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  1981 SAN DIEGO HYDROLOGY MANUAL RAINFALL INFORMATION USED

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  RAINFALL-INTENSITY ADJUSTMENT FACTOR = 1.000
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
```

```
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.44
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
 STREET LENGTH(FEET) =   460.00   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 =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.77
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
 STREET FLOW TRAVEL TIME(MIN.) =   4.49   Tc(MIN.) =   10.49
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.199
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.64
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.08

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.27
 FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.49
 RAINFALL INTENSITY(INCH/HR) =   3.20
 TOTAL STREAM AREA(ACRES) =     1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.08

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
```

```
 FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.97
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.08
 PIPE TRAVEL TIME(MIN.) =   3.36    Tc(MIN.) =   13.85
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.34
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.34

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.06
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.90
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
 STREET FLOW TRAVEL TIME(MIN.) =   0.85   Tc(MIN.) =    6.85
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.748
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(NARROWLEAF) POOR COVER RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.45
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.79

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.86
 FLOW VELOCITY(FEET/SEC.) =  1.98   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.79
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.79
  RAINFALL INTENSITY(INCH/HR) =   3.43
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.79

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.08    10.49        3.199          1.34
      2        1.79     8.79        3.434          0.55

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.66     8.79       3.434
      2        4.75    10.49       3.199

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.75   Tc(MIN.) =   10.49
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.75
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.79
```

```
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.159
 *USER SPECIFIED(SUBAREA):
 ROAD(DIRT) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    1.17
 TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       5.92
 TC(MIN.) =   10.79

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.92
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   11.30
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.103
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    2.78
 TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       8.70
 TC(MIN.) =   11.30

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.70
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.65
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.65
 RAINFALL INTENSITY(INCH/HR) =   3.07
 TOTAL STREAM AREA(ACRES) =     3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.70

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.89
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.42
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.43
 STREET FLOW TRAVEL TIME(MIN.) =   1.88   Tc(MIN.) =    7.88
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.580
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.13
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.46

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.08
 FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

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

```
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.05
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.46
 PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    8.86
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.86
 RAINFALL INTENSITY(INCH/HR) =   3.42
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.46

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.70    11.65        3.071          3.70
     2        1.46     8.86        3.422          0.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        9.26     8.86       3.422
     2       10.00    11.65       3.071

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.00   Tc(MIN.) =   11.65
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.00
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   12.20
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

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

```
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.022
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =   10.37
 TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      20.37
 TC(MIN.) =   12.20

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.20
 RAINFALL INTENSITY(INCH/HR) =   3.02
 TOTAL STREAM AREA(ACRES) =     9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.37

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.52
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.52

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.56
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
```

```
  HALFSTREET FLOOD WIDTH(FEET) =   10.93
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.72
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
STREET FLOW TRAVEL TIME(MIN.) =   3.80   Tc(MIN.) =    9.80
  50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.291
*USER SPECIFIED(SUBAREA):
WATER SURFACES(DURING FLOODS) COVER RUNOFF COEFFICIENT = .7000
S.C.S. CURVE NUMBER (AMC II) =   0
SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    6.06
TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.58

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.03
FLOW VELOCITY(FEET/SEC.) =  3.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    9.80
RAINFALL INTENSITY(INCH/HR) =   3.29
TOTAL STREAM AREA(ACRES) =     2.82
PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.58

** CONFLUENCE DATA **
STREAM     RUNOFF       Tc      INTENSITY      AREA
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
    1       20.37    12.20        3.022          9.17
    2        6.58     9.80        3.291          2.82

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

** PEAK FLOW RATE TABLE **
STREAM     RUNOFF       Tc      INTENSITY
NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
    1       25.29     9.80        3.291
    2       26.41    12.20        3.022

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      26.41   Tc(MIN.) =   12.20
TOTAL AREA(ACRES) =       12.0
LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

+--------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE DETAINED FLOW FROM THE STORAGE VAULT         |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   7
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN) =  24.40   RAIN INTENSITY(INCH/HOUR) =  2.11
TOTAL AREA(ACRES) =    11.97   TOTAL RUNOFF(CFS) =     11.64
```

Input for RatHydro to generate the inflow hydrograph

From detention analysis

```
****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.64
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   24.65
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    515.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.376
  TIME OF CONCENTRATION ASSUMED AS 6-MIN.
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 56.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   5.56   Tc(MIN.) =   11.56
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.080
```

```
 *USER SPECIFIED(SUBAREA):
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    3.52
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.88

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.96
 FLOW VELOCITY(FEET/SEC.) =  2.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.29
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.88
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.14
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =   12.14
 RAINFALL INTENSITY(INCH/HR) =   3.03
 TOTAL STREAM AREA(ACRES) =     1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.88

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 BARREN COVER RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    508.50
 DOWNSTREAM ELEVATION(FEET) =    507.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
 TIME OF CONCENTRATION ASSUMED AS 6-MIN.
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.910
 SUBAREA RUNOFF(CFS) =      0.29
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.29

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
```

```
 STREET LENGTH(FEET) =   100.00   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
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.53
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.50
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
 STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    6.67
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.783
 *USER SPECIFIED(SUBAREA):
 BARREN COVER RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =   0
 SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.48
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.77

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.27
 FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    6.67
 RAINFALL INTENSITY(INCH/HR) =   3.78
 TOTAL STREAM AREA(ACRES) =     0.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.77

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.88    12.14        3.027          1.36
     2        2.77     6.67        3.783          0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        5.88     6.67       3.783
     2        6.10    12.14       3.027

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.10   Tc(MIN.) =   12.14
 TOTAL AREA(ACRES) =        2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
```

```
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.10
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.73
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        6.10    12.73       2.974        2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       11.64    24.65       2.099       11.97
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      14.31      12.73        2.974
     2      15.94      24.65        2.099

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.94   Tc(MIN.) =   24.65
 TOTAL AREA(ACRES) =       14.3

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
========================================================================
```

100-year Storm Event
Basin 100 and Basin 200
[Post-project]
Unmitigated Flows

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

           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                        2003,1985,1981 HYDROLOGY MANUAL
        (c) Copyright 1982-2015 Advanced Engineering Software (aes)
            Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                        Analysis prepared by:



 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                        *
*  100 Year proposed Conditions- Unmitigated Flows                     *
* BY JANET KHABBAZ                                                     *
 ************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\100\PR100-UN.DAT
  TIME/DATE OF STUDY: 09:52 01/19/2022
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
```



```
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.290
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.48

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
  STREET LENGTH(FEET) =   460.00   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 =  2
  STREET PARKWAY CROSSFALL(DECIMAL) =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.72
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   4.45   Tc(MIN.) =   10.03
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.447
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =  91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.85
  TOTAL AREA(ACRES) =       1.3       PEAK FLOW RATE(CFS) =       3.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.47
  FLOW VELOCITY(FEET/SEC.) =  1.94   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.03
  RAINFALL INTENSITY(INCH/HR) =   3.45
  TOTAL STREAM AREA(ACRES) =     1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.23

************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
  FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.23
  PIPE TRAVEL TIME(MIN.) =   3.32    Tc(MIN.) =   13.34
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.
```

```
************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    522.10
 DOWNSTREAM ELEVATION(FEET) =    521.50
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.38
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
 UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
 STREET LENGTH(FEET) =    91.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.23
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.49
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =    4.18
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.860
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.70
 TOTAL AREA(ACRES) =       0.6        PEAK FLOW RATE(CFS) =       2.08

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.44
 FLOW VELOCITY(FEET/SEC.) =  2.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
 FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
```



```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.08
 PIPE TRAVEL TIME(MIN.) =   1.86    Tc(MIN.) =    6.04
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
========================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.04
 RAINFALL INTENSITY(INCH/HR) =   4.20
 TOTAL STREAM AREA(ACRES) =     0.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.08

 ** CONFLUENCE DATA **
 STREAM      RUNOFF        Tc       INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         3.23    10.03         3.447          1.34
     2         2.08     6.04         4.202          0.55

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF        Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1         4.03     6.04         4.202
     2         4.94    10.03         3.447

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.94   Tc(MIN.) =   10.03
 TOTAL AREA(ACRES) =       1.9
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.94
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.32
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.414
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7364
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    1.27
 TOTAL AREA(ACRES) =       2.4   TOTAL RUNOFF(CFS) =       6.08
 TC(MIN.) =   10.32

************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.08
 PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   10.83
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.359
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7238
 SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    3.01
 TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =      8.99
 TC(MIN.) =   10.83

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
 FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.99
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.18
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.18
 RAINFALL INTENSITY(INCH/HR) =   3.32
 TOTAL STREAM AREA(ACRES) =      3.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.99

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    520.20
 DOWNSTREAM ELEVATION(FEET) =    519.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
  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) =      0.12   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
```



```
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.03
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.26
  HALFSTREET FLOOD WIDTH(FEET) =    6.81
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
 STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    6.22
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.168
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.31
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.66

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.56
 FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.66
 PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    7.18
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.18
 RAINFALL INTENSITY(INCH/HR) =   3.99
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.66

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.99     11.18        3.320          3.70
     2        1.66      7.18        3.987          0.57

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        9.15     7.18       3.987
     2       10.38    11.18       3.320

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.38   Tc(MIN.) =   11.18
 TOTAL AREA(ACRES) =         4.3
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
 FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.77
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.38
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   11.72
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.260
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7096
 SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =   11.18
 TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      21.21
 TC(MIN.) =   11.72

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.72
 RAINFALL INTENSITY(INCH/HR) =   3.26
 TOTAL STREAM AREA(ACRES) =      9.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.21

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    520.00
 ELEVATION DIFFERENCE(FEET) =      1.20
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.59
 TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.59

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
```



```
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
 STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.11
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
 STREET FLOW TRAVEL TIME(MIN.) =   3.66   Tc(MIN.) =    8.09
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.813
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    7.02
 TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       7.53

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.85
 FLOW VELOCITY(FEET/SEC.) =  3.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
 LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.09
 RAINFALL INTENSITY(INCH/HR) =   3.81
 TOTAL STREAM AREA(ACRES) =     2.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.53

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       21.21    11.72        3.260         9.17
     2        7.53     8.09        3.813         2.82

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       25.67     8.09        3.813
     2       27.65    11.72        3.260

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      27.65   Tc(MIN.) =   11.72
 TOTAL AREA(ACRES) =       12.0
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
```

Input for RatHydro to generate the inflow hydrograph

```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
 FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.01
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      27.65
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.92
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    517.00
 DOWNSTREAM ELEVATION(FEET) =    515.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.295
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.40
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
 FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
 STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 56.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.64
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
   HALFSTREET FLOOD WIDTH(FEET) =   10.20
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
 STREET FLOW TRAVEL TIME(MIN.) =   5.33   Tc(MIN.) =    7.63
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
 *USER SPECIFIED(SUBAREA):
 LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.908
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.46
 TOTAL AREA(ACRES) =       1.4        PEAK FLOW RATE(CFS) =       4.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
```



```
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.08
 FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.59
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.82
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    8.18
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    8.18
 RAINFALL INTENSITY(INCH/HR) =   3.80
 TOTAL STREAM AREA(ACRES) =     1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.82

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
 UPSTREAM ELEVATION(FEET) =    508.50
 DOWNSTREAM ELEVATION(FEET) =    507.00
 ELEVATION DIFFERENCE(FEET) =      1.50
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
 STREET LENGTH(FEET) =   100.00   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
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.76
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.48
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
```

```
 STREET FLOW TRAVEL TIME(MIN.) =   0.64   Tc(MIN.) =    5.12
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.377
 *USER SPECIFIED(SUBAREA):
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.738
 SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.87
 TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       3.20

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.82
 FLOW VELOCITY(FEET/SEC.) =  2.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =    175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.12
 RAINFALL INTENSITY(INCH/HR) =   4.38
 TOTAL STREAM AREA(ACRES) =     0.99
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.20

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1         4.82     8.18        3.796          1.36
     2         3.20     5.12        4.377          0.99

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

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1         6.21     5.12        4.377
     2         7.59     8.18        3.796

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.59   Tc(MIN.) =    8.18
 TOTAL AREA(ACRES) =        2.3
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
 FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.59
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    8.74
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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         7.59     8.74        3.690         2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.
```


Unmitigated Q100 at Node 150


```
 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM      RUNOFF       Tc      INTENSITY     AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1        27.65    11.92        3.239        11.99
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc      INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1        27.86     8.74        3.690
     2        34.31    11.92        3.239

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      34.31   Tc(MIN.) =   11.92
 TOTAL AREA(ACRES) =       14.3

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| STARTING THE BASIN 200                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =  91
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    519.80
 ELEVATION DIFFERENCE(FEET) =      1.40
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.781
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.74
 TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.80  DOWNSTREAM(FEET) =   514.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.29
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.74
 PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =    5.69
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     250.00 FEET.

+--------------------------------------------------------------------------+
| THE FOLLOWING CODE 8 IS FOR THE CAMERCIAL AREA                           |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.268
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7857
 SUBAREA AREA(ACRES) =    0.32   SUBAREA RUNOFF(CFS) =    1.16
 TOTAL AREA(ACRES) =       0.6   TOTAL RUNOFF(CFS) =       1.88
 TC(MIN.) =    5.69

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.268
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7500
 SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.07
 TOTAL AREA(ACRES) =       0.6   TOTAL RUNOFF(CFS) =       1.95
 TC(MIN.) =    5.69

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   512.30  DOWNSTREAM(FEET) =   510.30
 FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.95
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    6.12
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE FLOW FROM THE STORM DRAIN WEST OF EMERALD     |
| CREST PER THE DRAINAGE REPORT FOR PA-16                                  |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  15.46   RAIN INTENSITY(INCH/HOUR) =  2.86
 TOTAL AREA(ACRES) =     9.54   TOTAL RUNOFF(CFS) =     19.97

****************************************************************************
 FLOW PROCESS FROM NODE     72.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.16  DOWNSTREAM(FEET) =   510.01
 FLOW LENGTH(FEET) =   504.88   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      19.97
```



```
 PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =   16.74
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     884.88 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.761
 *USER SPECIFIED(SUBAREA):
 OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8000
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7421
 SUBAREA AREA(ACRES) =    1.81   SUBAREA RUNOFF(CFS) =    4.00
 TOTAL AREA(ACRES) =      11.4   TOTAL RUNOFF(CFS) =      23.25
 TC(MIN.) =   16.74

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1        23.25     16.74        2.761      11.35
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     884.88 FEET.

 ** MEMORY BANK #  3 CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
    1         1.95      6.12        4.188       0.61
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     380.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF        Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
    1       10.45       6.12        4.188
    2       24.54      16.74        2.761

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      24.54   Tc(MIN.) =   16.74
 TOTAL AREA(ACRES) =       12.0

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE     76.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.01  DOWNSTREAM(FEET) =   509.00
 FLOW LENGTH(FEET) =   107.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.07
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      24.54
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   16.96
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE     76.00 =     991.88 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     76.00 TO NODE     76.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.743
 *USER SPECIFIED(SUBAREA):
```

```
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7516
 SUBAREA AREA(ACRES) =     0.55   SUBAREA RUNOFF(CFS) =    1.43
 TOTAL AREA(ACRES) =       12.5   TOTAL RUNOFF(CFS) =     25.79
 TC(MIN.) =   16.96

****************************************************************************
 FLOW PROCESS FROM NODE     76.00 TO NODE     78.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.61  DOWNSTREAM(FEET) =   508.52
 FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.76
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.79
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   16.98
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE     78.00 =     999.88 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     78.00 TO NODE     78.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.742
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =  91
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7587
 SUBAREA AREA(ACRES) =     0.46   SUBAREA RUNOFF(CFS) =    1.20
 TOTAL AREA(ACRES) =       13.0   TOTAL RUNOFF(CFS) =     26.98
 TC(MIN.) =   16.98
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       13.0  TC(MIN.) =     16.98
 PEAK FLOW RATE(CFS)   =      26.98
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Unmitigated Q100 at Node 78

100-year Storm Event
Basin 100 and Basin 200
[Post-project]

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                              Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* BDM Mixed Use                                                         *
* 100 YEAR PROPOSED CONDITION                                           *
* BY JANET KHABBAZ                                                      *
 ************************************************************************

  FILE NAME: R:\1613\HYD\DR\CALCS\AES\100-YR\PR100.DAT
  TIME/DATE OF STUDY: 10:38 09/02/2021
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  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     25.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  3   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130
  4   23.0     18.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0160
  5   31.0     13.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.60
```

```
 ELEVATION DIFFERENCE(FEET) =      0.60
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.577
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.290
 SUBAREA RUNOFF(CFS) =      0.48
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  522.50  DOWNSTREAM ELEVATION(FEET) =  517.90
 STREET LENGTH(FEET) =   460.00   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 =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.61
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.72
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
 STREET FLOW TRAVEL TIME(MIN.) =   4.45   Tc(MIN.) =   10.03
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.447
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.85
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.23

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.47
 FLOW VELOCITY(FEET/SEC.) =  1.94   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     520.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.03
 RAINFALL INTENSITY(INCH/HR) =   3.45
 TOTAL STREAM AREA(ACRES) =     1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.23

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   504.60
 FLOW LENGTH(FEET) =  1001.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.23
 PIPE TRAVEL TIME(MIN.) =   3.32    Tc(MIN.) =   13.34
 LONGEST FLOWPATH FROM NODE      0.00 TO NODE    104.00 =    1001.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    522.10
  DOWNSTREAM ELEVATION(FEET) =    521.50
  ELEVATION DIFFERENCE(FEET) =      0.60
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.346
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.38
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.38

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  521.50  DOWNSTREAM ELEVATION(FEET) =  520.59
  STREET LENGTH(FEET) =    91.00   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) =   0.0160
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.49
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =    4.18
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.860
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.70
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.44
  FLOW VELOCITY(FEET/SEC.) =  2.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    182.00 =     151.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   516.50  DOWNSTREAM(FEET) =   511.50
  FLOW LENGTH(FEET) =   497.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.08
 PIPE TRAVEL TIME(MIN.) =   1.86    Tc(MIN.) =    6.04
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.04
 RAINFALL INTENSITY(INCH/HR) =   4.20
 TOTAL STREAM AREA(ACRES) =     0.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.08

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        3.23    10.03        3.447          1.34
     2        2.08     6.04        4.202          0.55

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        4.03     6.04       4.202
     2        4.94    10.03       3.447

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.94   Tc(MIN.) =   10.03
 TOTAL AREA(ACRES) =        1.9
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    103.00 =     648.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   514.60  DOWNSTREAM(FEET) =   513.60
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.94
 PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.32
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    104.00 =     748.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.414
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7364
 SUBAREA AREA(ACRES) =    0.53   SUBAREA RUNOFF(CFS) =    1.27
 TOTAL AREA(ACRES) =        2.4   TOTAL RUNOFF(CFS) =       6.08
 TC(MIN.) =   10.32

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.60  DOWNSTREAM(FEET) =   511.80
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.08
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    106.00 =     928.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.359
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7238
  SUBAREA AREA(ACRES) =    1.28   SUBAREA RUNOFF(CFS) =    3.01
  TOTAL AREA(ACRES) =        3.7   TOTAL RUNOFF(CFS) =       8.99
  TC(MIN.) =   10.83

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   511.80  DOWNSTREAM(FEET) =   510.40
  FLOW LENGTH(FEET) =   136.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.99
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.18
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.18
  RAINFALL INTENSITY(INCH/HR) =   3.32
  TOTAL STREAM AREA(ACRES) =     3.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.99

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    520.20
  DOWNSTREAM ELEVATION(FEET) =    519.00
  ELEVATION DIFFERENCE(FEET) =      1.20
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
   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) =      0.12   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
 UPSTREAM ELEVATION(FEET) =  519.90  DOWNSTREAM ELEVATION(FEET) =  518.00
 STREET LENGTH(FEET) =   190.00   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) =   0.0160
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.03
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.81
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.76
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.46
 STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    6.22
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.168
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.31
 TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.66

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.56
 FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.58
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =     250.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   513.23  DOWNSTREAM(FEET) =   510.80
 FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.66
 PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    7.18
 LONGEST FLOWPATH FROM NODE    110.00 TO NODE    108.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.18
 RAINFALL INTENSITY(INCH/HR) =   3.99
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.66

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        8.99    11.18        3.320          3.70
     2        1.66     7.18        3.987          0.57

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

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        9.15     7.18       3.987
      2       10.38    11.18       3.320

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.38   Tc(MIN.) =   11.18
  TOTAL AREA(ACRES) =        4.3
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    108.00 =    1064.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   510.80  DOWNSTREAM(FEET) =   507.00
  FLOW LENGTH(FEET) =   252.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.38
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   11.72
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    109.00 =    1316.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    109.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.260
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7096
  SUBAREA AREA(ACRES) =    4.90   SUBAREA RUNOFF(CFS) =   11.18
  TOTAL AREA(ACRES) =        9.2   TOTAL RUNOFF(CFS) =      21.21
  TC(MIN.) =   11.72

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.72
  RAINFALL INTENSITY(INCH/HR) =   3.26
  TOTAL STREAM AREA(ACRES) =     9.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.21

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    521.20
  DOWNSTREAM ELEVATION(FEET) =    520.00
  ELEVATION DIFFERENCE(FEET) =      1.20
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.427
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.59
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.59

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    116.00 IS CODE =  62
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  520.00  DOWNSTREAM ELEVATION(FEET) =  513.80
  STREET LENGTH(FEET) =   620.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   3.66   Tc(MIN.) =    8.09
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.813
  *USER SPECIFIED(SUBAREA):
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.700
  SUBAREA AREA(ACRES) =    2.63      SUBAREA RUNOFF(CFS) =    7.02
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       7.53

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.85
  FLOW VELOCITY(FEET/SEC.) =  3.24   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    118.00 TO NODE    116.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.09
  RAINFALL INTENSITY(INCH/HR) =   3.81
  TOTAL STREAM AREA(ACRES) =     2.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.53

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.21    11.72        3.260          9.17
      2        7.53     8.09        3.813          2.82

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1       25.67     8.09        3.813
      2       27.65    11.72        3.260

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.65   Tc(MIN.) =   11.72
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    116.00 =    1316.50 FEET.

+----------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE DETAINED FLOW FROM THE STORAGE VAULT           |
|                                                                            |
```

Input for RatHydro to generate the inflow hydrograph

```
|                                                                              |
+------------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  23.44   RAIN INTENSITY(INCH/HOUR) =  2.29
  TOTAL AREA(ACRES) =    11.97   TOTAL RUNOFF(CFS) =     13.27

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   499.50  DOWNSTREAM(FEET) =   499.00
  FLOW LENGTH(FEET) =    82.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.27
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   23.67
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

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

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    517.00
  DOWNSTREAM ELEVATION(FEET) =    515.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.295
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    70.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  515.50  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   730.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 56.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  51.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.64
```

From detention analysis

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   5.33   Tc(MIN.) =    7.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.901
  *USER SPECIFIED(SUBAREA):
  LIMITED INDUSTRIAL RUNOFF COEFFICIENT = .9080
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.908
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.46
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.08
  FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    155.00 =     805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.70  DOWNSTREAM(FEET) =   500.85
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.82
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 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.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   3.80
  TOTAL STREAM AREA(ACRES) =     1.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.82

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    508.50
  DOWNSTREAM ELEVATION(FEET) =    507.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.479
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  505.00
  STREET LENGTH(FEET) =   100.00   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
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0160

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   0.64   Tc(MIN.) =    5.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.377
  *USER SPECIFIED(SUBAREA):
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7380
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.738
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.87
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.82
  FLOW VELOCITY(FEET/SEC.) =  2.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.12
  RAINFALL INTENSITY(INCH/HR) =   4.38
  TOTAL STREAM AREA(ACRES) =     0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.82     8.18        3.796          1.36
      2        3.20     5.12        4.377          0.99

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.21     5.12       4.377
      2        7.59     8.18       3.796

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.59   Tc(MIN.) =    8.18
  TOTAL AREA(ACRES) =        2.3
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    122.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.85  DOWNSTREAM(FEET) =   499.10
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =       7.59
 PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    8.74
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 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        7.59     8.74       3.690        2.35
 LONGEST FLOWPATH FROM NODE    152.00 TO NODE    150.00 =    1188.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       13.27    23.67       2.280       11.97
 LONGEST FLOWPATH FROM NODE    180.00 TO NODE    150.00 =    1398.50 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      12.49       8.74       3.690
     2      17.96      23.67       2.280

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      17.96   Tc(MIN.) =   23.67
 TOTAL AREA(ACRES) =       14.3

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| STARTING THE BASIN 200                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    521.20
 DOWNSTREAM ELEVATION(FEET) =    519.80
 ELEVATION DIFFERENCE(FEET) =      1.40
 URBAN SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.781
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.400
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.74
 TOTAL AREA(ACRES) =      0.24   TOTAL RUNOFF(CFS) =      0.74

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.80  DOWNSTREAM(FEET) =   514.00
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.29
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.74
 PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =    5.69
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     250.00 FEET.

+----------------------------------------------------------------------------+
| THE FOLLOWING CODE 8 IS FOR THE CAMERCIAL AREA                             |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.268
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (24. DU/AC OR LESS) RUNOFF COEFFICIENT = .8500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7857
 SUBAREA AREA(ACRES) =    0.32   SUBAREA RUNOFF(CFS) =    1.16
 TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.88
 TC(MIN.) =    5.69

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.268
 *USER SPECIFIED(SUBAREA):
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7500
 SUBAREA AREA(ACRES) =    0.05   SUBAREA RUNOFF(CFS) =    0.07
 TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.95
 TC(MIN.) =    5.69

+----------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE DETAINED FLOW FROM BASIN BF-1-2                |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =  10.40   RAIN INTENSITY(INCH/HOUR) =  3.41
 TOTAL AREA(ACRES) =     0.63   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   512.30  DOWNSTREAM(FEET) =   510.30
 FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.60
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.60
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   11.00
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     380.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  10
----------------------------------------------------------------------------
```

Input for RatHydro to generate the inflow hydrograph

From detention analysis

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
================================================================================

+------------------------------------------------------------------------------+
| THE FOLLOWING CODE 7 IS THE FLOW FROM THE STORM DRAIN WEST OF EMERALD         |
| CREST PER THE DRAINAGE REPORT FOR PA-16                                      |
|                                                                              |
+------------------------------------------------------------------------------+

********************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     72.00 IS CODE =   7
--------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
================================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =  15.46   RAIN INTENSITY(INCH/HOUR) =  2.86
  TOTAL AREA(ACRES) =     9.54   TOTAL RUNOFF(CFS) =     19.97

********************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE    210.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.16  DOWNSTREAM(FEET) =   510.01
  FLOW LENGTH(FEET) =   504.88   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.97
  PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =   16.74
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     884.88 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    210.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.761
  *USER SPECIFIED(SUBAREA):
  OFFICE PROFESSIONAL/COMMERCIAL RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.7421
  SUBAREA AREA(ACRES) =    1.81   SUBAREA RUNOFF(CFS) =    4.00
  TOTAL AREA(ACRES) =       11.4   TOTAL RUNOFF(CFS) =      23.25
  TC(MIN.) =   16.74

********************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  11
--------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       23.25    16.74       2.761       11.35
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     884.88 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.60    11.00       3.340        0.63
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    210.00 =     380.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      15.88      11.00        3.340
      2      23.75      16.74        2.761

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.75   Tc(MIN.) =   16.74
```

```
 TOTAL AREA(ACRES) =       12.0

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE     76.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   510.01  DOWNSTREAM(FEET) =   509.00
 FLOW LENGTH(FEET) =   107.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.03
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.75
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   16.96
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE     76.00 =     991.88 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     76.00 TO NODE     76.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.743
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7280
 SUBAREA AREA(ACRES) =    0.55   SUBAREA RUNOFF(CFS) =    1.43
 TOTAL AREA(ACRES) =       12.5   TOTAL RUNOFF(CFS) =      25.02
 TC(MIN.) =   16.96

****************************************************************************
 FLOW PROCESS FROM NODE     76.00 TO NODE     78.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.61  DOWNSTREAM(FEET) =   508.52
 FLOW LENGTH(FEET) =     8.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.71
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.02
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   16.98
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE     78.00 =     999.88 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     78.00 TO NODE     78.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.742
 *USER SPECIFIED(SUBAREA):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .9500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.7358
 SUBAREA AREA(ACRES) =    0.46   SUBAREA RUNOFF(CFS) =    1.20
 TOTAL AREA(ACRES) =       13.0   TOTAL RUNOFF(CFS) =      26.21
 TC(MIN.) =   16.98
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       13.0  TC(MIN.) =     16.98
 PEAK FLOW RATE(CFS)   =      26.21
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Mitigated Flow at Node 78

Appendix 4 – Detention Analysis

HMP-1 Discharge

Discharge vs Elevation Table

Low orifice:	2.5 "	Top orifice:	2.5 "		
Number:	1	Number:	5		
Cg-low:	0.61	Cg-low:	0.61		
invert elev:	0.00 ft	invert elev:	4.20 ft		
Middle orifice:	2.5 "	Emergency inlet1:		Emergency inlet2:	
number of orif:	7	Invert:	6.00 ft	Invert:	6.10 ft
Cg-middle:	0.61	Diameter	0.5 ft	Diameter	1.5 ft
invert elev:	3.90 ft	Circumferenc	1.570796 ft	Circumferenc	4.712388 ft

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-top -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Qemerg (cfs)	Qtot (cfs)	Qemerg (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000
0.02	0.10	0.00	0.00	0.00	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.0006
0.04	0.19	0.00	0.00	0.00	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.0024
0.06	0.29	0.00	0.00	0.00	0.000	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.0053
0.08	0.38	0.00	0.00	0.00	0.000	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.0092
0.10	0.48	0.00	0.00	0.00	0.000	0.014	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.0141
0.12	0.58	0.00	0.00	0.00	0.021	0.020	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.000	0.0197
0.14	0.67	0.00	0.00	0.00	0.032	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.0261
0.16	0.77	0.00	0.00	0.00	0.039	0.033	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.000	0.0330
0.17	0.82	0.00	0.00	0.00	0.043	0.037	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	0.000	0.0366
0.18	0.86	0.00	0.00	0.00	0.046	0.040	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.000	0.0404
0.20	0.96	0.00	0.00	0.00	0.052	0.048	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.000	0.0482
0.22	1.06	0.00	0.00	0.00	0.057	0.056	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.056	0.000	0.0561
0.24	1.15	0.00	0.00	0.00	0.062	0.064	0.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.062	0.000	0.0615
0.26	1.25	0.00	0.00	0.00	0.066	0.072	0.066	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.066	0.000	0.0659
0.28	1.34	0.00	0.00	0.00	0.070	0.080	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.070	0.000	0.0700
0.30	1.44	0.00	0.00	0.00	0.074	0.088	0.074	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.074	0.000	0.0738
0.32	1.54	0.00	0.00	0.00	0.078	0.095	0.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.078	0.000	0.0775
0.33	1.60	0.00	0.00	0.00	0.080	0.100	0.080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.000	0.0799
0.34	1.63	0.00	0.00	0.00	0.081	0.102	0.081	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081	0.000	0.0810
0.36	1.73	0.00	0.00	0.00	0.084	0.109	0.084	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.084	0.000	0.0844
0.38	1.82	0.00	0.00	0.00	0.088	0.115	0.088	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.088	0.000	0.0876
0.40	1.92	0.00	0.00	0.00	0.091	0.120	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091	0.000	0.0908
0.42	2.02	0.00	0.00	0.00	0.094	0.125	0.094	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.000	0.0938
0.44	2.11	0.00	0.00	0.00	0.097	0.129	0.097	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.097	0.000	0.0967
0.46	2.21	0.00	0.00	0.00	0.100	0.132	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.0995
0.48	2.30	0.00	0.00	0.00	0.102	0.134	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.000	0.1023
0.50	2.40	0.00	0.00	0.00	0.105	0.136	0.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.105	0.000	0.1050
0.52	2.50	0.00	0.00	0.00	0.108	0.138	0.108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.108	0.000	0.1076
0.54	2.59	0.00	0.00	0.00	0.110	0.139	0.110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.110	0.000	0.1102
0.56	2.69	0.00	0.00	0.00	0.113	0.139	0.113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.113	0.000	0.1127
0.58	2.78	0.00	0.00	0.00	0.115	0.139	0.115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115	0.000	0.1151
0.60	2.88	0.00	0.00	0.00	0.118	0.139	0.118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.118	0.000	0.1175
0.62	2.98	0.00	0.00	0.00	0.120	0.140	0.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.120	0.000	0.1198
0.64	3.07	0.00	0.00	0.00	0.122	0.140	0.122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.122	0.000	0.1222
0.66	3.17	0.00	0.00	0.00	0.124	0.142	0.124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.000	0.1244
0.67	3.22	0.00	0.00	0.00	0.126	0.143	0.126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.000	0.1255
0.68	3.26	0.00	0.00	0.00	0.127	0.144	0.127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.127	0.000	0.1266
0.70	3.36	0.00	0.00	0.00	0.129	0.147	0.129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.129	0.000	0.1288
0.72	3.46	0.00	0.00	0.00	0.131	0.152	0.131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.131	0.000	0.1310
0.74	3.55	0.00	0.00	0.00	0.133	0.159	0.133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.133	0.000	0.1331
0.76	3.65	0.00	0.00	0.00	0.135	0.169	0.135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.135	0.000	0.1351
0.78	3.74	0.00	0.00	0.00	0.137	0.181	0.137	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.000	0.1372
0.80	3.84	0.00	0.00	0.00	0.139	0.198	0.139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.139	0.000	0.1392
0.82	3.94	0.00	0.00	0.00	0.141	0.218	0.141	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.141	0.000	0.1412
0.83	4.00	0.00	0.00	0.00	0.142	0.234	0.142	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.142	0.000	0.1425
0.84	4.03	0.00	0.00	0.00	0.143	0.243	0.143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.143	0.000	0.1431
0.86	4.13	0.00	0.00	0.00	0.145	0.273	0.145	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.145	0.000	0.1451

0.88	4.22	0.00	0.00	0.00	0.147	0.310	0.147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.147	0.000	0.1470
0.90	4.32	0.00	0.00	0.00	0.149	0.354	0.149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.149	0.000	0.1489
0.92	4.42	0.00	0.00	0.00	0.151	0.405	0.151	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.151	0.000	0.1507
0.94	4.51	0.00	0.00	0.14	0.153	0.465	0.153	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.153	0.000	0.1526
0.96	4.61	0.00	0.00	1.30	0.154	0.535	0.154	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.154	0.000	0.1544
0.98	4.70	0.00	0.00	2.45	0.156	0.616	0.156	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.156	0.000	0.1562
1.00	4.80	0.00	0.00	3.60	0.158	0.708	0.158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.158	0.000	0.1579
1.02	4.90	0.00	0.00	4.75	0.160	0.813	0.160	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.160	0.000	0.1597
1.04	4.99	0.00	0.00	5.90	0.161	0.932	0.161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.161	0.000	0.1614
1.06	5.09	0.00	0.00	7.06	0.163	1.067	0.163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.163	0.000	0.1631
1.08	5.18	0.00	0.00	8.21	0.165	1.219	0.165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.165	0.000	0.1648
1.10	5.28	0.00	0.00	9.36	0.167	1.388	0.167	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.167	0.000	0.1665
1.12	5.38	0.00	0.00	10.51	0.168	1.577	0.168	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.168	0.000	0.1682
1.14	5.47	0.00	0.00	11.66	0.170	1.787	0.170	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.170	0.000	0.1698
1.16	5.57	0.00	0.00	12.82	0.171	2.020	0.171	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.171	0.000	0.1715
1.17	5.60	0.00	0.00	13.20	0.172	2.103	0.172	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.172	0.000	0.1720
1.18	5.66	0.00	0.00	13.97	0.173	2.278	0.173	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.173	0.000	0.1731
1.20	5.76	0.00	0.00	15.12	0.175	2.561	0.175	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.000	0.1747
1.22	5.86	0.00	0.00	16.27	0.176	2.873	0.176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.176	0.000	0.1763
1.24	5.95	0.00	0.00	17.42	0.178	3.214	0.178	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.178	0.000	0.1778
1.26	6.05	0.00	0.00	18.58	0.179	3.588	0.179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.179	0.000	0.1794
1.28	6.14	0.00	0.00	19.73	0.181	3.995	0.181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.181	0.000	0.1809
1.30	6.24	0.00	0.00	20.88	0.182	4.439	0.182	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.000	0.1825
1.32	6.34	0.00	0.00	22.03	0.184	4.921	0.184	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.184	0.000	0.1840
1.33	6.40	0.00	0.00	22.80	0.185	5.265	0.185	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.185	0.000	0.1850
1.34	6.43	0.00	0.00	23.18	0.186	5.444	0.186	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.186	0.000	0.1855
1.36	6.53	0.00	0.00	24.34	0.187	6.010	0.187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.187	0.000	0.1870
1.38	6.62	0.00	0.00	25.49	0.188	6.622	0.188	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.000	0.1885
1.40	6.72	0.00	0.00	26.64	0.190	7.282	0.190	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.190	0.000	0.1900
1.42	6.82	0.00	0.00	27.79	0.191	7.993	0.191	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.000	0.1914
1.44	6.91	0.00	0.00	28.94	0.193	8.758	0.193	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.193	0.000	0.1929
1.46	7.01	0.00	0.00	30.10	0.194	9.579	0.194	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.194	0.000	0.1943
1.48	7.10	0.00	0.00	31.25	0.196	10.461	0.196	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.196	0.000	0.1957
1.50	7.20	0.00	0.00	32.40	0.197	11.405	0.197	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.197	0.000	0.1972
1.52	7.30	0.00	0.00	33.55	0.199	12.415	0.199	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.199	0.000	0.1986
1.54	7.39	0.00	0.00	34.70	0.200	13.494	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.000	0.2000
1.56	7.49	0.00	0.00	35.86	0.201	14.646	0.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.000	0.2013
1.58	7.58	0.00	0.00	37.01	0.203	15.874	0.203	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.203	0.000	0.2027
1.60	7.68	0.00	0.00	38.16	0.204	17.181	0.204	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.204	0.000	0.2041
1.62	7.78	0.00	0.00	39.31	0.205	18.572	0.205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.205	0.000	0.2054
1.64	7.87	0.00	0.00	40.46	0.207	20.051	0.207	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.207	0.000	0.2068
1.66	7.97	0.00	0.00	41.62	0.208	21.620	0.208	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.208	0.000	0.2081
1.67	8.00	0.00	0.00	42.00	0.209	22.164	0.209	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.2086
1.68	8.06	0.00	0.00	42.77	0.209	23.285	0.209	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.000	0.2095
1.70	8.16	0.00	0.00	43.92	0.211	25.049	0.211	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.211	0.000	0.2108
1.72	8.26	0.00	0.00	45.07	0.212	26.917	0.212	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.212	0.000	0.2121
1.74	8.35	0.00	0.00	46.22	0.213	28.893	0.213	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.213	0.000	0.2134
1.76	8.45	0.00	0.00	47.38	0.215	30.981	0.215	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.215	0.000	0.2147
1.78	8.54	0.00	0.00	48.53	0.216	33.187	0.216	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.216	0.000	0.2160
1.80	8.64	0.00	0.00	49.68	0.217	35.514	0.217	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.217	0.000	0.2173
1.82	8.74	0.00	0.00	50.83	0.219	37.969	0.219	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.219	0.000	0.2186
1.83	8.80	0.00	0.00	51.60	0.219	39.678	0.219	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.219	0.000	0.2194
1.84	8.83	0.00	0.00	51.98	0.220	40.555	0.220	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.220	0.000	0.2199
1.86	8.93	0.00	0.00	53.14	0.221	43.278	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.221	0.000	0.2211
1.88	9.02	0.00	0.00	54.29	0.222	46.144	0.222	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.222	0.000	0.2224
1.90	9.12	0.00	0.00	55.44	0.224	49.157	0.224	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.224	0.000	0.2236
1.92	9.22	0.00	0.00	56.59	0.225	52.323	0.225	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.000	0.2249
1.94	9.31	0.00	0.00	57.74	0.226	55.648	0.226	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.226	0.000	0.2261
1.96	9.41	0.00	0.00	58.90	0.227	59.138	0.227	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.227	0.000	0.2273
1.98	9.50	0.00	0.00	60.05	0.229	62.798	0.229	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.000	0.2285
2.00	9.60	0.00	0.00	61.20	0.230	66.635	0.230	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.230	0.000	0.2298
2.02	9.70	0.00	0.00	62.35	0.231	70.654	0.231	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.231	0.000	0.2310
2.04	9.79	0.00	0.00	63.50	0.232	74.863	0.232	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.232	0.000	0.2322
2.06	9.89	0.00	0.00	64.66	0.233	79.267	0.233	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.233	0.000	0.2334

2.08	9.98	0.00	0.00	65.81	0.235	83.873	0.235	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.235	0.000	0.2346
2.10	10.08	0.00	0.00	66.96	0.236	88.689	0.236	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.236	0.000	0.2357
2.12	10.18	0.00	0.00	68.11	0.237	93.720	0.237	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.237	0.000	0.2369
2.14	10.27	0.00	0.00	69.26	0.238	98.975	0.238	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.238	0.000	0.2381
2.16	10.37	0.00	0.00	70.42	0.239	104.459	0.239	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.239	0.000	0.2393
2.17	10.40	0.00	0.00	70.80	0.240	106.340	0.240	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.240	0.000	0.2396
2.18	10.46	0.00	0.00	71.57	0.240	110.182	0.240	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.240	0.000	0.2404
2.20	10.56	0.00	0.00	72.72	0.242	116.149	0.242	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.242	0.000	0.2416
2.22	10.66	0.00	0.00	73.87	0.243	122.369	0.243	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.243	0.000	0.2427
2.24	10.75	0.00	0.00	75.02	0.244	128.850	0.244	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.244	0.000	0.2439
2.26	10.85	0.00	0.00	76.18	0.245	135.600	0.245	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.245	0.000	0.2450
2.28	10.94	0.00	0.00	77.33	0.246	142.626	0.246	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.246	0.000	0.2461
2.30	11.04	0.00	0.00	78.48	0.247	149.937	0.247	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.247	0.000	0.2473
2.32	11.14	0.00	0.00	79.63	0.248	157.542	0.248	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.248	0.000	0.2484
2.33	11.20	0.00	0.00	80.40	0.249	162.779	0.249	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.249	0.000	0.2491
2.34	11.23	0.00	0.00	80.78	0.250	165.449	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.2495
2.36	11.33	0.00	0.00	81.94	0.251	173.668	0.251	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.000	0.2506
2.38	11.42	0.00	0.00	83.09	0.252	182.206	0.252	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.252	0.000	0.2517
2.40	11.52	0.00	0.00	84.24	0.253	191.073	0.253	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.253	0.000	0.2528
2.42	11.62	0.00	0.00	85.39	0.254	200.279	0.254	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.254	0.000	0.2539
2.44	11.71	0.00	0.00	86.54	0.255	209.833	0.255	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.255	0.000	0.2550
2.46	11.81	0.00	0.00	87.70	0.256	219.744	0.256	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.256	0.000	0.2561
2.48	11.90	0.00	0.00	88.85	0.257	230.023	0.257	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.257	0.000	0.2572
2.50	12.00	0.00	0.00	90.00	0.258	240.680	0.258	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.258	0.000	0.2583
2.52	12.10	0.00	0.00	91.15	0.259	251.724	0.259	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.259	0.000	0.2594
2.54	12.19	0.00	0.00	92.30	0.260	263.166	0.260	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.260	0.000	0.2604
2.56	12.29	0.00	0.00	93.46	0.262	275.017	0.262	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.262	0.000	0.2615
2.58	12.38	0.00	0.00	94.61	0.263	287.287	0.263	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.263	0.000	0.2626
2.60	12.48	0.00	0.00	95.76	0.264	299.987	0.264	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.264	0.000	0.2636
2.62	12.58	0.00	0.00	96.91	0.265	313.128	0.265	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.265	0.000	0.2647
2.64	12.67	0.00	0.00	98.06	0.266	326.722	0.266	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.266	0.000	0.2657
2.66	12.77	0.00	0.00	99.22	0.267	340.781	0.267	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.267	0.000	0.2668
2.67	12.80	0.00	0.00	99.60	0.267	345.572	0.267	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.267	0.000	0.2671
2.68	12.86	0.00	0.00	100.37	0.268	355.315	0.268	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.268	0.000	0.2678
2.70	12.96	0.00	0.00	101.52	0.269	370.337	0.269	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.269	0.000	0.2689
2.72	13.06	0.00	0.00	102.67	0.270	385.858	0.270	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.270	0.000	0.2699
2.74	13.15	0.00	0.00	103.82	0.271	401.891	0.271	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.271	0.000	0.2709
2.76	13.25	0.00	0.00	104.98	0.272	418.449	0.272	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.272	0.000	0.2719
2.78	13.34	0.00	0.00	106.13	0.273	435.544	0.273	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.273	0.000	0.2730
2.80	13.44	0.00	0.00	107.28	0.274	453.189	0.274	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.274	0.000	0.2740
2.82	13.54	0.00	0.00	108.43	0.275	471.396	0.275	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.275	0.000	0.2750
2.83	13.60	0.00	0.00	109.20	0.276	483.854	0.276	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.276	0.000	0.2757
2.84	13.63	0.00	0.00	109.58	0.276	490.180	0.276	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.276	0.000	0.2760
2.86	13.73	0.00	0.00	110.74	0.277	509.553	0.277	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.277	0.000	0.2770
2.88	13.82	0.00	0.00	111.89	0.278	529.530	0.278	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.278	0.000	0.2780
2.90	13.92	0.00	0.00	113.04	0.279	550.124	0.279	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.279	0.000	0.2790
2.92	14.02	0.00	0.00	114.19	0.280	571.349	0.280	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.280	0.000	0.2800
2.94	14.11	0.00	0.00	115.34	0.281	593.220	0.281	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.281	0.000	0.2810
2.96	14.21	0.00	0.00	116.50	0.282	615.751	0.282	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.282	0.000	0.2820
2.98	14.30	0.00	0.00	117.65	0.283	638.957	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.283	0.000	0.2830
3.00	14.40	0.00	0.00	118.80	0.284	662.852	0.284	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.284	0.000	0.2840
3.02	14.50	0.00	0.00	119.95	0.285	687.452	0.285	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.285	0.000	0.2849
3.04	14.59	0.00	0.00	121.10	0.286	712.772	0.286	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.286	0.000	0.2859
3.06	14.69	0.00	0.00	122.26	0.287	738.828	0.287	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.287	0.000	0.2869
3.08	14.78	0.00	0.00	123.41	0.288	765.636	0.288	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.288	0.000	0.2879
3.10	14.88	0.00	0.00	124.56	0.289	793.211	0.289	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.289	0.000	0.2888
3.12	14.98	0.00	0.00	125.71	0.290	821.571	0.290	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.290	0.000	0.2898
3.14	15.07	0.00	0.00	126.86	0.291	850.730	0.291	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.291	0.000	0.2907
3.16	15.17	0.00	0.00	128.02	0.292	880.707	0.292	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.292	0.000	0.2917
3.17	15.20	0.00	0.00	128.40	0.292	890.883	0.292	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.292	0.000	0.2920
3.18	15.26	0.00	0.00	129.17	0.293	911.517	0.293	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.293	0.000	0.2927
3.20	15.36	0.00	0.00	130.32	0.294	943.179	0.294	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.294	0.000	0.2936
3.22	15.46	0.00	0.00	131.47	0.295	975.710	0.295	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.295	0.000	0.2946
3.24	15.55	0.00	0.00	132.62	0.295	1009.126	0.295	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.295	0.000	0.2955

3.26	15.65	0.00	0.00	133.78	0.296	1043.447	0.296	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.296	0.000	0.2964
3.28	15.74	0.00	0.00	134.93	0.297	1078.690	0.297	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.297	0.000	0.2974
3.30	15.84	0.00	0.00	136.08	0.298	1114.874	0.298	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.298	0.000	0.2983
3.32	15.94	0.00	0.00	137.23	0.299	1152.016	0.299	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.299	0.000	0.2992
3.33	16.00	0.00	0.00	138.00	0.300	1177.320	0.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.2999
3.34	16.03	0.00	0.00	138.38	0.300	1190.137	0.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.300	0.000	0.3002
3.36	16.13	0.00	0.00	139.54	0.301	1229.255	0.301	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.301	0.000	0.3011
3.38	16.22	0.00	0.00	140.69	0.302	1269.389	0.302	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.302	0.000	0.3020
3.40	16.32	0.00	0.00	141.84	0.303	1310.559	0.303	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.303	0.000	0.3029
3.42	16.42	0.00	0.00	142.99	0.304	1352.784	0.304	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.000	0.3039
3.44	16.51	0.00	0.00	144.14	0.305	1396.086	0.305	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.305	0.000	0.3048
3.46	16.61	0.00	0.00	145.30	0.306	1440.483	0.306	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.306	0.000	0.3057
3.48	16.70	0.00	0.00	146.45	0.307	1485.998	0.307	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.307	0.000	0.3066
3.50	16.80	0.00	0.00	147.60	0.308	1532.649	0.308	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.308	0.000	0.3075
3.52	16.90	0.00	0.00	148.75	0.308	1580.460	0.308	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.308	0.000	0.3084
3.54	16.99	0.00	0.00	149.90	0.309	1629.450	0.309	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.309	0.000	0.3093
3.56	17.09	0.00	0.00	151.06	0.310	1679.642	0.310	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.310	0.000	0.3102
3.58	17.18	0.00	0.00	152.21	0.311	1731.057	0.311	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.311	0.000	0.3111
3.60	17.28	0.00	0.00	153.36	0.312	1783.717	0.312	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.312	0.000	0.3120
3.62	17.38	0.00	0.00	154.51	0.313	1837.645	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.313	0.000	0.3129
3.64	17.47	0.00	0.00	155.66	0.314	1892.864	0.314	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.314	0.000	0.3138
3.66	17.57	0.00	0.00	156.82	0.315	1949.396	0.315	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.315	0.000	0.3147
3.67	17.60	0.00	0.00	157.20	0.315	1968.536	0.315	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.315	0.000	0.3150
3.68	17.66	0.00	0.00	157.97	0.316	2007.265	0.316	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.316	0.000	0.3156
3.70	17.76	0.00	0.00	159.12	0.316	2066.494	0.316	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.316	0.000	0.3164
3.72	17.86	0.00	0.00	160.27	0.317	2127.106	0.317	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.317	0.000	0.3173
3.74	17.95	0.00	0.00	161.42	0.318	2189.127	0.318	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.318	0.000	0.3182
3.76	18.05	0.00	0.00	162.58	0.319	2252.579	0.319	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.319	0.000	0.3191
3.78	18.14	0.00	0.00	163.73	0.320	2317.488	0.320	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.320	0.000	0.3199
3.80	18.24	0.00	0.00	164.88	0.321	2383.878	0.321	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.321	0.000	0.3208
3.82	18.34	0.00	0.00	166.03	0.322	2451.774	0.322	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.322	0.000	0.3217
3.83	18.40	0.00	0.00	166.80	0.322	2497.888	0.322	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.322	0.000	0.3222
3.84	18.43	0.00	0.00	167.18	0.323	2521.202	0.323	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.323	0.000	0.3225
3.86	18.53	0.00	0.00	168.34	0.323	2592.188	0.323	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.323	0.000	0.3234
3.88	18.62	0.00	0.00	169.49	0.324	2664.757	0.324	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.324	0.000	0.3243
3.90	18.72	0.00	0.00	170.64	0.325	2738.936	0.325	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.325	0.000	0.3251
3.92	18.82	0.10	0.00	171.79	0.326	2814.751	0.326	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.330	0.000	0.3304
3.94	18.91	0.19	0.00	172.94	0.327	2892.229	0.327	0.000	0.017	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.344	0.000	0.3438
3.96	19.01	0.29	0.00	174.10	0.328	2971.397	0.328	0.000	0.037	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.365	0.000	0.3650
3.98	19.10	0.38	0.00	175.25	0.329	3052.283	0.329	0.000	0.065	0.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.393	0.000	0.3932
4.00	19.20	0.48	0.00	176.40	0.329	3134.913	0.329	0.000	0.099	0.099	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.428	0.000	0.4279
4.02	19.30	0.58	0.00	177.55	0.330	3219.317	0.330	0.147	0.138	0.138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.468	0.000	0.4682
4.04	19.39	0.67	0.00	178.70	0.331	3305.522	0.331	0.221	0.182	0.182	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.513	0.000	0.5135
4.06	19.49	0.77	0.00	179.86	0.332	3393.557	0.332	0.276	0.231	0.231	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.563	0.000	0.5629
4.08	19.58	0.86	0.00	181.01	0.333	3483.450	0.333	0.322	0.283	0.283	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.616	0.000	0.6155
4.10	19.68	0.96	0.00	182.16	0.334	3575.232	0.334	0.362	0.337	0.337	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.671	0.000	0.6706
4.12	19.78	1.06	0.00	183.31	0.334	3668.931	0.334	0.398	0.393	0.393	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.727	0.000	0.7273
4.14	19.87	1.15	0.00	184.46	0.335	3764.578	0.335	0.431	0.450	0.431	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.766	0.000	0.7657
4.16	19.97	1.25	0.00	185.62	0.336	3862.201	0.336	0.461	0.506	0.461	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.797	0.000	0.7972
4.17	20.00	1.28	0.00	186.00	0.336	3895.187	0.336	0.471	0.525	0.471	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.807	0.000	0.8072
4.18	20.06	1.34	0.00	186.77	0.337	3961.833	0.337	0.490	0.562	0.490	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.827	0.000	0.8267
4.20	20.16	1.44	0.00	187.92	0.338	4063.502	0.338	0.517	0.616	0.517	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.855	0.000	0.8546
4.22	20.26	1.54	0.10	189.07	0.339	4167.241	0.339	0.543	0.668	0.543	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.884	0.000	0.8843
4.24	20.35	1.63	0.19	190.22	0.339	4273.081	0.339	0.567	0.716	0.567	0.000	0.012	0.012	0.000	0.000	0.000	0.000	0.919	0.000	0.9188
4.26	20.45	1.73	0.29	191.38	0.340	4381.053	0.340	0.591	0.762	0.591	0.000	0.027	0.027	0.000	0.000	0.000	0.000	0.958	0.000	0.9576
4.28	20.54	1.82	0.38	192.53	0.341	4491.189	0.341	0.613	0.803	0.613	0.000	0.046	0.046	0.000	0.000	0.000	0.000	1.001	0.000	1.0007
4.30	20.64	1.92	0.48	193.68	0.342	4603.522	0.342	0.635	0.840	0.635	0.000	0.070	0.070	0.000	0.000	0.000	0.000	1.048	0.000	1.0475
4.32	20.74	2.02	0.58	194.83	0.343	4718.083	0.343	0.656	0.872	0.656	0.105	0.099	0.099	0.000	0.000	0.000	0.000	1.098	0.000	1.0977
4.33	20.80	2.08	0.64	195.60	0.343	4795.713	0.343	0.670	0.891	0.670	0.142	0.119	0.119	0.000	0.000	0.000	0.000	1.133	0.000	1.1327
4.34	20.83	2.11	0.67	195.98	0.343	4834.907	0.343	0.677	0.900	0.677	0.158	0.130	0.130	0.000	0.000	0.000	0.000	1.151	0.000	1.1507
4.36	20.93	2.21	0.77	197.14	0.344	4954.026	0.344	0.697	0.923	0.697	0.197	0.165	0.165	0.000	0.000	0.000	0.000	1.206	0.000	1.2060
4.38	21.02	2.30	0.86	198.29	0.345	5075.474	0.345	0.716	0.941	0.716	0.230	0.202	0.202	0.000	0.000	0.000	0.000	1.263	0.000	1.2632
4.40	21.12	2.40	0.96	199.44	0.346	5199.284	0.346	0.735	0.954	0.735	0.258	0.241	0.241	0.000	0.000	0.000	0.000	1.322	0.000	1.3215
4.42	21.22	2.50	1.06	200.59	0.347	5325.491	0.347	0.753	0.964	0.753	0.284	0.281	0.281	0.000	0.000	0.000	0.000	1.381	0.000	1.3806

4.44	21.31	2.59	1.15	201.74	0.347	5454.130	0.347	0.771	0.970	0.771	0.308	0.321	0.308	0.000	0.000	0.000	0.000	1.426	0.000	1.4261
4.46	21.41	2.69	1.25	202.90	0.348	5585.234	0.348	0.789	0.973	0.789	0.329	0.361	0.329	0.000	0.000	0.000	0.000	1.466	0.000	1.4663
4.48	21.50	2.78	1.34	204.05	0.349	5718.840	0.349	0.806	0.975	0.806	0.350	0.401	0.350	0.000	0.000	0.000	0.000	1.505	0.000	1.5047
4.50	21.60	2.88	1.44	205.20	0.350	5854.983	0.350	0.823	0.976	0.823	0.369	0.440	0.369	0.000	0.000	0.000	0.000	1.542	0.000	1.5416
4.52	21.70	2.98	1.54	206.35	0.351	5993.698	0.351	0.839	0.978	0.839	0.388	0.477	0.388	0.000	0.000	0.000	0.000	1.577	0.000	1.5772
4.54	21.79	3.07	1.63	207.50	0.351	6135.022	0.351	0.855	0.983	0.855	0.405	0.512	0.405	0.000	0.000	0.000	0.000	1.612	0.000	1.6117
4.56	21.89	3.17	1.73	208.66	0.352	6278.992	0.352	0.871	0.991	0.871	0.422	0.544	0.422	0.000	0.000	0.000	0.000	1.645	0.000	1.6451
4.58	21.98	3.26	1.82	209.81	0.353	6425.643	0.353	0.886	1.006	0.886	0.438	0.574	0.438	0.000	0.000	0.000	0.000	1.678	0.000	1.6776
4.60	22.08	3.36	1.92	210.96	0.354	6575.014	0.354	0.902	1.030	0.902	0.454	0.600	0.454	0.000	0.000	0.000	0.000	1.709	0.000	1.7093
4.62	22.18	3.46	2.02	212.11	0.355	6727.143	0.355	0.917	1.066	0.917	0.469	0.623	0.469	0.000	0.000	0.000	0.000	1.740	0.000	1.7402
4.64	22.27	3.55	2.11	213.26	0.355	6882.065	0.355	0.931	1.115	0.931	0.484	0.643	0.484	0.000	0.000	0.000	0.000	1.770	0.000	1.7703
4.66	22.37	3.65	2.21	214.42	0.356	7039.821	0.356	0.946	1.182	0.946	0.498	0.659	0.498	0.000	0.000	0.000	0.000	1.800	0.000	1.7998
4.67	22.40	3.68	2.24	214.80	0.356	7093.043	0.356	0.951	1.209	0.951	0.502	0.664	0.502	0.000	0.000	0.000	0.000	1.810	0.000	1.8095
4.68	22.46	3.74	2.30	215.57	0.357	7200.449	0.357	0.960	1.270	0.960	0.512	0.672	0.512	0.000	0.000	0.000	0.000	1.829	0.000	1.8287
4.70	22.56	3.84	2.40	216.72	0.358	7363.986	0.358	0.974	1.383	0.974	0.525	0.682	0.525	0.000	0.000	0.000	0.000	1.857	0.000	1.8571
4.72	22.66	3.94	2.50	217.87	0.359	7530.474	0.359	0.988	1.525	0.988	0.538	0.688	0.538	0.000	0.000	0.000	0.000	1.885	0.000	1.8848
4.74	22.75	4.03	2.59	219.02	0.359	7699.951	0.359	1.002	1.700	1.002	0.551	0.693	0.551	0.000	0.000	0.000	0.000	1.912	0.000	1.9121
4.76	22.85	4.13	2.69	220.18	0.360	7872.457	0.360	1.016	1.913	1.016	0.563	0.695	0.563	0.000	0.000	0.000	0.000	1.939	0.000	1.9389
4.78	22.94	4.22	2.78	221.33	0.361	8048.033	0.361	1.029	2.169	1.029	0.576	0.696	0.576	0.000	0.000	0.000	0.000	1.965	0.000	1.9653
4.80	23.04	4.32	2.88	222.48	0.362	8226.720	0.362	1.042	2.475	1.042	0.588	0.697	0.588	0.000	0.000	0.000	0.000	1.991	0.000	1.9912
4.82	23.14	4.42	2.98	223.63	0.362	8408.557	0.362	1.055	2.835	1.055	0.599	0.699	0.599	0.000	0.000	0.000	0.000	2.017	0.000	2.0167
4.83	23.20	4.48	3.04	224.40	0.363	8531.553	0.363	1.064	3.108	1.064	0.607	0.700	0.607	0.000	0.000	0.000	0.000	2.033	0.000	2.0335
4.84	23.23	4.51	3.07	224.78	0.363	8593.587	0.363	1.068	3.256	1.068	0.611	0.702	0.611	0.000	0.000	0.000	0.000	2.042	0.000	2.0418
4.86	23.33	4.61	3.17	225.94	0.364	8781.852	0.364	1.081	3.745	1.081	0.622	0.708	0.622	0.000	0.000	0.000	0.000	2.067	0.000	2.0666
4.88	23.42	4.70	3.26	227.09	0.365	8973.393	0.365	1.093	4.309	1.093	0.633	0.719	0.633	0.000	0.000	0.000	0.000	2.091	0.000	2.0910
4.90	23.52	4.80	3.36	228.24	0.365	9168.254	0.365	1.106	4.955	1.106	0.644	0.736	0.644	0.000	0.000	0.000	0.000	2.115	0.000	2.1151
4.92	23.62	4.90	3.46	229.39	0.366	9366.476	0.366	1.118	5.692	1.118	0.655	0.761	0.655	0.000	0.000	0.000	0.000	2.139	0.000	2.1388
4.94	23.71	4.99	3.55	230.54	0.367	9568.103	0.367	1.130	6.527	1.130	0.665	0.797	0.665	0.000	0.000	0.000	0.000	2.162	0.000	2.1623
4.96	23.81	5.09	3.65	231.70	0.368	9773.179	0.368	1.142	7.470	1.142	0.676	0.844	0.676	0.000	0.000	0.000	0.000	2.185	0.000	2.1854
4.98	23.90	5.18	3.74	232.85	0.368	9981.747	0.368	1.154	8.530	1.154	0.686	0.907	0.686	0.000	0.000	0.000	0.000	2.208	0.000	2.2083
5.00	24.00	5.28	3.84	234.00	0.369	10193.852	0.369	1.166	9.717	1.166	0.696	0.988	0.696	0.000	0.000	0.000	0.000	2.231	0.000	2.2309
5.02	24.10	5.38	3.94	235.15	0.370	10409.539	0.370	1.177	11.041	1.177	0.706	1.089	0.706	0.000	0.000	0.000	0.000	2.253	0.000	2.2532
5.04	24.19	5.47	4.03	236.30	0.371	10628.852	0.371	1.189	12.512	1.189	0.716	1.214	0.716	0.000	0.000	0.000	0.000	2.275	0.000	2.2753
5.06	24.29	5.57	4.13	237.46	0.371	10851.838	0.371	1.200	14.143	1.200	0.725	1.366	0.725	0.000	0.000	0.000	0.000	2.297	0.000	2.2971
5.08	24.38	5.66	4.22	238.61	0.372	11078.541	0.372	1.212	15.945	1.212	0.735	1.549	0.735	0.000	0.000	0.000	0.000	2.319	0.000	2.3187
5.10	24.48	5.76	4.32	239.76	0.373	11309.008	0.373	1.223	17.929	1.223	0.744	1.768	0.744	0.000	0.000	0.000	0.000	2.340	0.000	2.3401
5.12	24.58	5.86	4.42	240.91	0.374	11543.286	0.374	1.234	20.111	1.234	0.754	2.025	0.754	0.000	0.000	0.000	0.000	2.361	0.000	2.3612
5.14	24.67	5.95	4.51	242.06	0.374	11781.421	0.374	1.245	22.501	1.245	0.763	2.326	0.763	0.000	0.000	0.000	0.000	2.382	0.000	2.3822
5.16	24.77	6.05	4.61	243.22	0.375	12023.461	0.375	1.256	25.115	1.256	0.772	2.675	0.772	0.000	0.000	0.000	0.000	2.403	0.000	2.4029
5.17	24.80	6.08	4.64	243.60	0.375	12105.017	0.375	1.259	26.039	1.259	0.775	2.803	0.775	0.000	0.000	0.000	0.000	2.410	0.000	2.4098
5.18	24.86	6.14	4.70	244.37	0.376	12269.454	0.376	1.267	27.968	1.267	0.781	3.078	0.781	0.000	0.000	0.000	0.000	2.423	0.000	2.4234
5.20	24.96	6.24	4.80	245.52	0.377	12519.447	0.377	1.277	31.073	1.277	0.790	3.539	0.790	0.000	0.000	0.000	0.000	2.444	0.000	2.4438
5.22	25.06	6.34	4.90	246.67	0.377	12773.489	0.377	1.288	34.448	1.288	0.798	4.065	0.798	0.000	0.000	0.000	0.000	2.464	0.000	2.4639
5.24	25.15	6.43	4.99	247.82	0.378	13031.630	0.378	1.299	38.108	1.299	0.807	4.662	0.807	0.000	0.000	0.000	0.000	2.484	0.000	2.4839
5.26	25.25	6.53	5.09	248.98	0.379	13293.917	0.379	1.309	42.070	1.309	0.816	5.336	0.816	0.000	0.000	0.000	0.000	2.504	0.000	2.5036
5.28	25.34	6.62	5.18	250.13	0.380	13560.402	0.380	1.319	46.353	1.319	0.824	6.093	0.824	0.000	0.000	0.000	0.000	2.523	0.000	2.5232
5.30	25.44	6.72	5.28	251.28	0.380	13831.133	0.380	1.330	50.973	1.330	0.833	6.941	0.833	0.000	0.000	0.000	0.000	2.543	0.000	2.5427
5.32	25.54	6.82	5.38	252.43	0.381	14106.162	0.381	1.340	55.951	1.340	0.841	7.886	0.841	0.000	0.000	0.000	0.000	2.562	0.000	2.5620
5.33	25.60	6.88	5.44	253.20	0.382	14291.927	0.382	1.347	59.477	1.347	0.846	8.575	0.846	0.000	0.000	0.000	0.000	2.575	0.000	2.5747
5.34	25.63	6.91	5.47	253.58	0.382	14385.539	0.382	1.350	61.305	1.350	0.849	8.937	0.849	0.000	0.000	0.000	0.000	2.581	0.000	2.5811
5.36	25.73	7.01	5.57	254.74	0.383	14669.316	0.383	1.360	67.056	1.360	0.857	10.102	0.857	0.000	0.000	0.000	0.000	2.600	0.000	2.6000
5.38	25.82	7.10	5.66	255.89	0.383	14957.544	0.383	1.370	73.225	1.370	0.865	11.389	0.865	0.000	0.000	0.000	0.000	2.619	0.000	2.6188
5.40	25.92	7.20	5.76	257.04	0.384	15250.275	0.384	1.380	79.833	1.380	0.873	12.807	0.873	0.000	0.000	0.000	0.000	2.637	0.000	2.6375
5.42	26.02	7.30	5.86	258.19	0.385	15547.561	0.385	1.390	86.903	1.390	0.881	14.365	0.881	0.000	0.000	0.000	0.000	2.656	0.000	2.6560
5.44	26.11	7.39	5.95	259.34	0.385	15849.457	0.385	1.400	94.457	1.400	0.889	16.072	0.889	0.000	0.000	0.000	0.000	2.674	0.000	2.6744
5.46	26.21	7.49	6.05	260.50	0.386	16156.013	0.386	1.409	102.520	1.409	0.897	17.940	0.897	0.000	0.000	0.000	0.000	2.693	0.000	2.6926
5.48	26.30	7.58	6.14	261.65	0.387	16467.286	0.387	1.419	111.115	1.419	0.905	19.977	0.905	0.000	0.000	0.000	0.000	2.711	0.000	2.7107
5.50	26.40	7.68	6.24	262.80	0.388	16783.327	0.388	1.429	120.269	1.429	0.912	22.195	0.912	0.000	0.000	0.000	0.000	2.729	0.000	2.7287
5.52	26.50	7.78	6.34	263.95	0.388	17104.193	0.388	1.438	130.006	1.438	0.920	24.606	0.920	0.000	0.000	0.000	0.000	2.746	0.000	2.7465
5.54	26.59	7.87	6.43	265.10	0.389	17429.937	0.389	1.448	140.355	1.448	0.928	27.220	0.928	0.000	0.000	0.000	0.000	2.764	0.000	2.7642
5.56	26.69	7.97	6.53	266.26	0.390	17760.616	0.390	1.457	151.341	1.457	0.935	30.050	0.935	0.000	0.000	0.000	0.000	2.782	0.000	2.7818
5.58	26.78	8.06	6.62	267.41	0.390	18096.285	0.390	1.466	162.994	1.466	0.942	33.109	0.942	0.000	0.000	0.000	0.000	2.799	0.000	2.7992
5.60	26.88	8.16	6.72	268.56	0.391	18436.999	0.391	1.476	175.343	1.476	0.950	36.409	0.950	0.000	0.000	0.000	0.000	2.817	0.000	2.8166
5.62	26.98	8.26	6.82	269.71	0.392	18782.816	0.392	1.485	188.418	1.485	0.957	39.965	0.957	0.000	0.000	0.000	0.000	2.834	0.000	2.8338

5.64	27.07	8.35	6.91	270.86	0.393	19133.793	0.393	1.494	202.249	1.494	0.964	43.789	0.964	0.000	0.000	0.000	0.000	2.851	0.000	2.8509
5.66	27.17	8.45	7.01	272.02	0.393	19489.987	0.393	1.503	216.868	1.503	0.972	47.897	0.972	0.000	0.000	0.000	0.000	2.868	0.000	2.8679
5.67	27.20	8.48	7.04	272.40	0.394	19609.887	0.394	1.506	221.922	1.506	0.974	49.332	0.974	0.000	0.000	0.000	0.000	2.874	0.000	2.8736
5.68	27.26	8.54	7.10	273.17	0.394	19851.455	0.394	1.512	232.308	1.512	0.979	52.303	0.979	0.000	0.000	0.000	0.000	2.885	0.000	2.8848
5.70	27.36	8.64	7.20	274.32	0.395	20218.257	0.395	1.521	248.601	1.521	0.986	57.023	0.986	0.000	0.000	0.000	0.000	2.902	0.000	2.9016
5.72	27.46	8.74	7.30	275.47	0.395	20590.450	0.395	1.530	265.782	1.530	0.993	62.073	0.993	0.000	0.000	0.000	0.000	2.918	0.000	2.9183
5.74	27.55	8.83	7.39	276.62	0.396	20968.095	0.396	1.539	283.886	1.539	1.000	67.469	1.000	0.000	0.000	0.000	0.000	2.935	0.000	2.9349
5.76	27.65	8.93	7.49	277.78	0.397	21351.249	0.397	1.548	302.948	1.548	1.007	73.228	1.007	0.000	0.000	0.000	0.000	2.951	0.000	2.9514
5.78	27.74	9.02	7.58	278.93	0.398	21739.974	0.398	1.557	323.007	1.557	1.014	79.368	1.014	0.000	0.000	0.000	0.000	2.968	0.000	2.9678
5.80	27.84	9.12	7.68	280.08	0.398	22134.330	0.398	1.565	344.098	1.565	1.020	85.906	1.020	0.000	0.000	0.000	0.000	2.984	0.000	2.9841
5.82	27.94	9.22	7.78	281.23	0.399	22534.377	0.399	1.574	366.262	1.574	1.027	92.862	1.027	0.000	0.000	0.000	0.000	3.000	0.000	3.0002
5.83	28.00	9.28	7.84	282.00	0.399	22804.268	0.399	1.580	381.653	1.580	1.032	97.740	1.032	0.000	0.000	0.000	0.000	3.011	0.000	3.0110
5.84	28.03	9.31	7.87	282.38	0.400	22940.178	0.400	1.583	389.537	1.583	1.034	100.253	1.034	0.000	0.000	0.000	0.000	3.016	0.000	3.0163
5.86	28.13	9.41	7.97	283.54	0.400	23351.792	0.400	1.591	413.965	1.591	1.041	108.101	1.041	0.000	0.000	0.000	0.000	3.032	0.000	3.0323
5.88	28.22	9.50	8.06	284.69	0.401	23769.284	0.401	1.600	439.586	1.600	1.047	116.425	1.047	0.000	0.000	0.000	0.000	3.048	0.000	3.0483
5.90	28.32	9.60	8.16	285.84	0.402	24192.715	0.402	1.608	466.443	1.608	1.054	125.245	1.054	0.000	0.000	0.000	0.000	3.064	0.000	3.0641
5.92	28.42	9.70	8.26	286.99	0.402	24622.148	0.402	1.617	494.579	1.617	1.061	134.584	1.061	0.000	0.000	0.000	0.000	3.080	0.000	3.0798
5.94	28.51	9.79	8.35	288.14	0.403	25057.647	0.403	1.625	524.040	1.625	1.067	144.464	1.067	0.000	0.000	0.000	0.000	3.095	0.000	3.0955
5.96	28.61	9.89	8.45	289.30	0.404	25499.276	0.404	1.634	554.869	1.634	1.074	154.906	1.074	0.000	0.000	0.000	0.000	3.111	0.000	3.1110
5.98	28.70	9.98	8.54	290.45	0.404	25947.098	0.404	1.642	587.114	1.642	1.080	165.934	1.080	0.000	0.000	0.000	0.000	3.127	0.000	3.1265
6.00	28.80	10.08	8.64	291.60	0.405	26401.180	0.405	1.650	620.823	1.650	1.087	177.572	1.087	0.000	0.000	0.000	0.000	3.142	0.000	3.1419
6.02	28.90	10.18	8.74	292.75	0.406	26861.586	0.406	1.658	656.043	1.658	1.093	189.844	1.093	0.000	0.000	0.000	0.014	3.171	0.000	3.1710
6.04	28.99	10.27	8.83	293.90	0.407	27328.382	0.407	1.667	692.824	1.667	1.099	202.775	1.099	0.000	0.000	0.000	0.039	3.211	0.000	3.2115
6.06	29.09	10.37	8.93	295.06	0.407	27801.634	0.407	1.675	731.216	1.675	1.106	216.392	1.106	0.000	0.000	0.000	0.072	3.259	0.000	3.2592
6.08	29.18	10.46	9.02	296.21	0.408	28281.408	0.408	1.683	771.272	1.683	1.112	230.719	1.112	0.000	0.000	0.000	0.110	3.313	0.000	3.3129
6.10	29.28	10.56	9.12	297.36	0.409	28767.772	0.409	1.691	813.043	1.691	1.118	245.785	1.118	0.000	0.000	0.000	0.154	3.372	0.000	3.3717
6.12	29.38	10.66	9.22	298.51	0.409	29260.794	0.409	1.699	856.585	1.699	1.124	261.616	1.124	0.000	0.000	0.000	0.202	3.435	0.041	3.4764
6.14	29.47	10.75	9.31	299.66	0.410	29760.541	0.410	1.707	901.950	1.707	1.130	278.241	1.130	0.000	0.000	0.000	0.255	3.503	0.117	3.6195
6.16	29.57	10.85	9.41	300.82	0.411	30267.081	0.411	1.715	949.197	1.715	1.137	295.689	1.137	0.000	0.000	0.000	0.312	3.574	0.215	3.7887
6.17	29.62	10.90	9.46	301.39	0.411	30522.921	0.411	1.719	973.543	1.719	1.140	304.731	1.140	0.000	0.000	0.000	0.341	3.611	0.271	3.8816
6.18	29.66	10.94	9.50	301.97	0.411	30780.484	0.411	1.723	998.380	1.723	1.143	313.990	1.143	0.000	0.000	0.000	0.372	3.649	0.331	3.9795
6.20	29.76	11.04	9.60	303.12	0.412	31300.820	0.412	1.731	1049.560	1.731	1.149	333.173	1.149	0.000	0.000	0.000	0.436	3.727	0.462	4.1892
6.22	29.86	11.14	9.70	304.27	0.413	31828.157	0.413	1.739	1102.795	1.739	1.155	353.271	1.155	0.000	0.000	0.000	0.502	3.809	0.607	4.4161
6.24	29.95	11.23	9.79	305.42	0.413	32362.566	0.413	1.747	1158.145	1.747	1.161	374.314	1.161	0.000	0.000	0.000	0.573	3.893	0.765	4.6586
6.26	30.05	11.33	9.89	306.58	0.414	32904.118	0.414	1.754	1215.673	1.754	1.167	396.335	1.167	0.000	0.000	0.000	0.646	3.981	0.935	4.9158
6.28	30.14	11.42	9.98	307.73	0.415	33452.885	0.415	1.762	1275.440	1.762	1.173	419.367	1.173	0.000	0.000	0.000	0.721	4.071	1.116	5.1867
6.30	30.24	11.52	10.08	308.88	0.415	34008.937	0.415	1.770	1337.512	1.770	1.179	443.445	1.179	0.000	0.000	0.000	0.800	4.164	1.307	5.4707
6.32	30.34	11.62	10.18	310.03	0.416	34572.348	0.416	1.778	1401.954	1.778	1.185	468.602	1.185	0.000	0.000	0.000	0.881	4.260	1.507	5.7671
6.33	30.38	11.66	10.22	310.61	0.416	34856.835	0.416	1.781	1435.083	1.781	1.188	481.596	1.188	0.000	0.000	0.000	0.923	4.308	1.611	5.9198
6.34	30.43	11.71	10.27	311.18	0.417	35143.189	0.417	1.785	1468.830	1.785	1.190	494.874	1.190	0.000	0.000	0.000	0.965	4.358	1.718	6.0754
6.36	30.53	11.81	10.37	312.34	0.417	35721.534	0.417	1.793	1538.211	1.793	1.196	522.297	1.196	0.000	0.000	0.000	1.052	4.458	1.937	6.3951
6.38	30.62	11.90	10.46	313.49	0.418	36307.457	0.418	1.800	1610.163	1.800	1.202	550.908	1.202	0.000	0.000	0.000	1.141	4.561	2.164	6.7257
6.40	30.72	12.00	10.56	314.64	0.419	36901.032	0.419	1.808	1684.758	1.808	1.208	580.745	1.208	0.000	0.000	0.000	1.232	4.667	2.400	7.0669
6.42	30.82	12.10	10.66	315.79	0.419	37502.332	0.419	1.816	1762.066	1.816	1.214	611.846	1.214	0.000	0.000	0.000	1.325	4.774	2.644	7.4184
6.44	30.91	12.19	10.75	316.94	0.420	38111.434	0.420	1.823	1842.161	1.823	1.219	644.250	1.219	0.000	0.000	0.000	1.421	4.884	2.896	7.7798
6.46	31.01	12.29	10.85	318.10	0.421	38728.413	0.421	1.831	1925.116	1.831	1.225	677.998	1.225	0.000	0.000	0.000	1.519	4.996	3.155	8.1509
6.48	31.10	12.38	10.94	319.25	0.421	39353.345	0.421	1.838	2011.006	1.838	1.231	713.129	1.231	0.000	0.000	0.000	1.619	5.109	3.422	8.5314
6.50	31.20	12.48	11.04	320.40	0.422	39986.307	0.422	1.845	2099.907	1.845	1.236	749.686	1.236	0.000	0.000	0.000	1.722	5.225	3.696	8.9211
6.52	31.30	12.58	11.14	321.55	0.423	40627.374	0.423	1.853	2191.898	1.853	1.242	787.711	1.242	0.000	0.000	0.000	1.765	5.282	3.976	9.2587
6.54	31.39	12.67	11.23	322.70	0.423	41276.626	0.423	1.860	2287.057	1.860	1.248	827.246	1.248	0.000	0.000	0.000	1.799	5.330	4.264	9.5933
6.56	31.49	12.77	11.33	323.86	0.424	41934.139	0.424	1.867	2385.465	1.867	1.253	868.338	1.253	0.000	0.000	0.000	1.832	5.376	4.558	9.9338
6.58	31.58	12.86	11.42	325.01	0.425	42599.993	0.425	1.875	2487.204	1.875	1.259	911.029	1.259	0.000	0.000	0.000	1.864	5.422	4.858	10.2802
6.60	31.68	12.96	11.52	326.16	0.425	43274.267	0.425	1.882	2592.356	1.882	1.264	955.366	1.264	0.000	0.000	0.000	1.896	5.467	5.165	10.6323
6.62	31.78	13.06	11.62	327.31	0.426	43957.039	0.426	1.889	2701.006	1.889	1.270	1001.395	1.270	0.000	0.000	0.000	1.927	5.512	5.295	10.8071
6.64	31.87	13.15	11.71	328.46	0.427	44648.390	0.427	1.896	2813.239	1.896	1.275	1049.165	1.275	0.000	0.000	0.000	1.958	5.556	5.396	10.9522
6.66	31.97	13.25	11.81	329.62	0.427	45348.401	0.427	1.904	2929.143	1.904	1.281	1098.722	1.281	0.000	0.000	0.000	1.988	5.600	5.495	11.0948
6.67	32.02	13.30	11.86	330.19	0.428	45701.678	0.428	1.907	2988.500	1.907	1.283	1124.187	1.283	0.000	0.000	0.000	2.003	5.622	5.544	11.1653
6.68	32.06	13.34	11.90	330.77	0.428	46057.151	0.428	1.911	3048.807	1.911	1.286	1150.117	1.286	0.000	0.000	0.000	2.018	5.643	5.592	11.2352
6.70	32.16	13.44	12.00	331.92	0.429	46774.724	0.429	1.918	3172.320	1.918	1.291	1203.399	1.291	0.000	0.000	0.000	2.048	5.686	5.688	11.3735
6.72	32.26	13.54	12.10	333.07	0.429	47501.200	0.429	1.925	3299.773	1.925	1.297	1258.619	1.297	0.000	0.000	0.000	2.077	5.728	5.782	11.5097
6.74	32.35	13.63	12.19	334.22	0.430	48236.662	0.430	1.932	3431.260	1.932	1.302	1315.829	1.302	0.000	0.000	0.000	2.106	5.770	5.874	11.6439
6.76	32.45	13.73	12.29	335.38	0.431	48981.194	0.431	1.939	3566.874	1.939	1.308	1375.083	1.308	0.000	0.000	0.000	2.134	5.811	5.965	11.7763
6.78	32.54	13.82	12.38	336.53	0.431	49734.878	0.431	1.946	3706.712	1.946	1.313	1436.433	1.313	0.000	0.000	0.000	2.162	5.852	6.055	11.9069
6.80	32.64	13.92	12.48	337.68	0.432	50497.799	0.432	1.953	3850.869	1.953	1.318	1499.934	1.318	0.000	0.000	0.000	2.189	5.892	6.143	12.0357

6.82	32.74	14.02	12.58	338.83	0.432	51270.042	0.432	1.960	3999.446	1.960	1.323	1565.641	1.323	0.000	0.000	0.000	2.216	5.932	6.231	12.1630
6.83	32.78	14.06	12.62	339.41	0.433	51659.685	0.433	1.964	4075.422	1.964	1.326	1599.340	1.326	0.000	0.000	0.000	2.230	5.952	6.274	12.2260
6.84	32.83	14.11	12.67	339.98	0.433	52051.690	0.433	1.967	4152.541	1.967	1.329	1633.612	1.329	0.000	0.000	0.000	2.243	5.972	6.317	12.2886
6.86	32.93	14.21	12.77	341.14	0.434	52842.831	0.434	1.974	4310.257	1.974	1.334	1703.904	1.334	0.000	0.000	0.000	2.270	6.011	6.401	12.4128
6.88	33.02	14.30	12.86	342.29	0.434	53643.549	0.434	1.981	4472.696	1.981	1.339	1776.574	1.339	0.000	0.000	0.000	2.296	6.050	6.485	12.5354
6.90	33.12	14.40	12.96	343.44	0.435	54453.932	0.435	1.988	4639.963	1.988	1.344	1851.683	1.344	0.000	0.000	0.000	2.322	6.089	6.568	12.6567
6.92	33.22	14.50	13.06	344.59	0.436	55274.067	0.436	1.995	4812.163	1.995	1.349	1929.290	1.349	0.000	0.000	0.000	2.348	6.127	6.649	12.7766
6.94	33.31	14.59	13.15	345.74	0.436	56104.041	0.436	2.001	4989.405	2.001	1.355	2009.456	1.355	0.000	0.000	0.000	2.373	6.165	6.730	12.8952
6.96	33.41	14.69	13.25	346.90	0.437	56943.942	0.437	2.008	5171.798	2.008	1.360	2092.245	1.360	0.000	0.000	0.000	2.398	6.203	6.809	13.0125
6.98	33.50	14.78	13.34	348.05	0.438	57793.859	0.438	2.015	5359.452	2.015	1.365	2177.719	1.365	0.000	0.000	0.000	2.423	6.240	6.888	13.1286
7.00	33.60	14.88	13.44	349.20	0.438	58653.882	0.438	2.022	5552.479	2.022	1.370	2265.943	1.370	0.000	0.000	0.000	2.448	6.278	6.966	13.2436
7.02	33.70	14.98	13.54	350.35	0.439	59524.099	0.439	2.029	5750.994	2.029	1.375	2356.981	1.375	0.000	0.000	0.000	2.472	6.314	7.043	13.3573
7.04	33.79	15.07	13.63	351.50	0.439	60404.602	0.439	2.035	5955.111	2.035	1.380	2450.900	1.380	0.000	0.000	0.000	2.496	6.351	7.119	13.4700
7.06	33.89	15.17	13.73	352.66	0.440	61295.481	0.440	2.042	6164.947	2.042	1.385	2547.767	1.385	0.000	0.000	0.000	2.520	6.387	7.194	13.5816
7.08	33.98	15.26	13.82	353.81	0.441	62196.827	0.441	2.049	6380.622	2.049	1.390	2647.651	1.390	0.000	0.000	0.000	2.544	6.423	7.269	13.6921
7.10	34.08	15.36	13.92	354.96	0.441	63108.732	0.441	2.055	6602.255	2.055	1.395	2750.621	1.395	0.000	0.000	0.000	2.567	6.459	7.343	13.8016
7.12	34.18	15.46	14.02	356.11	0.442	64031.289	0.442	2.062	6829.968	2.062	1.400	2856.747	1.400	0.000	0.000	0.000	2.590	6.494	7.416	13.9102
7.14	34.27	15.55	14.11	357.26	0.443	64964.591	0.443	2.068	7063.885	2.068	1.405	2966.101	1.405	0.000	0.000	0.000	2.613	6.530	7.488	14.0178
7.16	34.37	15.65	14.21	358.42	0.443	65908.730	0.443	2.075	7304.130	2.075	1.410	3078.755	1.410	0.000	0.000	0.000	2.636	6.564	7.560	14.1244
7.17	34.42	15.70	14.26	358.99	0.444	66384.894	0.444	2.078	7426.666	2.078	1.412	3136.342	1.412	0.000	0.000	0.000	2.647	6.582	7.595	14.1774
7.18	34.46	15.74	14.30	359.57	0.444	66863.802	0.444	2.082	7550.831	2.082	1.415	3194.783	1.415	0.000	0.000	0.000	2.659	6.599	7.631	14.2301
7.20	34.56	15.84	14.40	360.72	0.445	67829.900	0.445	2.088	7804.116	2.088	1.420	3314.259	1.420	0.000	0.000	0.000	2.681	6.634	7.701	14.3350
7.22	34.66	15.94	14.50	361.87	0.445	68807.119	0.445	2.095	8064.114	2.095	1.425	3437.260	1.425	0.000	0.000	0.000	2.703	6.668	7.771	14.4390
7.24	34.75	16.03	14.59	363.02	0.446	69795.556	0.446	2.101	8330.959	2.101	1.430	3563.861	1.430	0.000	0.000	0.000	2.726	6.702	7.840	14.5421
7.26	34.85	16.13	14.69	364.18	0.446	70795.307	0.446	2.108	8604.782	2.108	1.434	3694.142	1.434	0.000	0.000	0.000	2.747	6.736	7.908	14.6445
7.28	34.94	16.22	14.78	365.33	0.447	71806.467	0.447	2.114	8885.720	2.114	1.439	3828.180	1.439	0.000	0.000	0.000	2.769	6.770	7.976	14.7460
7.30	35.04	16.32	14.88	366.48	0.448	72829.135	0.448	2.121	9173.910	2.121	1.444	3966.057	1.444	0.000	0.000	0.000	2.791	6.803	8.044	14.8468
7.32	35.14	16.42	14.98	367.63	0.448	73863.408	0.448	2.127	9469.490	2.127	1.449	4107.853	1.449	0.000	0.000	0.000	2.812	6.836	8.110	14.9468
7.33	35.18	16.46	15.02	368.21	0.449	74384.927	0.449	2.130	9620.095	2.130	1.451	4180.246	1.451	0.000	0.000	0.000	2.823	6.853	8.144	14.9965
7.34	35.23	16.51	15.07	368.78	0.449	74909.385	0.449	2.133	9772.600	2.133	1.454	4253.651	1.454	0.000	0.000	0.000	2.833	6.869	8.177	15.0460
7.36	35.33	16.61	15.17	369.94	0.449	75967.164	0.449	2.140	10083.383	2.140	1.459	4403.534	1.459	0.000	0.000	0.000	2.854	6.902	8.242	15.1445
7.38	35.42	16.70	15.26	371.09	0.450	77036.845	0.450	2.146	10401.9830	2.1462	1.4633	4557.5872	1.463	0.000	0.000	0.000	2.875	6.935	8.307	15.2424
7.40	35.52	16.80	15.36	372.24	0.451	78118.528	0.451	2.153	10728.5452	2.1525	1.4680	4715.8965	1.468	0.000	0.000	0.000	2.896	6.967	8.372	15.3395
7.42	35.62	16.90	15.46	373.39	0.451	79212.314	0.451	2.159	11063.2174	2.1589	1.4728	4878.5487	1.473	0.000	0.000	0.000	2.917	7.000	8.436	15.4359
7.44	35.71	16.99	15.55	374.54	0.452	80318.304	0.452	2.165	11406.1489	2.1652	1.4775	5045.6321	1.477	0.000	0.000	0.000	2.937	7.032	8.500	15.5317
7.46	35.81	17.09	15.65	375.70	0.453	81436.600	0.453	2.171	11757.4909	2.1715	1.4822	5217.2359	1.482	0.000	0.000	0.000	2.957	7.064	8.563	15.6269
7.48	35.90	17.18	15.74	376.85	0.453	82567.303	0.453	2.178	12117.3962	2.1777	1.4869	5393.4507	1.487	0.000	0.000	0.000	2.978	7.095	8.626	15.7214
7.50	36.00	17.28	15.84	378.00	0.454	83710.517	0.454	2.184	12486.0198	2.1840	1.4916	5574.3683	1.492	0.000	0.000	0.000	2.998	7.127	8.688	15.8152
7.52	36.10	17.38	15.94	379.15	0.454	84866.345	0.454	2.190	12863.5182	2.1902	1.4962	5760.0816	1.496	0.000	0.000	0.000	3.018	7.159	8.750	15.9085
7.54	36.19	17.47	16.03	380.30	0.455	86034.891	0.455	2.196	13250.0499	2.1965	1.5009	5950.6847	1.501	0.000	0.000	0.000	3.037	7.190	8.811	16.0012
7.56	36.29	17.57	16.13	381.46	0.456	87216.260	0.456	2.203	13645.7753	2.2027	1.5055	6146.2730	1.506	0.000	0.000	0.000	3.057	7.221	8.872	16.0933
7.58	36.38	17.66	16.22	382.61	0.456	88410.556	0.456	2.209	14050.8566	2.2089	1.5101	6346.9431	1.510	0.000	0.000	0.000	3.077	7.252	8.933	16.1848
7.60	36.48	17.76	16.32	383.76	0.457	89617.886	0.457	2.215	14465.4579	2.2150	1.5147	6552.7929	1.515	0.000	0.000	0.000	3.096	7.283	8.993	16.2757
7.62	36.58	17.86	16.42	384.91	0.457	90838.356	0.457	2.221	14889.7453	2.2212	1.5193	6763.9212	1.519	0.000	0.000	0.000	3.115	7.313	9.053	16.3661
7.64	36.67	17.95	16.51	386.06	0.458	92072.072	0.458	2.227	15323.8868	2.2273	1.5239	6980.4286	1.524	0.000	0.000	0.000	3.134	7.344	9.112	16.4560
7.66	36.77	18.05	16.61	387.22	0.459	93319.142	0.459	2.233	15768.0520	2.2334	1.5284	7202.4165	1.528	0.000	0.000	0.000	3.154	7.374	9.171	16.5453
7.67	36.82	18.10	16.66	387.79	0.459	93947.719	0.459	2.236	15993.9472	2.2365	1.5307	7315.4978	1.531	0.000	0.000	0.000	3.163	7.389	9.201	16.5898
7.68	36.86	18.14	16.70	388.37	0.459	94579.674	0.459	2.240	16222.4130	2.2395	1.5330	7429.9878	1.533	0.000	0.000	0.000	3.172	7.404	9.230	16.6341
7.70	36.96	18.24	16.80	389.52	0.460	95853.777	0.460	2.246	16687.1432	2.2456	1.5375	7663.2466	1.538	0.000	0.000	0.000	3.191	7.434	9.288	16.7224
7.72	37.06	18.34	16.90	390.67	0.461	97141.560	0.461	2.252	17162.4186	2.2517	1.5421	7902.2982	1.542	0.000	0.000	0.000	3.210	7.464	9.346	16.8102
7.74	37.15	18.43	16.99	391.82	0.461	98443.132	0.461	2.258	17648.4166	2.2577	1.5466	8147.2492	1.547	0.000	0.000	0.000	3.229	7.494	9.403	16.8974
7.76	37.25	18.53	17.09	392.98	0.462	99758.603	0.462	2.264	18145.3169	2.2638	1.5511	8398.2078	1.551	0.000	0.000	0.000	3.247	7.524	9.461	16.9842
7.78	37.34	18.62	17.18	394.13	0.462	101088.086	0.462	2.270	18653.3012	2.2698	1.5555	8655.2830	1.556	0.000	0.000	0.000	3.266	7.553	9.517	17.0706
7.80	37.44	18.72	17.28	395.28	0.463	102431.691	0.463	2.276	19172.5529	2.2758	1.5600	8918.5856	1.560	0.000	0.000	0.000	3.284	7.583	9.574	17.1564
7.82	37.54	18.82	17.38	396.43	0.464	103789.530	0.464	2.282	19703.2578	2.2818	1.5645	9188.2273	1.564	0.000	0.000	0.000	3.302	7.612	9.630	17.2418
7.83	37.58	18.86	17.42	397.01	0.464	104473.822	0.464	2.285	19972.9637	2.2848	1.5667	9325.4606	1.567	0.000	0.000	0.000	3.311	7.626	9.658	17.2843
7.84	37.63	18.91	17.47	397.58	0.464	105161.716	0.464	2.288	20245.6034	2.2877	1.5689	9464.3213	1.569	0.000	0.000	0.000	3.320	7.641	9.686	17.3267
7.86	37.73	19.01	17.57	398.74	0.465	106548.362	0.465	2.294	20799.7795	2.2937	1.5733	9746.9823	1.573	0.000	0.000	0.000	3.338	7.670	9.741	17.4112
7.88	37.82	19.10	17.66	399.89	0.465	107949.582	0.465	2.300	21365.9776	2.2996	1.5778	10036.3261	1.578	0.000	0.000	0.000	3.356	7.699	9.797	17.4953
7.90	37.92	19.20	17.76	401.04	0.466	109365.491	0.466	2.306	21944.3916	2.3056	1.5822	10332.4699	1.582	0.000	0.000	0.000	3.374	7.727	9.851	17.5789
7.92	38.02	19.30	17.86	402.19	0.467	110796.204	0.467	2.311	22535.2172	2.3115	1.5866	10635.5324	1.587	0.000	0.000	0.000	3.392	7.756	9.906	17.6621
7.94	38.11	19.39	17.95	403.34	0.467	112241.836	0.467	2.317	23138.6524	2.3174	1.5909	10945.6334	1.591	0.000	0.000	0.000	3.409	7.785	9.960	17.7449
7.96	38.21	19.49	18.05	404.50	0.468	113702.504	0.468	2.323	23754.8970	2.3233	1.5953	11262.8943	1.595	0.000	0.000	0.000	3.427	7.813	10.014	17.8272
7.98	38.30	19.58	18.14	405.65	0.468	115178.324	0.468	2.329	24384.1533	2.3291	1.5997	11587.4378	1.600	0.000	0.000	0.000	3.444	7.841	10.068	17.9092

8.00	38.40	19.68	18.24	406.80	0.469	116669.414	0.469	2.335	25026.6252	2.3350	1.6040	11919.3880	1.604	0.000	0.000	0.000	3.461	7.869	10.121	17.9907

Stage Storage Vault 1 (Per Contech Table)

Depth	volume (cf)	volume (acft)	Effective Area (s.f.)
0.00	0	0.000000	1830
0.02	37	0.000840	1830
0.04	73	0.001680	1830
0.06	110	0.002520	1830
0.08	146	0.003360	1830
0.10	183	0.004200	1830
0.12	220	0.005041	1830
0.14	256	0.005881	1830
0.16	293	0.006721	1830
0.17	311	0.007141	1830
0.18	345	0.007922	1917
0.20	413	0.009485	2066
0.22	481	0.011048	2188
0.24	549	0.012611	2289
0.26	617	0.014174	2375
0.28	686	0.015737	2448
0.30	754	0.017300	2512
0.32	822	0.018863	2568
0.33	867	0.019905	230
0.34	895	0.020556	2634
0.36	981	0.022511	2724
0.38	1066	0.024465	2804
0.40	1151	0.026419	2877
0.42	1236	0.028374	2943
0.44	1321	0.030328	3002
0.46	1406	0.032282	3057
0.48	1491	0.034237	3107
0.50	1576	0.036191	3153
0.52	1674	0.038429	3219
0.54	1771	0.040668	3281
0.56	1869	0.042906	3337
0.58	1966	0.045145	3391
0.60	2064	0.047383	3440
0.62	2162	0.049621	3486
0.64	2259	0.051860	3530
0.66	2357	0.054098	3570
0.67	2405	0.055217	3590
0.68	2462	0.056521	3621
0.70	2576	0.059129	3680
0.72	2689	0.061737	3735
0.74	2803	0.064344	3788
0.76	2916	0.066952	3837
0.78	3030	0.069560	3885
0.80	3144	0.072168	3930
0.82	3257	0.074776	3972
0.83	3333	0.076514	4000
0.84	3373	0.077444	4016
0.86	3495	0.080232	4064
0.88	3616	0.083021	4110
0.90	3738	0.085810	4153
0.92	3859	0.088598	4195
0.94	3981	0.091387	4235
0.96	4102	0.094176	4273
0.98	4224	0.096964	4310
1.00	4345	0.099753	4345
1.02	4476	0.102745	4388
1.04	4606	0.105736	4429
1.06	4736	0.108728	4468
1.08	4866	0.111719	4506
1.10	4997	0.114711	4543
1.12	5127	0.117703	4578
1.14	5257	0.120694	4612
1.16	5388	0.123686	4645

Stage Storage Vault 12 (Per Contech Table)

Depth	volume (cf)	volume (acft)	Effective Area (s.f.)
1.17	5431	0.124683	4655
1.18	5523	0.126797	4681
1.20	5661	0.129967	4718
1.22	5799	0.133137	4754
1.24	5938	0.136308	4788
1.26	6076	0.139478	4822
1.28	6214	0.142648	4855
1.30	6352	0.145819	4886
1.32	6490	0.148989	4917
1.33	6582	0.151103	4937
1.34	6630	0.152212	4948
1.36	6775	0.155541	4982
1.38	6920	0.158870	5015
1.40	7065	0.162199	5047
1.42	7210	0.165527	5078
1.44	7355	0.168856	5108
1.46	7500	0.172185	5137
1.48	7645	0.175514	5166
1.50	7790	0.178843	5194
1.52	7942	0.182312	5225
1.54	8093	0.185782	5255
1.56	8244	0.189252	5284
1.58	8395	0.192722	5313
1.60	8546	0.196191	5341
1.62	8697	0.199661	5369
1.64	8848	0.203131	5395
1.66	9000	0.206601	5421
1.67	9050	0.207757	5430
1.68	9154	0.210154	5449
1.70	9311	0.213749	5477
1.72	9468	0.217345	5504
1.74	9624	0.220940	5531
1.76	9781	0.224535	5557
1.78	9937	0.228130	5583
1.80	10094	0.231726	5608
1.82	10251	0.235321	5632
1.83	10355	0.237718	5648
1.84	10409	0.238954	5657
1.86	10570	0.242661	5683
1.88	10732	0.246368	5708
1.90	10893	0.250075	5733
1.92	11055	0.253782	5758
1.94	11216	0.257489	5782
1.96	11378	0.261196	5805
1.98	11539	0.264903	5828
2.00	11701	0.268610	5850
2.02	11866	0.272416	5874
2.04	12032	0.276222	5898
2.06	12198	0.280028	5921
2.08	12364	0.283835	5944
2.10	12530	0.287641	5966
2.12	12695	0.291447	5988
2.14	12861	0.295253	6010
2.16	13027	0.299059	6031
2.17	13082	0.300328	6038
2.18	13195	0.302924	6053
2.20	13365	0.306817	6075
2.22	13535	0.310711	6097
2.24	13704	0.314605	6118
2.26	13874	0.318498	6139
2.28	14043	0.322392	6159
2.30	14213	0.326286	6180
2.32	14383	0.330179	6199

Stage Storage Vault 12 (Per Contech Table)

Depth	volume (cf)	volume (acft)	Effective Area (s.f.)
2.33	14496	0.332775	6212
2.34	14553	0.334099	6219
2.36	14726	0.338069	6240
2.38	14899	0.342039	6260
2.40	15072	0.346009	6280
2.42	15245	0.349980	6300
2.44	15418	0.353950	6319
2.46	15591	0.357920	6338
2.48	15764	0.361891	6356
2.50	15937	0.365861	6375
2.52	16113	0.369898	6394
2.54	16289	0.373934	6413
2.56	16464	0.377971	6431
2.58	16640	0.382008	6450
2.60	16816	0.386045	6468
2.62	16992	0.390081	6485
2.64	17168	0.394118	6503
2.66	17344	0.398155	6520
2.67	17402	0.399500	6526
2.68	17521	0.402229	6538
2.70	17699	0.406323	6555
2.72	17878	0.410416	6573
2.74	18056	0.414509	6590
2.76	18234	0.418603	6607
2.78	18413	0.422696	6623
2.80	18591	0.426790	6640
2.82	18769	0.430883	6656
2.83	18888	0.433612	6666
2.84	18948	0.434992	6672
2.86	19129	0.439133	6688
2.88	19309	0.443274	6705
2.90	19489	0.447414	6720
2.92	19670	0.451555	6736
2.94	19850	0.455696	6752
2.96	20030	0.459837	6767
2.98	20211	0.463977	6782
3.00	20391	0.468118	6797
3.02	20573	0.472297	6812
3.04	20755	0.476476	6827
3.06	20937	0.480656	6842
3.08	21119	0.484835	6857
3.10	21301	0.489014	6871
3.12	21483	0.493193	6886
3.14	21666	0.497372	6900
3.16	21848	0.501551	6914
3.17	21908	0.502944	6918
3.18	22030	0.505750	6928
3.20	22214	0.509958	6942
3.22	22397	0.514167	6956
3.24	22580	0.518376	6969
3.26	22764	0.522584	6983
3.28	22947	0.526793	6996
3.30	23130	0.531002	7009
3.32	23314	0.535210	7022
3.33	23436	0.538016	7031
3.34	23497	0.539426	7035
3.36	23682	0.543656	7048
3.38	23866	0.547885	7061
3.40	24050	0.552115	7074
3.42	24234	0.556345	7086
3.44	24419	0.560574	7098
3.46	24603	0.564804	7111
3.48	24787	0.569034	7123

Stage Storage Vault 12 (Per Contech Table)

Depth	volume (cf)	volume (acft)	Effective Area (s.f.)
3.50	24971	0.573263	7135
3.52	25156	0.577506	7147
3.54	25341	0.581748	7158
3.56	25526	0.585990	7170
3.58	25711	0.590232	7182
3.60	25895	0.594474	7193
3.62	26080	0.598717	7204
3.64	26265	0.602959	7216
3.66	26450	0.607201	7227
3.67	26511	0.608615	7230
3.68	26635	0.611446	7238
3.70	26820	0.615692	7249
3.72	27005	0.619939	7259
3.74	27190	0.624185	7270
3.76	27374	0.628432	7280
3.78	27559	0.632678	7291
3.80	27744	0.636924	7301
3.82	27929	0.641171	7311
3.83	28053	0.644002	7318
3.84	28114	0.645416	7321
3.86	28299	0.649658	7331
3.88	28484	0.653900	7341
3.90	28669	0.658142	7351
3.92	28853	0.662385	7361
3.94	29038	0.666627	7370
3.96	29223	0.670869	7380
3.98	29408	0.675111	7389
4.00	29593	0.679353	7398
4.02	29777	0.683583	7407
4.04	29961	0.687813	7416
4.06	30145	0.692042	7425
4.08	30330	0.696272	7434
4.10	30514	0.700502	7442
4.12	30698	0.704731	7451
4.14	30882	0.708961	7460
4.16	31067	0.713191	7468
4.17	31128	0.714601	7471
4.18	31250	0.717406	7476
4.20	31434	0.721615	7484
4.22	31617	0.725824	7492
4.24	31800	0.730032	7500
4.26	31984	0.734241	7508
4.28	32167	0.738450	7516
4.30	32350	0.742658	7523
4.32	32534	0.746867	7531
4.33	32656	0.749673	7536
4.34	32716	0.751066	7538
4.36	32898	0.755245	7546
4.38	33081	0.759424	7553
4.40	33263	0.763603	7560
4.42	33445	0.767782	7567
4.44	33627	0.771961	7574
4.46	33809	0.776140	7580
4.48	33991	0.780319	7587
4.50	34173	0.784499	7594
4.52	34353	0.788639	7600
4.54	34533	0.792780	7606
4.56	34714	0.796921	7613
4.58	34894	0.801062	7619
4.60	35075	0.805202	7625
4.62	35255	0.809343	7631
4.64	35435	0.813484	7637
4.66	35616	0.817625	7643

Stage Storage Vault 12 (Per Contech Table)

Depth	volume (cf)	volume (acft)	Effective Area (s.f.)
4.67	35676	0.819005	7645
4.68	35795	0.821734	7648
4.70	35973	0.825827	7654
4.72	36151	0.829921	7659
4.74	36330	0.834014	7664
4.76	36508	0.838107	7670
4.78	36686	0.842201	7675
4.80	36865	0.846294	7680
4.82	37043	0.850388	7685
4.83	37162	0.853116	7689
4.84	37220	0.854462	7690
4.86	37396	0.858499	7695
4.88	37572	0.862535	7699
4.90	37748	0.866572	7704
4.92	37924	0.870609	7708
4.94	38100	0.874646	7712
4.96	38275	0.878682	7717
4.98	38451	0.882719	7721
5.00	38627	0.886756	7725
5.02	38800	0.890726	7729
5.04	38973	0.894696	7733
5.06	39146	0.898667	7736
5.08	39319	0.902637	7740
5.10	39492	0.906607	7743
5.12	39665	0.910578	7747
5.14	39838	0.914548	7751
5.16	40011	0.918518	7754
5.17	40068	0.919842	7755
5.18	40181	0.922437	7757
5.20	40351	0.926331	7760
5.22	40521	0.930225	7763
5.24	40690	0.934118	7765
5.26	40860	0.938012	7768
5.28	41029	0.941906	7771
5.30	41199	0.945799	7773
5.32	41369	0.949693	7776
5.33	41482	0.952289	7778
5.34	41537	0.953558	7778
5.36	41703	0.957364	7780
5.38	41869	0.961170	7782
5.40	42034	0.964976	7784
5.42	42200	0.968782	7786
5.44	42366	0.972588	7788
5.46	42532	0.976395	7790
5.48	42698	0.980201	7792
5.50	42863	0.984007	7793
5.52	43025	0.987714	7794
5.54	43186	0.991421	7795
5.56	43348	0.995128	7796
5.58	43509	0.998835	7797
5.60	43671	1.002542	7798
5.62	43832	1.006249	7799
5.64	43994	1.009956	7800
5.66	44155	1.013663	7801
5.67	44209	1.014899	7802
5.68	44313	1.017296	7802
5.70	44470	1.020891	7802
5.72	44627	1.024486	7802
5.74	44783	1.028082	7802
5.76	44940	1.031677	7802
5.78	45096	1.035272	7802
5.80	45253	1.038868	7802
5.82	45410	1.042463	7802

Stage Storage Vault 12 (Per Contech Table)

Depth	volume (cf)	volume (acft)	Effective Area (s.f.)
5.83	45514	1.044860	7802
5.84	45564	1.046016	7802
5.86	45716	1.049486	7801
5.88	45867	1.052956	7800
5.90	46018	1.056426	7800
5.92	46169	1.059895	7799
5.94	46320	1.063365	7798
5.96	46471	1.066835	7797
5.98	46622	1.070304	7796
6.00	46774	1.073774	7796
6.02	46916	1.077038	7793
6.04	47058	1.080301	7791
6.06	47200	1.083565	7789
6.08	47342	1.086828	7787
6.10	47484	1.090092	7784
6.12	47627	1.093355	7782
6.14	47769	1.096619	7780
6.16	47911	1.099882	7778
6.17	47982	1.101514	7777
6.18	48054	1.103165	7776
6.20	48198	1.106468	7774
6.22	48342	1.109770	7772
6.24	48485	1.113073	7770
6.26	48629	1.116375	7768
6.28	48773	1.119678	7766
6.30	48917	1.122980	7765
6.32	49061	1.126282	7763
6.33	49133	1.127934	7762
6.34	49197	1.129400	7760
6.36	49324	1.132333	7755
6.38	49452	1.135266	7751
6.40	49580	1.138199	7747
6.42	49708	1.141132	7743
6.44	49835	1.144065	7738
6.46	49963	1.146998	7734
6.48	50091	1.149931	7730
6.50	50219	1.152864	7726
6.52	50338	1.155598	7721
6.54	50457	1.158332	7715
6.56	50576	1.161066	7710
6.58	50695	1.163800	7704
6.60	50814	1.166534	7699
6.62	50933	1.169268	7694
6.64	51052	1.172002	7689
6.66	51171	1.174736	7683
6.67	51231	1.176103	7681
6.68	51289	1.177434	7678
6.70	51405	1.180096	7672
6.72	51521	1.182758	7667
6.74	51637	1.185420	7661
6.76	51753	1.188082	7656
6.78	51869	1.190744	7650
6.80	51985	1.193406	7645
6.82	52101	1.196068	7639
6.83	52159	1.197400	7637
6.84	52207	1.198519	7633
6.86	52305	1.200757	7625
6.88	52402	1.202995	7617
6.90	52500	1.205234	7609
6.92	52597	1.207472	7601
6.94	52695	1.209711	7593
6.96	52792	1.211949	7585
6.98	52890	1.214187	7577

Stage Storage Vault 12 (Per Contech Table)

Depth	volume (cf)	volume (acft)	Effective Area (s.f.)
7.00	52988	1.216426	7570
7.02	53071	1.218342	7560
7.04	53154	1.220258	7550
7.06	53238	1.222174	7541
7.08	53321	1.224090	7531
7.10	53405	1.226006	7522
7.12	53488	1.227922	7512
7.14	53572	1.229838	7503
7.16	53655	1.231754	7494
7.17	53697	1.232712	7489
7.18	53732	1.233510	7484
7.20	53801	1.235105	7472
7.22	53871	1.236701	7461
7.24	53940	1.238296	7450
7.26	54010	1.239892	7439
7.28	54079	1.241487	7428
7.30	54149	1.243083	7418
7.32	54218	1.244678	7407
7.33	54253	1.245476	7401
7.34	54271	1.245896	7394
7.36	54308	1.246736	7379
7.38	54344	1.247576	7364
7.40	54381	1.248416	7349
7.42	54418	1.249256	7334
7.44	54454	1.250097	7319
7.46	54491	1.250937	7304
7.48	54527	1.251777	7290
7.50	54564	1.252617	7275
7.52	54565	1.253	7256
7.54	54566	1.253	7237
7.56	54567	1.253	7218
7.58	54568	1.253	7199
7.60	54569	1.253	7180
7.62	54570	1.253	7161
7.64	54571	1.253	7143
7.66	54572	1.253	7124
7.67	54572	1.253	7115
7.68	54573	1.253	7106
7.70	54574	1.253	7088
7.72	54575	1.253	7069
7.74	54576	1.253	7051
7.76	54577	1.253	7033
7.78	54578	1.253	7015
7.80	54579	1.253	6997
7.82	54580	1.253	6980
7.83	54581	1.253	6971
7.84	54581	1.253	6962
7.86	54582	1.253	6944
7.88	54583	1.253	6927
7.90	54584	1.253	6909
7.92	54585	1.253	6892
7.94	54586	1.253	6875
7.96	54587	1.253	6858
7.98	54588	1.253	6841
8.00	54589	1.253	6824

Vault 1 Total Draw Down

Depth	Q_{AVG} (CFS)	V (CF)	DT (HR)	Total T
0.00	0.000	0.0	2.481	43.175
0.24	0.062	549.3	0.297	40.694
0.26	0.066	617.4	0.278	40.397
0.28	0.070	685.5	0.263	40.119
0.30	0.074	753.6	0.250	39.856
0.32	0.078	821.7	0.160	39.606
0.33	0.080	867.1	0.098	39.446
0.34	0.081	895.4	0.286	39.348
0.36	0.084	980.6	0.275	39.062
0.38	0.088	1065.7	0.265	38.787
0.40	0.091	1150.8	0.256	38.522
0.42	0.094	1236.0	0.248	38.266
0.44	0.097	1321.1	0.241	38.017
0.46	0.100	1406.2	0.234	37.776
0.48	0.102	1491.4	0.228	37.542
0.50	0.105	1576.5	0.255	37.314
0.52	0.108	1674.0	0.249	37.059
0.54	0.110	1771.5	0.243	36.810
0.56	0.113	1869.0	0.238	36.567
0.58	0.115	1966.5	0.233	36.329
0.60	0.118	2064.0	0.228	36.097
0.62	0.120	2161.5	0.224	35.868
0.64	0.122	2259.0	0.220	35.645
0.66	0.124	2356.5	0.108	35.425
0.67	0.126	2405.3	0.125	35.316
0.68	0.127	2462.1	0.247	35.191
0.70	0.129	2575.7	0.243	34.944
0.72	0.131	2689.3	0.239	34.701
0.74	0.133	2802.8	0.235	34.462
0.76	0.135	2916.4	0.232	34.227
0.78	0.137	3030.0	0.228	33.995
0.80	0.139	3143.6	0.225	33.767
0.82	0.141	3257.2	0.148	33.542
0.83	0.142	3333.0	0.079	33.394
0.84	0.143	3373.4	0.234	33.315
0.86	0.145	3494.9	0.231	33.081
0.88	0.147	3616.4	0.228	32.850
0.90	0.149	3737.9	0.225	32.621
0.92	0.151	3859.3	0.223	32.396
0.94	0.153	3980.8	0.220	32.174
0.96	0.154	4102.3	0.217	31.954
0.98	0.156	4223.8	0.215	31.736
1.00	0.158	4345.2	0.228	31.522
1.02	0.160	4475.6	0.225	31.294
1.04	0.161	4605.9	0.223	31.068
1.06	0.163	4736.2	0.221	30.845
1.08	0.165	4866.5	0.218	30.624
1.10	0.167	4996.8	0.216	30.406
1.12	0.168	5127.1	0.214	30.190
1.14	0.170	5257.4	0.212	29.975

Vault 1 Total Draw Down

1.16	0.171	5387.8	0.070	29.763
1.17	0.172	5431.2	0.148	29.693
1.18	0.173	5523.3	0.221	29.545
1.20	0.175	5661.4	0.219	29.324
1.22	0.176	5799.5	0.217	29.106
1.24	0.178	5937.6	0.215	28.889
1.26	0.179	6075.7	0.213	28.674
1.28	0.181	6213.8	0.211	28.461
1.30	0.182	6351.9	0.209	28.250
1.32	0.184	6490.0	0.139	28.041
1.33	0.185	6582.0	0.072	27.902
1.34	0.186	6630.4	0.216	27.830
1.36	0.187	6775.4	0.215	27.614
1.38	0.188	6920.4	0.213	27.399
1.40	0.190	7065.4	0.211	27.186
1.42	0.191	7210.4	0.210	26.975
1.44	0.193	7355.4	0.208	26.765
1.46	0.194	7500.4	0.207	26.557
1.48	0.196	7645.4	0.205	26.351
1.50	0.197	7790.4	0.212	26.146
1.52	0.199	7941.5	0.211	25.933
1.54	0.200	8092.7	0.209	25.723
1.56	0.201	8243.8	0.208	25.513
1.58	0.203	8394.9	0.206	25.306
1.60	0.204	8546.1	0.205	25.099
1.62	0.205	8697.2	0.204	24.894
1.64	0.207	8848.4	0.202	24.691
1.66	0.208	8999.5	0.067	24.488
1.67	0.209	9049.9	0.139	24.421
1.68	0.209	9154.3	0.207	24.282
1.70	0.211	9310.9	0.206	24.075
1.72	0.212	9467.5	0.204	23.870
1.74	0.213	9624.1	0.203	23.665
1.76	0.215	9780.8	0.202	23.462
1.78	0.216	9937.4	0.201	23.260
1.80	0.217	10094.0	0.200	23.059
1.82	0.219	10250.6	0.132	22.860
1.83	0.219	10355.0	0.068	22.727
1.84	0.220	10408.8	0.203	22.659
1.86	0.221	10570.3	0.202	22.456
1.88	0.222	10731.8	0.201	22.253
1.90	0.224	10893.3	0.200	22.052
1.92	0.225	11054.7	0.199	21.852
1.94	0.226	11216.2	0.198	21.653
1.96	0.227	11377.7	0.197	21.455
1.98	0.229	11539.2	0.196	21.259
2.00	0.230	11700.6	0.200	21.063
2.02	0.231	11866.4	0.199	20.863
2.04	0.232	12032.2	0.198	20.664
2.06	0.233	12198.0	0.197	20.466
2.08	0.235	12363.8	0.196	20.269
2.10	0.236	12529.6	0.195	20.073
2.12	0.237	12695.4	0.194	19.879
2.14	0.238	12861.2	0.193	19.685
2.16	0.239	13027.0	0.064	19.492
2.17	0.240	13082.3	0.131	19.428
2.18	0.240	13195.4	0.195	19.297
2.20	0.242	13365.0	0.195	19.101
2.22	0.243	13534.6	0.194	18.907
2.24	0.244	13704.2	0.193	18.713
2.26	0.245	13873.8	0.192	18.520
2.28	0.246	14043.4	0.191	18.328
2.30	0.247	14213.0	0.190	18.138
2.32	0.248	14382.6	0.126	17.947

#REF!

Vault 1 Total Draw Down

2.33	0.249	14495.7	0.064	17.821		
2.34	0.250	14553.3	0.192	17.757		
2.36	0.251	14726.3	0.191	17.565		
2.38	0.252	14899.2	0.190	17.374		
2.40	0.253	15072.2	0.190	17.183		
2.42	0.254	15245.1	0.189	16.994		
2.44	0.255	15418.1	0.188	16.805		
2.46	0.256	15591.0	0.187	16.617		
2.48	0.257	15764.0	0.186	16.430		
2.50	0.258	15936.9	0.189	16.243		
2.52	0.259	16112.7	0.188	16.055		
2.54	0.260	16288.6	0.187	15.867		
2.56	0.262	16464.4	0.186	15.679		
2.58	0.263	16640.3	0.186	15.493		
2.60	0.264	16816.1	0.185	15.307		
2.62	0.265	16991.9	0.184	15.123		
2.64	0.266	17167.8	0.183	14.938		
2.66	0.267	17343.6	0.061	14.755		
2.67	0.267	17402.2	0.123	14.694		
2.68	0.268	17521.1	0.185	14.570		
2.70	0.269	17699.4	0.184	14.386		
2.72	0.270	17877.7	0.183	14.202		
2.74	0.271	18056.0	0.182	14.019		
2.76	0.272	18234.3	0.182	13.836		
2.78	0.273	18412.6	0.181	13.655		
2.80	0.274	18591.0	0.180	13.473		
2.82	0.275	18769.3	0.120	13.293		
2.83	0.276	18888.1	0.061	13.173		
2.84	0.276	18948.3	0.181	13.113		
2.86	0.277	19128.6	0.181	12.931		
2.88	0.278	19309.0	0.180	12.751		
2.90	0.279	19489.4	0.179	12.571		
2.92	0.280	19669.7	0.179	12.392		
2.94	0.281	19850.1	0.178	12.213		
2.96	0.282	20030.5	0.177	12.035		
2.98	0.283	20210.9	0.177	11.858		
3.00	0.284	20391.2	0.178	11.681		
3.02	0.285	20573.3	0.177	11.503		
3.04	0.286	20755.3	0.177	11.326		
3.06	0.287	20937.4	0.176	11.149		
3.08	0.288	21119.4	0.175	10.973		
3.10	0.289	21301.4	0.175	10.798		
3.12	0.290	21483.5	0.174	10.623		
3.14	0.291	21665.5	0.174	10.449		
3.16	0.292	21847.6	0.058	10.275		
3.17	0.292	21908.2	0.116	10.218		
3.18	0.293	22030.5	0.174	10.102		
3.20	0.294	22213.8	0.173	9.928		
3.22	0.295	22397.1	0.173	9.755		
3.24	0.295	22580.4	0.172	9.582		
3.26	0.296	22763.8	0.172	9.410		
3.28	0.297	22947.1	0.171	9.239	WQ Draw Down =	35.2945
3.30	0.298	23130.4	0.170	9.068		
3.32	0.299	23313.8	0.113	8.897		
3.33	0.300	23436.0	0.057	8.784		
3.34	0.300	23497.4	0.170	8.727		
3.36	0.301	23681.6	0.170	8.557		
3.38	0.302	23865.9	0.169	8.387		
3.40	0.303	24050.1	0.169	8.218		
3.42	0.304	24234.4	0.168	8.049		
3.44	0.305	24418.6	0.168	7.881		
3.46	0.306	24602.9	0.167	7.713		
3.48	0.307	24787.1	0.167	7.546		
3.50	0.308	24971.4	0.167	7.379		

Vault 1 Total Draw Down

3.52	0.308	25156.1	0.166	7.213
3.54	0.309	25340.9	0.166	7.047
3.56	0.310	25525.7	0.165	6.881
3.58	0.311	25710.5	0.165	6.716
3.60	0.312	25895.3	0.164	6.551
3.62	0.313	26080.1	0.164	6.387
3.64	0.314	26264.9	0.163	6.223
3.66	0.315	26449.7	0.054	6.059
3.67	0.315	26511.3	0.109	6.005
3.68	0.316	26634.6	0.163	5.896
3.70	0.316	26819.6	0.162	5.734
3.72	0.317	27004.5	0.162	5.572
3.74	0.318	27189.5	0.161	5.410
3.76	0.319	27374.5	0.161	5.249
3.78	0.320	27559.5	0.160	5.088
3.80	0.321	27744.4	0.160	4.927
3.82	0.322	27929.4	0.106	4.767
3.83	0.322	28052.7	0.053	4.661
3.84	0.323	28114.3	0.159	4.608
3.86	0.323	28299.1	0.159	4.449
3.88	0.324	28483.9	0.158	4.291
3.90	0.325	28668.7	0.157	4.132
3.92	0.330	28853.5	0.152	3.976
3.94	0.344	29038.3	0.145	3.824
3.96	0.365	29223.1	0.135	3.679
3.98	0.393	29407.8	0.125	3.543
4.00	0.428	29592.6	0.114	3.418
4.02	0.468	29776.9	0.104	3.304
4.04	0.513	29961.1	0.095	3.200
4.06	0.563	30145.4	0.087	3.105
4.08	0.616	30329.6	0.080	3.018
4.10	0.671	30513.9	0.073	2.938
4.12	0.727	30698.1	0.069	2.865
4.14	0.766	30882.3	0.065	2.796
4.16	0.797	31066.6	0.021	2.731
4.17	0.807	31128.0	0.042	2.710
4.18	0.827	31250.2	0.061	2.668
4.20	0.855	31433.6	0.059	2.608
4.22	0.884	31616.9	0.056	2.549
4.24	0.919	31800.2	0.054	2.493
4.26	0.958	31983.5	0.052	2.438
4.28	1.001	32166.9	0.050	2.386
4.30	1.048	32350.2	0.047	2.337
4.32	1.098	32533.5	0.030	2.289
4.33	1.133	32655.7	0.015	2.259
4.34	1.151	32716.4	0.043	2.244
4.36	1.206	32898.5	0.041	2.201
4.38	1.263	33080.5	0.039	2.160
4.40	1.322	33262.6	0.037	2.121
4.42	1.381	33444.6	0.036	2.083
4.44	1.426	33626.6	0.035	2.047
4.46	1.466	33808.7	0.034	2.012
4.48	1.505	33990.7	0.033	1.978
4.50	1.542	34172.8	0.032	1.945
4.52	1.577	34353.1	0.031	1.913
4.54	1.612	34533.5	0.031	1.882
4.56	1.645	34713.9	0.030	1.851
4.58	1.678	34894.2	0.030	1.821
4.60	1.709	35074.6	0.029	1.791
4.62	1.740	35255.0	0.029	1.762
4.64	1.770	35435.4	0.028	1.734
4.66	1.800	35615.7	0.009	1.705
4.67	1.810	35675.8	0.018	1.696
4.68	1.829	35794.7	0.027	1.678

Vault 1 Total Draw Down

4.70	1.857	35973.0	0.026	1.651
4.72	1.885	36151.3	0.026	1.625
4.74	1.912	36329.6	0.026	1.599
4.76	1.939	36508.0	0.025	1.573
4.78	1.965	36686.3	0.025	1.548
4.80	1.991	36864.6	0.025	1.522
4.82	2.017	37042.9	0.016	1.498
4.83	2.033	37161.8	0.008	1.481
4.84	2.042	37220.4	0.024	1.473
4.86	2.067	37396.2	0.023	1.450
4.88	2.091	37572.0	0.023	1.426
4.90	2.115	37747.9	0.023	1.403
4.92	2.139	37923.7	0.023	1.380
4.94	2.162	38099.6	0.022	1.357
4.96	2.185	38275.4	0.022	1.335
4.98	2.208	38451.2	0.022	1.313
5.00	2.231	38627.1	0.021	1.291
5.02	2.253	38800.0	0.021	1.269
5.04	2.275	38973.0	0.021	1.248
5.06	2.297	39145.9	0.021	1.227
5.08	2.319	39318.9	0.021	1.206
5.10	2.340	39491.8	0.020	1.185
5.12	2.361	39664.8	0.020	1.165
5.14	2.382	39837.7	0.020	1.145
5.16	2.403	40010.7	0.007	1.125
5.17	2.410	40068.3	0.013	1.118
5.18	2.423	40181.4	0.019	1.105
5.20	2.444	40351.0	0.019	1.086
5.22	2.464	40520.6	0.019	1.067
5.24	2.484	40690.2	0.019	1.047
5.26	2.504	40859.8	0.019	1.029
5.28	2.523	41029.4	0.019	1.010
5.30	2.543	41199.0	0.018	0.991
5.32	2.562	41368.6	0.012	0.973
5.33	2.575	41481.7	0.006	0.961
5.34	2.581	41537.0	0.018	0.955
5.36	2.600	41702.8	0.018	0.937
5.38	2.619	41868.6	0.018	0.919
5.40	2.637	42034.4	0.017	0.902
5.42	2.656	42200.2	0.017	0.884
5.44	2.674	42366.0	0.017	0.867
5.46	2.693	42531.7	0.017	0.850
5.48	2.711	42697.5	0.017	0.833
5.50	2.729	42863.3	0.016	0.816
5.52	2.746	43024.8	0.016	0.799
5.54	2.764	43186.3	0.016	0.783
5.56	2.782	43347.8	0.016	0.767
5.58	2.799	43509.3	0.016	0.751
5.60	2.817	43670.7	0.016	0.735
5.62	2.834	43832.2	0.016	0.719
5.64	2.851	43993.7	0.016	0.703
5.66	2.868	44155.2	0.005	0.688
5.67	2.874	44209.0	0.010	0.682
5.68	2.885	44313.4	0.015	0.672
5.70	2.902	44470.0	0.015	0.657
5.72	2.918	44626.6	0.015	0.642
5.74	2.935	44783.2	0.015	0.627
5.76	2.951	44939.8	0.015	0.613
5.78	2.968	45096.5	0.015	0.598
5.80	2.984	45253.1	0.015	0.583
5.82	3.000	45409.7	0.010	0.569
5.83	3.011	45514.1	0.005	0.559
5.84	3.016	45564.5	0.014	0.555
5.86	3.032	45715.6	0.014	0.541

Vault 1 Total Draw Down

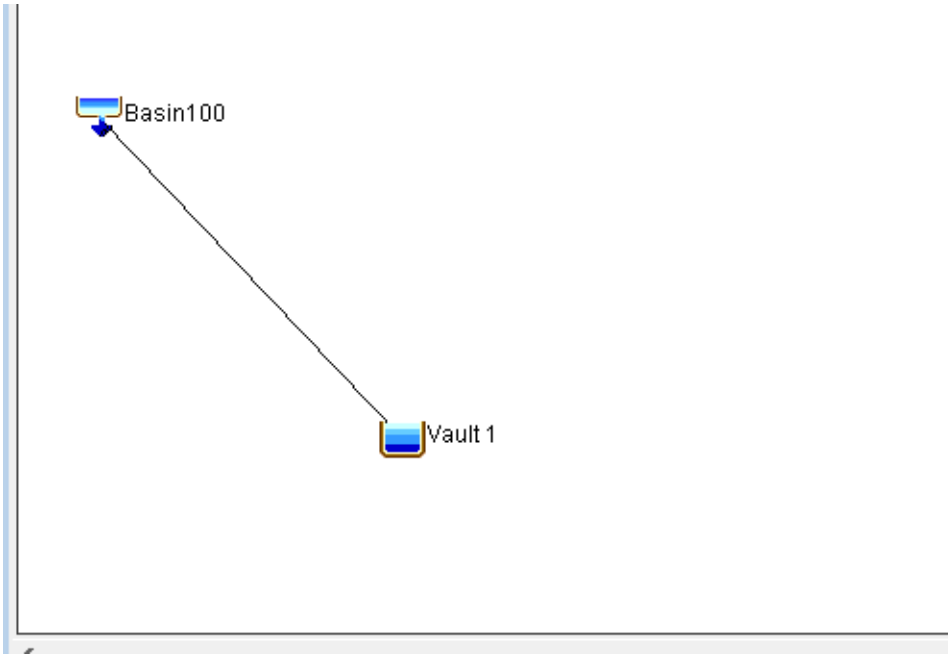
5.88	3.048	45866.8	0.014	0.527
5.90	3.064	46017.9	0.014	0.513
5.92	3.080	46169.0	0.014	0.499
5.94	3.095	46320.2	0.014	0.486
5.96	3.111	46471.3	0.013	0.472
5.98	3.127	46622.5	0.013	0.459
6.00	3.142	46773.6	0.013	0.445
6.02	3.171	46915.8	0.012	0.433
6.04	3.211	47057.9	0.012	0.421
6.06	3.259	47200.1	0.012	0.408
6.08	3.313	47342.2	0.012	0.396
6.10	3.372	47484.4	0.012	0.385
6.12	3.435	47626.6	0.011	0.373
6.14	3.503	47768.7	0.011	0.362
6.16	3.574	47910.9	0.005	0.350
6.17	3.611	47982.0	0.006	0.345
6.18	3.649	48053.9	0.011	0.339
6.20	3.727	48197.7	0.011	0.329
6.22	3.809	48341.6	0.010	0.318
6.24	3.893	48485.4	0.010	0.308
6.26	3.981	48629.3	0.010	0.297
6.28	4.071	48773.2	0.010	0.287
6.30	4.164	48917.0	0.009	0.278
6.32	4.260	49060.9	0.005	0.268
6.33	4.308	49132.8	0.004	0.264
6.34	4.358	49196.7	0.008	0.260
6.36	4.458	49324.4	0.008	0.251
6.38	4.561	49452.2	0.008	0.244
6.40	4.667	49579.9	0.008	0.236
6.42	4.774	49707.7	0.007	0.228
6.44	4.884	49835.5	0.007	0.221
6.46	4.996	49963.2	0.007	0.214
6.48	5.109	50091.0	0.007	0.207
6.50	5.225	50218.7	0.006	0.200
6.52	5.282	50337.8	0.006	0.194
6.54	5.330	50456.9	0.006	0.187
6.56	5.376	50576.0	0.006	0.181
6.58	5.422	50695.1	0.006	0.175
6.60	5.467	50814.2	0.006	0.169
6.62	5.512	50933.3	0.006	0.163
6.64	5.556	51052.4	0.006	0.157
6.66	5.600	51171.5	0.003	0.151
6.67	5.622	51231.0	0.003	0.148
6.68	5.643	51289.0	0.006	0.145
6.70	5.686	51405.0	0.006	0.140
6.72	5.728	51520.9	0.006	0.134
6.74	5.770	51636.9	0.006	0.128
6.76	5.811	51752.9	0.006	0.123
6.78	5.852	51868.8	0.005	0.117
6.80	5.892	51984.8	0.005	0.112
6.82	5.932	52100.7	0.003	0.106
6.83	5.952	52158.7	0.002	0.104
6.84	5.972	52207.5	0.005	0.101
6.86	6.011	52305.0	0.004	0.097
6.88	6.050	52402.5	0.004	0.092
6.90	6.089	52500.0	0.004	0.088
6.92	6.127	52597.5	0.004	0.083
6.94	6.165	52695.0	0.004	0.079
6.96	6.203	52792.5	0.004	0.075
6.98	6.240	52890.0	0.004	0.070
7.00	6.278	52987.5	0.004	0.066
7.02	6.314	53071.0	0.004	0.062
7.04	6.351	53154.4	0.004	0.059
7.06	6.387	53237.9	0.004	0.055

Vault 1 Total Draw Down

7.08	6.423	53321.4	0.004	0.051
7.10	6.459	53404.8	0.004	0.048
7.12	6.494	53488.3	0.004	0.044
7.14	6.530	53571.7	0.004	0.041
7.16	6.564	53655.2	0.002	0.037
7.17	6.582	53696.9	0.001	0.035
7.18	6.599	53731.7	0.003	0.034
7.20	6.634	53801.2	0.003	0.031
7.22	6.668	53870.7	0.003	0.028
7.24	6.702	53940.2	0.003	0.025
7.26	6.736	54009.7	0.003	0.022
7.28	6.770	54079.2	0.003	0.019
7.30	6.803	54148.7	0.003	0.017
7.32	6.836	54218.2	0.001	0.014
7.33	6.853	54252.9	0.001	0.012
7.34	6.869	54271.2	0.001	0.012
7.36	6.902	54307.8	0.001	0.010
7.38	6.935	54344.4	0.001	0.009
7.40	6.967	54381.0	0.001	0.007
7.42	7.000	54417.6	0.001	0.006
7.44	7.032	54454.2	0.001	0.004
7.46	7.064	54490.8	0.001	0.003
7.48	7.095	54527.4	0.001	0.001
7.50	7.127	54564.0		

Basin 100 to Vault HMP-1

HEC-HMS INPUT



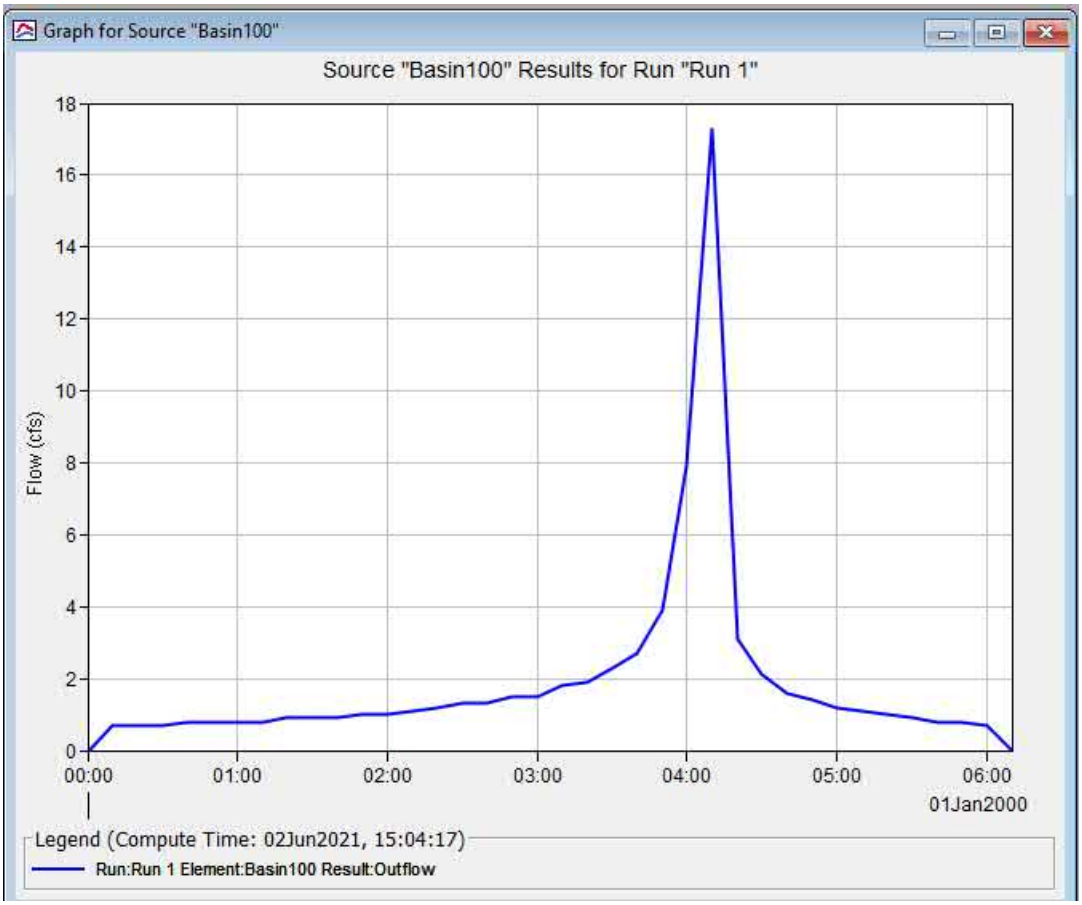
5-Year Detention

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 6/2/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 11.97 ACRES
RUNOFF COEFFICIENT 0.7
PEAK DISCHARGE 17.33 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.7
TIME (MIN) = 20	DISCHARGE (CFS) = 0.7
TIME (MIN) = 30	DISCHARGE (CFS) = 0.7
TIME (MIN) = 40	DISCHARGE (CFS) = 0.8
TIME (MIN) = 50	DISCHARGE (CFS) = 0.8
TIME (MIN) = 60	DISCHARGE (CFS) = 0.8
TIME (MIN) = 70	DISCHARGE (CFS) = 0.8
TIME (MIN) = 80	DISCHARGE (CFS) = 0.9
TIME (MIN) = 90	DISCHARGE (CFS) = 0.9
TIME (MIN) = 100	DISCHARGE (CFS) = 0.9
TIME (MIN) = 110	DISCHARGE (CFS) = 1
TIME (MIN) = 120	DISCHARGE (CFS) = 1
TIME (MIN) = 130	DISCHARGE (CFS) = 1.1
TIME (MIN) = 140	DISCHARGE (CFS) = 1.2
TIME (MIN) = 150	DISCHARGE (CFS) = 1.3
TIME (MIN) = 160	DISCHARGE (CFS) = 1.3
TIME (MIN) = 170	DISCHARGE (CFS) = 1.5
TIME (MIN) = 180	DISCHARGE (CFS) = 1.5
TIME (MIN) = 190	DISCHARGE (CFS) = 1.8
TIME (MIN) = 200	DISCHARGE (CFS) = 1.9
TIME (MIN) = 210	DISCHARGE (CFS) = 2.3
TIME (MIN) = 220	DISCHARGE (CFS) = 2.7
TIME (MIN) = 230	DISCHARGE (CFS) = 3.9
TIME (MIN) = 240	DISCHARGE (CFS) = 7.9
TIME (MIN) = 250	DISCHARGE (CFS) = 17.33
TIME (MIN) = 260	DISCHARGE (CFS) = 3.1
TIME (MIN) = 270	DISCHARGE (CFS) = 2.1
TIME (MIN) = 280	DISCHARGE (CFS) = 1.6
TIME (MIN) = 290	DISCHARGE (CFS) = 1.4
TIME (MIN) = 300	DISCHARGE (CFS) = 1.2
TIME (MIN) = 310	DISCHARGE (CFS) = 1.1
TIME (MIN) = 320	DISCHARGE (CFS) = 1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.9
TIME (MIN) = 340	DISCHARGE (CFS) = 0.8
TIME (MIN) = 350	DISCHARGE (CFS) = 0.8
TIME (MIN) = 360	DISCHARGE (CFS) = 0.7
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Inflow Vault – 5 Year



Inflow Vault – 5 Year

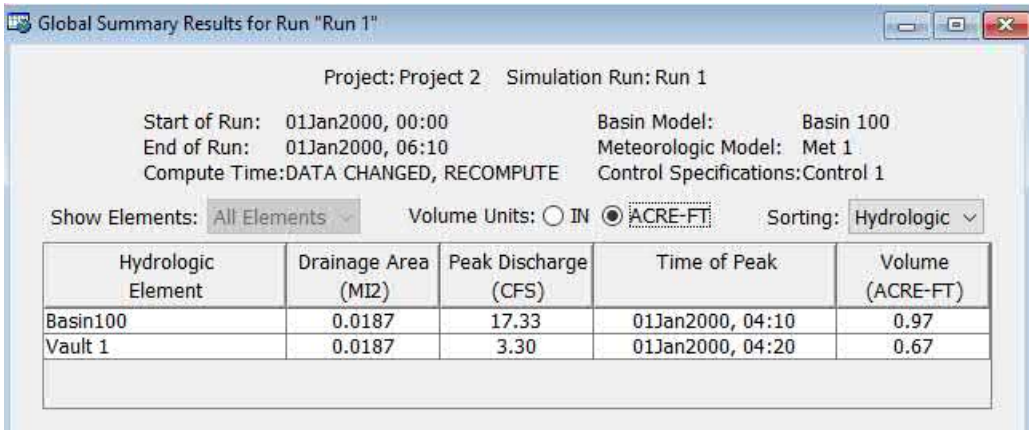
Time-Series Results for Source "Basin100"

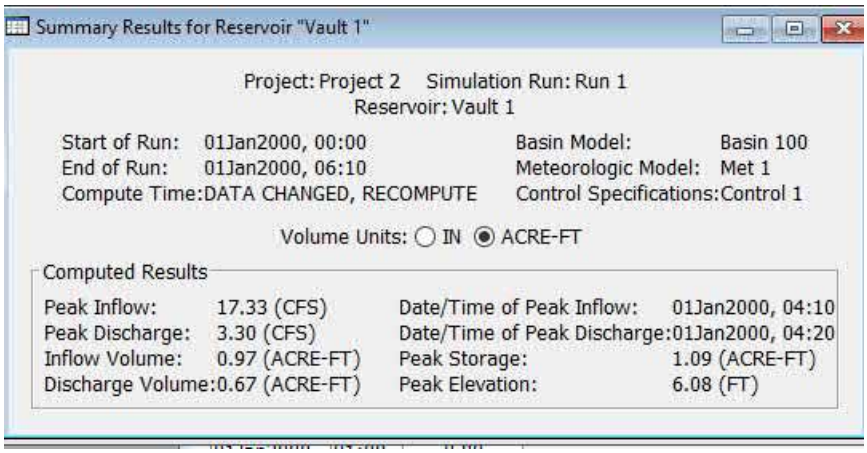
Project: Project 2 Simulation Run: Run 1
Source: Basin100

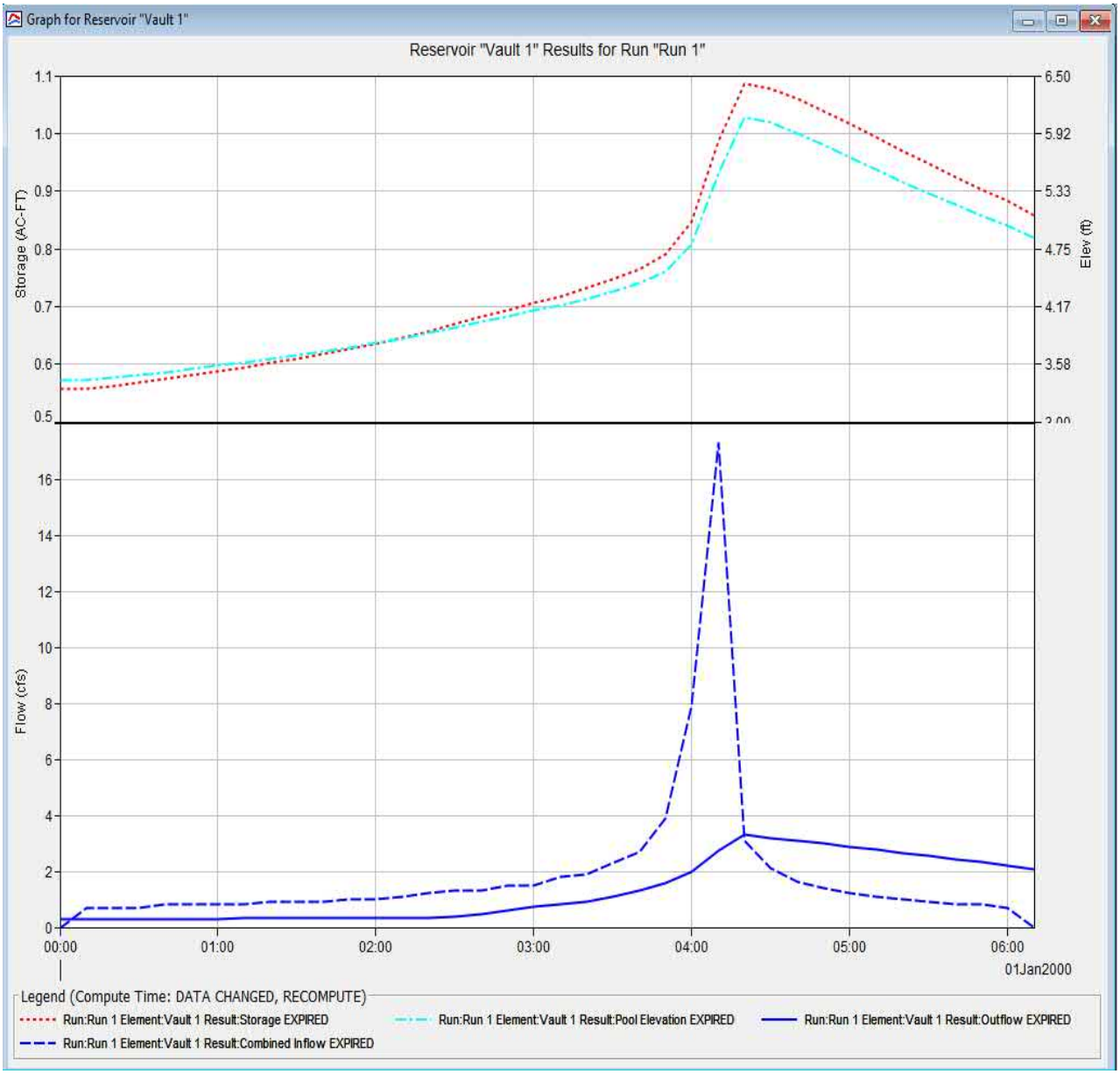
Start of Run: 01Jan2000, 00:00 Basin Model: Basin 100
End of Run: 01Jan2000, 06:10 Meteorologic Model: Met 1
Compute Time: 02Jun2021, 15:04:17 Control Specifications: Control 1

Date	Time	Discharge (CFS)
01Jan2000	00:00	0.00
01Jan2000	00:10	0.70
01Jan2000	00:20	0.70
01Jan2000	00:30	0.70
01Jan2000	00:40	0.80
01Jan2000	00:50	0.80
01Jan2000	01:00	0.80
01Jan2000	01:10	0.80
01Jan2000	01:20	0.90
01Jan2000	01:30	0.90
01Jan2000	01:40	0.90
01Jan2000	01:50	1.00
01Jan2000	02:00	1.00
01Jan2000	02:10	1.10
01Jan2000	02:20	1.20
01Jan2000	02:30	1.30
01Jan2000	02:40	1.30
01Jan2000	02:50	1.50
01Jan2000	03:00	1.50
01Jan2000	03:10	1.80
01Jan2000	03:20	1.90
01Jan2000	03:30	2.30
01Jan2000	03:40	2.70
01Jan2000	03:50	3.90
01Jan2000	04:00	7.90
01Jan2000	04:10	17.33
01Jan2000	04:20	3.10
01Jan2000	04:30	2.10
01Jan2000	04:40	1.60
01Jan2000	04:50	1.40
01Jan2000	05:00	1.20
01Jan2000	05:10	1.10
01Jan2000	05:20	1.00
01Jan2000	05:30	0.90
01Jan2000	05:40	0.80
01Jan2000	05:50	0.80
01Jan2000	06:00	0.70
01Jan2000	06:10	0.00

HEC-HMS RESULTS 5-Year






Graph for Reservoir "Vault 1"
Reservoir "Vault 1" Results for Run "Run 1"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
1.1
1.0
0.9
0.8
0.7
0.6
0.5
6.50
5.92
5.33
4.75
4.17
3.58
16
14
12
10
8
6
4
2
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: DATA CHANGED, RECOMPUTE)
Run:Run 1 Element:Vault 1 Result:Storage EXPIRED
Run:Run 1 Element:Vault 1 Result:Pool Elevation EXPIRED
Run:Run 1 Element:Vault 1 Result:Outflow EXPIRED
Run:Run 1 Element:Vault 1 Result:Combined Inflow EXPIRED

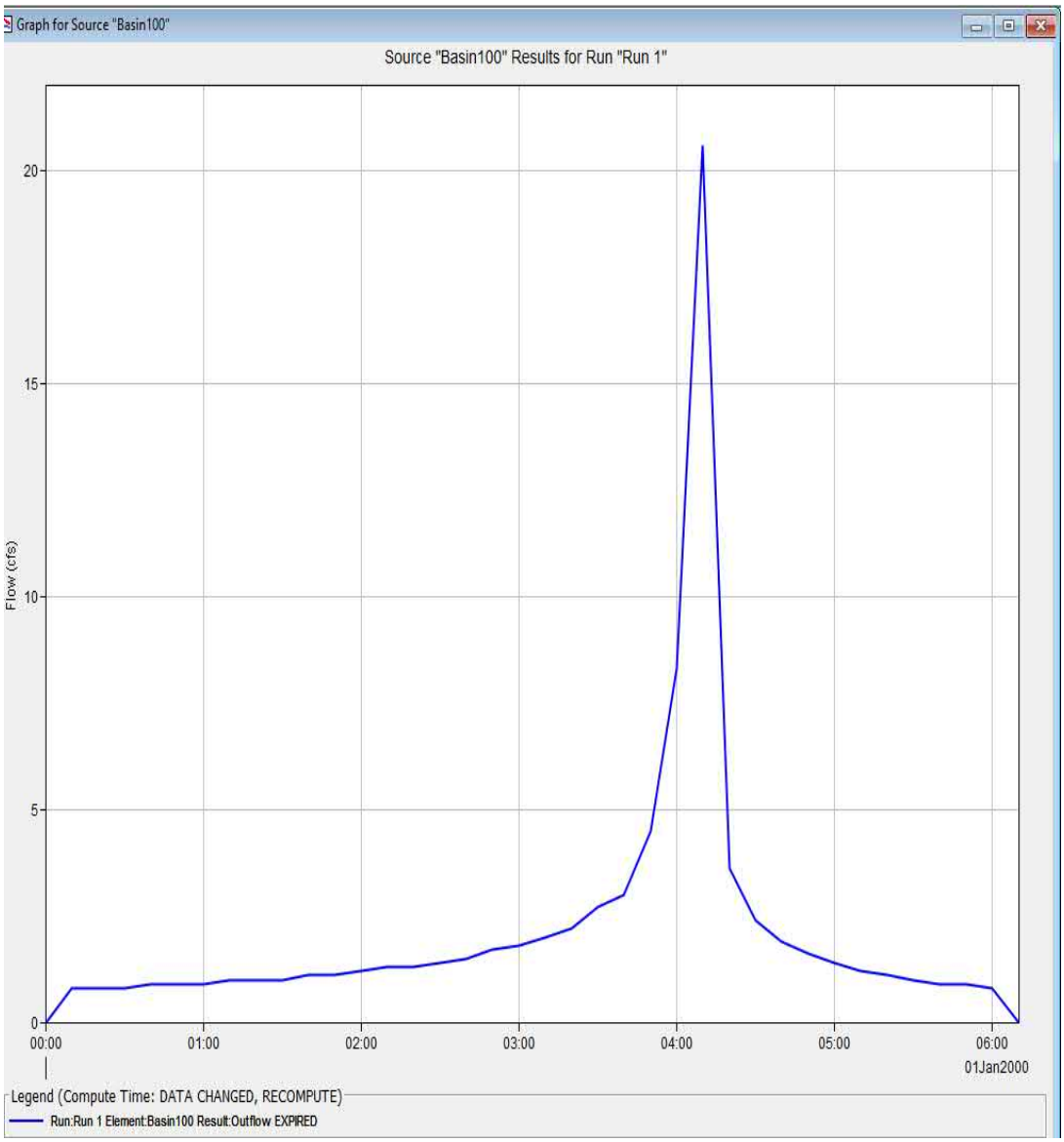
10-Year Detention

RATIONAL METHOD HYDROGRAPH PROGRAM

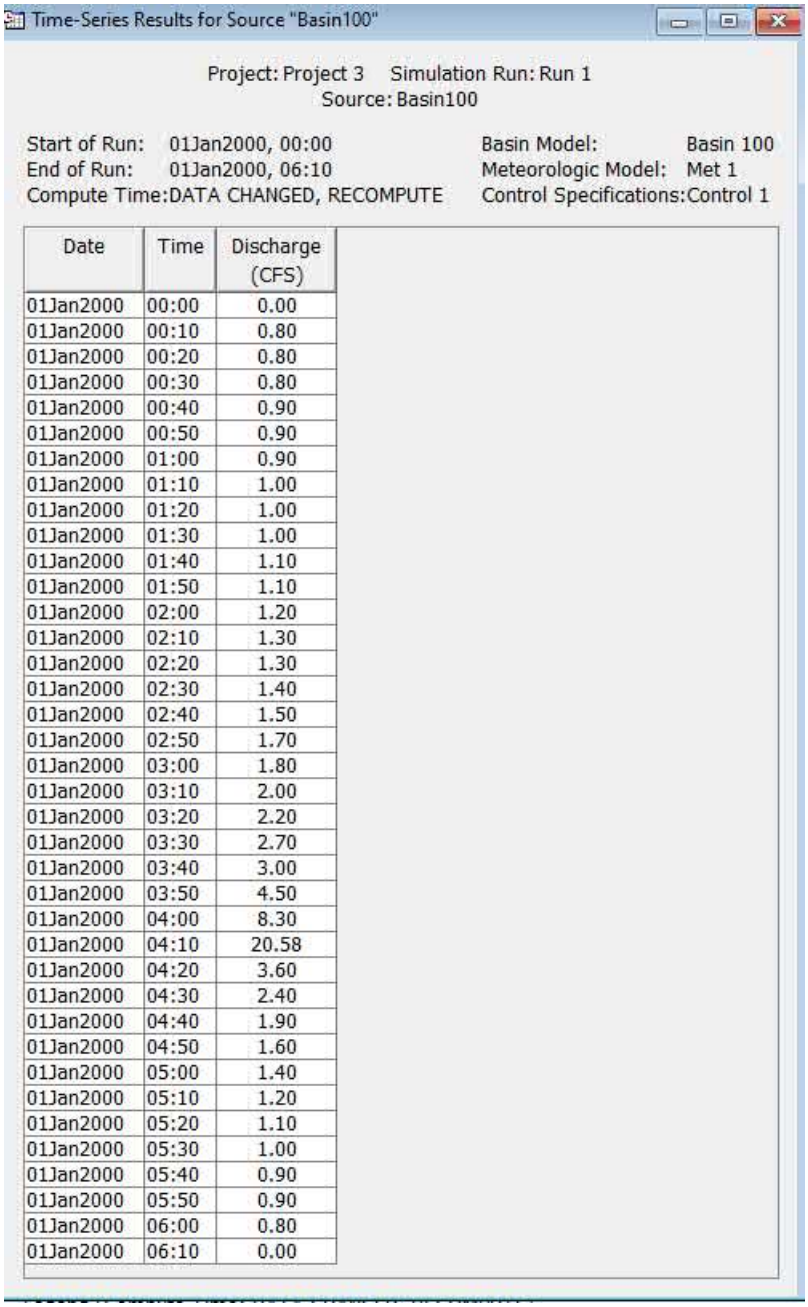
RUN DATE 6/2/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 1.6 INCHES
BASIN AREA 11.97 ACRES
RUNOFF COEFFICIENT 0.7
PEAK DISCHARGE 20.58 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.8
TIME (MIN) = 20	DISCHARGE (CFS) = 0.8
TIME (MIN) = 30	DISCHARGE (CFS) = 0.8
TIME (MIN) = 40	DISCHARGE (CFS) = 0.9
TIME (MIN) = 50	DISCHARGE (CFS) = 0.9
TIME (MIN) = 60	DISCHARGE (CFS) = 0.9
TIME (MIN) = 70	DISCHARGE (CFS) = 1
TIME (MIN) = 80	DISCHARGE (CFS) = 1
TIME (MIN) = 90	DISCHARGE (CFS) = 1
TIME (MIN) = 100	DISCHARGE (CFS) = 1.1
TIME (MIN) = 110	DISCHARGE (CFS) = 1.1
TIME (MIN) = 120	DISCHARGE (CFS) = 1.2
TIME (MIN) = 130	DISCHARGE (CFS) = 1.3
TIME (MIN) = 140	DISCHARGE (CFS) = 1.3
TIME (MIN) = 150	DISCHARGE (CFS) = 1.4
TIME (MIN) = 160	DISCHARGE (CFS) = 1.5
TIME (MIN) = 170	DISCHARGE (CFS) = 1.7
TIME (MIN) = 180	DISCHARGE (CFS) = 1.8
TIME (MIN) = 190	DISCHARGE (CFS) = 2
TIME (MIN) = 200	DISCHARGE (CFS) = 2.2
TIME (MIN) = 210	DISCHARGE (CFS) = 2.7
TIME (MIN) = 220	DISCHARGE (CFS) = 3
TIME (MIN) = 230	DISCHARGE (CFS) = 4.5
TIME (MIN) = 240	DISCHARGE (CFS) = 8.3
TIME (MIN) = 250	DISCHARGE (CFS) = 20.58
TIME (MIN) = 260	DISCHARGE (CFS) = 3.6
TIME (MIN) = 270	DISCHARGE (CFS) = 2.4
TIME (MIN) = 280	DISCHARGE (CFS) = 1.9
TIME (MIN) = 290	DISCHARGE (CFS) = 1.6
TIME (MIN) = 300	DISCHARGE (CFS) = 1.4
TIME (MIN) = 310	DISCHARGE (CFS) = 1.2
TIME (MIN) = 320	DISCHARGE (CFS) = 1.1
TIME (MIN) = 330	DISCHARGE (CFS) = 1
TIME (MIN) = 340	DISCHARGE (CFS) = 0.9
TIME (MIN) = 350	DISCHARGE (CFS) = 0.9
TIME (MIN) = 360	DISCHARGE (CFS) = 0.8
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Inflow Vault – 10 Year



Inflow Vault – 10 Year



Time-Series Results for Source "Basin100"

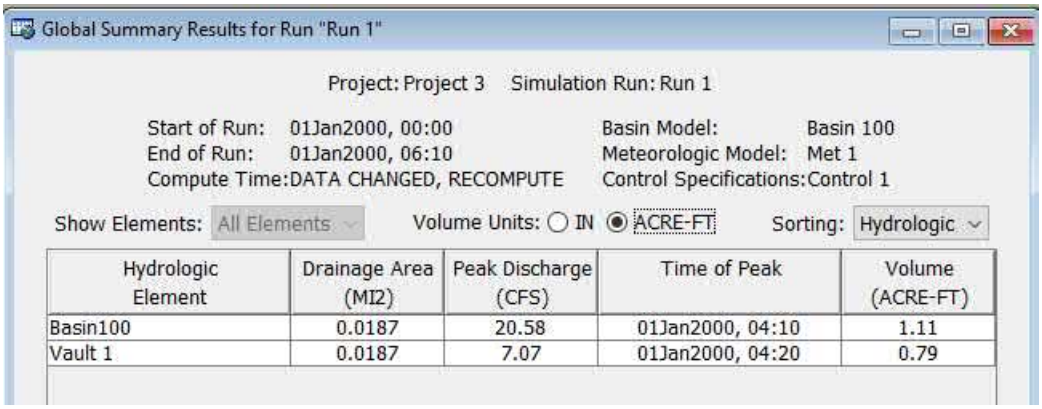
Project: Project 3 Simulation Run: Run 1
Source: Basin100

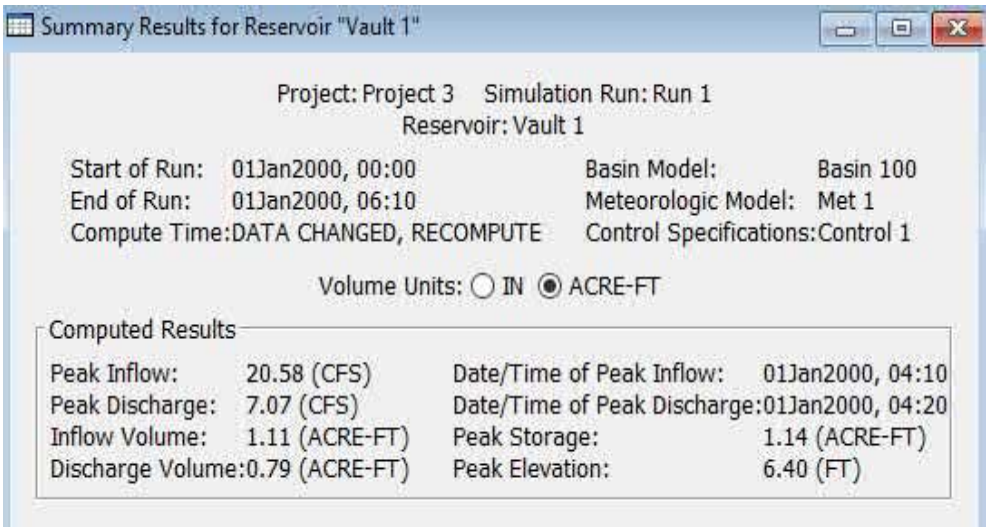
Start of Run: 01Jan2000, 00:00
End of Run: 01Jan2000, 06:10
Compute Time: DATA CHANGED, RECOMPUTE

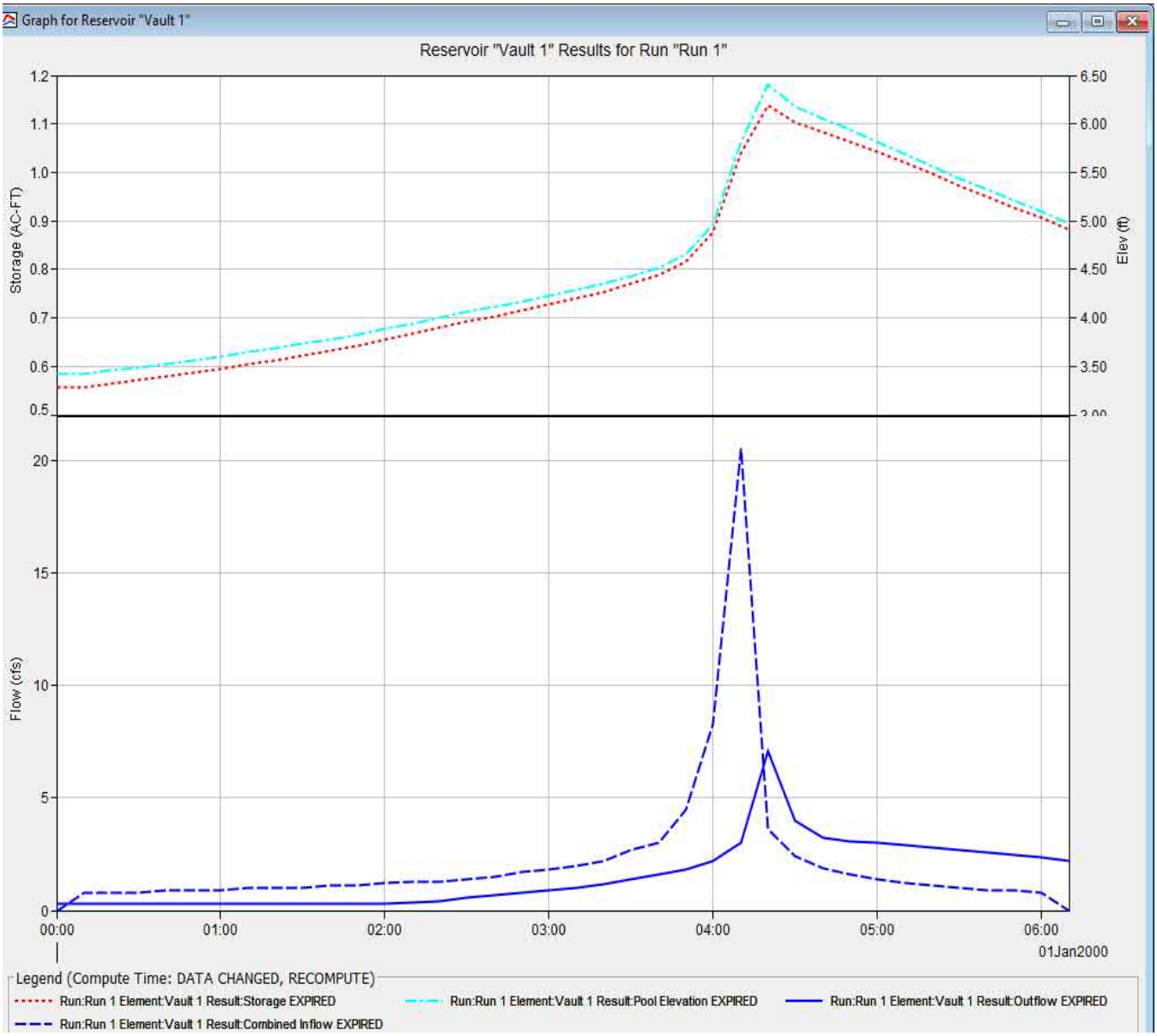
Basin Model: Basin 100
Meteorologic Model: Met 1
Control Specifications: Control 1

Date	Time	Discharge (CFS)
01Jan2000	00:00	0.00
01Jan2000	00:10	0.80
01Jan2000	00:20	0.80
01Jan2000	00:30	0.80
01Jan2000	00:40	0.90
01Jan2000	00:50	0.90
01Jan2000	01:00	0.90
01Jan2000	01:10	1.00
01Jan2000	01:20	1.00
01Jan2000	01:30	1.00
01Jan2000	01:40	1.10
01Jan2000	01:50	1.10
01Jan2000	02:00	1.20
01Jan2000	02:10	1.30
01Jan2000	02:20	1.30
01Jan2000	02:30	1.40
01Jan2000	02:40	1.50
01Jan2000	02:50	1.70
01Jan2000	03:00	1.80
01Jan2000	03:10	2.00
01Jan2000	03:20	2.20
01Jan2000	03:30	2.70
01Jan2000	03:40	3.00
01Jan2000	03:50	4.50
01Jan2000	04:00	8.30
01Jan2000	04:10	20.58
01Jan2000	04:20	3.60
01Jan2000	04:30	2.40
01Jan2000	04:40	1.90
01Jan2000	04:50	1.60
01Jan2000	05:00	1.40
01Jan2000	05:10	1.20
01Jan2000	05:20	1.10
01Jan2000	05:30	1.00
01Jan2000	05:40	0.90
01Jan2000	05:50	0.90
01Jan2000	06:00	0.80
01Jan2000	06:10	0.00

HEC-HMS RESULTS 10-Year






Graph for Reservoir "Vault 1"
Reservoir "Vault 1" Results for Run "Run 1"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
6.50
6.00
5.50
5.00
4.50
4.00
3.50
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: DATA CHANGED, RECOMPUTE)
Run:Run 1 Element:Vault 1 Result:Storage EXPIRED
Run:Run 1 Element:Vault 1 Result:Pool Elevation EXPIRED
Run:Run 1 Element:Vault 1 Result:Outflow EXPIRED
Run:Run 1 Element:Vault 1 Result:Combined Inflow EXPIRED

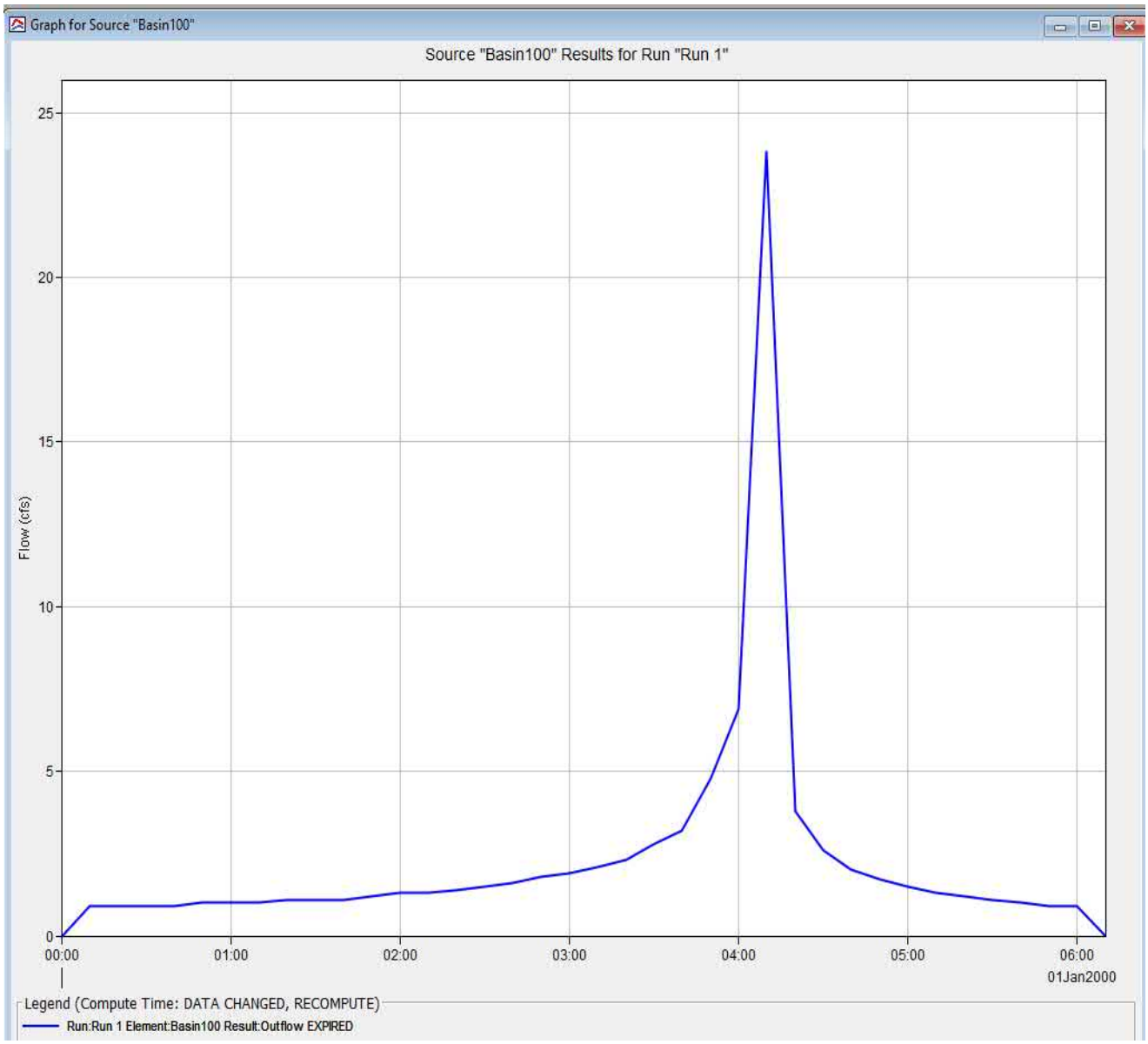
25-Year Detention

RATIONAL METHOD HYDROGRAPH PROGRAM

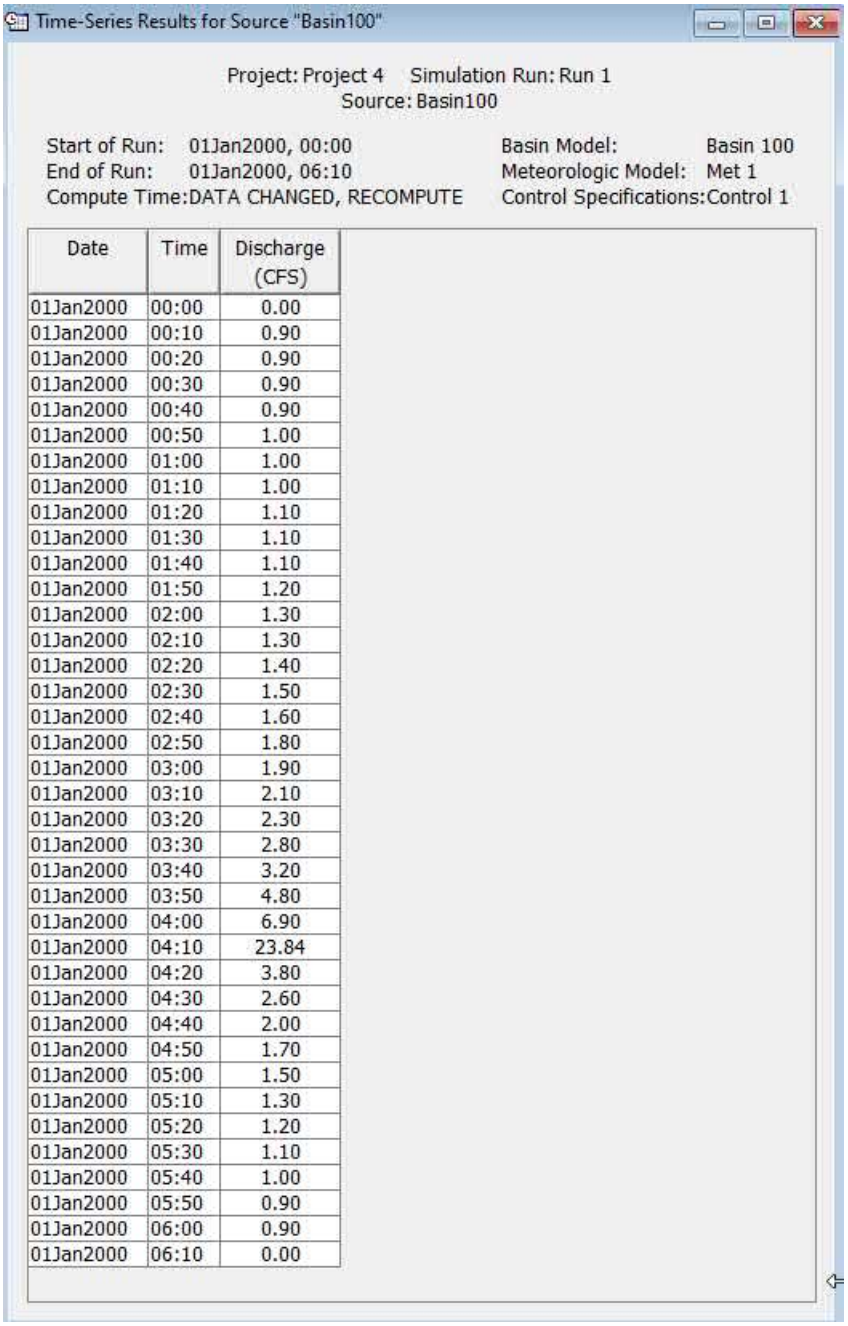
RUN DATE 6/2/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 1.7 INCHES
BASIN AREA 11.97 ACRES
RUNOFF COEFFICIENT 0.7
PEAK DISCHARGE 23.84 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.9
TIME (MIN) = 20	DISCHARGE (CFS) = 0.9
TIME (MIN) = 30	DISCHARGE (CFS) = 0.9
TIME (MIN) = 40	DISCHARGE (CFS) = 0.9
TIME (MIN) = 50	DISCHARGE (CFS) = 1
TIME (MIN) = 60	DISCHARGE (CFS) = 1
TIME (MIN) = 70	DISCHARGE (CFS) = 1
TIME (MIN) = 80	DISCHARGE (CFS) = 1.1
TIME (MIN) = 90	DISCHARGE (CFS) = 1.1
TIME (MIN) = 100	DISCHARGE (CFS) = 1.1
TIME (MIN) = 110	DISCHARGE (CFS) = 1.2
TIME (MIN) = 120	DISCHARGE (CFS) = 1.3
TIME (MIN) = 130	DISCHARGE (CFS) = 1.3
TIME (MIN) = 140	DISCHARGE (CFS) = 1.4
TIME (MIN) = 150	DISCHARGE (CFS) = 1.5
TIME (MIN) = 160	DISCHARGE (CFS) = 1.6
TIME (MIN) = 170	DISCHARGE (CFS) = 1.8
TIME (MIN) = 180	DISCHARGE (CFS) = 1.9
TIME (MIN) = 190	DISCHARGE (CFS) = 2.1
TIME (MIN) = 200	DISCHARGE (CFS) = 2.3
TIME (MIN) = 210	DISCHARGE (CFS) = 2.8
TIME (MIN) = 220	DISCHARGE (CFS) = 3.2
TIME (MIN) = 230	DISCHARGE (CFS) = 4.8
TIME (MIN) = 240	DISCHARGE (CFS) = 6.9
TIME (MIN) = 250	DISCHARGE (CFS) = 23.84
TIME (MIN) = 260	DISCHARGE (CFS) = 3.8
TIME (MIN) = 270	DISCHARGE (CFS) = 2.6
TIME (MIN) = 280	DISCHARGE (CFS) = 2
TIME (MIN) = 290	DISCHARGE (CFS) = 1.7
TIME (MIN) = 300	DISCHARGE (CFS) = 1.5
TIME (MIN) = 310	DISCHARGE (CFS) = 1.3
TIME (MIN) = 320	DISCHARGE (CFS) = 1.2
TIME (MIN) = 330	DISCHARGE (CFS) = 1.1
TIME (MIN) = 340	DISCHARGE (CFS) = 1
TIME (MIN) = 350	DISCHARGE (CFS) = 0.9
TIME (MIN) = 360	DISCHARGE (CFS) = 0.9
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Inflow Vault – 25 Year



Inflow Vault – 25 Year



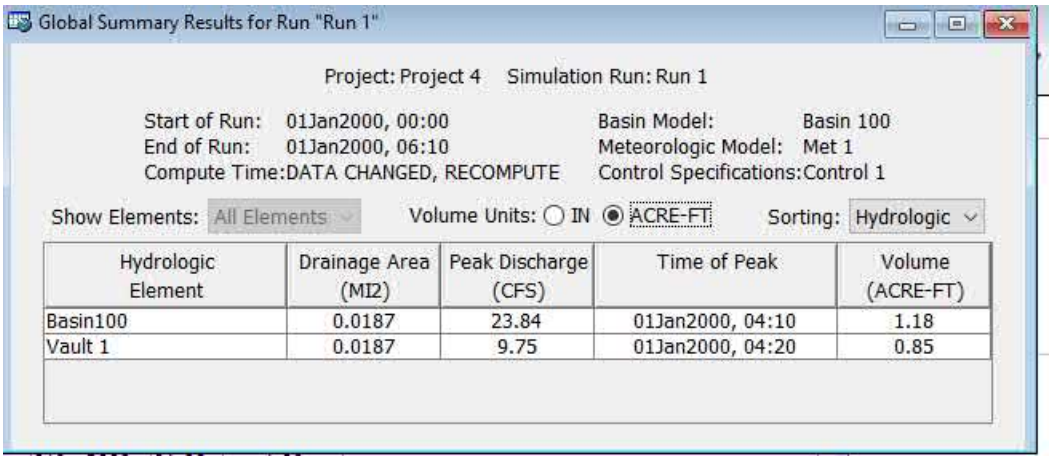
Time-Series Results for Source "Basin100"

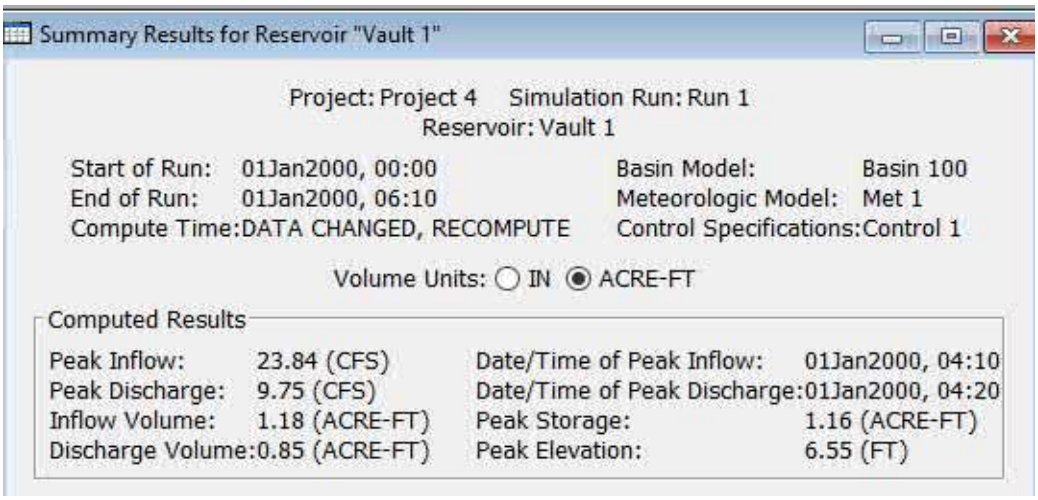
Project: Project 4 Simulation Run: Run 1
Source: Basin100

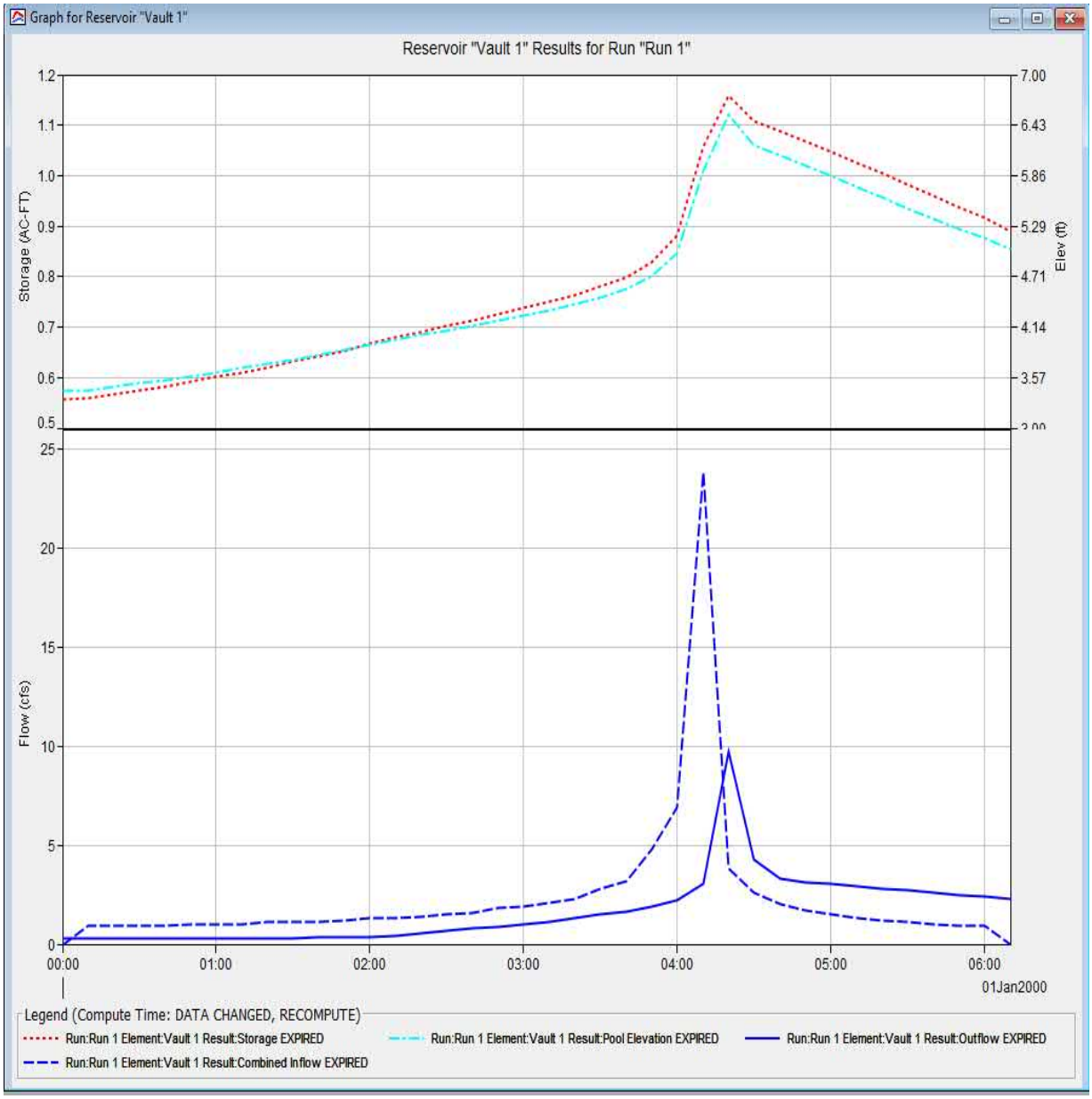
Start of Run: 01Jan2000, 00:00
End of Run: 01Jan2000, 06:10
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: Basin 100
Meteorologic Model: Met 1
Control Specifications: Control 1

Date	Time	Discharge (CFS)
01Jan2000	00:00	0.00
01Jan2000	00:10	0.90
01Jan2000	00:20	0.90
01Jan2000	00:30	0.90
01Jan2000	00:40	0.90
01Jan2000	00:50	1.00
01Jan2000	01:00	1.00
01Jan2000	01:10	1.00
01Jan2000	01:20	1.10
01Jan2000	01:30	1.10
01Jan2000	01:40	1.10
01Jan2000	01:50	1.20
01Jan2000	02:00	1.30
01Jan2000	02:10	1.30
01Jan2000	02:20	1.40
01Jan2000	02:30	1.50
01Jan2000	02:40	1.60
01Jan2000	02:50	1.80
01Jan2000	03:00	1.90
01Jan2000	03:10	2.10
01Jan2000	03:20	2.30
01Jan2000	03:30	2.80
01Jan2000	03:40	3.20
01Jan2000	03:50	4.80
01Jan2000	04:00	6.90
01Jan2000	04:10	23.84
01Jan2000	04:20	3.80
01Jan2000	04:30	2.60
01Jan2000	04:40	2.00
01Jan2000	04:50	1.70
01Jan2000	05:00	1.50
01Jan2000	05:10	1.30
01Jan2000	05:20	1.20
01Jan2000	05:30	1.10
01Jan2000	05:40	1.00
01Jan2000	05:50	0.90
01Jan2000	06:00	0.90
01Jan2000	06:10	0.00

HEC-HMS RESULTS 25-Year






Graph for Reservoir "Vault 1"
Reservoir "Vault 1" Results for Run "Run 1"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
7.00
6.43
5.86
5.29
4.71
4.14
3.57
25
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: DATA CHANGED, RECOMPUTE)
Run:Run 1 Element:Vault 1 Result:Storage EXPIRED
Run:Run 1 Element:Vault 1 Result:Pool Elevation EXPIRED
Run:Run 1 Element:Vault 1 Result:Outflow EXPIRED
Run:Run 1 Element:Vault 1 Result:Combined Inflow EXPIRED

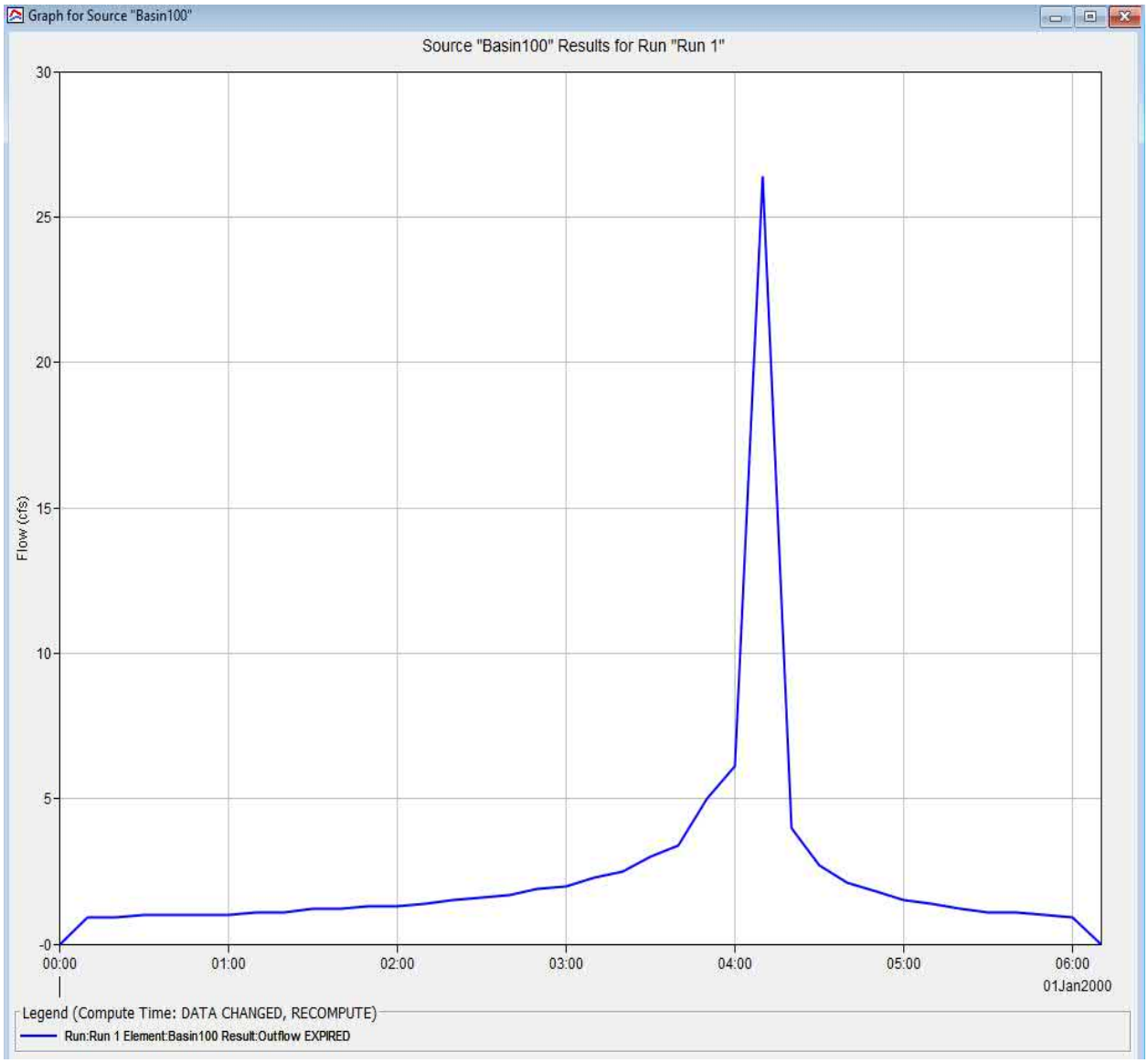
50-Year Detention

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 6/2/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 1.8 INCHES
BASIN AREA 11.97 ACRES
RUNOFF COEFFICIENT 0.7
PEAK DISCHARGE 26.41 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0.9
TIME (MIN) = 20	DISCHARGE (CFS) = 0.9
TIME (MIN) = 30	DISCHARGE (CFS) = 1
TIME (MIN) = 40	DISCHARGE (CFS) = 1
TIME (MIN) = 50	DISCHARGE (CFS) = 1
TIME (MIN) = 60	DISCHARGE (CFS) = 1
TIME (MIN) = 70	DISCHARGE (CFS) = 1.1
TIME (MIN) = 80	DISCHARGE (CFS) = 1.1
TIME (MIN) = 90	DISCHARGE (CFS) = 1.2
TIME (MIN) = 100	DISCHARGE (CFS) = 1.2
TIME (MIN) = 110	DISCHARGE (CFS) = 1.3
TIME (MIN) = 120	DISCHARGE (CFS) = 1.3
TIME (MIN) = 130	DISCHARGE (CFS) = 1.4
TIME (MIN) = 140	DISCHARGE (CFS) = 1.5
TIME (MIN) = 150	DISCHARGE (CFS) = 1.6
TIME (MIN) = 160	DISCHARGE (CFS) = 1.7
TIME (MIN) = 170	DISCHARGE (CFS) = 1.9
TIME (MIN) = 180	DISCHARGE (CFS) = 2
TIME (MIN) = 190	DISCHARGE (CFS) = 2.3
TIME (MIN) = 200	DISCHARGE (CFS) = 2.5
TIME (MIN) = 210	DISCHARGE (CFS) = 3
TIME (MIN) = 220	DISCHARGE (CFS) = 3.4
TIME (MIN) = 230	DISCHARGE (CFS) = 5
TIME (MIN) = 240	DISCHARGE (CFS) = 6.1
TIME (MIN) = 250	DISCHARGE (CFS) = 26.41
TIME (MIN) = 260	DISCHARGE (CFS) = 4
TIME (MIN) = 270	DISCHARGE (CFS) = 2.7
TIME (MIN) = 280	DISCHARGE (CFS) = 2.1
TIME (MIN) = 290	DISCHARGE (CFS) = 1.8
TIME (MIN) = 300	DISCHARGE (CFS) = 1.5
TIME (MIN) = 310	DISCHARGE (CFS) = 1.4
TIME (MIN) = 320	DISCHARGE (CFS) = 1.2
TIME (MIN) = 330	DISCHARGE (CFS) = 1.1
TIME (MIN) = 340	DISCHARGE (CFS) = 1.1
TIME (MIN) = 350	DISCHARGE (CFS) = 1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.9
TIME (MIN) = 370	DISCHARGE (CFS) = 0

Inflow Vault – 50 Year



Inflow Vault – 50 Year

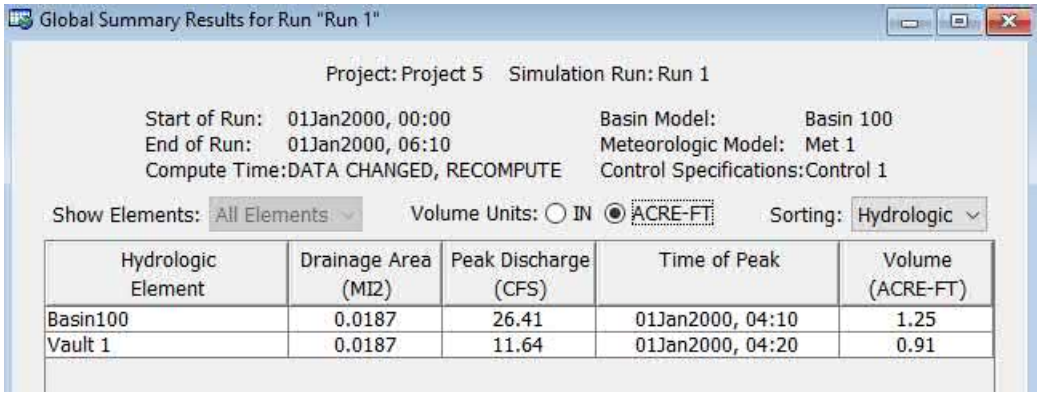
Time-Series Results for Source "Basin100"

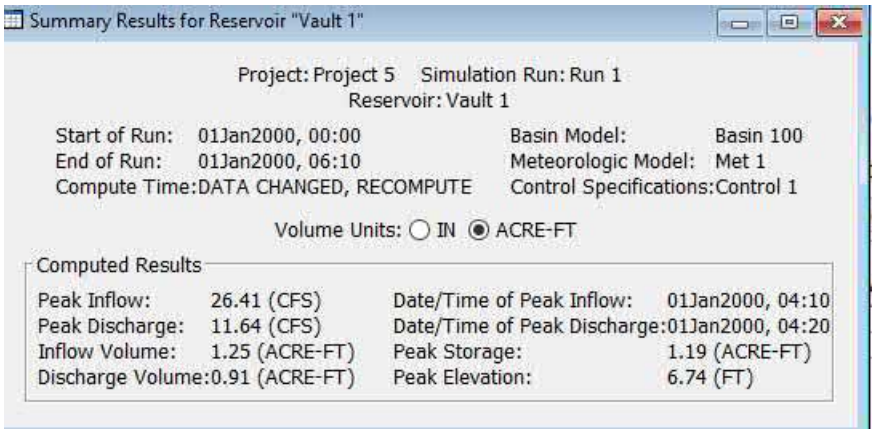
Project: Project 5 Simulation Run: Run 1
Source: Basin100

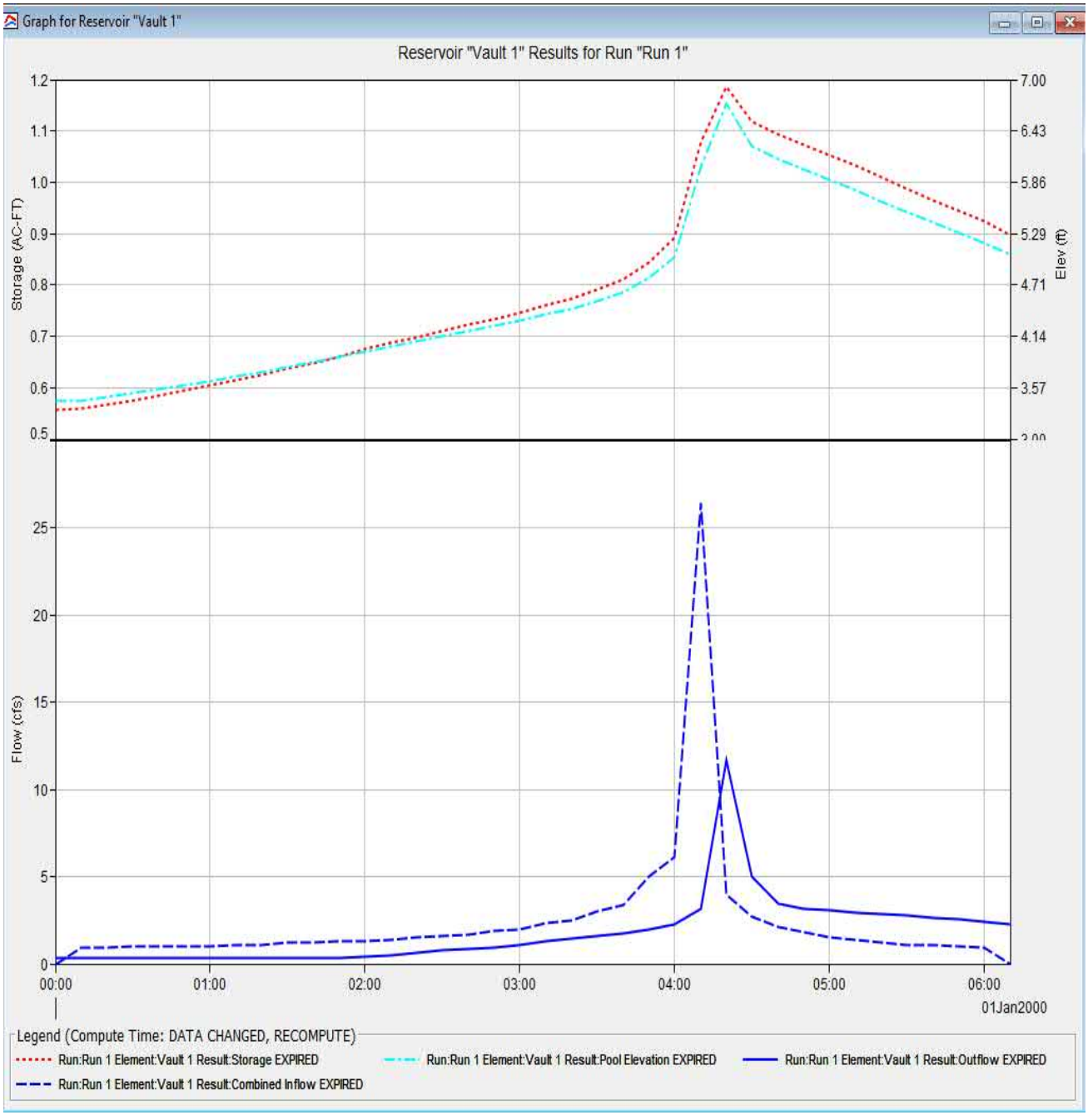
Start of Run: 01Jan2000, 00:00
End of Run: 01Jan2000, 06:10
Compute Time: DATA CHANGED, RECOMPUTE
Basin Model: Basin 100
Meteorologic Model: Met 1
Control Specifications: Control 1

Date	Time	Discharge (CFS)
01Jan2000	00:00	0.00
01Jan2000	00:10	0.90
01Jan2000	00:20	0.90
01Jan2000	00:30	1.00
01Jan2000	00:40	1.00
01Jan2000	00:50	1.00
01Jan2000	01:00	1.00
01Jan2000	01:10	1.10
01Jan2000	01:20	1.10
01Jan2000	01:30	1.20
01Jan2000	01:40	1.20
01Jan2000	01:50	1.30
01Jan2000	02:00	1.30
01Jan2000	02:10	1.40
01Jan2000	02:20	1.50
01Jan2000	02:30	1.60
01Jan2000	02:40	1.70
01Jan2000	02:50	1.90
01Jan2000	03:00	2.00
01Jan2000	03:10	2.30
01Jan2000	03:20	2.50
01Jan2000	03:30	3.00
01Jan2000	03:40	3.40
01Jan2000	03:50	5.00
01Jan2000	04:00	6.10
01Jan2000	04:10	26.41
01Jan2000	04:20	4.00
01Jan2000	04:30	2.70
01Jan2000	04:40	2.10
01Jan2000	04:50	1.80
01Jan2000	05:00	1.50
01Jan2000	05:10	1.40
01Jan2000	05:20	1.20
01Jan2000	05:30	1.10
01Jan2000	05:40	1.10
01Jan2000	05:50	1.00
01Jan2000	06:00	0.90
01Jan2000	06:10	0.00

HEC-HMS RESULTS 50-Year






Graph for Reservoir "Vault 1"
Reservoir "Vault 1" Results for Run "Run 1"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
7.00
6.43
5.86
5.29
4.71
4.14
3.57
25
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: DATA CHANGED, RECOMPUTE)
Run:Run 1 Element:Vault 1 Result:Storage EXPIRED
Run:Run 1 Element:Vault 1 Result:Pool Elevation EXPIRED
Run:Run 1 Element:Vault 1 Result:Outflow EXPIRED
Run:Run 1 Element:Vault 1 Result:Combined Inflow EXPIRED

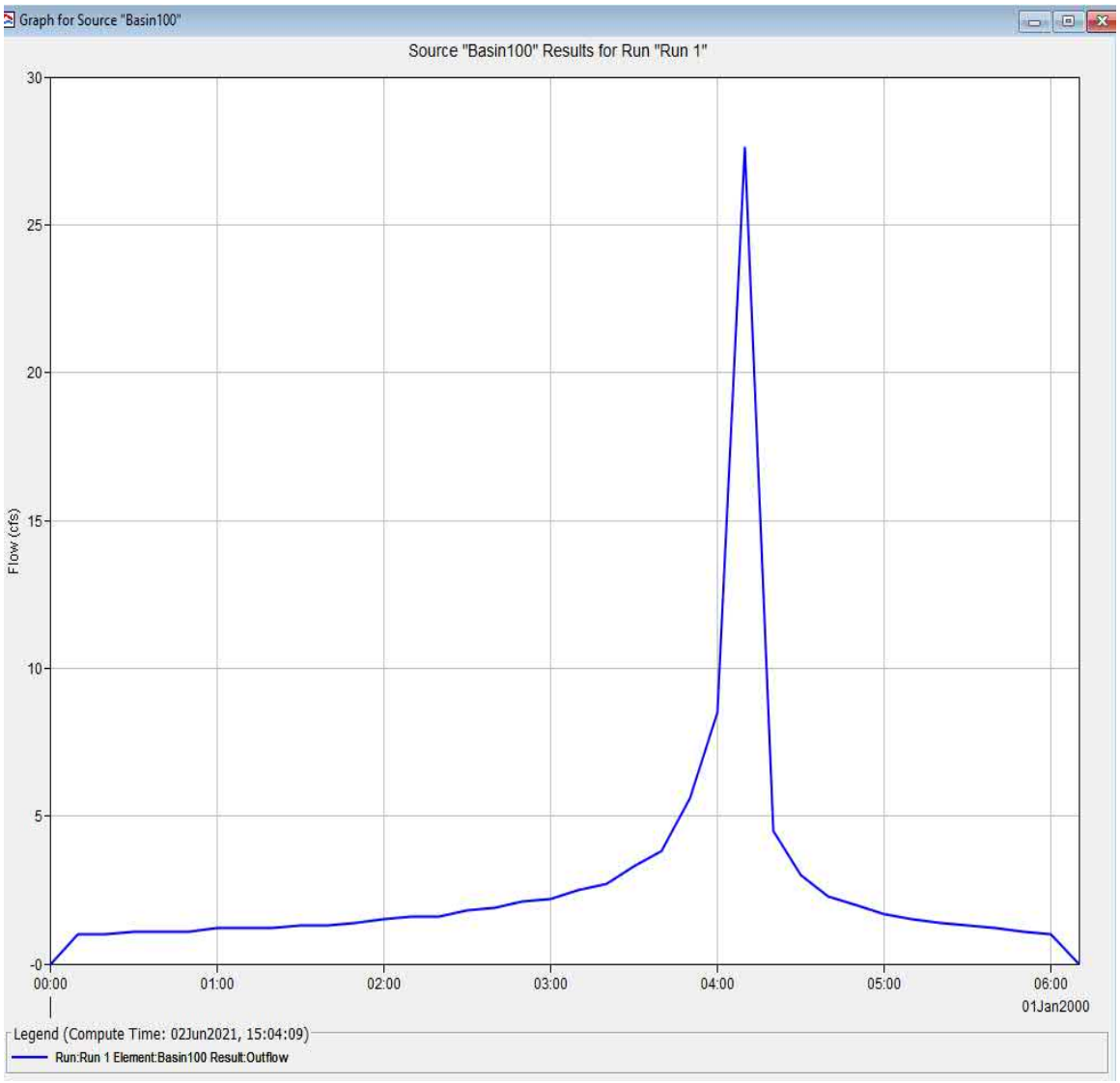
100-Year Detention

RATIONAL METHOD HYDROGRAPH PROGRAM

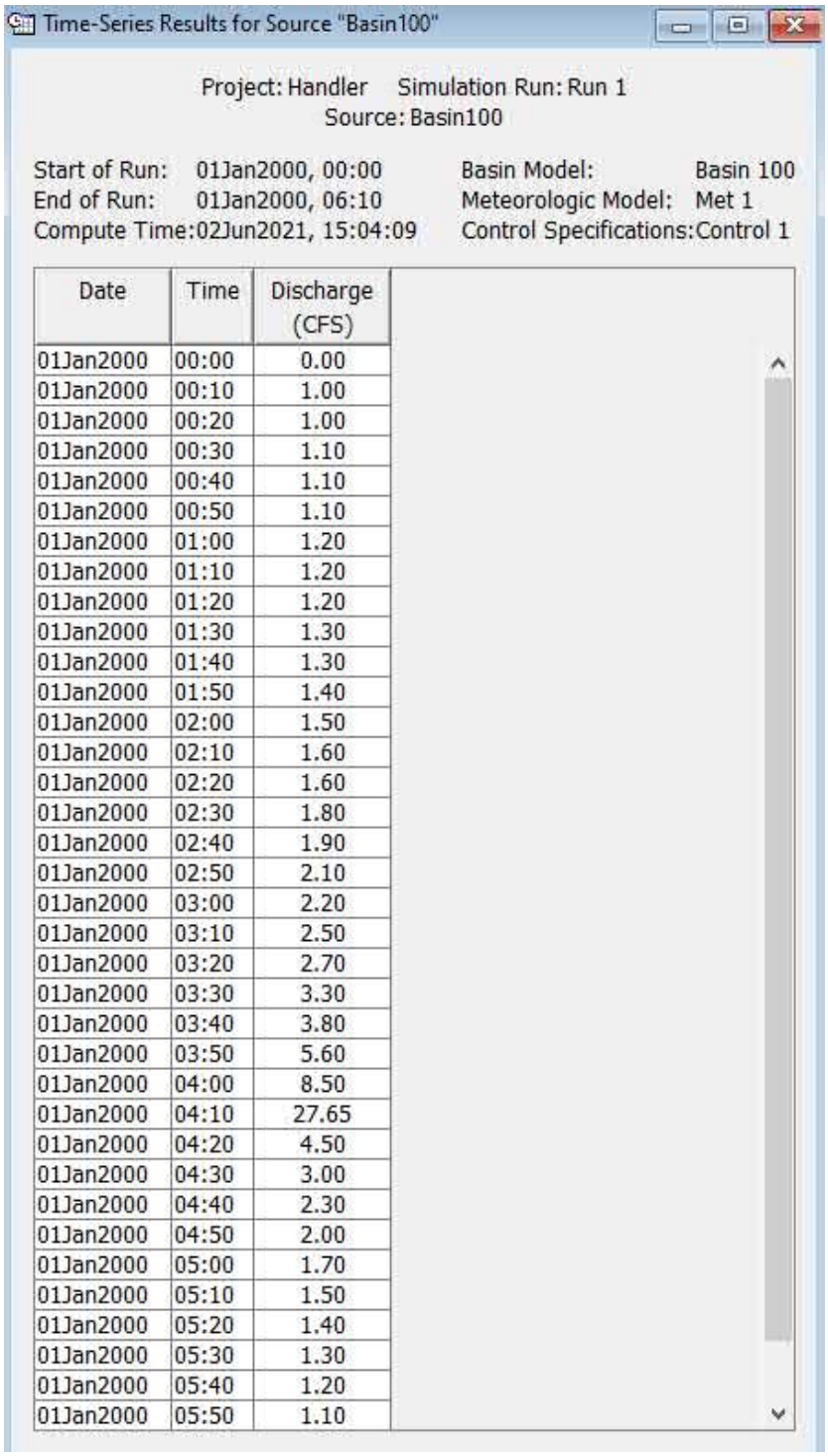
RUN DATE 6/1/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 10 MIN.
6 HOUR RAINFALL 2 INCHES
BASIN AREA 11.97 ACRES
RUNOFF COEFFICIENT 0.7
PEAK DISCHARGE 27.65 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 1
TIME (MIN) = 20	DISCHARGE (CFS) = 1
TIME (MIN) = 30	DISCHARGE (CFS) = 1.1
TIME (MIN) = 40	DISCHARGE (CFS) = 1.1
TIME (MIN) = 50	DISCHARGE (CFS) = 1.1
TIME (MIN) = 60	DISCHARGE (CFS) = 1.2
TIME (MIN) = 70	DISCHARGE (CFS) = 1.2
TIME (MIN) = 80	DISCHARGE (CFS) = 1.2
TIME (MIN) = 90	DISCHARGE (CFS) = 1.3
TIME (MIN) = 100	DISCHARGE (CFS) = 1.3
TIME (MIN) = 110	DISCHARGE (CFS) = 1.4
TIME (MIN) = 120	DISCHARGE (CFS) = 1.5
TIME (MIN) = 130	DISCHARGE (CFS) = 1.6
TIME (MIN) = 140	DISCHARGE (CFS) = 1.6
TIME (MIN) = 150	DISCHARGE (CFS) = 1.8
TIME (MIN) = 160	DISCHARGE (CFS) = 1.9
TIME (MIN) = 170	DISCHARGE (CFS) = 2.1
TIME (MIN) = 180	DISCHARGE (CFS) = 2.2
TIME (MIN) = 190	DISCHARGE (CFS) = 2.5
TIME (MIN) = 200	DISCHARGE (CFS) = 2.7
TIME (MIN) = 210	DISCHARGE (CFS) = 3.3
TIME (MIN) = 220	DISCHARGE (CFS) = 3.8
TIME (MIN) = 230	DISCHARGE (CFS) = 5.6
TIME (MIN) = 240	DISCHARGE (CFS) = 8.5
TIME (MIN) = 250	DISCHARGE (CFS) = 27.65
TIME (MIN) = 260	DISCHARGE (CFS) = 4.5
TIME (MIN) = 270	DISCHARGE (CFS) = 3
TIME (MIN) = 280	DISCHARGE (CFS) = 2.3
TIME (MIN) = 290	DISCHARGE (CFS) = 2
TIME (MIN) = 300	DISCHARGE (CFS) = 1.7
TIME (MIN) = 310	DISCHARGE (CFS) = 1.5
TIME (MIN) = 320	DISCHARGE (CFS) = 1.4
TIME (MIN) = 330	DISCHARGE (CFS) = 1.3
TIME (MIN) = 340	DISCHARGE (CFS) = 1.2
TIME (MIN) = 350	DISCHARGE (CFS) = 1.1
TIME (MIN) = 360	DISCHARGE (CFS) = 1
TIME (MIN) = 370	DISCHARGE (CFS) = 0

HEC-HMS Inflow 100-year



HEC-HMS Inflow 100-year



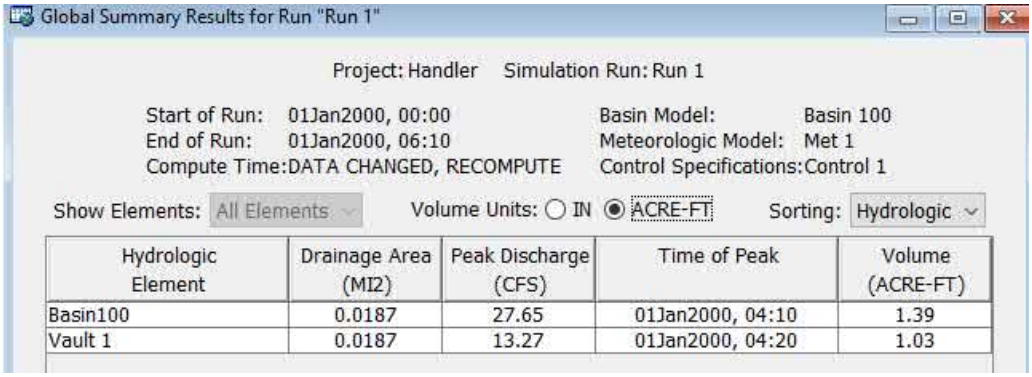
Time-Series Results for Source "Basin100"

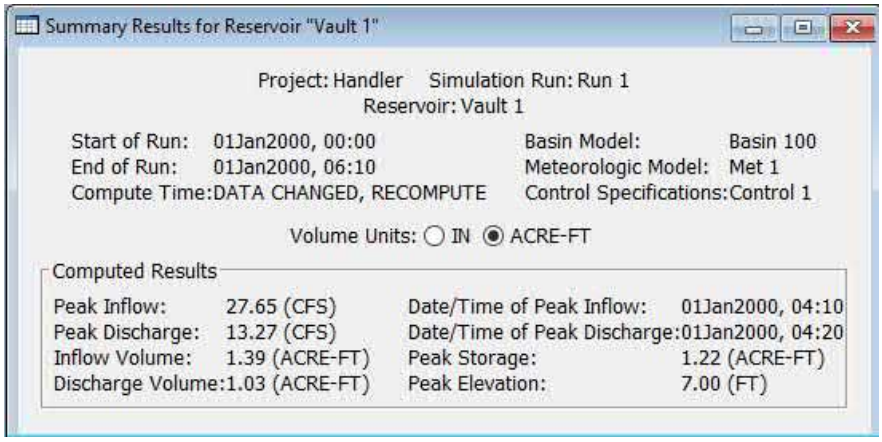
Project: Handler Simulation Run: Run 1
Source: Basin100

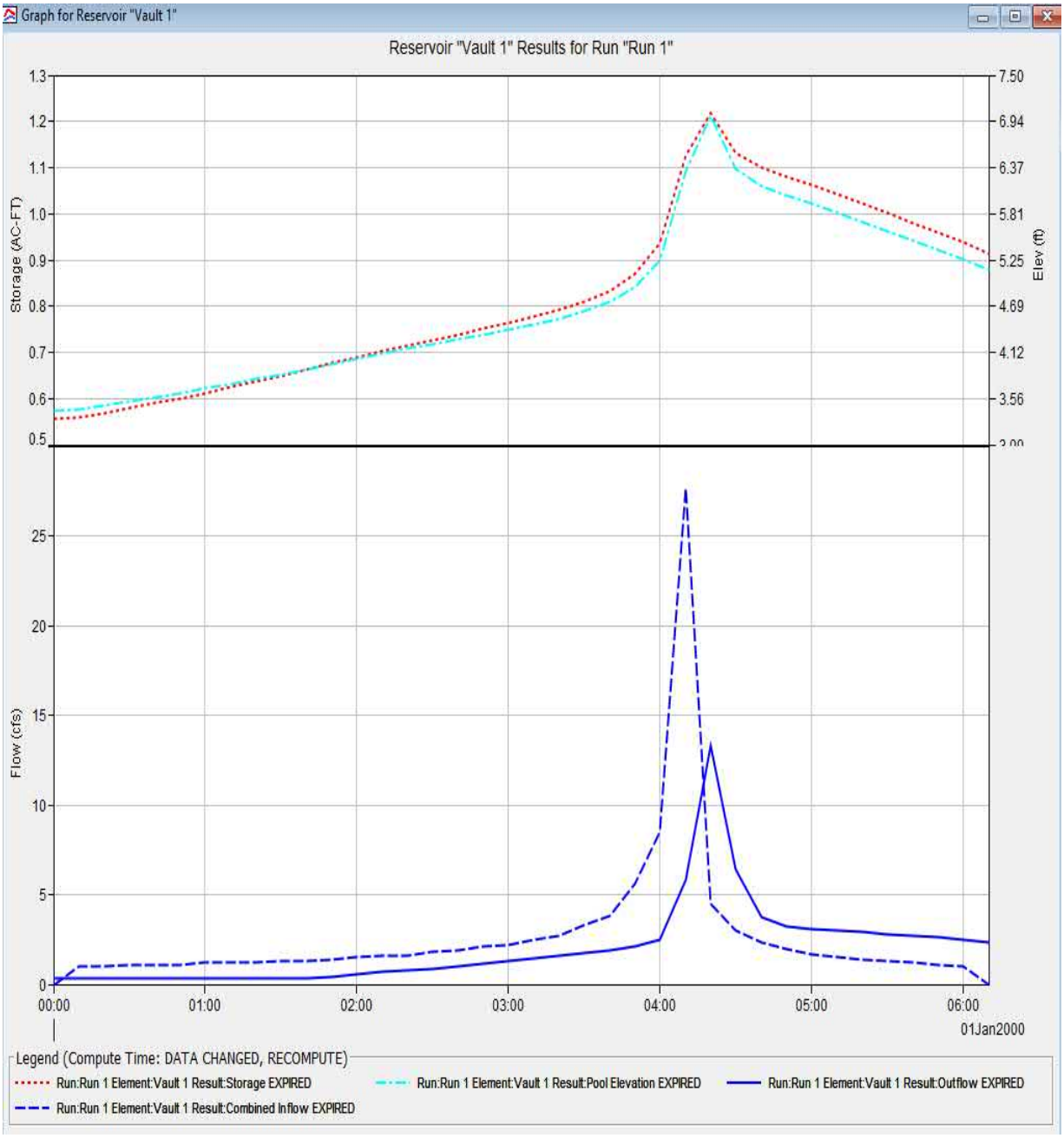
Start of Run: 01Jan2000, 00:00 Basin Model: Basin 100
End of Run: 01Jan2000, 06:10 Meteorologic Model: Met 1
Compute Time: 02Jun2021, 15:04:09 Control Specifications: Control 1

Date	Time	Discharge (CFS)
01Jan2000	00:00	0.00
01Jan2000	00:10	1.00
01Jan2000	00:20	1.00
01Jan2000	00:30	1.10
01Jan2000	00:40	1.10
01Jan2000	00:50	1.10
01Jan2000	01:00	1.20
01Jan2000	01:10	1.20
01Jan2000	01:20	1.20
01Jan2000	01:30	1.30
01Jan2000	01:40	1.30
01Jan2000	01:50	1.40
01Jan2000	02:00	1.50
01Jan2000	02:10	1.60
01Jan2000	02:20	1.60
01Jan2000	02:30	1.80
01Jan2000	02:40	1.90
01Jan2000	02:50	2.10
01Jan2000	03:00	2.20
01Jan2000	03:10	2.50
01Jan2000	03:20	2.70
01Jan2000	03:30	3.30
01Jan2000	03:40	3.80
01Jan2000	03:50	5.60
01Jan2000	04:00	8.50
01Jan2000	04:10	27.65
01Jan2000	04:20	4.50
01Jan2000	04:30	3.00
01Jan2000	04:40	2.30
01Jan2000	04:50	2.00
01Jan2000	05:00	1.70
01Jan2000	05:10	1.50
01Jan2000	05:20	1.40
01Jan2000	05:30	1.30
01Jan2000	05:40	1.20
01Jan2000	05:50	1.10

HEC-HMS RESULTS 100-Year

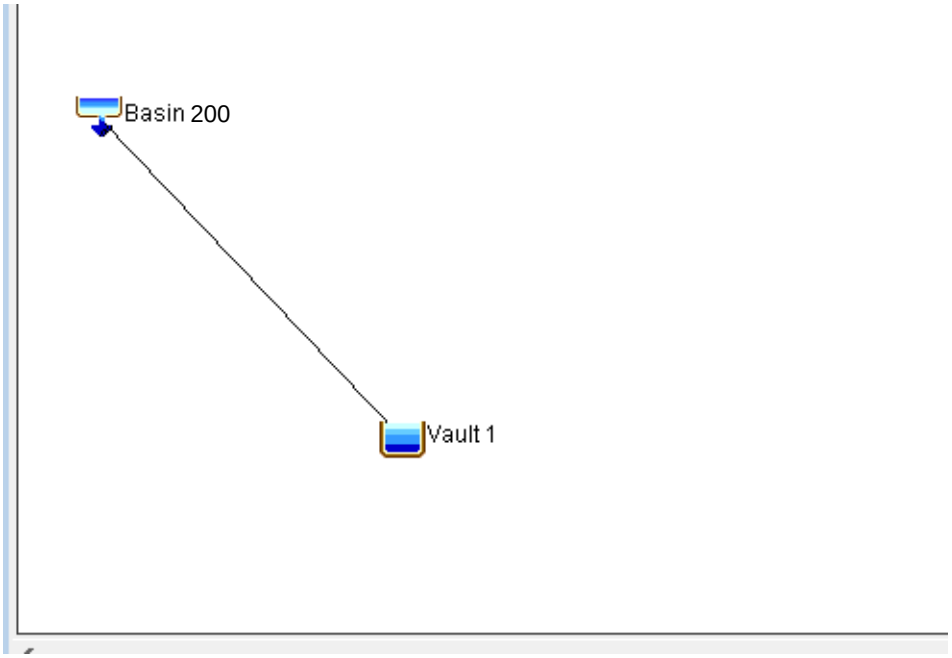





Graph for Reservoir "Vault 1"
Reservoir "Vault 1" Results for Run "Run 1"
Storage (AC-FT)
Elev (ft)
Flow (cfs)
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
7.50
6.94
6.37
5.81
5.25
4.69
4.12
3.56
25
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
01Jan2000
Legend (Compute Time: DATA CHANGED, RECOMPUTE)
Run:Run 1 Element:Vault 1 Result:Storage EXPIRED
Run:Run 1 Element:Vault 1 Result:Pool Elevation EXPIRED
Run:Run 1 Element:Vault 1 Result:Outflow EXPIRED
Run:Run 1 Element:Vault 1 Result:Combined Inflow EXPIRED

Basin 200 to HMP-2 HEC-

HMS INPUT



BF-1-2- HMP-2

Discharge vs Elevation Table

Bottom orifice diameter:	0.65 "	Top orifice diameter:	1 "
Number:	1	Number:	7
Cg-low:	0.61	Cg-low:	0.61
invert elev:	0.50 ft	invert elev:	2.00 ft
Middle orifice diameter:	1 "	Emergency weir:	3'X1.916' Type G
number of orif:	4	Invert:	3.00 ft
Cg-middle:	0.61	Area	5.75 sq ft
invert elev:	1.20 ft	Circumference	9.832 ft

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Q emergency (cfs)	Qtot (cfs)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00000
0.55	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00156
0.60	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00305
0.65	2.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00395
0.70	3.69	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00469
0.75	4.62	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00533
0.80	5.54	0.00	0.00	0.00	0.01	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00589
0.85	6.46	0.00	0.00	0.00	0.01	0.19	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00641
0.90	7.38	0.00	0.00	0.00	0.01	0.46	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00689
0.95	8.31	0.00	0.00	0.00	0.01	0.96	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00734
1.00	9.23	0.00	0.00	0.00	0.01	1.82	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00776
1.05	10.15	0.00	0.00	0.00	0.01	3.19	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00816
1.10	11.08	0.00	0.00	0.00	0.01	5.27	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00854
1.15	12.00	0.00	0.00	0.00	0.01	8.30	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00890
1.20	12.92	0.00	0.00	0.00	0.01	12.56	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00925
1.25	13.85	0.60	0.00	0.00	0.01	18.41	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01819
1.30	14.77	1.20	0.00	0.00	0.01	26.25	0.01	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.03571
1.35	15.69	1.80	0.00	0.00	0.01	36.52	0.01	0.04	0.05	0.04	0.00	0.00	0.00	0.00	0.04538
1.40	16.62	2.40	0.00	0.00	0.01	49.77	0.01	0.04	0.06	0.04	0.00	0.00	0.00	0.00	0.05304
1.45	17.54	3.00	0.00	0.00	0.01	66.59	0.01	0.05	0.06	0.05	0.00	0.00	0.00	0.00	0.05958
1.50	18.46	3.60	0.00	0.00	0.01	87.65	0.01	0.05	0.07	0.05	0.00	0.00	0.00	0.00	0.06541
1.55	19.38	4.20	0.00	0.00	0.01	113.71	0.01	0.06	0.12	0.06	0.00	0.00	0.00	0.00	0.07071
1.60	20.31	4.80	0.00	0.00	0.01	145.60	0.01	0.06	0.29	0.06	0.00	0.00	0.00	0.00	0.07561
1.65	21.23	5.40	0.00	0.00	0.01	184.24	0.01	0.07	0.66	0.07	0.00	0.00	0.00	0.00	0.08020
1.70	22.15	6.00	0.00	0.00	0.01	230.66	0.01	0.07	1.38	0.07	0.00	0.00	0.00	0.00	0.08452
1.75	23.08	6.60	0.00	0.00	0.01	285.97	0.01	0.08	2.62	0.08	0.00	0.00	0.00	0.00	0.08862
1.80	24.00	7.20	0.00	0.00	0.01	351.38	0.01	0.08	4.62	0.08	0.00	0.00	0.00	0.00	0.09253
1.85	24.92	7.80	0.00	0.00	0.01	428.21	0.01	0.08	7.66	0.08	0.00	0.00	0.00	0.00	0.09627

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Q emergency (cfs)	Qtot (cfs)
1.90	25.85	8.40	0.00	0.00	0.01	517.89	0.01	0.09	12.11	0.09	0.00	0.00	0.00	0.00	0.09987
1.95	26.77	9.00	0.00	0.00	0.01	621.98	0.01	0.09	18.38	0.09	0.00	0.00	0.00	0.00	0.10334
2.00	27.69	9.60	0.00	0.00	0.01	742.12	0.01	0.09	26.97	0.09	0.00	0.00	0.00	0.00	0.10669
2.05	28.62	10.20	0.60	0.00	0.01	880.12	0.01	0.10	38.46	0.10	0.02	0.02	0.00	0.00	0.12499
2.10	29.54	10.80	1.20	0.00	0.01	1037.89	0.01	0.10	53.51	0.10	0.05	0.05	0.00	0.00	0.15823
2.15	30.46	11.40	1.80	0.00	0.01	1217.47	0.01	0.10	72.88	0.10	0.06	0.08	0.00	0.00	0.17767
2.20	31.38	12.00	2.40	0.00	0.01	1421.05	0.01	0.10	97.42	0.10	0.07	0.10	0.00	0.00	0.19351
2.25	32.31	12.60	3.00	0.00	0.01	1650.95	0.01	0.11	128.10	0.11	0.09	0.10	0.00	0.00	0.20735
2.30	33.23	13.20	3.60	0.00	0.02	1909.64	0.02	0.11	166.00	0.11	0.09	0.12	0.00	0.00	0.21988
2.35	34.15	13.80	4.20	0.00	0.02	2199.75	0.02	0.11	212.29	0.11	0.10	0.21	0.00	0.00	0.23144
2.40	35.08	14.40	4.80	0.00	0.02	2524.04	0.02	0.11	268.30	0.11	0.11	0.50	0.00	0.00	0.24226
2.45	36.00	15.00	5.40	0.00	0.02	2885.45	0.02	0.12	335.47	0.12	0.12	1.15	0.00	0.00	0.25247
2.50	36.92	15.60	6.00	0.00	0.02	3287.07	0.02	0.12	415.37	0.12	0.13	2.41	0.00	0.00	0.26217
2.55	37.85	16.20	6.60	0.00	0.02	3732.17	0.02	0.12	509.71	0.12	0.13	4.58	0.00	0.00	0.27145
2.60	38.77	16.80	7.20	0.00	0.02	4224.18	0.02	0.12	620.37	0.12	0.14	8.08	0.00	0.00	0.28036
2.65	39.69	17.40	7.80	0.00	0.02	4766.71	0.02	0.13	749.37	0.13	0.15	13.41	0.00	0.00	0.28895
2.70	40.62	18.00	8.40	0.00	0.02	5363.55	0.02	0.13	898.86	0.13	0.15	21.20	0.00	0.00	0.29724
2.75	41.54	18.60	9.00	0.00	0.02	6018.68	0.02	0.13	1071.21	0.13	0.16	32.17	0.00	0.00	0.30528
2.80	42.46	19.20	9.60	0.00	0.02	6736.25	0.02	0.13	1268.92	0.13	0.16	47.20	0.00	0.00	0.31308
2.85	43.38	19.80	10.20	0.00	0.02	7520.64	0.02	0.14	1494.68	0.14	0.17	67.30	0.00	0.00	0.32067
2.90	44.31	20.40	10.80	0.00	0.02	8376.39	0.02	0.14	1751.36	0.14	0.17	93.64	0.00	0.00	0.32806
2.95	45.23	21.00	11.40	0.00	0.02	9308.26	0.02	0.14	2042.03	0.14	0.18	127.53	0.00	0.00	0.33527
3.00	46.15	21.60	12.00	0.00	0.02	10321.23	0.02	0.14	2369.93	0.14	0.18	170.49	0.00	0.00	0.34231
3.05	47.08	22.20	12.60	0.10	0.02	11420.46	0.02	0.14	2738.53	0.14	0.19	224.18	0.00	0.21	0.56321
3.10	48.00	22.80	13.20	0.21	0.02	12611.35	0.02	0.15	3151.48	0.15	0.19	290.50	0.00	0.61	0.96124
3.15	48.92	23.40	13.80	0.31	0.02	13899.51	0.02	0.15	3612.67	0.15	0.20	371.51	0.00	1.11	1.47454
3.20	49.85	24.00	14.40	0.42	0.02	15290.78	0.02	0.15	4126.18	0.15	0.20	469.53	0.00	1.71	2.08105
3.25	50.77	24.60	15.00	0.52	0.02	16791.22	0.02	0.15	4696.34	0.15	0.21	587.07	0.00	2.39	2.76801
3.30	51.69	25.20	15.60	0.63	0.02	18407.14	0.02	0.15	5327.71	0.15	0.21	726.89	0.00	3.15	3.52682
3.35	52.62	25.80	16.20	0.73	0.02	20145.06	0.02	0.16	6025.05	0.16	0.21	892.00	0.00	3.96	4.35115
3.40	53.54	26.40	16.80	0.84	0.02	22011.78	0.02	0.16	6793.41	0.16	0.22	1085.65	0.00	4.84	5.23613
3.45	54.46	27.00	17.40	0.94	0.02	24014.31	0.02	0.16	7638.07	0.16	0.22	1311.39	0.00	5.78	6.17782
3.50	55.38	27.60	18.00	1.04	0.02	26159.92	0.02	0.16	8564.55	0.16	0.23	1573.01	0.00	6.77	7.17295
3.55	56.31	28.20	18.60	1.15	0.02	28456.16	0.02	0.16	9578.66	0.16	0.23	1874.62	0.00	7.81	8.21878
3.60	57.23	28.80	19.20	1.25	0.02	30910.81	0.02	0.16	10686.45	0.16	0.23	2220.62	0.00	8.90	9.31295
3.65	58.15	29.40	19.80	1.36	0.02	33531.92	0.02	0.17	11894.25	0.17	0.24	2615.70	0.00	10.03	10.45339
3.70	59.08	30.00	20.40	1.46	0.02	36327.82	0.02	0.17	13208.68	0.17	0.24	3064.89	0.00	11.21	11.63828
3.75	60.00	30.60	21.00	1.57	0.02	39307.10	0.02	0.17	14636.64	0.17	0.24	3573.55	0.00	12.43	12.86601
3.80	60.92	31.20	21.60	1.67	0.02	42478.64	0.02	0.17	16185.32	0.17	0.25	4147.38	0.00	13.70	14.13513
3.85	61.85	31.80	22.20	1.77	0.02	45851.60	0.02	0.17	17862.19	0.17	0.25	4792.42	0.00	15.00	15.44431
3.90	62.77	32.40	22.80	1.88	0.02	49435.40	0.02	0.17	19675.05	0.17	0.25	5515.09	0.00	16.34	16.79236
3.95	63.69	33.00	23.40	1.98	0.02	53239.79	0.02	0.18	21631.99	0.18	0.26	6322.17	0.00	17.72	18.17818
4.00	64.62	33.60	24.00	2.09	0.02	57274.79	0.02	0.18	23741.42	0.18	0.26	7220.82	0.00	19.14	19.60078
4.05	65.54	34.20	24.60	2.19	0.02	61550.71	0.02	0.18	26012.08	0.18	0.26	8218.60	0.00	20.59	21.05921
4.10	66.46	34.80	25.20	2.30	0.02	66078.21	0.02	0.18	28453.02	0.18	0.27	9323.48	0.00	22.08	22.55261
4.15	67.38	35.40	25.80	2.40	0.02	70868.20	0.02	0.18	31073.62	0.18	0.27	10543.84	0.00	23.61	24.08018
4.20	68.31	36.00	26.40	2.51	0.02	75931.93	0.02	0.18	33883.63	0.18	0.27	11888.47	0.00	25.16	25.64117
4.25	69.23	36.60	27.00	2.61	0.02	81280.98	0.02	0.19	36893.12	0.19	0.28	13366.62	0.00	26.75	27.23487
4.30	70.15	37.20	27.60	2.71	0.02	86927.23	0.02	0.19	40112.50	0.19	0.28	14987.97	0.00	28.37	28.86063
4.35	71.08	37.80	28.20	2.82	0.02	92882.89	0.02	0.19	43552.57	0.19	0.28	16762.65	0.00	30.02	30.51782
4.40	72.00	38.40	28.80	2.92	0.02	99160.51	0.02	0.19	47224.46	0.19	0.29	18701.28	0.00	31.71	32.20586
4.45	72.92	39.00	29.40	3.03	0.02	105772.95	0.02	0.19	51139.68	0.19	0.29	20814.94	0.00	33.42	33.92418

h (ft)	H/D-low -	H/D-mid -	H/D-top -	H/D-peak -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qtop-orif (cfs)	Qtop-weir (cfs)	Qtot-top (cfs)	Q emergency (cfs)	Qtot (cfs)
4.50	73.85	39.60	30.00	3.13	0.02	112733.44	0.02	0.19	55310.13	0.19	0.29	23115.20	0.00	34.46	34.96987
4.55	74.77	40.20	30.60	3.24	0.02	120055.54	0.02	0.19	59748.07	0.19	0.30	25614.13	0.00	35.03	35.54411
4.60	75.69	40.80	31.20	3.34	0.02	127753.14	0.02	0.20	64466.15	0.20	0.30	28324.31	0.00	35.59	36.10918
4.65	76.62	41.40	31.80	3.44	0.02	135840.51	0.02	0.20	69477.42	0.20	0.30	31258.83	0.00	36.14	36.66552
4.70	77.54	42.00	32.40	3.55	0.02	144332.27	0.02	0.20	74795.33	0.20	0.30	34431.34	0.00	36.69	37.21352
4.75	78.46	42.60	33.00	3.65	0.02	153243.38	0.02	0.20	80433.73	0.20	0.31	37855.98	0.00	37.22	37.75355
4.80	79.38	43.20	33.60	3.76	0.02	162589.19	0.02	0.20	86406.87	0.20	0.31	41547.49	0.00	37.75	38.28594
4.85	80.31	43.80	34.20	3.86	0.02	172385.40	0.02	0.20	92729.43	0.20	0.31	45521.14	0.00	38.27	38.81101
4.90	81.23	44.40	34.80	3.97	0.02	182648.11	0.02	0.20	99416.51	0.20	0.32	49792.78	0.00	38.79	39.32906
4.95	82.15	45.00	35.40	4.07	0.02	193393.77	0.02	0.21	106483.64	0.21	0.32	54378.84	0.00	39.29	39.84036
5.00	83.08	45.60	36.00	4.18	0.02	204639.22	0.02	0.21	113946.78	0.21	0.32	59296.36	0.00	39.79	40.34516

BF-2-1 /Stage Storage					
HMP-2					
depth	area	area (ac)	elevation	volume (cf)	volume (acft)
0.00	800	0.018	514	0	0
0.05	800	0.018	514.05	40.0	0.000918
0.10	800	0.018	514.1	80.0	0.001837
0.15	800	0.018	514.15	120.0	0.002755
0.20	800	0.018	514.2	160.0	0.003673
0.25	800	0.018	514.25	200.0	0.004591
0.30	800	0.018	514.3	240.0	0.005510
0.35	800	0.018	514.35	280.0	0.006428
0.40	800	0.018	514.4	320.0	0.007346
0.45	800	0.018	514.45	360.0	0.008264
0.50	800	0.018	514.5	400.0	0.009183
0.55	800	0.018	514.55	440.0	0.010101
0.60	800	0.018	514.6	480.0	0.011019
0.65	800	0.018	514.65	520.0	0.011938
0.70	800	0.018	514.7	560.0	0.012856
0.75	800	0.018	514.75	600.0	0.013774
0.80	800	0.018	514.8	640.0	0.014692
0.85	800	0.018	514.85	680.0	0.015611
0.90	800	0.018	514.9	720.0	0.016529
0.95	800	0.018	514.95	760.0	0.017447
1.00	800	0.018	515	800.0	0.018365
1.05	800	0.018	515.05	840.0	0.019284
1.10	800	0.018	515.1	880.0	0.020202
1.15	800	0.018	515.15	920.0	0.021120
1.20	800	0.018	515.2	960.0	0.022039
1.25	800	0.018	515.25	1000.0	0.022957
1.30	800	0.018	515.3	1040.0	0.023875
1.35	800	0.018	515.35	1080.0	0.024793
1.40	800	0.018	515.4	1120.0	0.025712
1.45	800	0.018	515.45	1160.0	0.026630
1.50	800	0.018	515.5	1200.0	0.027548
1.55	800	0.018	515.55	1240.0	0.028466
1.60	800	0.018	515.6	1280.0	0.029385
1.65	800	0.018	515.65	1320.0	0.030303
1.70	800	0.018	515.7	1360.0	0.031221
1.75	800	0.018	515.75	1400.0	0.032140
1.80	800	0.018	515.8	1440.0	0.033058
1.85	800	0.018	515.85	1480.0	0.033976
1.90	800	0.018	515.9	1520.0	0.034894
1.95	800	0.018	515.95	1560.0	0.035813
2.00	800	0.018	516	1600.0	0.036731
2.05	800	0.018	516.05	1640.0	0.037649
2.10	800	0.018	516.1	1680.0	0.038567
2.15	800	0.018	516.15	1720.0	0.039486
2.20	800	0.018	516.2	1760.0	0.040404
2.25	800	0.018	516.25	1800.0	0.041322
2.30	800	0.018	516.3	1840.0	0.042241
2.35	800	0.018	516.35	1880.0	0.043159
2.40	800	0.018	516.4	1920.0	0.044077
2.45	800	0.018	516.45	1960.0	0.044995
2.50	800	0.018	516.5	2000.0	0.045914
2.55	800	0.018	516.55	2040.0	0.046832
2.60	800	0.018	516.6	2080.0	0.047750
2.65	800	0.018	516.65	2120.0	0.048669
2.70	800	0.018	516.7	2160.0	0.049587
2.75	800	0.018	516.75	2200.0	0.050505
2.80	800	0.018	516.8	2240.0	0.051423
2.85	800	0.018	516.85	2280.0	0.052342
2.90	800	0.018	516.9	2320.0	0.053260
2.95	800	0.018	516.95	2360.0	0.054178
3.00	800	0.018	517.0	2400.0	0.055096
3.05	844	0.019	517.0	2441.1	0.056040
3.10	888	0.020	517.1	2484.4	0.057034
3.15	932	0.021	517.1	2529.9	0.058079
3.20	976	0.022	517.2	2577.6	0.059174

depth	area	area (ac)	elevation	volume (cf)	volume (acft)
3.25	1020	0.023	517.2	2627.5	0.060319
3.30	1064	0.024	517.3	2679.6	0.061515
3.35	1108	0.025	517.3	2733.9	0.062762
3.40	1152	0.026	517.4	2790.4	0.064059
3.45	1196	0.027	517.4	2849.1	0.065406
3.50	1240	0.028	517.5	2910.0	0.066804
3.55	1284	0.029	517.5	2973.1	0.068253
3.60	1328	0.030	517.6	3038.4	0.069752
3.65	1372	0.031	517.6	3105.9	0.071302
3.70	1416	0.033	517.7	3175.6	0.072902
3.75	1460	0.034	517.7	3247.5	0.074552
3.80	1504	0.035	517.8	3321.6	0.076253
3.85	1548	0.036	517.8	3397.9	0.078005
3.90	1592	0.037	517.9	3476.4	0.079807
3.95	1636	0.038	517.9	3557.1	0.081660
4.00	1680	0.039	518.0	3640.0	0.083563
4.05	1682	0.039	518.0	3724.0	0.085492
4.10	1684	0.039	518.1	3808.2	0.087424
4.15	1685	0.039	518.1	3892.4	0.089357
4.20	1687	0.039	518.2	3976.7	0.091292
4.25	1689	0.039	518.2	4061.1	0.093230
4.30	1691	0.039	518.3	4145.6	0.095169
4.35	1692	0.039	518.3	4230.1	0.097111
4.40	1694	0.039	518.4	4314.8	0.099054
4.45	1696	0.039	518.4	4399.5	0.101000
4.50	1698	0.039	518.5	4484.4	0.102947
4.55	1699	0.039	518.5	4569.3	0.104897
4.60	1701	0.039	518.6	4654.3	0.106848
4.65	1703	0.039	518.6	4739.4	0.108802
4.70	1705	0.039	518.7	4824.6	0.110757
4.75	1706	0.039	518.7	4909.8	0.112715
4.80	1708	0.039	518.8	4995.2	0.114674
4.85	1710	0.039	518.8	5080.6	0.116636
4.90	1712	0.039	518.9	5166.2	0.118599
4.95	1713	0.039	518.9	5251.8	0.120565
5.00	1715	0.039	519.0	5337.5	0.122532

BF-2-1		$Q_{Sub\ Drain}$=	0.006	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
0.00	0.006	40.0	1.852	36.16
0.05	0.006	40.0	1.852	34.31
0.10	0.006	40.0	1.852	32.46
0.15	0.006	40.0	1.852	30.61
0.20	0.006	40.0	1.852	28.75
0.25	0.006	40.0	1.852	26.90
0.30	0.006	40.0	1.852	25.05
0.35	0.006	40.0	1.852	23.20
0.40	0.006	40.0	1.852	21.35
0.45	0.006	40.0	1.852	19.50
0.50	0.006	40.0	1.639	17.64
0.55	0.008	40.0	1.339	16.00
0.60	0.009	40.0	1.170	14.67
0.65	0.010	40.0	1.076	13.50
0.70	0.011	40.0	1.009	12.42
0.75	0.011	40.0	0.957	11.41
0.80	0.012	40.0	0.914	10.45
0.85	0.012	40.0	0.878	9.54
0.90	0.013	40.0	0.847	8.66
0.95	0.013	40.0	0.820	7.81
1.00	0.014	40.0	0.796	6.99
1.05	0.014	40.0	0.774	6.20
1.10	0.015	40.0	0.755	5.42
1.15	0.015	40.0	0.737	4.67
1.20	0.015	40.0	0.563	3.93
1.25	0.024	40.0	0.337	3.37
1.30	0.042	40.0	0.239	3.03
1.35	0.051	40.0	0.201	2.79
1.40	0.059	40.0	0.178	2.59
1.45	0.066	40.0	0.162	2.41
1.50	0.071	40.0	0.150	2.25
1.55	0.077	40.0	0.140	2.10
1.60	0.082	40.0	0.132	1.96
1.65	0.086	40.0	0.126	1.83
1.70	0.091	40.0	0.120	1.70
1.75	0.095	40.0	0.115	1.58
1.80	0.099	40.0	0.111	1.47
1.85	0.102	40.0	0.107	1.36
1.90	0.106	40.0	0.103	1.25
1.95	0.109	40.0	0.100	1.15
2.00	0.113	40.0	0.091	1.05
2.05	0.131	40.0	0.075	0.95
2.10	0.164	40.0	0.064	0.88
2.15	0.184	40.0	0.058	0.81
2.20	0.200	40.0	0.054	0.76
2.25	0.213	40.0	0.051	0.70
2.30	0.226	40.0	0.048	0.65
2.35	0.237	40.0	0.046	0.60
2.40	0.248	40.0	0.044	0.56
2.45	0.258	40.0	0.042	0.51
2.50	0.268	40.0	0.041	0.47
2.55	0.277	40.0	0.039	0.43
2.60	0.286	40.0	0.038	0.39
2.65	0.295	40.0	0.037	0.35
2.70	0.303	40.0	0.036	0.32
2.75	0.311	40.0	0.035	0.28
2.80	0.319	40.0	0.034	0.25
2.85	0.327	40.0	0.034	0.21
2.90	0.334	40.0	0.033	0.18
2.95	0.341	40.0	0.032	0.14
3.00	0.348	41.1	0.025	0.11
3.05	0.569	43.3	0.016	0.09
3.10	0.967	45.5	0.010	0.07
3.15	1.481	47.7	0.007	0.06
3.20	2.087	49.9	0.006	0.05

BF-2-1		$Q_{Sub\ Drain}$=	0.006	cfs
Elevation	Q_{AVG} (CFS)	DV (CF)	DT (HR)	Total T
3.25	2.774	52.1	0.005	0.05
3.30	3.533	54.3	0.004	0.04
3.35	4.357	56.5	0.003	0.04
3.40	5.242	58.7	0.003	0.04
3.45	6.184	60.9	0.003	0.03
3.50	7.179	63.1	0.002	0.03
3.55	8.225	65.3	0.002	0.03
3.60	9.319	67.5	0.002	0.03
3.65	10.459	69.7	0.002	0.03
3.70	11.644	71.9	0.002	0.02
3.75	12.872	74.1	0.002	0.02
3.80	14.141	76.3	0.001	0.02
3.85	15.450	78.5	0.001	0.02
3.90	16.798	80.7	0.001	0.02
3.95	18.184	82.9	0.001	0.02
4.00	19.607	84.0	0.001	0.02
4.05	21.065	84.1	0.001	0.01
4.10	22.559	84.2	0.001	0.01
4.15	24.086	84.3	0.001	0.01
4.20	25.647	84.4	0.001	0.01
4.25	27.241	84.5	0.001	0.01
4.30	28.867	84.6	0.001	0.01
4.35	30.524	84.7	0.001	0.01
4.40	32.212	84.7	0.001	0.01
4.45	33.930	84.8	0.001	0.01
4.50	34.976	84.9	0.001	0.01
4.55	35.550	85.0	0.001	0.01
4.60	36.115	85.1	0.001	0.00
4.65	36.672	85.2	0.001	0.00
4.70	37.220	85.3	0.001	0.00
4.75	37.760	85.4	0.001	0.00
4.80	38.292	85.4	0.001	0.00
4.85	38.817	85.5	0.001	0.00
4.90	39.335	85.6	0.001	0.00
4.95	39.846	85.7	0.001	0.00
5.00	40.351			

100-Year Detention

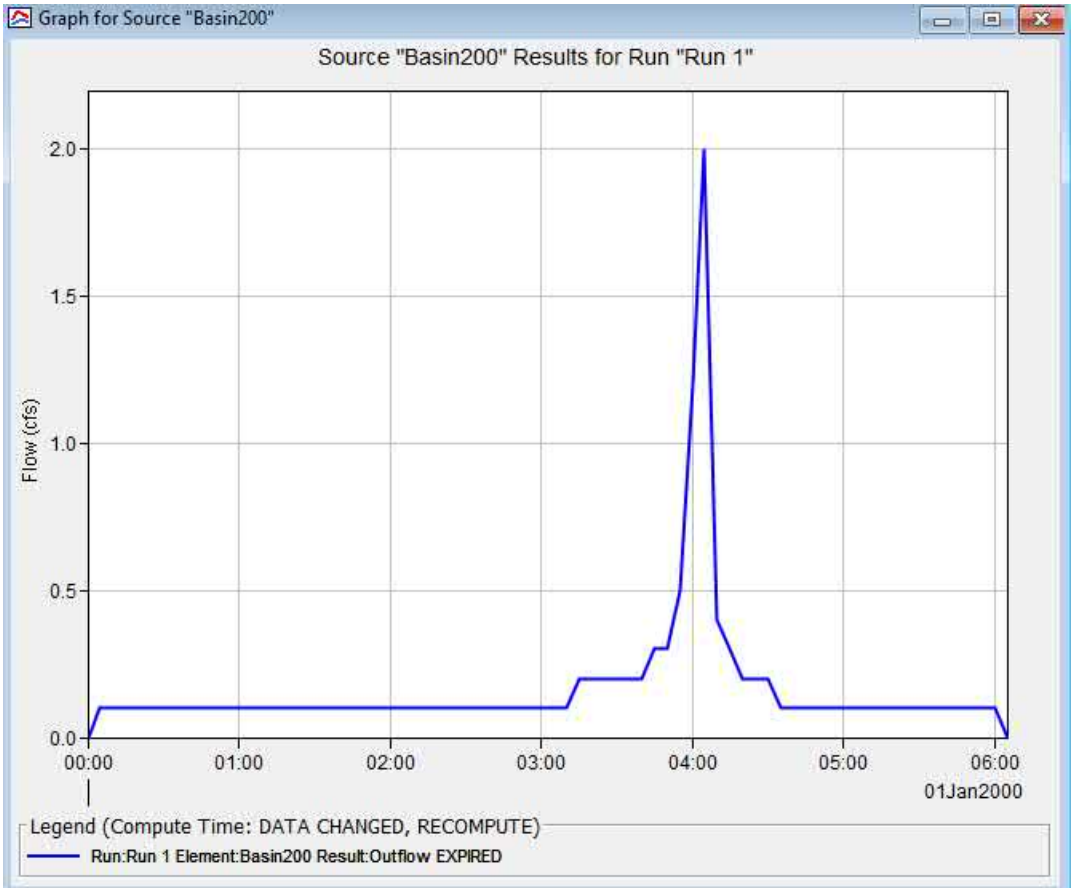
RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 6/1/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2 INCHES
BASIN AREA 0.63 ACRES
RUNOFF COEFFICIENT 0.75
PEAK DISCHARGE 2 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) = 0.1
TIME (MIN) = 25	DISCHARGE (CFS) = 0.1
TIME (MIN) = 30	DISCHARGE (CFS) = 0.1
TIME (MIN) = 35	DISCHARGE (CFS) = 0.1
TIME (MIN) = 40	DISCHARGE (CFS) = 0.1
TIME (MIN) = 45	DISCHARGE (CFS) = 0.1
TIME (MIN) = 50	DISCHARGE (CFS) = 0.1
TIME (MIN) = 55	DISCHARGE (CFS) = 0.1
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 65	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 75	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 85	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 95	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
TIME (MIN) = 105	DISCHARGE (CFS) = 0.1
TIME (MIN) = 110	DISCHARGE (CFS) = 0.1
TIME (MIN) = 115	DISCHARGE (CFS) = 0.1
TIME (MIN) = 120	DISCHARGE (CFS) = 0.1
TIME (MIN) = 125	DISCHARGE (CFS) = 0.1
TIME (MIN) = 130	DISCHARGE (CFS) = 0.1
TIME (MIN) = 135	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 145	DISCHARGE (CFS) = 0.1
TIME (MIN) = 150	DISCHARGE (CFS) = 0.1
TIME (MIN) = 155	DISCHARGE (CFS) = 0.1
TIME (MIN) = 160	DISCHARGE (CFS) = 0.1
TIME (MIN) = 165	DISCHARGE (CFS) = 0.1
TIME (MIN) = 170	DISCHARGE (CFS) = 0.1
TIME (MIN) = 175	DISCHARGE (CFS) = 0.1
TIME (MIN) = 180	DISCHARGE (CFS) = 0.1
TIME (MIN) = 185	DISCHARGE (CFS) = 0.1
TIME (MIN) = 190	DISCHARGE (CFS) = 0.1
TIME (MIN) = 195	DISCHARGE (CFS) = 0.2
TIME (MIN) = 200	DISCHARGE (CFS) = 0.2
TIME (MIN) = 205	DISCHARGE (CFS) = 0.2
TIME (MIN) = 210	DISCHARGE (CFS) = 0.2
TIME (MIN) = 215	DISCHARGE (CFS) = 0.2
TIME (MIN) = 220	DISCHARGE (CFS) = 0.2
TIME (MIN) = 225	DISCHARGE (CFS) = 0.3
TIME (MIN) = 230	DISCHARGE (CFS) = 0.3
TIME (MIN) = 235	DISCHARGE (CFS) = 0.5
TIME (MIN) = 240	DISCHARGE (CFS) = 1.2
TIME (MIN) = 245	DISCHARGE (CFS) = 2
TIME (MIN) = 250	DISCHARGE (CFS) = 0.4
TIME (MIN) = 255	DISCHARGE (CFS) = 0.3
TIME (MIN) = 260	DISCHARGE (CFS) = 0.2
TIME (MIN) = 265	DISCHARGE (CFS) = 0.2
TIME (MIN) = 270	DISCHARGE (CFS) = 0.2
TIME (MIN) = 275	DISCHARGE (CFS) = 0.1
TIME (MIN) = 280	DISCHARGE (CFS) = 0.1
TIME (MIN) = 285	DISCHARGE (CFS) = 0.1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.1
TIME (MIN) = 295	DISCHARGE (CFS) = 0.1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.1
TIME (MIN) = 305	DISCHARGE (CFS) = 0.1
TIME (MIN) = 310	DISCHARGE (CFS) = 0.1
TIME (MIN) = 315	DISCHARGE (CFS) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 325	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 335	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0.1
TIME (MIN) = 345	DISCHARGE (CFS) = 0.1
TIME (MIN) = 350	DISCHARGE (CFS) = 0.1
TIME (MIN) = 355	DISCHARGE (CFS) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1

TIME (MIN) = 365 DISCHARGE (CFS) = 0

HEC-HMS Inflow 100-year



Time-Series Results for Source "Basin200"

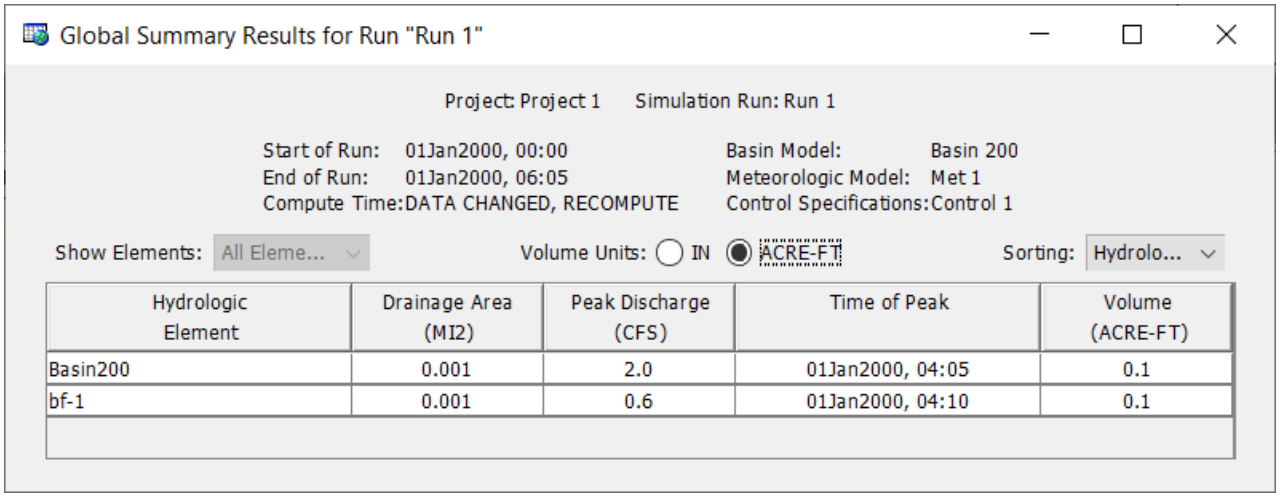
Project: Project 1 Simulation Run: Run 1
Source: Basin200

Start of Run: 01Jan2000, 00:00
End of Run: 01Jan2000, 06:05
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Basin 200
Meteorologic Model: Met 1
Control Specifications: Control 1

Date	Time	Discharge (CFS)
01Jan2000	00:00	0.00
01Jan2000	00:05	0.10
01Jan2000	00:10	0.10
01Jan2000	00:15	0.10
01Jan2000	00:20	0.10
01Jan2000	00:25	0.10
01Jan2000	00:30	0.10
01Jan2000	00:35	0.10
01Jan2000	00:40	0.10
01Jan2000	00:45	0.10
01Jan2000	00:50	0.10
01Jan2000	00:55	0.10
01Jan2000	01:00	0.10
01Jan2000	01:05	0.10
01Jan2000	01:10	0.10
01Jan2000	01:15	0.10
01Jan2000	01:20	0.10
01Jan2000	01:25	0.10
01Jan2000	01:30	0.10
01Jan2000	01:35	0.10
01Jan2000	01:40	0.10
01Jan2000	01:45	0.10
01Jan2000	01:50	0.10
01Jan2000	01:55	0.10
01Jan2000	02:00	0.10
01Jan2000	02:05	0.10
01Jan2000	02:10	0.10
01Jan2000	02:15	0.10
01Jan2000	02:20	0.10
01Jan2000	02:25	0.10
01Jan2000	02:30	0.10
01Jan2000	02:35	0.10
01Jan2000	02:40	0.10
01Jan2000	02:45	0.10
01Jan2000	02:50	0.10
01Jan2000	02:55	0.10
01Jan2000	03:00	0.10
01Jan2000	03:05	0.10
01Jan2000	03:10	0.10
01Jan2000	03:15	0.20
01Jan2000	03:20	0.20
01Jan2000	03:25	0.20
01Jan2000	03:30	0.20
01Jan2000	03:35	0.20
01Jan2000	03:40	0.20
01Jan2000	03:45	0.30
01Jan2000	03:50	0.30
01Jan2000	03:55	0.50
01Jan2000	04:00	1.20
01Jan2000	04:05	2.00
01Jan2000	04:10	0.40
01Jan2000	04:15	0.30
01Jan2000	04:20	0.20
01Jan2000	04:25	0.20
01Jan2000	04:30	0.20
01Jan2000	04:35	0.10
01Jan2000	04:40	0.10
01Jan2000	04:45	0.10
01Jan2000	04:50	0.10
01Jan2000	04:55	0.10
01Jan2000	05:00	0.10
01Jan2000	05:05	0.10
01Jan2000	05:10	0.10
01Jan2000	05:15	0.10
01Jan2000	05:20	0.10
01Jan2000	05:25	0.10
01Jan2000	05:30	0.10
01Jan2000	05:35	0.10
01Jan2000	05:40	0.10
01Jan2000	05:45	0.10
01Jan2000	05:50	0.10
01Jan2000	05:55	0.10
01Jan2000	06:00	0.10
01Jan2000	06:05	0.00

HEC-HMS RESULTS 100-Year



Global Summary Results for Run "Run 1"

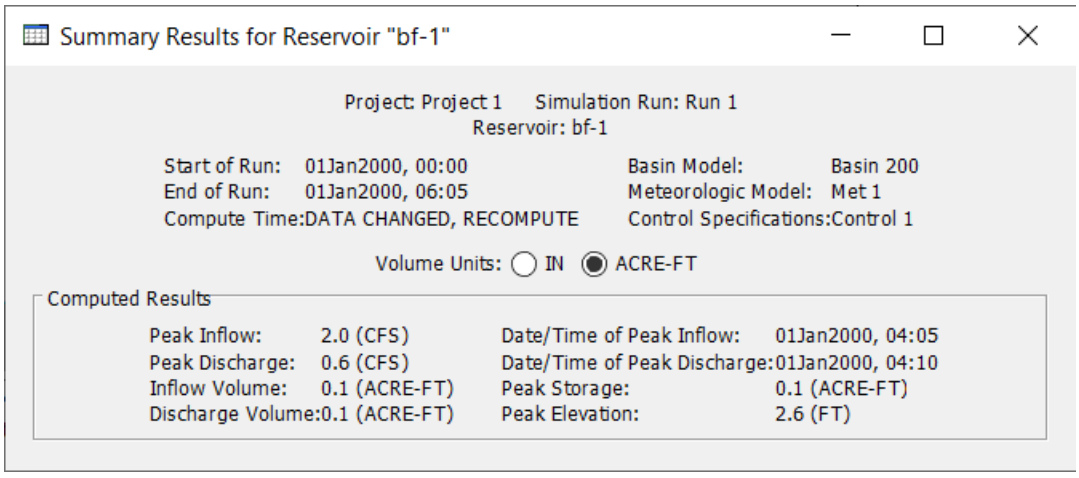
Project: Project 1 Simulation Run: Run 1

Start of Run: 01Jan2000, 00:00
End of Run: 01Jan2000, 06:05
Compute Time: DATA CHANGED, RECOMPUTE

Basin Model: Basin 200
Meteorologic Model: Met 1
Control Specifications: Control 1

Show Elements: All Eleme... Volume Units: IN ACRE-FT Sorting: Hydrolo...

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (ACRE-FT)
Basin200	0.001	2.0	01Jan2000, 04:05	0.1
bf-1	0.001	0.6	01Jan2000, 04:10	0.1



Summary Results for Reservoir "bf-1"

Project: Project 1 Simulation Run: Run 1
Reservoir: bf-1

Start of Run: 01Jan2000, 00:00
End of Run: 01Jan2000, 06:05
Compute Time: DATA CHANGED, RECOMPUTE

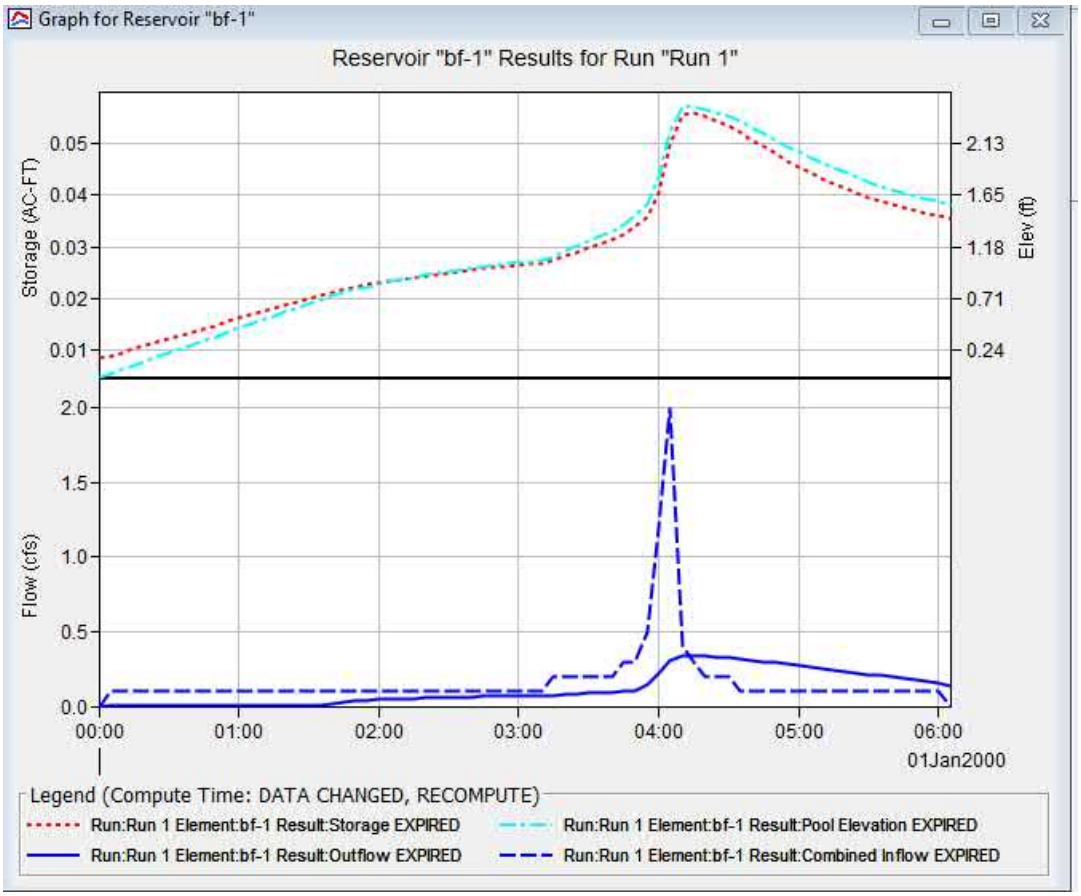
Basin Model: Basin 200
Meteorologic Model: Met 1
Control Specifications: Control 1

Volume Units: IN ACRE-FT

Computed Results

Peak Inflow: 2.0 (CFS)
Peak Discharge: 0.6 (CFS)
Inflow Volume: 0.1 (ACRE-FT)
Discharge Volume: 0.1 (ACRE-FT)

Date/Time of Peak Inflow: 01Jan2000, 04:05
Date/Time of Peak Discharge: 01Jan2000, 04:10
Peak Storage: 0.1 (ACRE-FT)
Peak Elevation: 2.6 (FT)


Graph for Reservoir "bf-1"
Reservoir "bf-1" Results for Run "Run 1"
Storage (AC-FT)
0.05
0.04
0.03
0.02
0.01
Elev (ft)
2.13
1.65
1.18
0.71
0.24
Flow (cfs)
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: DATA CHANGED, RECOMPUTE)
Run:Run 1 Element:bf-1 Result:Storage EXPIRED
Run:Run 1 Element:bf-1 Result:Pool Elevation EXPIRED
Run:Run 1 Element:bf-1 Result:Outflow EXPIRED
Run:Run 1 Element:bf-1 Result:Combined Inflow EXPIRED

Appendix 5 – Map Pockets – Proposed Drainage Map

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW DIRECTION
- 00.00 ACRES — AREA
- D — HYDROLOGIC SOIL TYPE
- 406 — NODE NUMBER

60 0 60 120 180
SCALE 1" = 60'

PROPOSED MITIGATED
78 — Q_{100} = 26.21 cfs.
A= 13.00 ac.
T_c =16.98 min.

78 — Q_{100} = 26.98 cfs.
A= 13.00 ac.
T_c =16.98 min.

EXISTING
78 — Q_{100} =27.759 cfs.
A= 13.18 ac.
T_c =16.90 min.

REFER TO DRAINAGE STUDY FOR PA-61 PREPARED BY CHANG CONSULTANT

EMERALD CREST COURT
OTAY MESA ROAD
CORPORATE CENTER DRIVE
PRIVATE DRIVE 'A'
PRIVATE DRIVE 'B'
PRIVATE DRIVE 'C'
PRIVATE DRIVE 'D'
PRIVATE DRIVE 'E'
PRIVATE DRIVE 'F'
HIGHWAY 905/EXISTING CALTRANS RIGHT-OF-WAY

BLDG 1 FF=523.5 P=522.8 COMMERCIAL SPACE 4,949 SF
BLDG 2 FF=522.8 P=527.0
BLDG 3 FF=519.0 P=518.2
BLDG 4 FF=520.0 P=519.2
BLDG 5 FF=515.0 P=513.2
BLDG 6 FF=517.5 P=516.7
BLDG 7 FF=519.7 P=516.9
AMENITY BUILDING FF=517.5 P=516.7
AMENITY BUILDING FF=514.4 P=513.6
87 UNITS AFFORDABLE HOUSING COURT

76 — 0.55 ACRES
78 — 0.46 ACRES
205 — 1.81 ACRES
152 — 0.10 ACRES
210 — 154
1.26 ACRES
120 — 0.10 ACRES
155 — 121
118 — 203 — 0.05 ACRES
0.19 ACRES
120
72 — 222 — 0.10 ACRES — 180
0.34 ACRES — 1
202 — 0.24 ACRES — 4 — 201
110 — 0.12 ACRES — 111
181 — 0.45 ACRES
112
220 — 182 — 0.16 ACRES
101 — D — 102
0.45 ACRES
0.53 ACRES
1.28 ACRES
1.18 ACRES
103 — 104 — 106 — 108 — 109 — 116
114 — 4.90 ACRES
0.89 ACRES
2.63 ACRES
122 — 160 — 150

PROPOSED MITIGATED
150 — Q_{100} = 17.96 cfs.
A= 14.3 ac.
T_c =23.67 min.

PROPOSED UNMITIGATED
150 — Q_{100} = 34.31cfs.
A= 14.3 ac.
T_c = 11.92 min.

EXISTING
150 — Q_{100} = 18.7 cfs.
A= 14.0 ac.
T_c = 20.0 min.

REFER TO STUDY FOR HANDLER COMMERCIAL AND OTAY MESA ROAD PTS #618357

PREPARED BY:
HUNSAKER & ASSOCIATES SAN DIEGO, INC
PLANNING 9707 Waples Street
ENGINEERING San Diego, Ca 92121
SURVEYING PH(858)558-4500· FX(858)558-1414

PROPOSED DRAINAGE MAP

BDM MIXED USE

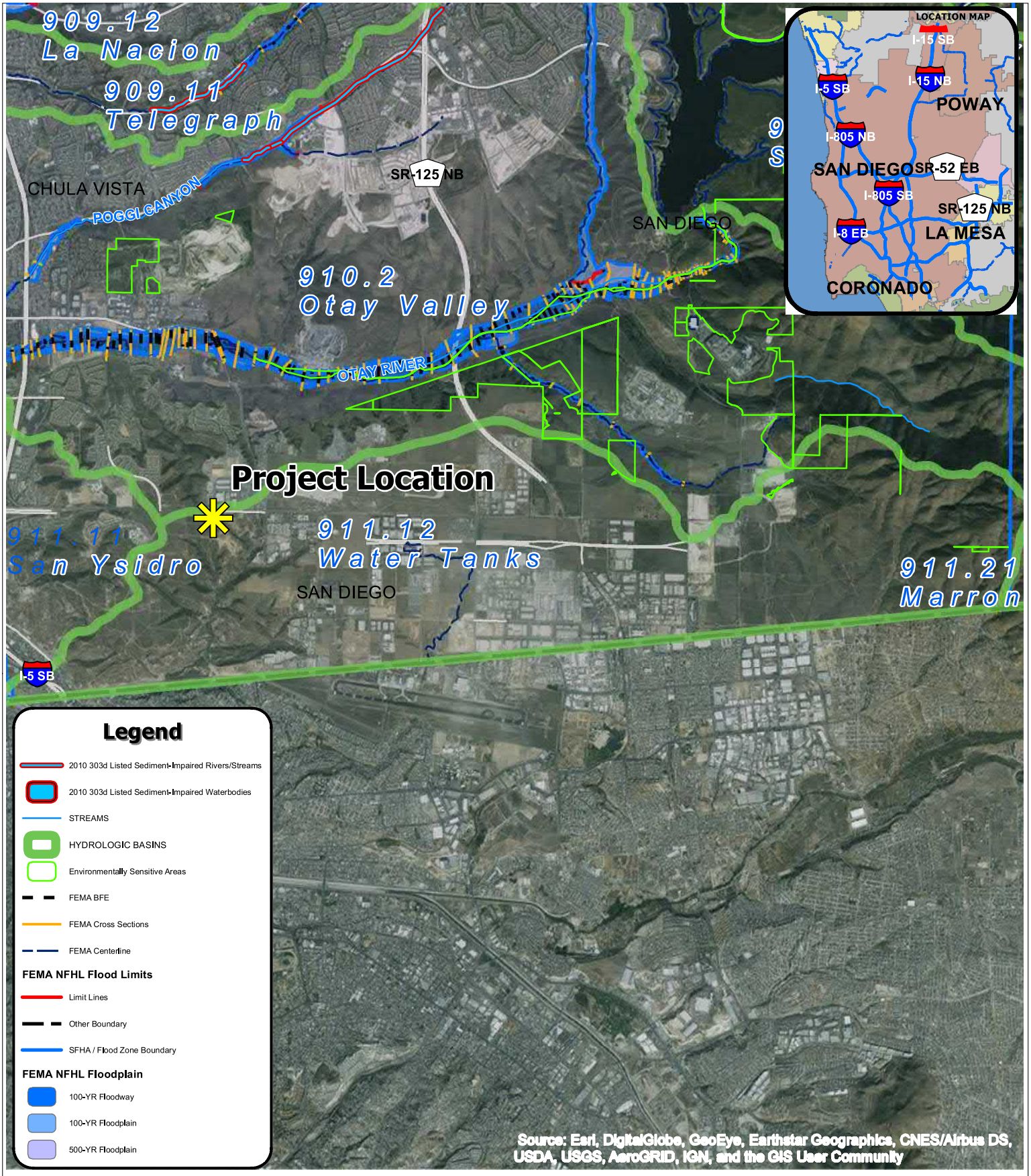
CITY OF SAN DIEGO, CALIFORNIA

MAP 1 OF 1

W.O.# 3592-0002

R:\1613\Hyd\DR\CAD\1613-HYD_Hydro_PR.dwg[]Jan-19-2022:12:00

Appendix 6 – FEMA Map



1 inch = 6,500 feet

Feet

0 3,000 6,000 12,000

THIS PROJECT LOCATED WITHIN
THE CITY OF SAN DIEGO

Appendix 7 – References

ChangConsultants
Civil Engineering◦Hydrology◦Hydraulics◦Sedimentation

P.O. Box 9496
Rancho Santa Fe, CA 92067-4496
T: 858.692.0760
F: 858.832.1402
wayne@changconsultants.com

October 9, 2020

Christopher Lezarda
Civil Sense, Inc.
13475 Danielson Street, Suite 150
Poway, CA 92064

Subject: PA-61 Drainage Study Addendum

Dear Chris,

This letter is an addendum to Chang Consultants' approved December 11, 2019, *Drainage Report for California Terraces – PA61*. The design of Emerald Crest Court along the east side of PA-61 has been revised by Civil Sense, Inc. due to delay and/or redesign of the adjacent Handler Commercial site. PA-61 is west of Emerald Crest Court and Handler Commercial is east of Emerald Crest Court. Under the 2019 design, PA-61 would construct the west half of Emerald Crest Court and Handler Commercial would construct the east half of Emerald Crest Court. Storm runoff from the west half of Emerald Crest Court would be conveyed by a proposed storm drain system to the southerly portion of the Handler Commercial site.

Since the status of the Handler Commercial site is uncertain, the PA-61 design of Emerald Crest Court has been revised. PA-61 will still construct the west half of Emerald Crest Court (and now also its cul-de-sac), but storm runoff from the improved street will be conveyed by a storm drain north along Emerald Crest Court, then approximately 450 feet east to an existing storm drain crossing Otay Mesa Road. This letter contains hydrologic and hydraulic analyses for the redesign.

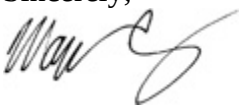
The revised Proposed Condition Rational Method Work Map is attached. The drainage subarea encompassing the west half Emerald Crest Court and its cul-de-sac covers 0.73 acres. In the future, Handler Commercial will be responsible for addressing storm runoff from the easterly half of the street. The storm runoff is captured by a proposed curb inlet in a low point on the west side of the street. The proposed storm drain continues north, turns east in Otay Mesa Road, and then extends to an existing 30-inch reinforced concrete pipe crossing Otay Mesa Road. There is an additional 2.63 acres tributary to the southerly end of the 30-inch RCP, 0.55 acres tributary to an existing storm drain that connects to the 30-inch RCP, and 0.46 acres tributary to an existing curb inlet along the 30-inch RCP on the north side of Otay Mesa Road. Topographic information east of the PA-61 site was obtained from the Handler Commercial pre-project Drainage Study Map.

The remaining rational method input parameters are similar to the December 2019 report. The City's 100-year Intensity-Duration-Frequency curve from the *Drainage Design Manual* was used. The soil group within the site is entirely 'D' according to the City criteria. Under proposed conditions, the subareas along the site were assigned a multi-unit land use (C=0.70) while the two

subareas along the north side of Otay Mesa Road were assigned an industrial land use (C=0.95). The rational method results are attached. The overall 100-year flow rate tributary to the existing 30-inch RCP is 28 cubic feet per second from 13.18 acres.

Hydraulic analyses were performed for the existing and proposed storm drains between the 30-inch RCP outfall and site. The pipe lengths and elevations were based on as-built plans, survey information, and the proposed storm drain plans. The 100-year WSPGW results are attached for Storm Drain Lines 2 and 3 as well as a new lateral storm drain. The results show that both systems can convey the 100-year runoff. A portion of Storm Drain Lines 2 and 3 is under a minor amount of pressure, but this does not meet the criteria for water-tight joints. Therefore, the existing and proposed storm drains can adequately convey the 100-year runoff associated with the revised PA-61 design.

Sincerely,



Wayne W. Chang, M.S., P.E.

Enclosures

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2005 Version 6.4

Rational method hydrology program based on
San Diego County Flood Control Division 1985 hydrology manual
Rational Hydrology Study Date: 10/02/20

California Terraces - PA61
Final Engineering
Proposed Conditions
100-Year Storm Event

********* Hydrology Study Control Information **********

Program License Serial Number 4028

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used
English (in) rainfall data used

Standard intensity of Appendix I-B used for year and
Elevation 0 - 1500 feet
Factor (to multiply * intensity) = 1.000
Only used if inside City of San Diego
San Diego hydrology manual 'C' values used
Runoff coefficients by rational method

++
Process from Point/Station 10.000 to Point/Station 12.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type]
Initial subarea flow distance = 262.000(Ft.)
Highest elevation = 528.200(Ft.)
Lowest elevation = 526.260(Ft.)
Elevation difference = 1.940(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) = 12.88 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7000)*(262.000^.5)/(0.740^(1/3)]= 12.88
Rainfall intensity (I) = 3.077(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.700

```
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       18.467     15.46            2.871
2        1.868      8.58            3.566
Qmax(1) =
        1.000 *    1.000 *    18.467) +
        0.805 *    1.000 *     1.868) + =      19.971
Qmax(2) =
        1.000 *    0.555 *    18.467) +
        1.000 *    1.000 *     1.868) + =      12.124

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.467       1.868
Maximum flow rates at confluence using above data:
       19.971       12.124
Area of streams before confluence:
        8.810        0.730
Results of confluence:
Total flow rate =     19.971(CFS)
Time of concentration =    15.456 min.
Effective stream area after confluence =      9.540(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       72.000 to Point/Station       74.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =   513.160(Ft.)
Downstream point/station elevation =   510.010(Ft.)
Pipe length  =   504.88(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    19.971(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    19.971(CFS)
Normal flow depth in pipe =   18.54(In.)
Flow top width inside pipe =   25.05(In.)
Critical Depth =   18.75(In.)
Pipe flow velocity =      6.86(Ft/s)
Travel time through pipe =    1.23 min.
Time of concentration (TC) =    16.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       72.000 to Point/Station       74.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type                    ]
Time of concentration =    16.68 min.
Rainfall intensity =      2.786(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.700
Subarea runoff =      5.129(CFS) for    2.630(Ac.)
Total runoff =     25.100(CFS)   Total area =       12.17(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       74.000 to Point/Station       76.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   510.010(Ft.)
Downstream point/station elevation =   509.000(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    25.100(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    25.100(CFS)
Normal flow depth in pipe =   17.27(In.)
Flow top width inside pipe =   29.65(In.)
Critical Depth =   20.48(In.)
Pipe flow velocity =      8.58(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    16.89 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       76.000 to Point/Station       76.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                       ]
Time of concentration =    16.89 min.
Rainfall intensity =      2.772(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.448(CFS) for    0.550(Ac.)
Total runoff =     26.548(CFS)   Total area =       12.72(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       76.000 to Point/Station       78.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   508.610(Ft.)
Downstream point/station elevation =   508.520(Ft.)
Pipe length  =     8.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.548(CFS)
```

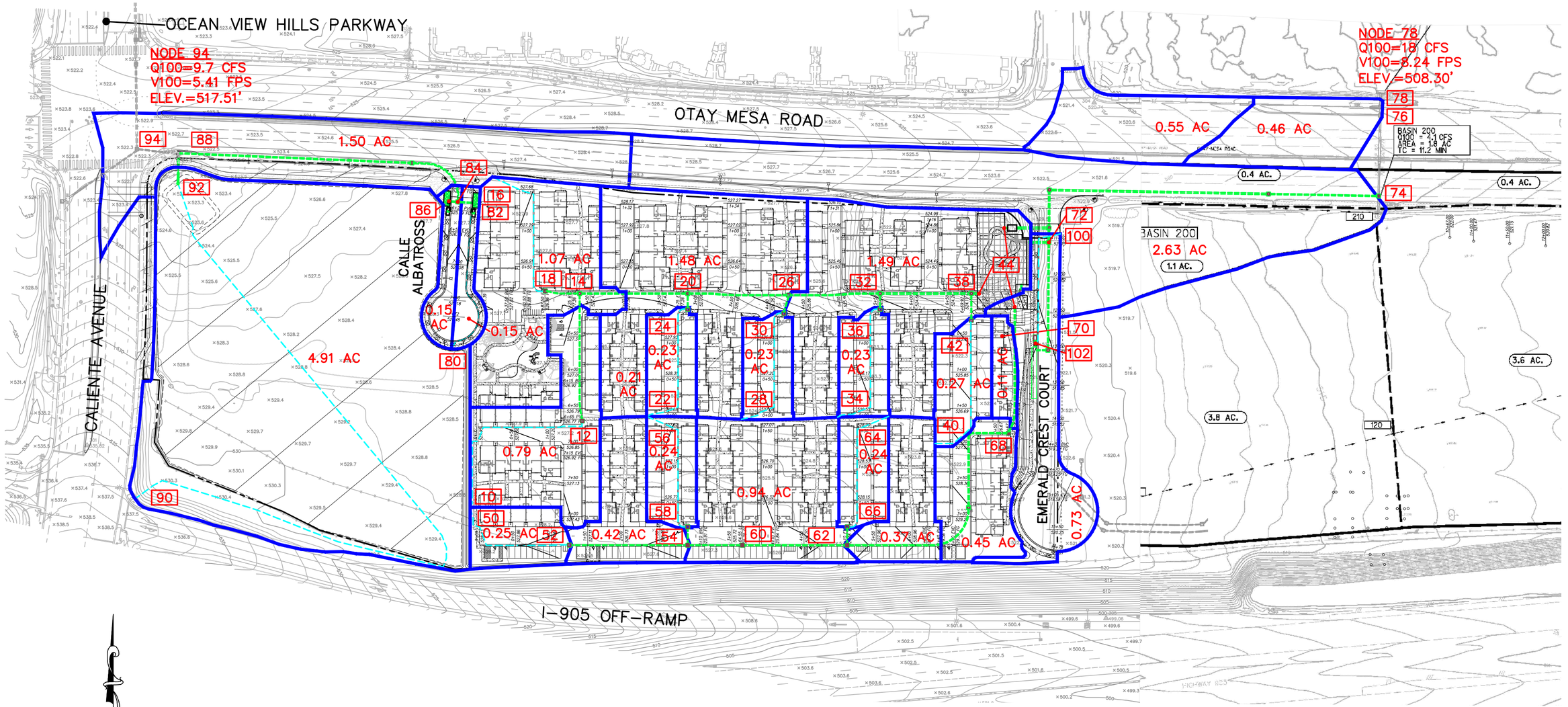
```
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =    26.548(CFS)
Normal flow depth in pipe =   16.92(In.)
Flow top width inside pipe =   29.75(In.)
Critical Depth =   21.07(In.)
Pipe flow velocity =      9.30(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    16.90 min.
```

The northern discharge location

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       78.000 to Point/Station       78.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                         ]
Time of concentration =    16.90 min.
Rainfall intensity =      2.771(In/Hr) for a   100.0 year storm
Runoff coefficient used for sub-area, Rational method,Q=KCIA, C = 0.950
Subarea runoff =      1.211(CFS) for    0.460(Ac.)
Total runoff =     27.759(CFS)   Total area =       13.18(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       80.000 to Point/Station       82.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MULTI - UNITS area type                      ]
Initial subarea flow distance  =  208.000(Ft.)
Highest elevation =  528.200(Ft.)
Lowest elevation =  525.600(Ft.)
Elevation difference =    2.600(Ft.)
Time of concentration calculated by the urban
areas overland flow method (App X-C) =     9.64 min.
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7000)*( 208.000^.5)/( 1.250^(1/3)]=   9.64
Rainfall intensity (I) =      3.419(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.700
Subarea runoff =      0.359(CFS)
Total initial stream area =       0.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       82.000 to Point/Station       84.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```



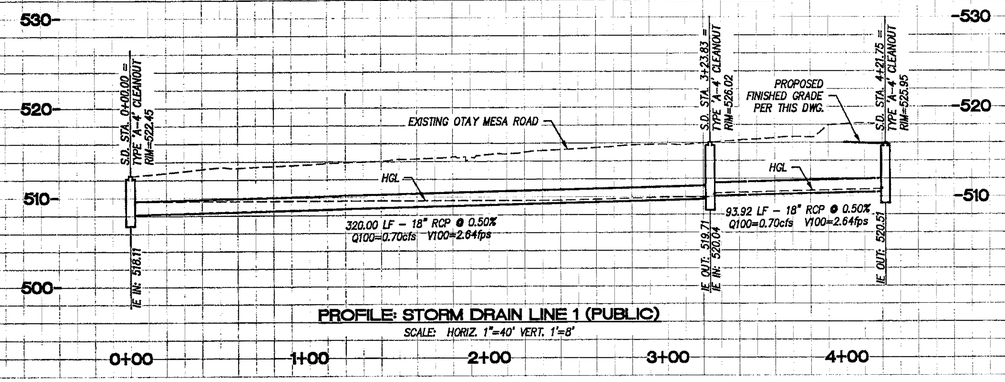
1" = 100'

0 100

LEGEND:

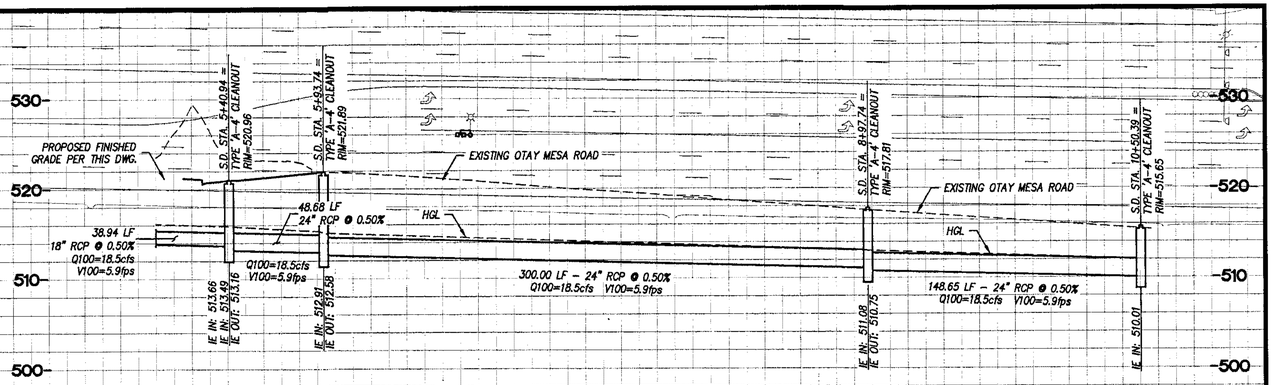
- DRAINAGE BASIN BOUNDARY
- OVERLAND FLOW PATH
- PROPOSED DRAINAGE FACILITY
- 3.62 AC DRAINAGE BASIN AREA
- 10 RATIONAL METHOD NODE NUMBER

PROPOSED CONDITION
RATIONAL METHOD WORK MAP



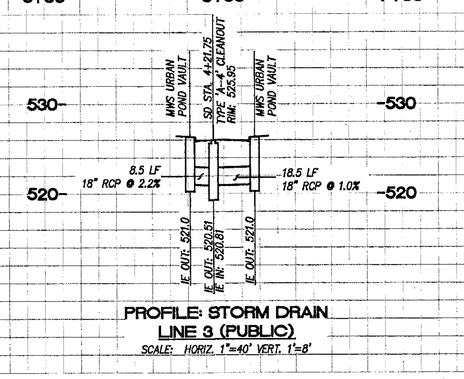
PROFILE: STORM DRAIN LINE 1 (PUBLIC)

SCALE: HORIZ. 1"=40' VERT. 1'=8'



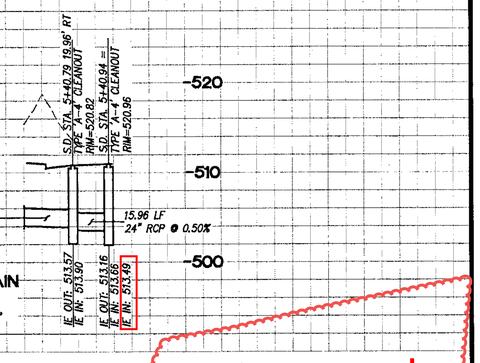
PROFILE: STORM DRAIN LINE 2 (PUBLIC)

SCALE: HORIZ. 1"=40' VERT. 1'=8'



PROFILE: STORM DRAIN LINE 3 (PUBLIC)

SCALE: HORIZ. 1"=40' VERT. 1'=8'



PROFILE: STORM DRAIN LINE 4 (PUBLIC)

SCALE: HORIZ. 1"=40' VERT. 1'=8'

100-year flow rates listed next to storm drain segments.

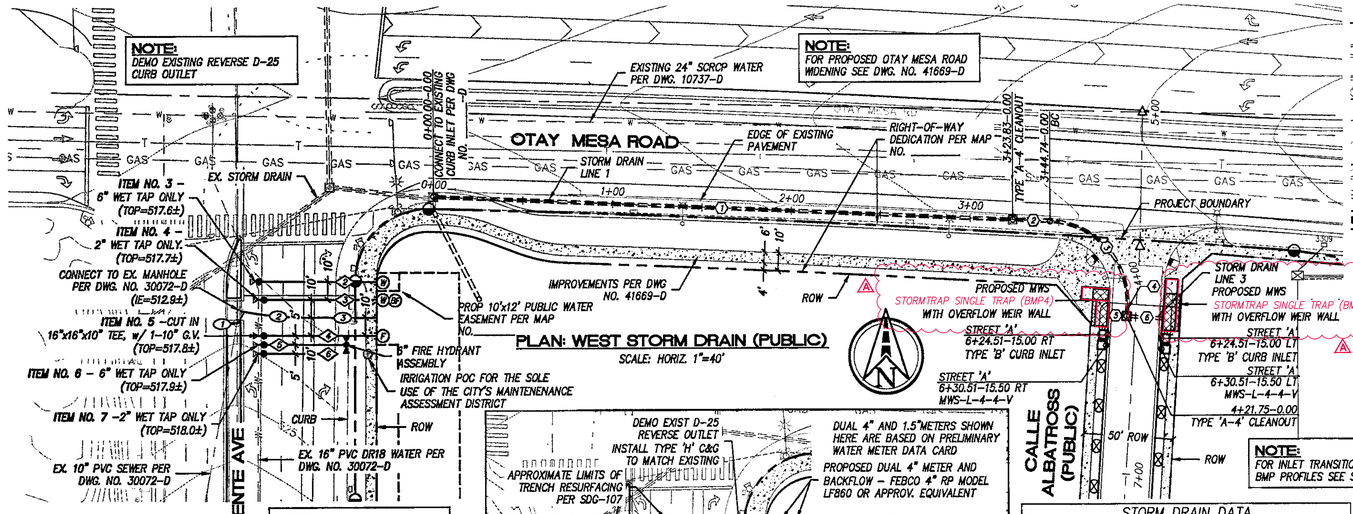
27.8
1.2
26.5
1.4
25.1
20.0
5.1
10.53

NOTE:
DEMO EXISTING REVERSE D-25 CURB OUTLET

NOTE:
FOR PROPOSED OTAY MESA ROAD WIDENING SEE DWG. NO. 41669-D

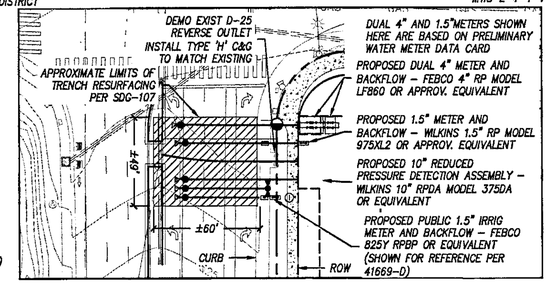
NOTE:
FOR PRIVATE SEWER LATERAL IN PUBLIC RIGHT-OF-WAY SEE EMRA APPROVAL NO. 2354541

NOTE:
FOR PRIVATE WATER, FIRE, AND SEWER SEE PRIVATE PLUMBING PLANS PTS 653925



PLAN: WEST STORM DRAIN (PUBLIC)

SCALE: HORIZ. 1"=40'



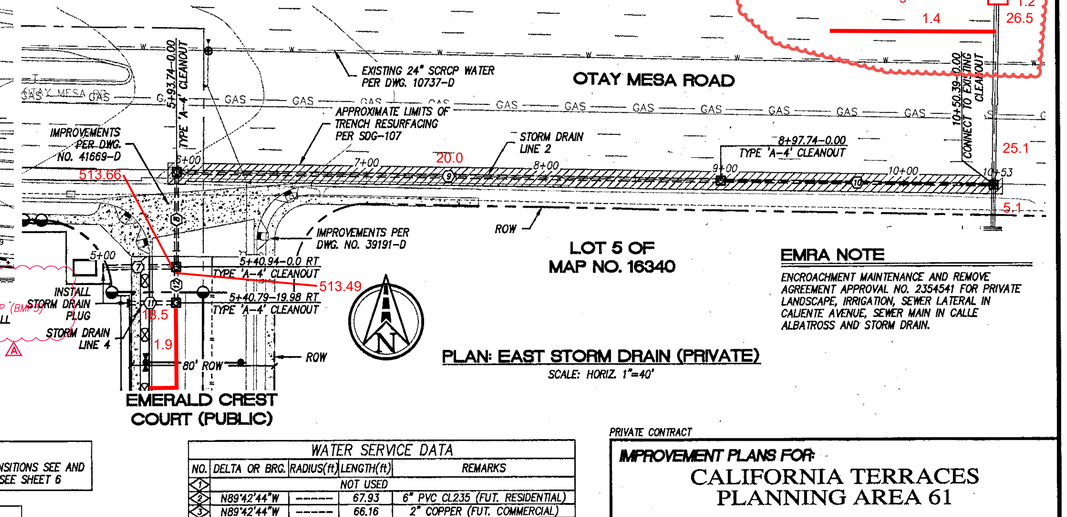
PLAN: TRENCH RESURFACING DETAIL

SCALE: HORIZ. 1"=40'

NOTE:
FOR INLET TRANSITIONS SEE AND BMP PROFILES SEE SHEET 6

STORM DRAIN DATA				
NO.	DELTA OR BRG.	RADIUS(ft)	LENGTH(ft)	REMARKS
①	N87°36'49"W	-------	320.00	18" RCP (1350-D) (PUB)
②	N87°36'49"W	-------	18.91	"
③	91°24'21"	45.00	71.79*	"
④	N03°47'32"E	-------	3.22	"
⑤	N86°12'28"W	-------	8.50	"
⑥	N86°12'28"W	-------	18.50	"
⑦	N90°00'00"E	-------	38.94**	24" RCP (1350-D) (PVT)
⑧	N00°26'43"E	-------	48.68**	"
⑨	N88°56'55"W	-------	300.00**	"
⑩	N88°56'55"W	-------	148.65**	"
⑪	N90°00'00"E	-------	25.22**	"
⑫	N00°16'59"E	-------	15.96**	"

*8-FT LENGTHS W/5° BEVEL BOTH ENDS
**WITH WATER TIGHT JOINTS



PLAN: EAST STORM DRAIN (PRIVATE)

SCALE: HORIZ. 1"=40'

WATER SERVICE DATA				
NO.	DELTA OR BRG.	RADIUS(ft)	LENGTH(ft)	REMARKS
①		NOT USED		
②	N89°42'44"W	-------	67.93	6" PVC CL235 (FUT. RESIDENTIAL)
③	N89°42'44"W	-------	66.16	2" COPPER (FUT. COMMERCIAL)
④	N89°42'44"W	-------	66.17	10" PVC C900 (FIRE)
⑤	N89°42'44"W	-------	49.17	6" PVC
⑥	N89°42'44"W	-------	44.17	2" COPPER IRRIGATION SERVICE

SEWER DATA (PRIVATE)				
NO.	DELTA OR BRG.	RADIUS(ft)	LENGTH(ft)	REMARKS
①	N79°57'40"W	-------	4.22	10" PVC SDR-35
②	9°45'04"	200.00	34.04	"
③	N89°42'44"W	-------	38.14	"

EMRA NOTE

ENCROACHMENT MAINTENANCE AND REMOVE AGREEMENT APPROVAL NO. 2354541 FOR PRIVATE LANDSCAPE, IRRIGATION, SEWER LATERAL IN CALIENTE AVENUE, SEWER MAIN IN CALLE ALBATROSS AND STORM DRAIN.

PRIVATE CONTRACT

IMPROVEMENT PLANS FOR:

CALIFORNIA TERRACES PLANNING AREA 61

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 5 OF 23 SHEETS

FOR CITY ENGINEER _____ DATE 8/18/20

I.O. NO. N/A
PROJECT NO. 648290
V.T.M. 2152396

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	CSI			
⚠	CSI			

146–1763 NAD83 COORDINATES
1786–6323 LAMBERT COORDINATES

AS-BUILTS
CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

41595-5-D

HENRY H. PENG
R.C.E 63686
DATE 3/12/20

DESIGNED BY:	PM REVIEW:
IL	MV

REGISTERED PROFESSIONAL ENGINEER HENRY H. PENG No. 63686 Exp. 09-30-20 CIVIL STATE OF CALIFORNIA

⚠ REVISE BMP CALLOUT

CIVIL SENSE INC
13475 Danielson Street, Suite 150
Poway, CA 92064 | 858-842-4333

0 20 40 80 120
(IN FEET)
1 inch = 40 ft.

(REV 7/27/2016)

DRAINAGE STUDY
FOR
HANDLER COMMERCIAL AND
OTAY MESA ROAD

(FINAL ENGINEERING)

PTS # ~~462454~~ 618357
DWG # 39191-D
IO # 24006395

Job Number 18157

December 8, 2017
Revised: April 17, 2018
Revised: June 15, 2018
Revised: October 18, 2018

RICK
ENGINEERING COMPANY

DRAINAGE STUDY
FOR
HANDLER COMMERCIAL
AND
OTAY MESA ROAD

(FINAL ENGINEERING)

PTS # ~~462454~~ 618357

Job Number 18157

Brendan Hastie, P.E.
R.C.E. #65809
Exp. 09/19

Prepared for:

Dr. Gerald Handler
9523 La Jolla Farms Road
La Jolla, California 92037

Prepared by:

Rick Engineering Company
Water Resources Division
5620 Friars Road
San Diego, California 92110-2596
(619) 291-0707

December 8, 2017
Revised: April 17, 2018
Revised: June 15, 2018
Revised: October 18, 2018

2.2 Hydrologic Results

The hydrologic results for the pre- and post-project conditions can be found in Table 2.1 and Table 2.2. These results describe the pre- and post-project peak flow rates for each storm event (i.e. 5, 10, 25, 50, and 100-year storm event) before and after they are being detained. The drainage areas of basin 100 and basin 200 are 14 and 1.8 acres respectively.

Table 2.1 – Hydrologic Summary for Basin 100

Storm Event	Pre-project[1]		Post-project[1,3]	
	Time of Concentration (minutes)	Peak Flow Rate (cfs)[2]	Time of Concentration (minutes)	Peak Flow Rate (cfs)[2]
100-year	20.0	18.7	22.5	18.1
50-year	20.2	17.4	14.6	14.7
25-year	20.5	15.7	15.9	12.2
10-year	21.1	13.4	19.0	9.8
5-year	15.5	6.7	20.9	6.7

Note:

1: Results include the routing of anticipated existing offsite flows from an undeveloped property to the east which historically flow through the project site.

2: cfs= cubic feet per second.

3: Post-project flows reflect the peak discharge rates after detention is implemented in the biofiltration basins located in each lot.

DRAINAGE LEGEND:

- MAJOR DRAINAGE BASIN BOUNDARY
- SUB BASIN BOUNDARY
- DRAINAGE NODE NUMBER — XXX
- DRAINAGE AREA — 1.0 AC.
- FLOW DIRECTION
- DETENTION SYSTEM
- DRAINAGE BASIN ID — BASIN XXX

NOTE:
POC-2 DISCHARGES NORTH
TO DENNERY CANYON AND TOWARD
THE OTAY RIVER AND EVENTUALLY
TO THE SAN DIEGO BAY

BASIN 200
Q100 = 5.8 CFS
AREA = 1.8 AC
TC = 6.7 MIN

OTAY-MESA ROAD

BASIN 200

BASIN 100

FLOOD STORAGE EASEMENT

FINN DRIVE

BARCLAY CREST COURT

CORPORATE CENTER DRIVE

Q100 = 3.6 CFS
V100 = 4.3 FPS

PER PIPE (4-18" PIPES)
Q100 = 6.5 CFS (PER PIPE)
V100 (PIPE EXIT) = 4.7 FPS
V100 (CRITICAL VEL) = 5.3 FPS
V100 (RIPRAP EXIT) = 2.1 FPS

NOTE:
POC-1 DISCHARGES EAST
AND SOUTH ACROSS THE
INTERNATIONAL BORDER
TOWARD THE TIJUANA RIVER AND
EVENTUALLY TO THE PACIFIC OCEAN

HIGHWAY 905

GRAPHIC SCALE 1" = 60'

DRAINAGE STUDY MAP FOR HANDLER COMMERCIAL (POST-PROJECT)

Date: December 8, 2017
Revised: March 27, 2018
Revised: June 15, 2018

J-18157

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver

NOT FOR CONSTRUCTION - EXHIBIT FOR DRAINAGE STUDY ONLY

NOTE:
BASIN 200 DISCHARGES NORTH TO DENNERY CANYON AND TOWARD THE OTAY RIVER AND EVENTUALLY TO THE SAN DIEGO BAY

BASIN 200
Q100 = 4.1 CFS
AREA = 1.8 AC
TC = 11.2 MIN

WITH OFFSITE AREA
Q100 = 26.4 CFS
AREA = 24.6 AC
TC = 28.7 MIN

BASIN 100 ONLY
Q100 = 18.7 CFS
AREA = 14.0 AC
TC = 20.0 MIN

NOTE:
BASIN 100 DISCHARGES EAST AND SOUTH ACROSS THE INTERNATIONAL BORDER TOWARD THE TIJUANA RIVER AND EVENTUALLY TO THE PACIFIC OCEAN

DRAINAGE LEGEND:

- MAJOR DRAINAGE BASIN BOUNDARY
- SUB BASIN BOUNDARY
- DRAINAGE NODE NUMBER — XXX
- DRAINAGE AREA — 1.0 AC.
- FLOW DIRECTION
- DETENTION SYSTEM
- DRAINAGE BASIN ID — BASIN XXX

GRAPHIC SCALE 1" = 60'

DRAINAGE STUDY MAP FOR HANDLER COMMERCIAL (PRE-PROJECT)

Date: December 8, 2017
Revised: March 27, 2018

J-18157

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver

J-18157

NOT FOR CONSTRUCTION - EXHIBIT FOR DRAINAGE STUDY ONLY