PRELIMINARY
HYDROLOGY AND HYDRAULIC STUDY
FOR:
BEAUMONT POINTE
CITY OF BEAUMONT, COUNTY OF RIVERSIDE, CALIFORNIA

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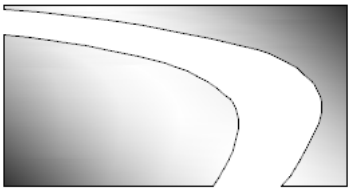

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APRIL 2022

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Section 1: Project Narrative

The Beaumont Pointe Specific Plan project is approximately 539.9 acres where roughly 276.4 acres will be developed for commercial and warehousing with paved parking. The project also includes a portion dedicated to future retail development located at the most eastern edge of the property. The project is located within the County of Riverside on the western border of the City of Beaumont on the southeast side along the frontage of 60 Freeway. The project will have access from the future extension of 4th Street from the adjected development on the western property line.

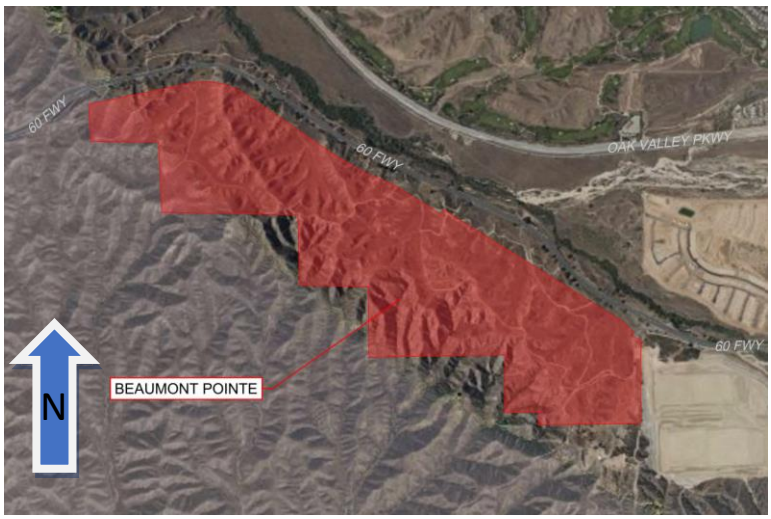


Figure 1: Vicinity Map

EXISTING DRAINAGE CONDITION:

The project site is currently on undeveloped open space between the 60 Freeway and the northern edge of the foothills of the Badlands. The property is located within FEMA Zone X per FRIM panels 0785G and 0795H. All the runoff from the property drains north towards the 60 Freeway to 16 existing Caltrans culverts (1-16) via their respective tributary areas (drainage areas 100 thru 1600) as depicted in the Existing Hydrology Key Map in Appendix F. The pre-developed tributaries include the offsite areas in between the south edge property lines and the ridgelines along the adjacent hillsides. The runoff from these tributaries is detained in the natural detention areas located adjacent culvert inlets. All the culverts ultimately discharge into San Timoteo Creek that flows northwest along the 60 Freeway. Table 1 summarizes the existing hydrology analysis for the 16 tributaries along with their respective culvert sizes and calculated capacities.

PROPOSED DRAINAGE DESIGN CONCEPT:

The proposed development maintains the 16 existing culverts (1-16) as the discharge points apart from the first two culvert (1 and 2). The culverts 1 and 2 are to be abandoned in place and proposed 20'x20' reinforced concrete box (RCB) to be installed west of culvert 1 as part of the improvements Caltrans is conducting on the 60 Freeway. Portions of the Caltrans freeway widening plan can be found in Appendix H.

The runoff from the developed site will be intercepted by a proposed onsite drainage system which routes the runoff to four stormwater treatment basins where the water is detained and treated in accordance with the Riverside County *LID BMP Design Manual* for the Santa Ana River Watershed requirements. Afterwards, the runoff is discharged into their respective culvert tributaries. The entire proposed storm water management system will be located within the property boundaries. Table 2 summarizes the developed hydrology analysis for Areas 1 through 16. The developed hydrology key map can be found in Appendix G.

The proposed stormwater treatment basins will provide peak runoff mitigation before discharging to the culverts with the exception for Basin 1. Basin 1 within Area 1 discharges into a natural drainage sump that will be created as a result of the proposed onsite fill required for the improvements. This sump is located at the southwest corner of the property that is tucked in the existing foothills and it will serve as a detention area for offsite flows originating from the southern hillsides and runoff discharged from Basin 1. The detention area is not a maintained BMP facility as it will not provide stormwater treatment facilities or improvements, however only the proposed inlet and out structures will require maintenance. Basins 2, 3, and 4 outlets into the natural drainage areas upstream of their culverts where the water continues to be naturally detained and mitigated before converging with San Timoteo Creek. A summary of the basin detention volumes Basins 1 through 4 can be found in Appendix F.

For the future commercial Parcels 1 and 2, also referred to Planning Areas 1 and 2, will be mass graded and will utilize temporary sediment basins in the interim until they are later developed. Per this study, outlet structures that connect to the backbone storm drain lines have been provided to these parcels and have been sized for an assumed land use and impervious fraction for commercial use. However, the future developer of these parcels will need to provide the final mitigation basins and BMP solutions that best works with the proposed site plan.

STORMWATER TREATMENT:

Treatment of first flush waters from the commercial and warehouse parcels will be accomplished through four proposed BMP basins (Basin 1 thru Basin 4). Future soil percolation and infiltration tests will need to be conducted to determine the BMP basin type and to verify if infiltration basins will be feasible for this project. The proposed BMP basins will be consistent with Riverside County Stormwater Quality Best Management Practice Design Handbook. See Appendix F for the Santa Ana Watershed BMP Basin worksheet for the basin design summary.

Parcels 1 and 2 will implement SE-2 sediment basins per the CASQA California Stormwater BMP Handbook Construction. These basins will be implemented in the interim graded condition until the final site plan and design is approved. Preliminary sizing calculations for sediment basins were prepared but final sediment basin sizing shall be included with the erosion control plans.

DESIGN ASSUMPTIONS:

A. Hydrologic soil groups were obtained from NRCS Web Soil Survey Hydrological Soils Group Map (see Appendix A for Soil Survey results). A future geotechnical soils report will be crossed referenced to confirm the hydrological soils groups for the project.

B. Antecedent moisture condition AMC 2 (moderately moist) was used for all calculations.

C. The standard intensity-duration curve (RCFC & WCD Hydrology Manual Plate D-4.6) for 'Beaumont Area' was used.

D. Precipitation values for the 10-year and 100-year, 1-hour events were acquired from NOAA Atlas 14.

Section 2: Hydrological Calculation Methodology

RATIONAL METHOD ANALYSIS & MODELING:

The Modified Rational Method hydrology analysis for this study is based upon "Riverside County Flood Control and Water Conservation District Hydrology Manual", dated April 1978. Software designed by "CivilDESIGN" of San Bernardino was used to solve the drainage models of the site. The output is printed in the Standard Riverside County format.

1. Rainfall:

   The computer software stores a rainfall database corresponding to Plate D-4.1 that provides all the required time vs. intensity data for Riverside County.

2. Infiltration:

   Soil type was based on soils group map from NRSC Web Soil Survey. The computer software then uses Plates D-5.1 through D-5.8 as applicable.

3. Runoff and Routing:

   After the "C" value is determined, the computer software determines the runoff and routes the flood downstream based on the input model and Plates D-7 through D-9 as necessary.

The following tables summarizes the existing hydrology analysis for the property for the 100-year storm event. The software output files for the models can be found in Appendix B. Per the NRSC Web Soil Survey, the hydrologic soil groups A, B, C, and D were present onsite and mapped. For each subarea the soil cover was calculated as a percentage of which was utilized to calculate the runoff index. The rational method calculates the weighted runoff coefficient for each subarea and determines the average runoff index to be later implemented in unit hydrograph models. Details for the method for calculating the hydraulic capacities for the culverts can be found in Section 3 and Appendix D. Where runoff exceeds the calculated culvert capacity, the excess runoff ponds within the natural detention areas adjacent to the culvert invert. For Area 1100 and culvert 11, the approximate natural detention area is 18.4 ac-ft. For Area 1300 and culvert 13, the approximate natural detention area is 15.8 ac-ft. Areas 600 and 900 have an estimated natural detention capacity of 10.18 ac-ft and 12.06 ac-ft. respectfully.

Table 1: Existing Rational Method Analysis & Culvert Capacity

Pre-Developed Drainage Area ID	Pre-Developed Area (AC.)	Q_{100} (CFS)	Time of Concentration (minutes)	Average Runoff Coefficient (RI)	Culvert ID	Culvert Size	Culvert Capacity, Calculated (CFS)
100	140.1	376.7	14.8	78.8	1	*54" CMP	**483.4
200	2.6	9.0	9.1	72.3	2	*30" CMP	
300	9.3	28.4	11.6	75.1	3	30" CMP	96.0
400	16.9	54.5	11.2	75.2	4	36" CMP	154.1
450	0.4	1.8	5.0	78.0	Not Applicable	Not Applicable	Not Applicable
500	5.4	16.4	12.1	75.9	5	30" CMP	71.8
600	53.9	160.5	12.8	74.6	6	42" CMP	132.0
700	4.4	14.3	10.6	76.2	7	24" CMP	59.5
800	7.0	22.6	10.7	76.5	8	24" CMP	51.5
900	14.1	49.7	9.2	76.2	9	24" CMP	38.7
1000	0.5	2.2	5.2	78.0	10	24" CMP	77.8
1100	79.1	212.6	16.2	75.8	11	48" CMP	79.2
1200	3.0	10.5	8.8	73.9	12	24" CMP	54.1
1300	65.7	191.2	13.6	74.8	13	36" CMP	138.8
1400	4.7	8.7	30.3	75.7	14	36" CMP	118.6
1500	25.8	88.4	9.7	75.1	15	36" CMP	119.6
1600	90.5	234.7	17.0	75.1	16	2-48" CMP	476.9
Total	523.4	1,482.2	30.3				

** Existing culverts with no available data to use to calculate the estimated capacity. Culvert capacity calculations can be found in Appendix D. Existing culverts to be replaced by a 20'x20' RCB per Caltrans 60 Freeway widening project. Culvert capacity calculations based on Caltrans drainage plans (slope & pipe size). See selected Caltrans Drainage plan sheets in Appendix H).*

*** Proposed 20'x20' RCB culvert capacity calculated with an assumed depth of 2 ft which is 10% of the total height of the culvert. The actual capacity of the culvert far exceeds the assumption and is a function of the depth of flow, however it is unlikely that the depth of flow will exceed 25% of the total height.*

The following tables summarize the developed hydrology analysis for the property for the 100-year storm event. The software output files for the models can be found in Appendix C. Details for the method for calculating the hydraulic capacities for the culverts can be found in section 3.

Table 2: Developed Rational Method Analysis

Developed Area ID	Developed Area (AC)	Q_{100} (CFS)	Time of Concentration (minutes)	Runoff Index (RI)	Basin ID	Culvert ID	Culvert Size	Culvert Capacity, Calculated (CFS)
1	178.1	389.7	25.8	67.9	Basin 4	1	*54" CMP	**483.4
2	2.6	9.0	9.2	72.3	N/A	2	*30" CMP	
3	6.7	20.0	12.0	74.0	N/A	3	30" CMP	96.0
4	6.7	21.6	10.3	73.8	N/A	4	36" CMP	154.1
45	0.4	1.8	5.0	78.0	N/A	N/A	Not Applicable	Not Applicable
5	5.1	15.6	11.4	74.8	N/A	5	30" CMP	71.8
6	43.7	113.9	11.2	60.6	Basin 3	6	42" CMP	132.0
7	4.2	15.2	8.6	76.1	N/A	7	24" CMP	59.5
8	5.2	16.9	10.3	75.9	N/A	8	24" CMP	51.5
9	9.6	31.3	10.0	69.8	N/A	9	24" CMP	38.7
10	0.5	2.1	6.0	78.0	N/A	10	24" CMP	77.8
11	12.1	36.7	12.2	74.6	N/A	11	48" CMP	79.2
12	2.9	10.2	9.0	74.0	N/A	12	24" CMP	54.1
†13	117.9	313.1	17.2	58.2	Basin 2	13	36" CMP	138.8
14	4.2	13.7	10.1	75.4	N/A	14	36" CMP	118.6
15	7.7	22.2	12.7	72.3	N/A	15	36" CMP	119.6
16	137.3	311.7	26.2	52.1	Basin 1	16	2-48" CMP	476.9
Total	544.9	1,379.5						

** Existing culverts with no available data to use to calculate the estimated capacity. Existing culverts to be replaced by a 20'x20' RCB per Caltrans 60 Freeway widening project. Culvert capacity calculations based on Caltrans drainage plans (slope & pipe size). See selected Caltrans Drainage plan sheets in Appendix H).*

*** Proposed 20'x20' RCB culvert capacity calculated with an assumed depth of 2 feet which is 10% of the total height of the culvert.*

† *Area 13's peak flow rate will be split between Area 11 and 13's culverts via a proposed junction structure with flow restriction storm gates. Details of diversion structure to be included with the final version of this study. Please see discussion below and in section 3: existing culvert analysis for runoff exceeding the calculated culvert capacity.*

Each culvert has an existing natural drainage detention area located before the upstream inlets. These areas will provide detention storage and peak flow mitigation for the increased flow rates that exceed the calculated culvert capacity.

Section 3: Hydraulic Calculations

EXISTING CULVERT ANALYSIS:

No previously prepared hydrology or hydraulic studies or design plans or design flow rates were found for the existing culverts. Therefore, the culvert capacities were estimated using the Manning's equation for gravity pipe flow utilizing field survey data to determine the size, material, and slope of the culverts. The capacities of the culverts were calculated using the civil design software *CivilCADD Version 2.1* under maximum open channel flow conditions (D/d = 0.938) based on survey shots taken at the upstream and downstream flowline elevations. A Manning's roughness coefficient 'n' of 0.015 typically used for CMP was assumed since the current field conditions of the culverts were not verified. The hydraulic calculation output files can be found in Appendix D.

These culverts may be able to accept more flow, however this will cause the runoff to pond upstream within their respective natural drainage areas. These natural detention areas will provide storage and flow mitigation for the increased runoff produced by the project site before routing through the existing culverts.

SYNTHETIC UNIT HYDROGRAPH METHOD:

The Synthetic Unit Hydrograph, a computational procedure for developing peak runoff and discharge for storms of a specified recurrence interval, was used to evaluate our detention and mitigation needs onsite. This procedure calculates effective rainfall, which is the portion of the total rainfall that appears as surface runoff, at a specific concentration point. Precipitation data for the project location was taken from NOAA Atlas 14 and are provided in Appendix 1 of this report. It should be noted that the peak runoff flowrates resulting from the unit hydrograph analysis will vary from the peak runoff from the Modified Rational Method due to the different methodology and calculations as well as the parameters based on the times of concentration and flow travel lengths. The different methods serve to help design and size specific elements of the proposed onsite storm drain system. The Modified Rational Method is utilized for designing and sizing inlet structures and storm drain pipes whereas the Unit Hydrograph Method is used to design the basins with the necessary capacity.

The 100-year storm frequencies for each of the 1-hour and 24-hour durations were analyzed for increased runoff mitigation.

The following assumptions/guidelines were applied in the use to the Synthetic Unit Hydrograph Method:

- The 100-Year point rainfall depths at 1 and 24-hour durations were obtained from NOAA Atlas 14.
- Lag times used for the development of the synthetic unit hydrograph were generated based on the size and shape of the sub basin. The watershed sub area lag times were calculated according to the lag time equation as indicated in the RCFC&WCD Hydrology Manual.
- The basin factor (Manning's 'N'-value) 0.030 was estimated based on field investigations and existing and planned development. For the developed condition models, a Manning's 'N'-value of 0.015 was used which.
- The Foothill S curve graph was used for this project site due to the existing ground slope which ranges from steep to flat (>30% to <0.5%). The 1 and 24-hour, 5-minute interval data was used.

These were derived from the RCFC & WCD Hydrology Manual and are applied to the unit hydrograph model within the CivilDesign Software.

- An area averaged infiltration rate was calculated based on hydrologic soil type, vegetative cover land use and impervious percentage. The "low loss rate" function was then incorporated. The RCFC&WCD Hydrology Manual's synthetic unit hydrograph method includes a "low loss rate" function when calculating effective rainfall (i.e. total rain minus infiltration).

Table 3: Developed Unit Hydrograph Analysis

		Peak Volume (Ac-Ft.)		Peak Runoff (Q, CFS)			
Area ID	**Acreage (AC)**	**100-Year; 1-Hour**	**100-Year; 24-Hour**	**100-Year; 1-Hour**	**100-Year; 24-Hour**	**Basin ID**	**Basin Capacity (Ac-Ft.)**
1	70.8	8.4	23.5	268.0	51.3	Basin 4	9.4
6	33.7	4.0	12.5	120.0	24.0	Basin 3	9.5
13	88.7	10.6	32.7	333.7	65.0	Basin 2	11.1
16	85.6	10.2	32.8	320.3	63.3	Basin 1	10.3

The developed unit hydrograph analysis models and results can be found in Appendix E.

The proposed basins serve as combination stormwater treatment basins and detention basins for increased runoff from the entire project site. The basins will mitigate the peak runoff flow rate for the 100-year, 1-hour event of which generates the highest peak runoff rate. The basins are designed to treat the runoff from their respective tributaries and detain the required stormwater quality design capture volume (VBMP), which receives the water via their proposed storm drain system. A summary of the basin volume calculations and properties can be found in Appendix F.

BASIN ROUTING METHOD:

The following assumptions/guidelines were made in the use of Reservoir Routing:

The Modified Pul's (Storage Indication) Method is used for the detention basin routing studies. The basin routing relationships are based upon the following formula:

$$I - O = DS/Dt \qquad \text{(Equation 1)}$$

Where:

I = Basin inflow rate (cfs)
O = Basin outflow rate (cfs)
DS = Change in basin storage during the time step (cubic feet)
Dt = time step (sec)

- The basin inflow rates are based on the developed unit hydrograph files (See Appendix E).
- Depth-Storage-Discharge curve is based on Basin Volume worksheet

- The procedure is repeated for each time step until the basin inflow hydrograph has been completely analyzed and the basin outflow becomes negligible.

For Basin 2 within Area 13, a basin routing model was prepared to demonstrate the mitigation performance of the proposed basin for the developed 100-year, 1-hour unit hydrograph analysis. The model includes the inflow rate from the unit hydrograph analysis, the volume and outflow rate per depth of basin, and a diversion/flow cutoff structure downstream for splitting the flow between culverts 11 and 13. The outlet structure flow rate was calculated using a combination of orifice (Equation 2) and weir (Equation 3) flows. A detailed table for the basins showing the storage volume and the total outflow rate can be found in Appendix F.

The orifice size was determined using the LID Extended Detention Basin BMP worksheet of which allows for the VBMP to be retained for at least 24 hours and less than 72 hours.

$$Q = CA(2gh)^{0.5} \qquad \text{(Equation 2)}$$

Where:

Q = Discharge in cfs

C = Coefficient of discharge (0.66)

A = area of opening in square feet

g = 32.2 ft/sec

h = depth of water to orifice invert (ft)

Above the VBMP water surface elevation, a 48-inch diameter riser is used for the 100-year mitigation using an equivalent length rectangular weir.

$$Q = Cw(L)(h)^{1.5} \qquad \text{(Equation 3)}$$

Q = Discharge in cfs

Cw = Coefficient of discharge (3.0)

L = length of rectangular weir in feet

h = depth of water to orifice invert (ft)

As part of the design of the basin and the routing model, it is assumed that the basin starts with VBMP volume and water surface elevation. This is to provide a conservative approach assuming that the basin had already experienced a storm event that has filled. This way, the basin is still able to provide the capacity to mitigate the 100-year events and protect the adjacent properties. After the basin routing model, the proposed Basin 2 achieved a maximum detention volume of 10.3 Ac-ft, a peak outflow rate of 138.5 cfs and a maximum depth of 4.7 ft. The proposed basin reduced the peak developed unit hydrograph runoff by 177 cfs.

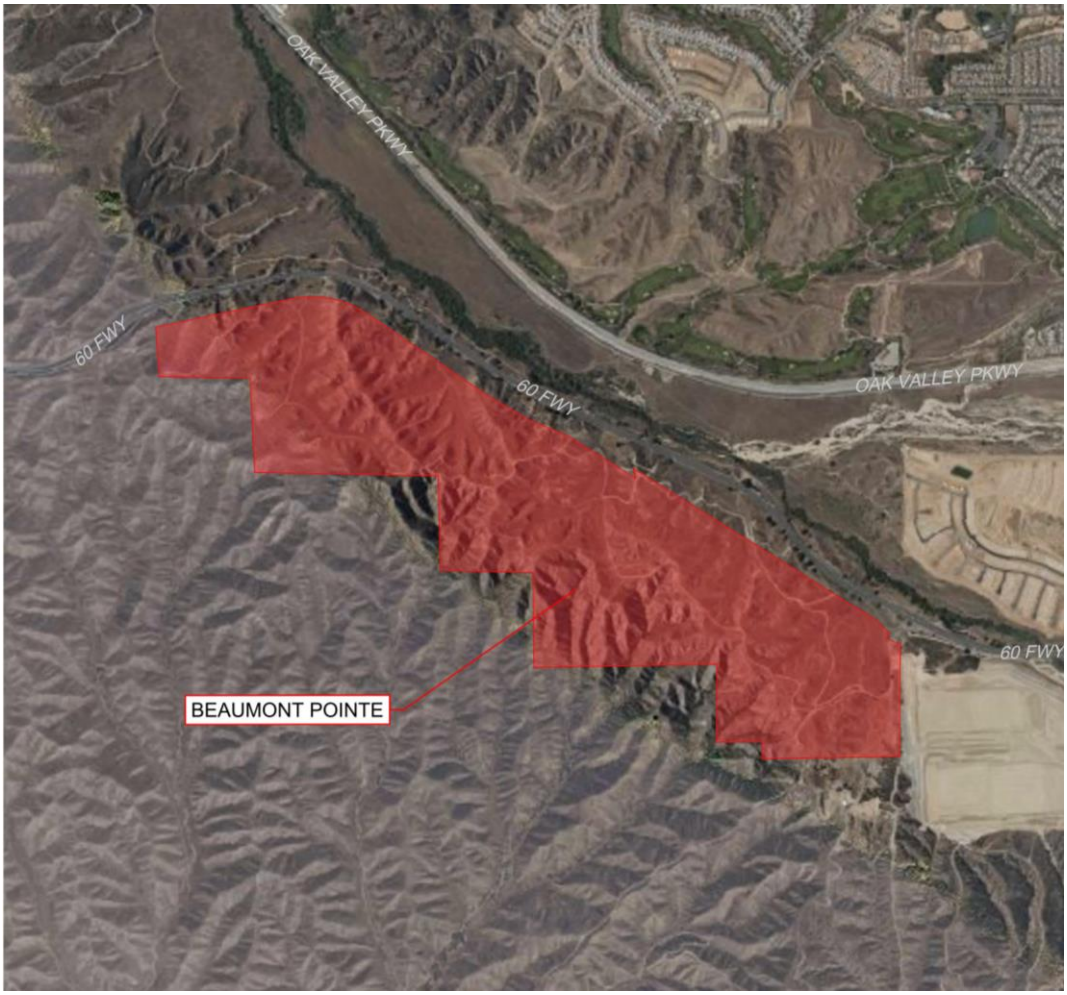
Included in the model, a flow diversion/cutoff wall downstream of the basin. This diversion would restrict the flow going to culvert 13 to be no more than 138.8 cfs, whereas the exceeding flows would be diverted to culvert 11. The Basin 2 routing model output and results can be found in Appendix F.

At this time, only Basin 2 was analyzed with a basin routing model due to the developed unit hydrograph peak runoff exceeding the sum of the capacities of culverts 11 and 13.

CONCLUSIONS:

The Beaumont Pointe Specific Plan project will utilize onsite drainage systems consisting of parking inlets, catch basins, storm drain pipe varying from 18" to 48" diameter, outlet structures, a flow diversion structure, and four water quality basins. The onsite stormwater system will be designed to bypass offsite tributary flows from the south, intercept and treat runoff from the development, and provide peak flow mitigation for the 100-year storm events. The treated stormwater runoff from the basin outlets to the natural and historical detention areas upstream of their respective existing culverts. The proposed design meets the water quality and drainage mitigation criteria and will not result in a substantial increase in rate or amount of runoff that would result in on- or off-site flooding or exceed the existing or planned stormwater system.

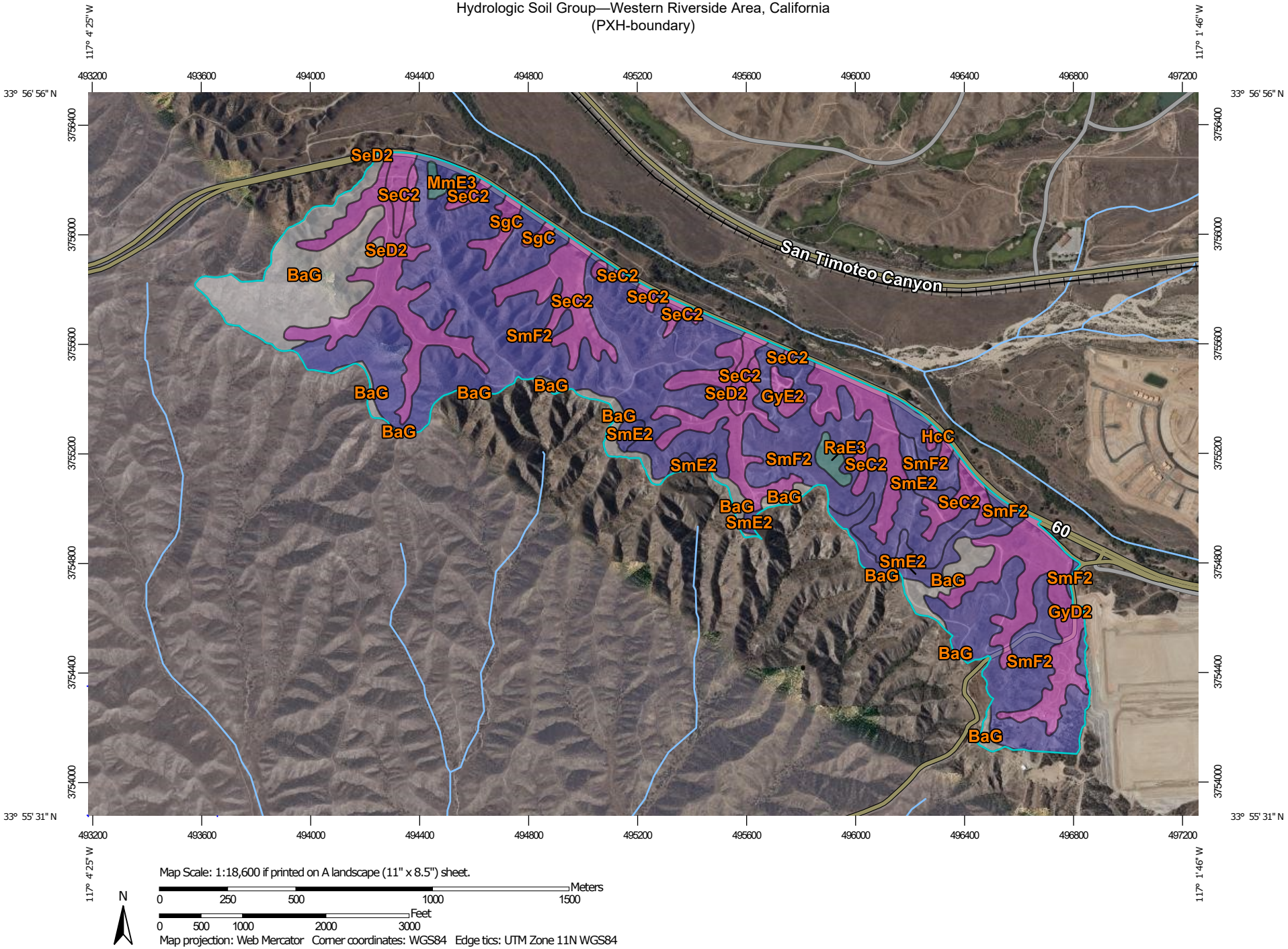
Section 4: Vicinity Map



Riverside County Flood Control & Water Conservation District Plates..... A

- NRCS Web Soil Survey Hydrological Soils Group Map
- NOAA Atlas 14 Rainfall Data
- Slope of Intensity Duration Curve (Plate D-4.6)

Hydrologic Soil Group—Western Riverside Area, California
(PXH-boundary)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 13, 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: Dec 31, 2009—Aug 31, 2018

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BaG	Badland		67.2	12.9%
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	A	0.7	0.1%
GyD2	Greenfield sandy loam, 8 to 15 percent slopes, eroded	A	33.2	6.4%
GyE2	Greenfield sandy loam, 15 to 25 percent slopes, eroded	A	3.3	0.6%
HcC	Hanford coarse sandy loam, 2 to 8 percent slopes	A	2.1	0.4%
MmE3	Monserate sandy loam, 15 to 25 percent slopes, severely eroded	C	1.9	0.4%
RaE3	Ramona sandy loam, 15 to 25 percent slopes, severely eroded	C	3.3	0.6%
SeC2	San Emigdio fine sandy loam, 2 to 8 percent slopes, eroded	A	58.2	11.2%
SeD2	San Emigdio fine sandy loam, 8 to 15 percent slopes, eroded	A	54.7	10.5%
SgC	San Emigdio loam, 2 to 8 percent slopes	A	5.4	1.0%
SmE2	San Timoteo loam, 8 to 25 percent slopes, eroded	B	20.5	3.9%
SmF2	San Timoteo loam, 25 to 50 percent slopes, eroded	B	268.9	51.8%
Totals for Area of Interest			**519.5**	**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

NOAA Atlas 14, Volume 6, Version 2
Location name: Beaumont, California, USA*
Latitude: 33.9382°, Longitude: -117.051°
Elevation: 2359.04 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.112** (0.093-0.136)	**0.146** (0.121-0.177)	**0.194** (0.161-0.236)	**0.236** (0.194-0.289)	**0.299** (0.238-0.379)	**0.352** (0.274-0.457)	**0.412** (0.312-0.548)	**0.479** (0.353-0.656)	**0.582** (0.411-0.832)	**0.672** (0.459-0.996)
10-min	**0.161** (0.134-0.195)	**0.209** (0.174-0.253)	**0.278** (0.230-0.338)	**0.338** (0.278-0.415)	**0.428** (0.340-0.544)	**0.505** (0.393-0.655)	**0.590** (0.448-0.785)	**0.687** (0.506-0.941)	**0.834** (0.589-1.19)	**0.964** (0.657-1.43)
15-min	**0.194** (0.162-0.235)	**0.253** (0.210-0.307)	**0.336** (0.279-0.408)	**0.409** (0.336-0.501)	**0.518** (0.412-0.657)	**0.610** (0.475-0.792)	**0.713** (0.541-0.949)	**0.830** (0.612-1.14)	**1.01** (0.713-1.44)	**1.17** (0.795-1.73)
30-min	**0.288** (0.240-0.349)	**0.375** (0.312-0.455)	**0.499** (0.414-0.607)	**0.607** (0.500-0.745)	**0.769** (0.612-0.976)	**0.907** (0.706-1.18)	**1.06** (0.804-1.41)	**1.23** (0.909-1.69)	**1.50** (1.06-2.14)	**1.73** (1.18-2.57)
60-min	**0.423** (0.353-0.513)	**0.551** (0.458-0.668)	**0.731** (0.607-0.890)	**0.890** (0.733-1.09)	**1.13** (0.897-1.43)	**1.33** (1.03-1.73)	**1.56** (1.18-2.07)	**1.81** (1.33-2.48)	**2.20** (1.55-3.14)	**2.54** (1.73-3.76)
2-hr	**0.613** (0.511-0.742)	**0.777** (0.647-0.943)	**1.01** (0.835-1.22)	**1.20** (0.991-1.48)	**1.49** (1.19-1.90)	**1.73** (1.35-2.25)	**1.99** (1.51-2.65)	**2.28** (1.68-3.12)	**2.70** (1.91-3.86)	**3.05** (2.08-4.52)
3-hr	**0.757** (0.631-0.917)	**0.952** (0.792-1.16)	**1.22** (1.01-1.49)	**1.45** (1.19-1.78)	**1.78** (1.42-2.26)	**2.05** (1.60-2.66)	**2.34** (1.78-3.12)	**2.66** (1.96-3.64)	**3.12** (2.20-4.45)	**3.50** (2.38-5.18)
6-hr	**1.09** (0.910-1.32)	**1.37** (1.14-1.66)	**1.74** (1.44-2.11)	**2.05** (1.69-2.52)	**2.49** (1.98-3.17)	**2.85** (2.22-3.70)	**3.22** (2.45-4.29)	**3.62** (2.67-4.96)	**4.19** (2.96-5.99)	**4.64** (3.17-6.88)
12-hr	**1.47** (1.23-1.78)	**1.86** (1.55-2.26)	**2.39** (1.99-2.91)	**2.83** (2.33-3.47)	**3.43** (2.73-4.36)	**3.91** (3.04-5.07)	**4.40** (3.34-5.86)	**4.92** (3.62-6.73)	**5.63** (3.97-8.04)	**6.19** (4.22-9.17)
24-hr	**1.95** (1.73-2.25)	**2.54** (2.24-2.93)	**3.31** (2.92-3.83)	**3.94** (3.45-4.60)	**4.82** (4.08-5.80)	**5.49** (4.56-6.75)	**6.18** (5.01-7.79)	**6.90** (5.44-8.94)	**7.89** (5.98-10.6)	**8.66** (6.34-12.1)
2-day	**2.36** (2.09-2.72)	**3.13** (2.77-3.61)	**4.17** (3.67-4.82)	**5.03** (4.40-5.87)	**6.25** (5.29-7.53)	**7.22** (5.99-8.88)	**8.23** (6.67-10.4)	**9.30** (7.33-12.0)	**10.8** (8.18-14.6)	**12.0** (8.79-16.7)
3-day	**2.55** (2.25-2.94)	**3.41** (3.01-3.93)	**4.60** (4.05-5.32)	**5.61** (4.91-6.54)	**7.06** (5.98-8.50)	**8.23** (6.83-10.1)	**9.48** (7.68-11.9)	**10.8** (8.53-14.0)	**12.7** (9.65-17.2)	**14.3** (10.5-19.9)
4-day	**2.76** (2.44-3.18)	**3.72** (3.29-4.29)	**5.05** (4.45-5.84)	**6.19** (5.41-7.22)	**7.82** (6.62-9.42)	**9.15** (7.59-11.3)	**10.6** (8.56-13.3)	**12.1** (9.55-15.7)	**14.3** (10.8-19.3)	**16.1** (11.8-22.5)
7-day	**3.17** (2.81-3.66)	**4.30** (3.80-4.96)	**5.85** (5.16-6.77)	**7.17** (6.27-8.36)	**9.06** (7.67-10.9)	**10.6** (8.78-13.0)	**12.2** (9.89-15.4)	**13.9** (11.0-18.0)	**16.4** (12.4-22.1)	**18.5** (13.5-25.7)
10-day	**3.45** (3.05-3.98)	**4.69** (4.14-5.41)	**6.39** (5.63-7.39)	**7.83** (6.85-9.14)	**9.89** (8.37-11.9)	**11.5** (9.58-14.2)	**13.3** (10.8-16.7)	**15.2** (12.0-19.6)	**17.8** (13.5-24.0)	**20.0** (14.6-27.9)
20-day	**4.26** (3.77-4.92)	**5.84** (5.17-6.74)	**8.00** (7.05-9.26)	**9.82** (8.59-11.5)	**12.4** (10.5-14.9)	**14.5** (12.0-17.8)	**16.6** (13.5-21.0)	**19.0** (14.9-24.5)	**22.2** (16.8-29.9)	**24.8** (18.2-34.6)
30-day	**5.04** (4.47-5.82)	**6.92** (6.12-7.99)	**9.48** (8.36-11.0)	**11.6** (10.2-13.6)	**14.7** (12.4-17.7)	**17.1** (14.2-21.1)	**19.7** (15.9-24.8)	**22.4** (17.7-29.0)	**26.2** (19.8-35.3)	**29.3** (21.4-40.8)
45-day	**6.05** (5.35-6.97)	**8.27** (7.31-9.54)	**11.3** (9.95-13.1)	**13.8** (12.1-16.1)	**17.4** (14.7-21.0)	**20.2** (16.8-24.9)	**23.2** (18.8-29.3)	**26.4** (20.8-34.2)	**30.9** (23.4-41.6)	**34.4** (25.2-48.0)
60-day	**7.07** (6.26-8.15)	**9.59** (8.48-11.1)	**13.0** (11.5-15.1)	**15.9** (13.9-18.5)	**19.9** (16.9-24.0)	**23.2** (19.2-28.5)	**26.5** (21.5-33.4)	**30.1** (23.7-39.0)	**35.1** (26.6-47.4)	**39.2** (28.7-54.6)

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

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

Please refer to NOAA Atlas 14 document for more information.

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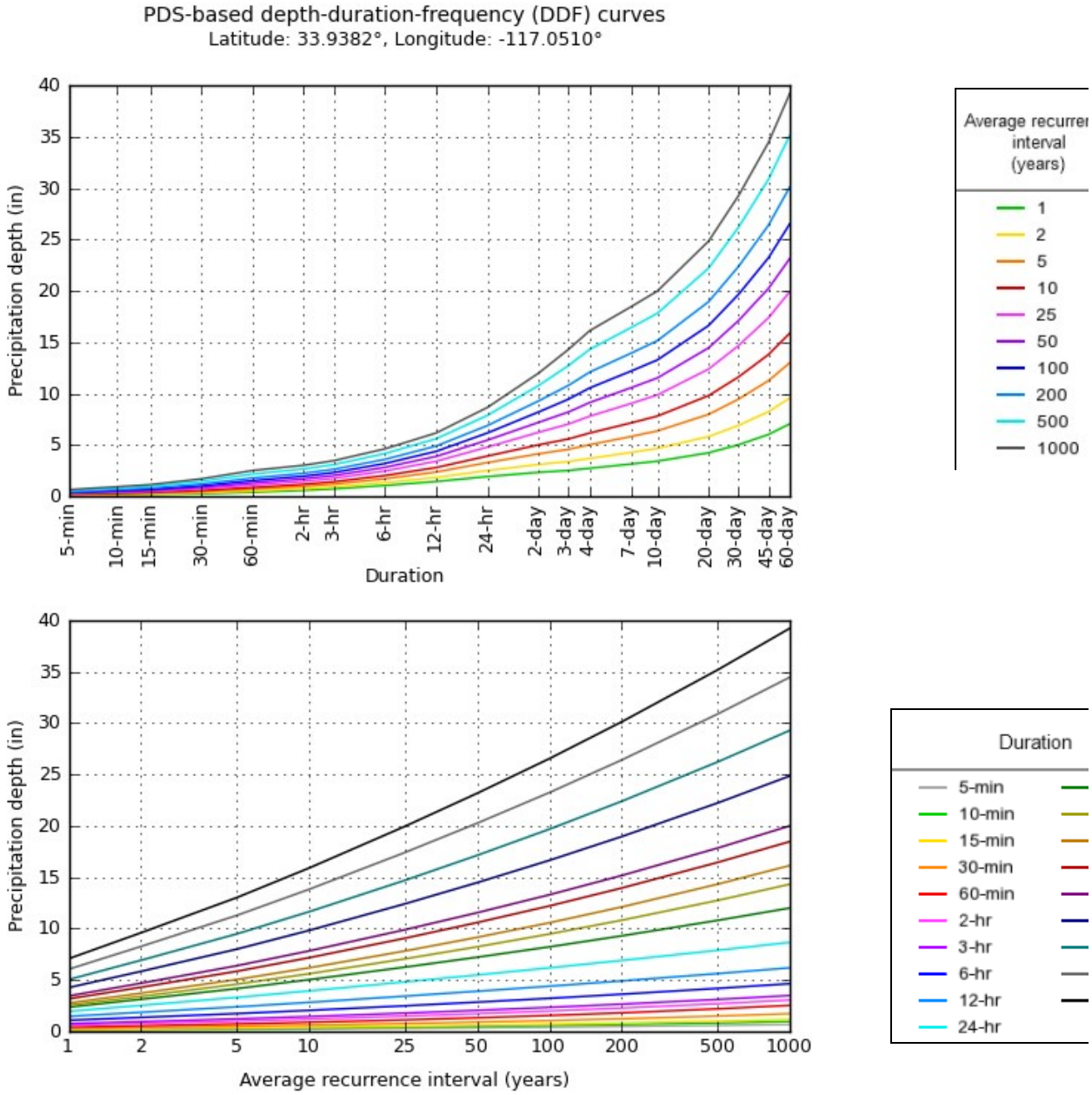
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Thu May 28 23:17:27 2020

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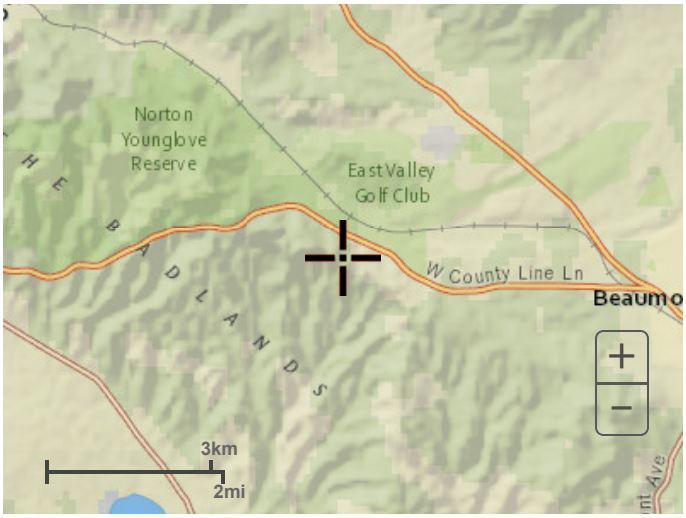
Maps & aerials

Small scale terrain



Large scale terrain

Large scale map

Large scale aerial

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

Disclaimer

BEAUMONT POINTE

PROJECT SITE:
0.50

NOTES:
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

SLOPE OF INTENSITY DURATION CURVE

PLATE D-4.6

Existing Hydrology Model and Results ..... B

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/06/20 File:PX100.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 100 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 907.600(Ft.)
Top (of initial area) elevation = 2500.000(Ft.)
Bottom (of initial area) elevation = 2417.000(Ft.)
Difference in elevation = 83.000(Ft.)
Slope = 0.09145 s(percent)= 9.14
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 13.038 min.
Rainfall intensity = 3.347(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.884
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
RI index for soil(AMC 3) = 95.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 17.510(CFS)
Total initial stream area = 5.920(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 101.000 to Point/Station 102.000

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2417.000(Ft.)
End of natural channel elevation = 2286.100(Ft.)
Length of natural channel = 1721.600(Ft.)
Estimated mean flow rate at midpoint of channel = 62.567(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 11.39(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0760
Corrected/adjusted channel slope = 0.0760
Travel time = 2.52 min. TC = 15.56 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.190
Decimal fraction soil group B = 0.270
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.540
RI index for soil(AMC 3) = 92.11
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.064(In/Hr) for a 100.0 year storm
Subarea runoff = 80.990(CFS) for 30.468(Ac.)
Total runoff = 98.500(CFS) Total area = 36.388(Ac.)

++
Process from Point/Station 102.000 to Point/Station 102.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 36.388(Ac.)
Runoff from this stream = 98.500(CFS)
Time of concentration = 15.56 min.
Rainfall intensity = 3.064(In/Hr)
Program is now starting with Main Stream No. 2

++
Process from Point/Station 103.000 to Point/Station 104.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 577.200(Ft.)
Top (of initial area) elevation = 2431.000(Ft.)
Bottom (of initial area) elevation = 2349.900(Ft.)
Difference in elevation = 81.100(Ft.)
Slope = 0.14051 s(percent)= 14.05
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.983 min.
Rainfall intensity = 3.824(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.140
Decimal fraction soil group B = 0.750
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.110
RI index for soil(AMC 3) = 89.60
Pervious area fraction = 1.000; Impervious fraction = 0.000

```
Initial subarea runoff =     26.161(CFS)
Total initial stream area =        7.908(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      102.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   2349.900(Ft.)
End of natural channel elevation =   2286.100(Ft.)
Length of natural channel  =  1353.100(Ft.)
Estimated mean flow rate at midpoint of channel =     94.525(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.13(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0472
Corrected/adjusted channel slope =  0.0472
Travel time =    2.23 min.     TC =   12.21  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.250
Decimal fraction soil group B = 0.730
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.020
RI index for soil(AMC 3)  =  88.28
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.458(In/Hr) for a   100.0 year storm
Subarea runoff =    122.381(CFS) for     41.331(Ac.)
Total runoff =    148.542(CFS)   Total area =      49.239(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      102.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     49.239(Ac.)
Runoff from this stream =    148.542(CFS)
Time of concentration =   12.21 min.
Rainfall intensity =     3.458(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       98.500     15.56            3.064
2      148.542     12.21            3.458
Largest stream flow has longer or shorter time of concentration
Qp =    148.542 + sum of
         Qa          Tb/Ta
         98.500 *    0.785 =     77.300
Qp =    225.842

Total of 2 main streams to confluence:
Flow rates before confluence point:
```

```
      98.500     148.542
Area of streams before confluence:
       36.388       49.239


Results of confluence:
Total flow rate =    225.842(CFS)
Time of concentration =    12.208 min.
Effective stream area after confluence  =     85.627(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   2286.100(Ft.)
End of natural channel elevation =   2230.000(Ft.)
Length of natural channel  =  1718.300(Ft.)
Estimated mean flow rate at midpoint of channel =    267.201(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.60(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0326
Corrected/adjusted channel slope =  0.0326
Travel time =    2.47 min.     TC =   14.68  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.852
Decimal fraction soil group A = 0.490
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.260
RI index for soil(AMC 3)  =  88.28
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.154(In/Hr) for a   100.0 year storm
Subarea runoff =     84.297(CFS) for     31.362(Ac.)
Total runoff =    310.139(CFS)   Total area =     116.989(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =    116.989(Ac.)
Runoff from this stream =    310.139(CFS)
Time of concentration =   14.68 min.
Rainfall intensity =     3.154(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   859.900(Ft.)
Top (of initial area) elevation =  2540.000(Ft.)
Bottom (of initial area) elevation =  2310.000(Ft.)
```

```
Difference in elevation =   230.000(Ft.)
Slope =    0.26747  s(percent)=      26.75
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.294 min.
Rainfall intensity =      3.766(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.070
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.930
RI index for soil(AMC 3)  =  94.98
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     28.572(CFS)
Total initial stream area =        8.587(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      105.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   2310.000(Ft.)
End of natural channel elevation =   2230.000(Ft.)
Length of natural channel  =  1513.500(Ft.)
Estimated mean flow rate at midpoint of channel =     52.649(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.03(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0529
Corrected/adjusted channel slope =  0.0529
Travel time =    2.79 min.     TC =   13.09  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
RI index for soil(AMC 3)  =  91.12
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.340(In/Hr) for a   100.0 year storm
Subarea runoff =     41.877(CFS) for     14.472(Ac.)
Total runoff =     70.449(CFS)   Total area =      23.059(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     23.059(Ac.)
Runoff from this stream =     70.449(CFS)
Time of concentration =   13.09 min.
Rainfall intensity =     3.340(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
```

```
 No.       (CFS)       (min)                 (In/Hr)


1      310.139     14.68            3.154
2       70.449     13.09            3.340
Largest stream flow has longer time of concentration
Qp =    310.139 + sum of
         Qb         Ia/Ib
         70.449 *    0.944 =     66.523
Qp =    376.662

Total of 2 main streams to confluence:
Flow rates before confluence point:
     310.139      70.449
Area of streams before confluence:
      116.989       23.059


Results of confluence:
Total flow rate =    376.662(CFS)
Time of concentration =    14.677 min.
Effective stream area after confluence  =    140.048(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2230.000(Ft.)
Downstream point/station elevation =  2218.900(Ft.)
Pipe length  =   155.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   376.662(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   376.662(CFS)
Normal flow depth in pipe =   38.53(In.)
Flow top width inside pipe =   38.20(In.)
Critical depth could not be calculated.
Pipe flow velocity =     34.87(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    14.75 min.
End of computations, total study area =          140.05 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  78.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX200.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 200 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 579.900(Ft.)
Top (of initial area) elevation = 2390.000(Ft.)
Bottom (of initial area) elevation = 2250.000(Ft.)
Difference in elevation = 140.000(Ft.)
Slope = 0.24142 s(percent)= 24.14
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.976 min.
Rainfall intensity = 4.033(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.520
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 86.37
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 9.015(CFS)
Total initial stream area = 2.613(Ac.)
Pervious area fraction = 1.000

++

```
Process from Point/Station      201.000 to Point/Station      202.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2250.000(Ft.)
Downstream point/station elevation =  2219.600(Ft.)
Pipe length  =   167.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.015(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     9.015(CFS)
Normal flow depth in pipe =    6.66(In.)
Flow top width inside pipe =   11.93(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.16(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     9.11 min.
End of computations, total study area =            2.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  72.3
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX300.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 300 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 982.400(Ft.)
Top (of initial area) elevation = 2430.200(Ft.)
Bottom (of initial area) elevation = 2224.800(Ft.)
Difference in elevation = 205.400(Ft.)
Slope = 0.20908 s(percent)= 20.91
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.406 min.
Rainfall intensity = 3.578(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.260
Decimal fraction soil group B = 0.740
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.08
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 28.437(CFS)
Total initial stream area = 9.276(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 301.000 to Point/Station 302.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2224.800(Ft.)
Downstream point/station elevation = 2211.100(Ft.)
Pipe length = 217.70(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 28.437(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 28.437(CFS)
Normal flow depth in pipe = 13.14(In.)
Flow top width inside pipe = 20.33(In.)
Critical depth could not be calculated.
Pipe flow velocity = 17.96(Ft/s)
Travel time through pipe = 0.20 min.
Time of concentration (TC) = 11.61 min.
End of computations, total study area = 9.28 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 75.1

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX400.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 400 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 400.000 to Point/Station 401.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 795.900(Ft.)
Top (of initial area) elevation = 2490.000(Ft.)
Bottom (of initial area) elevation = 2263.900(Ft.)
Difference in elevation = 226.100(Ft.)
Slope = 0.28408 s(percent)= 28.41
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.861 min.
Rainfall intensity = 3.848(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.150
Decimal fraction soil group B = 0.850
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.81
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 31.235(CFS)
Total initial stream area = 9.413(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 401.000 to Point/Station 402.000

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2263.900(Ft.)
End of natural channel elevation = 2225.400(Ft.)
Length of natural channel = 629.800(Ft.)
Estimated mean flow rate at midpoint of channel = 43.621(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 9.20(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0611
Corrected/adjusted channel slope = 0.0611
Travel time = 1.14 min. TC = 11.00 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.390
Decimal fraction soil group B = 0.610
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.23
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.643(In/Hr) for a 100.0 year storm
Subarea runoff = 23.231(CFS) for 7.465(Ac.)
Total runoff = 54.466(CFS) Total area = 16.878(Ac.)

++
Process from Point/Station 402.000 to Point/Station 403.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2225.400(Ft.)
Downstream point/station elevation = 2214.400(Ft.)
Pipe length = 178.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 54.466(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 54.466(CFS)
Normal flow depth in pipe = 19.03(In.)
Flow top width inside pipe = 19.45(In.)
Critical depth could not be calculated.
Pipe flow velocity = 20.37(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 11.15 min.
End of computations, total study area = 16.88 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 75.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 04/21/22 File:PX450.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 450 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 450.000 to Point/Station 451.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 152.500(Ft.)
Top (of initial area) elevation = 2290.000(Ft.)
Bottom (of initial area) elevation = 2233.900(Ft.)
Difference in elevation = 56.100(Ft.)
Slope = 0.36787 s(percent)= 36.79
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the

```
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      5.404(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.803(CFS)
Total initial stream area =        0.381(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            0.38 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  78.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX500.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 500 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 500.000 to Point/Station 501.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 981.000(Ft.)
Top (of initial area) elevation = 2390.100(Ft.)
Bottom (of initial area) elevation = 2222.300(Ft.)
Difference in elevation = 167.800(Ft.)
Slope = 0.17105 s(percent)= 17.10
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.866 min.
Rainfall intensity = 3.508(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.190
Decimal fraction soil group B = 0.810
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.55
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 16.367(CFS)
Total initial stream area = 5.439(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 501.000 to Point/Station 502.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2222.300(Ft.)
Downstream point/station elevation = 2215.500(Ft.)
Pipe length = 190.70(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 16.367(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 16.367(CFS)
Normal flow depth in pipe = 12.47(In.)
Flow top width inside pipe = 16.61(In.)
Critical depth could not be calculated.
Pipe flow velocity = 12.54(Ft/s)
Travel time through pipe = 0.25 min.
Time of concentration (TC) = 12.12 min.
End of computations, total study area = 5.44 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 75.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX600.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 600 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 600.000 to Point/Station 601.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 841.500(Ft.)
Top (of initial area) elevation = 2480.300(Ft.)
Bottom (of initial area) elevation = 2300.000(Ft.)
Difference in elevation = 180.300(Ft.)
Slope = 0.21426 s(percent)= 21.43
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.669 min.
Rainfall intensity = 3.700(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.864
Decimal fraction soil group A = 0.120
Decimal fraction soil group B = 0.790
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.090
RI index for soil(AMC 3) = 89.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 26.075(CFS)
Total initial stream area = 8.159(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 601.000 to Point/Station 602.000

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2300.000(Ft.)
End of natural channel elevation = 2250.000(Ft.)
Length of natural channel = 801.400(Ft.)
Estimated mean flow rate at midpoint of channel = 64.016(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 10.39(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0624
Corrected/adjusted channel slope = 0.0624
Travel time = 1.29 min. TC = 11.95 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.320
Decimal fraction soil group B = 0.650
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.030
RI index for soil(AMC 3) = 87.89
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.495(In/Hr) for a 100.0 year storm
Subarea runoff = 70.950(CFS) for 23.743(Ac.)
Total runoff = 97.026(CFS) Total area = 31.902(Ac.)

++
Process from Point/Station 602.000 to Point/Station 603.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2250.000(Ft.)
End of natural channel elevation = 2230.000(Ft.)
Length of natural channel = 426.700(Ft.)
Estimated mean flow rate at midpoint of channel = 124.952(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 10.99(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0469
Corrected/adjusted channel slope = 0.0469
Travel time = 0.65 min. TC = 12.60 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.390
Decimal fraction soil group B = 0.610
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.23
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.404(In/Hr) for a 100.0 year storm
Subarea runoff = 53.208(CFS) for 18.364(Ac.)
Total runoff = 150.233(CFS) Total area = 50.266(Ac.)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   2230.000(Ft.)
End of natural channel elevation =   2225.200(Ft.)
Length of natural channel  =    75.600(Ft.)
Estimated mean flow rate at midpoint of channel =    155.597(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  13.68(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0635
Corrected/adjusted channel slope =  0.0635
Travel time =    0.09 min.     TC =   12.69  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.845
Decimal fraction soil group A = 0.590
Decimal fraction soil group B = 0.410
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  85.91
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.392(In/Hr) for a   100.0 year storm
Subarea runoff =     10.291(CFS) for      3.589(Ac.)
Total runoff =    160.525(CFS)   Total area =      53.855(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      605.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  2225.200(Ft.)
Downstream point/station elevation =  2222.100(Ft.)
Pipe length  =   154.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   160.525(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   160.525(CFS)
Normal flow depth in pipe =   34.59(In.)
Flow top width inside pipe =   37.95(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.62(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    12.84 min.
End of computations, total study area =           53.86 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  74.6
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX700.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 700 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 700.000 to Point/Station 701.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 777.500(Ft.)
Top (of initial area) elevation = 2400.000(Ft.)
Bottom (of initial area) elevation = 2240.100(Ft.)
Difference in elevation = 159.900(Ft.)
Slope = 0.20566 s(percent)= 20.57
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.421 min.
Rainfall intensity = 3.743(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.160
Decimal fraction soil group B = 0.840
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.74
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 14.314(CFS)
Total initial stream area = 4.441(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 701.000 to Point/Station 702.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2240.100(Ft.)
Downstream point/station elevation = 2228.700(Ft.)
Pipe length = 144.20(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.314(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 14.314(CFS)
Normal flow depth in pipe = 10.04(In.)
Flow top width inside pipe = 14.11(In.)
Critical depth could not be calculated.
Pipe flow velocity = 16.40(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 10.57 min.
End of computations, total study area = 4.44 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 76.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX800.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 800 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 800.000 to Point/Station 801.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 834.500(Ft.)
Top (of initial area) elevation = 2430.000(Ft.)
Bottom (of initial area) elevation = 2243.400(Ft.)
Difference in elevation = 186.600(Ft.)
Slope = 0.22361 s(percent)= 22.36
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.543 min.
Rainfall intensity = 3.722(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.140
Decimal fraction soil group B = 0.860
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.88
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 22.568(CFS)
Total initial stream area = 7.040(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 801.000 to Point/Station 802.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2243.400(Ft.)
Downstream point/station elevation = 2234.700(Ft.)
Pipe length = 146.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 22.568(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 22.568(CFS)
Normal flow depth in pipe = 13.13(In.)
Flow top width inside pipe = 16.00(In.)
Critical depth could not be calculated.
Pipe flow velocity = 16.35(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 10.69 min.
End of computations, total study area = 7.04 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 76.5

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX900.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 900 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 900.000 to Point/Station 901.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 528.600(Ft.)
Top (of initial area) elevation = 2440.000(Ft.)
Bottom (of initial area) elevation = 2280.200(Ft.)
Difference in elevation = 159.800(Ft.)
Slope = 0.30231 s(percent)= 30.23
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.269 min.
Rainfall intensity = 4.202(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 14.160(CFS)
Total initial stream area = 3.879(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 901.000 to Point/Station 902.000

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2280.200(Ft.)
End of natural channel elevation = 2241.600(Ft.)
Length of natural channel = 439.600(Ft.)
Estimated mean flow rate at midpoint of channel = 32.854(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 10.18(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0878
Corrected/adjusted channel slope = 0.0878
Travel time = 0.72 min. TC = 8.99 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.230
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.28
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 4.030(In/Hr) for a 100.0 year storm
Subarea runoff = 35.589(CFS) for 10.242(Ac.)
Total runoff = 49.749(CFS) Total area = 14.121(Ac.)

++
Process from Point/Station 902.000 to Point/Station 903.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2241.600(Ft.)
Downstream point/station elevation = 2236.100(Ft.)
Pipe length = 166.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 49.749(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 49.749(CFS)
Normal flow depth in pipe = 19.69(In.)
Flow top width inside pipe = 24.00(In.)
Critical depth could not be calculated.
Pipe flow velocity = 16.00(Ft/s)
Travel time through pipe = 0.17 min.
Time of concentration (TC) = 9.16 min.
End of computations, total study area = 14.12 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 76.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX1000.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1000 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1000.000 to Point/Station 1001.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 233.700(Ft.)
Top (of initial area) elevation = 2430.000(Ft.)
Bottom (of initial area) elevation = 2258.500(Ft.)
Difference in elevation = 171.500(Ft.)
Slope = 0.73385 s(percent)= 73.38
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the
time of concentration is 5 minutes.
Initial area time of concentration = 5.000 min.
Rainfall intensity = 5.404(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 2.247(CFS)
Total initial stream area = 0.475(Ac.)
Pervious area fraction = 1.000

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2258.500(Ft.)
Downstream point/station elevation =  2237.100(Ft.)
Pipe length  =   156.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.247(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.247(CFS)
Normal flow depth in pipe =    3.78(In.)
Flow top width inside pipe =    8.88(In.)
Critical Depth =    8.05(In.)
Pipe flow velocity =     12.77(Ft/s)
Travel time through pipe =    0.20 min.
Time of concentration (TC) =     5.20 min.
End of computations, total study area =            0.47 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  78.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX1100.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1100 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1100.000 to Point/Station 1101.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 960.500(Ft.)
Top (of initial area) elevation = 2470.000(Ft.)
Bottom (of initial area) elevation = 2340.000(Ft.)
Difference in elevation = 130.000(Ft.)
Slope = 0.13535 s(percent)= 13.53
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.331 min.
Rainfall intensity = 3.441(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.320
Decimal fraction soil group B = 0.410
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.270
RI index for soil(AMC 3) = 89.47
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 17.704(CFS)
Total initial stream area = 5.977(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 1101.000 to Point/Station 1102.000

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2340.000(Ft.)
End of natural channel elevation = 2270.000(Ft.)
Length of natural channel = 1224.400(Ft.)
Estimated mean flow rate at midpoint of channel = 79.906(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 10.61(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0572
Corrected/adjusted channel slope = 0.0572
Travel time = 1.92 min. TC = 14.25 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.270
Decimal fraction soil group B = 0.560
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.170
RI index for soil(AMC 3) = 89.14
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.201(In/Hr) for a 100.0 year storm
Subarea runoff = 115.143(CFS) for 42.000(Ac.)
Total runoff = 132.847(CFS) Total area = 47.977(Ac.)

++
Process from Point/Station 1102.000 to Point/Station 1103.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2270.000(Ft.)
End of natural channel elevation = 2246.900(Ft.)
Length of natural channel = 889.600(Ft.)
Estimated mean flow rate at midpoint of channel = 175.867(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 9.08(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0260
Corrected/adjusted channel slope = 0.0260
Travel time = 1.63 min. TC = 15.89 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.390
Decimal fraction soil group B = 0.590
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.020
RI index for soil(AMC 3) = 87.36
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.032(In/Hr) for a 100.0 year storm
Subarea runoff = 79.713(CFS) for 31.073(Ac.)
Total runoff = 212.559(CFS) Total area = 79.050(Ac.)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1103.000 to Point/Station     1104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2246.900(Ft.)
Downstream point/station elevation =  2246.300(Ft.)
Pipe length  =   160.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   212.559(CFS)
Nearest computed pipe diameter  =     66.00(In.)
Calculated individual pipe flow  =   212.559(CFS)
Normal flow depth in pipe =   56.44(In.)
Flow top width inside pipe =   46.46(In.)
Critical Depth =   48.93(In.)
Pipe flow velocity =      9.84(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    16.16 min.
End of computations, total study area =           79.05 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  75.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX1200.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1200 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1200.000 to Point/Station 1201.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 491.100(Ft.)
Top (of initial area) elevation = 2370.400(Ft.)
Bottom (of initial area) elevation = 2269.500(Ft.)
Difference in elevation = 100.900(Ft.)
Slope = 0.20546 s(percent)= 20.55
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.674 min.
Rainfall intensity = 4.103(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.370
Decimal fraction soil group B = 0.630
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.36
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 10.531(CFS)
Total initial stream area = 2.986(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 1201.000 to Point/Station 1202.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2269.500(Ft.)
Downstream point/station elevation = 2259.500(Ft.)
Pipe length = 109.30(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.531(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 10.531(CFS)
Normal flow depth in pipe = 9.60(In.)
Flow top width inside pipe = 9.60(In.)
Critical depth could not be calculated.
Pipe flow velocity = 15.64(Ft/s)
Travel time through pipe = 0.12 min.
Time of concentration (TC) = 8.79 min.
End of computations, total study area = 2.99 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 73.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX1300.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1300 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1300.000 to Point/Station 1301.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 533.500(Ft.)
Top (of initial area) elevation = 2500.000(Ft.)
Bottom (of initial area) elevation = 2390.000(Ft.)
Difference in elevation = 110.000(Ft.)
Slope = 0.20619 s(percent)= 20.62
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.959 min.
Rainfall intensity = 4.037(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.867
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 8.912(CFS)
Total initial stream area = 2.545(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 1301.000 to Point/Station 1302.000

```
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   2390.000(Ft.)
End of natural channel elevation =   2300.000(Ft.)
Length of natural channel  =  1273.800(Ft.)
Estimated mean flow rate at midpoint of channel =     34.762(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.28(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0707
Corrected/adjusted channel slope =  0.0707
Travel time =    2.29 min.     TC =   11.25  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.370
Decimal fraction soil group B = 0.630
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  87.36
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.603(In/Hr) for a   100.0 year storm
Subarea runoff =     45.438(CFS) for     14.763(Ac.)
Total runoff =     54.351(CFS)   Total area =      17.308(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1302.000 to Point/Station     1303.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   2300.000(Ft.)
End of natural channel elevation =   2269.900(Ft.)
Length of natural channel  =   946.300(Ft.)
Estimated mean flow rate at midpoint of channel =     99.045(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   8.44(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0318
Corrected/adjusted channel slope =  0.0318
Travel time =    1.87 min.     TC =   13.12  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.340
Decimal fraction soil group B = 0.610
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.050
RI index for soil(AMC 3)  =  87.89
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.336(In/Hr) for a   100.0 year storm
Subarea runoff =     81.016(CFS) for     28.466(Ac.)
Total runoff =    135.367(CFS)   Total area =      45.774(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1303.000 to Point/Station     1304.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of natural channel elevation =   2269.900(Ft.)
End of natural channel elevation =   2258.000(Ft.)
Length of natural channel  =   281.400(Ft.)
Estimated mean flow rate at midpoint of channel =    164.841(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.36(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0423
Corrected/adjusted channel slope =  0.0423
Travel time =    0.41 min.     TC =   13.53  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.350
Decimal fraction soil group B = 0.560
Decimal fraction soil group C = 0.080
Decimal fraction soil group D = 0.010
RI index for soil(AMC 3)  =  87.94
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.285(In/Hr) for a   100.0 year storm
Subarea runoff =     55.828(CFS) for     19.933(Ac.)
Total runoff =    191.195(CFS)   Total area =      65.707(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1304.000 to Point/Station     1305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2258.000(Ft.)
Downstream point/station elevation =  2249.600(Ft.)
Pipe length  =   168.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   191.195(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =   191.195(CFS)
Normal flow depth in pipe =   33.38(In.)
Flow top width inside pipe =   27.40(In.)
Critical depth could not be calculated.
Pipe flow velocity =     25.27(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =    13.64 min.
End of computations, total study area =           65.71 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  74.8
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX1400.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1400 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1400.000 to Point/Station 1401.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 706.800(Ft.)
Top (of initial area) elevation = 2280.100(Ft.)
Bottom (of initial area) elevation = 2279.500(Ft.)
Difference in elevation = 0.600(Ft.)
Slope = 0.00085 s(percent)= 0.08
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 30.076 min.
Rainfall intensity = 2.203(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.834
Decimal fraction soil group A = 0.210
Decimal fraction soil group B = 0.790
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.41
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 8.670(CFS)
Total initial stream area = 4.719(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 1401.000 to Point/Station 1402.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2279.500(Ft.)
Downstream point/station elevation = 2274.400(Ft.)
Pipe length = 141.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.670(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 8.670(CFS)
Normal flow depth in pipe = 9.30(In.)
Flow top width inside pipe = 14.56(In.)
Critical Depth = 13.72(In.)
Pipe flow velocity = 10.84(Ft/s)
Travel time through pipe = 0.22 min.
Time of concentration (TC) = 30.29 min.
End of computations, total study area = 4.72 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 75.7

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX1500.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1500 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1500.000 to Point/Station 1501.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 395.200(Ft.)
Top (of initial area) elevation = 2500.000(Ft.)
Bottom (of initial area) elevation = 2390.000(Ft.)
Difference in elevation = 110.000(Ft.)
Slope = 0.27834 s(percent)= 27.83
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.483 min.
Rainfall intensity = 4.417(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 5.962(CFS)
Total initial stream area = 1.551(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 1501.000 to Point/Station 1502.000

```
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   2390.000(Ft.)
End of natural channel elevation =   2308.500(Ft.)
Length of natural channel  =   965.100(Ft.)
Estimated mean flow rate at midpoint of channel =     29.682(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.70(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0844
Corrected/adjusted channel slope =  0.0844
Travel time =    1.66 min.     TC =    9.14  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.280
Decimal fraction soil group B = 0.720
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  87.95
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.997(In/Hr) for a   100.0 year storm
Subarea runoff =     42.455(CFS) for     12.342(Ac.)
Total runoff =     48.416(CFS)   Total area =      13.893(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1502.000 to Point/Station     1503.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   2308.500(Ft.)
End of natural channel elevation =   2287.800(Ft.)
Length of natural channel  =   296.000(Ft.)
Estimated mean flow rate at midpoint of channel =     69.181(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  11.25(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0699
Corrected/adjusted channel slope =  0.0699
Travel time =    0.44 min.     TC =    9.58  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.290
Decimal fraction soil group B = 0.710
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  87.89
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.904(In/Hr) for a   100.0 year storm
Subarea runoff =     39.991(CFS) for     11.917(Ac.)
Total runoff =     88.407(CFS)   Total area =      25.810(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1503.000 to Point/Station     1504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2287.800(Ft.)
Downstream point/station elevation =  2283.200(Ft.)
Pipe length  =   124.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    88.407(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    88.407(CFS)
Normal flow depth in pipe =   23.77(In.)
Flow top width inside pipe =   29.63(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.29(Ft/s)
Travel time through pipe =    0.11 min.
Time of concentration (TC) =     9.69 min.
End of computations, total study area =           25.81 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  75.1
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 10/04/20 File:PX1600.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1600 EXISTING
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1600.000 to Point/Station 1601.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 946.800(Ft.)
Top (of initial area) elevation = 2510.000(Ft.)
Bottom (of initial area) elevation = 2401.500(Ft.)
Difference in elevation = 108.500(Ft.)
Slope = 0.11460 s(percent)= 11.46
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.675 min.
Rainfall intensity = 3.394(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.130
Decimal fraction soil group B = 0.700
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.170
RI index for soil(AMC 3) = 90.06
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 23.891(CFS)
Total initial stream area = 8.160(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 1601.000 to Point/Station 1602.000

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2401.500(Ft.)
End of natural channel elevation = 2360.000(Ft.)
Length of natural channel = 1034.600(Ft.)
Estimated mean flow rate at midpoint of channel = 55.648(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 8.00(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0401
Corrected/adjusted channel slope = 0.0401
Travel time = 2.16 min. TC = 14.83 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.350
Decimal fraction soil group B = 0.650
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.49
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.138(In/Hr) for a 100.0 year storm
Subarea runoff = 57.750(CFS) for 21.693(Ac.)
Total runoff = 81.641(CFS) Total area = 29.853(Ac.)

++
Process from Point/Station 1602.000 to Point/Station 1603.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2360.000(Ft.)
End of natural channel elevation = 2301.500(Ft.)
Length of natural channel = 1300.900(Ft.)
Estimated mean flow rate at midpoint of channel = 128.168(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 10.85(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0450
Corrected/adjusted channel slope = 0.0450
Travel time = 2.00 min. TC = 16.83 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.450
Decimal fraction soil group B = 0.550
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 86.83
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 2.945(In/Hr) for a 100.0 year storm
Subarea runoff = 84.406(CFS) for 34.026(Ac.)
Total runoff = 166.047(CFS) Total area = 63.879(Ac.)

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1603.000 to Point/Station     1603.000
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     63.879(Ac.)
Runoff from this stream =    166.047(CFS)
Time of concentration =   16.83 min.
Rainfall intensity =     2.945(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1604.000 to Point/Station     1605.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------------
Initial area flow distance =   611.700(Ft.)
Top (of initial area) elevation =  2500.000(Ft.)
Bottom (of initial area) elevation =  2390.000(Ft.)
Difference in elevation =   110.000(Ft.)
Slope =    0.17983  s(percent)=      17.98
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.726 min.
Rainfall intensity =      3.875(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.360
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.640
RI index for soil(AMC 3)  =  94.02
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     11.572(CFS)
Total initial stream area =        3.391(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1605.000 to Point/Station     1603.000
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Top of natural channel elevation =   2390.000(Ft.)
End of natural channel elevation =   2301.500(Ft.)
Length of natural channel  =  1627.400(Ft.)
Estimated mean flow rate at midpoint of channel =     51.152(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   9.09(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0544
Corrected/adjusted channel slope =  0.0544
Travel time =    2.99 min.     TC =   12.71  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.857
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.360
```

```
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.240
RI index for soil(AMC 3)  =  88.74
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.389(In/Hr) for a   100.0 year storm
Subarea runoff =     67.396(CFS) for     23.197(Ac.)
Total runoff =     78.968(CFS)   Total area =      26.588(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1603.000 to Point/Station     1603.000
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     26.588(Ac.)
Runoff from this stream =     78.968(CFS)
Time of concentration =   12.71 min.
Rainfall intensity =     3.389(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      166.047     16.83           2.945
2       78.968     12.71           3.389
Largest stream flow has longer time of concentration
Qp =    166.047 + sum of
         Qb         Ia/Ib
         78.968 *    0.869 =     68.628
Qp =    234.675

Total of 2 main streams to confluence:
Flow rates before confluence point:
     166.047      78.968
Area of streams before confluence:
       63.879       26.588


Results of confluence:
Total flow rate =    234.675(CFS)
Time of concentration =    16.830 min.
Effective stream area after confluence  =     90.467(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1603.000 to Point/Station     1606.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2301.500(Ft.)
Downstream point/station elevation =  2295.200(Ft.)
Pipe length  =   199.80(Ft.)   Manning's N = 0.013
No. of pipes = 2  Required pipe flow  =   234.675(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   117.337(CFS)
Normal flow depth in pipe =   29.20(In.)
Flow top width inside pipe =   28.18(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.10(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    17.00 min.
End of computations, total study area =           90.47 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 75.1

Developed Hydrology Model and Results C

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 04/21/22 File:AREA01.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 1 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 1.000 to Point/Station 1.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 491.000(Ft.)
Top (of initial area) elevation = 2381.300(Ft.)
Bottom (of initial area) elevation = 2377.600(Ft.)
Difference in elevation = 3.700(Ft.)
Slope = 0.00754 s(percent)= 0.75
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.509 min.

```
Rainfall intensity =      3.919(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.878
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  52.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.233(CFS)
Total initial stream area =        1.520(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.010 to Point/Station        1.020
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2374.100(Ft.)
Downstream point/station elevation =  2368.000(Ft.)
Pipe length  =   883.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.233(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.233(CFS)
Normal flow depth in pipe =   11.95(In.)
Flow top width inside pipe =   12.07(In.)
Critical Depth =   11.12(In.)
Pipe flow velocity =      4.99(Ft/s)
Travel time through pipe =    2.95 min.
Time of concentration (TC) =    12.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.010 to Point/Station        1.020
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      1.520(Ac.)
Runoff from this stream =      5.233(CFS)
Time of concentration =   12.46 min.
Rainfall intensity =     3.423(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.030 to Point/Station        1.040
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   830.600(Ft.)
```

```
Top (of initial area) elevation =  2377.100(Ft.)
Bottom (of initial area) elevation =  2373.200(Ft.)
Difference in elevation =     3.900(Ft.)
Slope =    0.00470  s(percent)=       0.47
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.899 min.
Rainfall intensity =      3.365(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.140
Decimal fraction soil group B = 0.860
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  72.11
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.817(CFS)
Total initial stream area =        1.947(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.040 to Point/Station        1.050
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2369.700(Ft.)
Downstream point/station elevation =  2368.800(Ft.)
Pipe length  =    90.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.817(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.817(CFS)
Normal flow depth in pipe =   11.16(In.)
Flow top width inside pipe =   13.10(In.)
Critical Depth =   11.71(In.)
Pipe flow velocity =      5.95(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    13.15 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.050 to Point/Station        1.050
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.200
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  70.96
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Time of concentration =    13.15 min.
Rainfall intensity =      3.332(In/Hr) for a   100.0 year storm
Subarea runoff =     43.891(CFS) for     14.845(Ac.)
Total runoff =     49.708(CFS)  Total area =      16.792(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.050 to Point/Station        1.020
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2368.800(Ft.)
Downstream point/station elevation =  2368.000(Ft.)
Pipe length  =    62.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    49.708(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    49.708(CFS)
Normal flow depth in pipe =   23.02(In.)
Flow top width inside pipe =   30.32(In.)
Critical Depth =   27.87(In.)
Pipe flow velocity =     11.24(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    13.25 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.050 to Point/Station        1.020
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     16.792(Ac.)
Runoff from this stream =     49.708(CFS)
Time of concentration =   13.25 min.
Rainfall intensity =     3.320(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        5.233     12.46                3.423
2       49.708     13.25                3.320
Largest stream flow has longer time of concentration
Qp =     49.708 + sum of
          Qb         Ia/Ib
           5.233 *    0.970 =      5.075
Qp =     54.783

Total of 2 main streams to confluence:
Flow rates before confluence point:
```

```
       5.233      49.708
Area of streams before confluence:
        1.520       16.792


Results of confluence:
Total flow rate =     54.783(CFS)
Time of concentration =    13.245 min.
Effective stream area after confluence  =     18.312(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.020 to Point/Station        1.060
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2368.000(Ft.)
Downstream point/station elevation =  2364.700(Ft.)
Pipe length  =   855.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    54.783(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    54.783(CFS)
Normal flow depth in pipe =   30.47(In.)
Flow top width inside pipe =   37.49(In.)
Critical Depth =   27.79(In.)
Pipe flow velocity =      7.32(Ft/s)
Travel time through pipe =    1.95 min.
Time of concentration (TC) =    15.19 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.060 to Point/Station        1.060
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.280
Decimal fraction soil group B = 0.720
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  69.28
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.19 min.
Rainfall intensity =      3.100(In/Hr) for a   100.0 year storm
Subarea runoff =     19.092(CFS) for      6.954(Ac.)
Total runoff =     73.876(CFS)  Total area =      25.266(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.060 to Point/Station        1.061
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

```
Upstream point/station elevation =  2364.700(Ft.)
Downstream point/station elevation =  2362.500(Ft.)
Pipe length  =   277.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    73.876(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    73.876(CFS)
Normal flow depth in pipe =   32.11(In.)
Flow top width inside pipe =   29.75(In.)
Critical Depth =   32.63(In.)
Pipe flow velocity =     10.11(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    15.65 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.061 to Point/Station        1.070
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
```

```
Top of natural channel elevation =   2362.500(Ft.)
End of natural channel elevation =   2362.000(Ft.)
Length of natural channel  =   794.300(Ft.)
Estimated mean flow rate at midpoint of channel =     77.916(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   1.11(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0006
Corrected/adjusted channel slope =  0.0006
Travel time =   11.97 min.     TC =   27.62  min.


 Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.767
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  76.96
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.299(In/Hr) for a   100.0 year storm
Subarea runoff =      4.873(CFS) for      2.764(Ac.)
Total runoff =     78.749(CFS)  Total area =      28.030(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.061 to Point/Station        1.070
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     28.030(Ac.)
Runoff from this stream =     78.749(CFS)
Time of concentration =   27.62 min.
Rainfall intensity =     2.299(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station        1.080 to Point/Station        1.090
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   954.600(Ft.)
Top (of initial area) elevation =  2375.000(Ft.)
Bottom (of initial area) elevation =  2370.300(Ft.)
Difference in elevation =     4.700(Ft.)
Slope =    0.00492  s(percent)=       0.49
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.508 min.
Rainfall intensity =      3.288(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.520
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  63.52
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      6.712(CFS)
Total initial stream area =        2.312(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.090 to Point/Station        1.070
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2366.800(Ft.)
Downstream point/station elevation =  2362.000(Ft.)
Pipe length  =    95.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.712(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.712(CFS)
Normal flow depth in pipe =    8.43(In.)
Flow top width inside pipe =   10.98(In.)
```

```
Critical depth could not be calculated.
Pipe flow velocity =     11.38(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    13.65 min.


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Process from Point/Station        1.090 to Point/Station        1.070
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      2.312(Ac.)
Runoff from this stream =      6.712(CFS)
Time of concentration =   13.65 min.
Rainfall intensity =     3.271(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.100 to Point/Station        1.110
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   648.000(Ft.)
Top (of initial area) elevation =  2374.500(Ft.)
Bottom (of initial area) elevation =  2368.500(Ft.)
Difference in elevation =     6.000(Ft.)
Slope =    0.00926  s(percent)=       0.93
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.196 min.
Rainfall intensity =      3.784(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.490
Decimal fraction soil group B = 0.510
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  64.24
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     29.292(CFS)
Total initial stream area =        8.744(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.110 to Point/Station        1.070
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  2364.000(Ft.)
Downstream point/station elevation =  2362.000(Ft.)
```

```
Pipe length  =    18.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.292(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    29.292(CFS)
Normal flow depth in pipe =   12.77(In.)
Flow top width inside pipe =   16.34(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.83(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =    10.21 min.


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Process from Point/Station        1.110 to Point/Station        1.070
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      8.744(Ac.)
Runoff from this stream =     29.292(CFS)
Time of concentration =   10.21 min.
Rainfall intensity =     3.782(In/Hr)
Program is now starting with Main Stream No. 4


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Process from Point/Station        1.000 to Point/Station        1.120
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   743.500(Ft.)
Top (of initial area) elevation =  2381.300(Ft.)
Bottom (of initial area) elevation =  2375.700(Ft.)
Difference in elevation =     5.600(Ft.)
Slope =    0.00753  s(percent)=       0.75
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.227 min.
Rainfall intensity =      3.606(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.330
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.670
RI index for soil(AMC 3)  =  78.65
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.709(CFS)
Total initial stream area =        2.397(Ac.)
Pervious area fraction = 0.100
```

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Process from Point/Station        1.120 to Point/Station        1.130
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2372.200(Ft.)
Downstream point/station elevation =  2367.500(Ft.)
Pipe length  =   665.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.709(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.709(CFS)
Normal flow depth in pipe =   13.03(In.)
Flow top width inside pipe =   16.09(In.)
Critical Depth =   12.91(In.)
Pipe flow velocity =      5.63(Ft/s)
Travel time through pipe =    1.97 min.
Time of concentration (TC) =    13.20 min.


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Process from Point/Station        1.120 to Point/Station        1.130
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 4 in normal stream number 1
Stream flow area =      2.397(Ac.)
Runoff from this stream =      7.709(CFS)
Time of concentration =   13.20 min.
Rainfall intensity =     3.326(In/Hr)


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Process from Point/Station        1.140 to Point/Station        1.150
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   981.000(Ft.)
Top (of initial area) elevation =  2379.100(Ft.)
Bottom (of initial area) elevation =  2372.800(Ft.)
Difference in elevation =     6.300(Ft.)
Slope =    0.00642  s(percent)=       0.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.950 min.
Rainfall intensity =      3.358(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.650
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  62.30
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     11.045(CFS)
```

```
Total initial stream area =        3.727(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station        1.150 to Point/Station        1.160
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2369.100(Ft.)
Downstream point/station elevation =  2368.700(Ft.)
Pipe length  =    85.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.045(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.045(CFS)
Normal flow depth in pipe =   17.63(In.)
Flow top width inside pipe =   15.43(In.)
Critical Depth =   14.86(In.)
Pipe flow velocity =      5.13(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    13.23 min.


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Process from Point/Station        1.160 to Point/Station        1.160
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.360
Decimal fraction soil group B = 0.630
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.010
RI index for soil(AMC 3)  =  67.55
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.23 min.
Rainfall intensity =      3.322(In/Hr) for a   100.0 year storm
Subarea runoff =     40.863(CFS) for     13.890(Ac.)
Total runoff =     51.908(CFS)  Total area =      17.617(Ac.)


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Process from Point/Station        1.160 to Point/Station        1.130
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2368.700(Ft.)
Downstream point/station elevation =  2363.800(Ft.)
Pipe length  =    79.20(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    51.908(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    51.908(CFS)
```

```
Normal flow depth in pipe =   18.19(In.)
Flow top width inside pipe =   20.56(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.33(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    13.29 min.


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Process from Point/Station        1.160 to Point/Station        1.130
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 4 in normal stream number 2
Stream flow area =     17.617(Ac.)
Runoff from this stream =     51.908(CFS)
Time of concentration =   13.29 min.
Rainfall intensity =     3.314(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        7.709     13.20                3.326
2       51.908     13.29                3.314
Largest stream flow has longer time of concentration
Qp =     51.908 + sum of
          Qb         Ia/Ib
           7.709 *    0.996 =      7.681
Qp =     59.589

Total of 2 streams to confluence:
Flow rates before confluence point:
       7.709      51.908
Area of streams before confluence:
        2.397       17.617
Results of confluence:
Total flow rate =     59.589(CFS)
Time of concentration =    13.293 min.
Effective stream area after confluence =     20.014(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.130 to Point/Station        1.170
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2368.300(Ft.)
Downstream point/station elevation =  2363.800(Ft.)
Pipe length  =   899.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    59.589(CFS)
```

```
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    59.589(CFS)
Normal flow depth in pipe =   32.72(In.)
Flow top width inside pipe =   28.67(In.)
Critical Depth =   29.55(In.)
Pipe flow velocity =      8.02(Ft/s)
Travel time through pipe =    1.87 min.
Time of concentration (TC) =    15.16 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.130 to Point/Station        1.170
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 4 in normal stream number 1
Stream flow area =     20.014(Ac.)
Runoff from this stream =     59.589(CFS)
Time of concentration =   15.16 min.
Rainfall intensity =     3.103(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.180 to Point/Station        1.190
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   562.300(Ft.)
Top (of initial area) elevation =  2375.900(Ft.)
Bottom (of initial area) elevation =  2372.300(Ft.)
Difference in elevation =     3.600(Ft.)
Slope =    0.00640  s(percent)=       0.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.372 min.
Rainfall intensity =      3.752(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.230
Decimal fraction soil group B = 0.770
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  70.38
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      9.312(CFS)
Total initial stream area =        2.794(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station        1.190 to Point/Station        1.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
```

```
Upstream point/station elevation =  2368.100(Ft.)
Downstream point/station elevation =  2363.800(Ft.)
Pipe length  =    57.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.312(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     9.312(CFS)
Normal flow depth in pipe =    9.40(In.)
Flow top width inside pipe =    9.89(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.12(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    10.44 min.


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Process from Point/Station        1.200 to Point/Station        1.200
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.990
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.61
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.44 min.
Rainfall intensity =      3.740(In/Hr) for a   100.0 year storm
Subarea runoff =     19.664(CFS) for      5.906(Ac.)
Total runoff =     28.977(CFS)  Total area =       8.700(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station        1.170
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2368.100(Ft.)
Downstream point/station elevation =  2363.800(Ft.)
Pipe length  =    57.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    28.977(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    28.977(CFS)
Normal flow depth in pipe =   14.91(In.)
Flow top width inside pipe =   13.58(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.52(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    10.49 min.
```

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Process from Point/Station        1.200 to Point/Station        1.170
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 4 in normal stream number 2
Stream flow area =      8.700(Ac.)
Runoff from this stream =     28.977(CFS)
Time of concentration =   10.49 min.
Rainfall intensity =     3.731(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       59.589     15.16                 3.103
2       28.977     10.49                 3.731
Largest stream flow has longer time of concentration
Qp =     59.589 + sum of
          Qb         Ia/Ib
          28.977 *    0.832 =     24.102
Qp =     83.691

Total of 2 streams to confluence:
Flow rates before confluence point:
      59.589      28.977
Area of streams before confluence:
       20.014        8.700
Results of confluence:
Total flow rate =     83.691(CFS)
Time of concentration =    15.164 min.
Effective stream area after confluence =     28.714(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.170 to Point/Station        1.210
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2363.800(Ft.)
Downstream point/station elevation =  2363.100(Ft.)
Pipe length  =   145.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    83.691(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =    83.691(CFS)
Normal flow depth in pipe =   36.75(In.)
Flow top width inside pipe =   34.82(In.)
Critical Depth =   33.79(In.)
Pipe flow velocity =      8.66(Ft/s)
Travel time through pipe =    0.28 min.
Time of concentration (TC) =    15.44 min.
```

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Process from Point/Station        1.210 to Point/Station        1.210
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    15.44 min.
Rainfall intensity =      3.075(In/Hr) for a   100.0 year storm
Subarea runoff =      8.144(CFS) for      2.981(Ac.)
Total runoff =     91.835(CFS)  Total area =      31.695(Ac.)


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Process from Point/Station        1.210 to Point/Station        1.070
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  2363.100(Ft.)
Downstream point/station elevation =  2362.000(Ft.)
Pipe length  =   220.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    91.835(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =    91.835(CFS)
Normal flow depth in pipe =   35.81(In.)
Flow top width inside pipe =   41.78(In.)
Critical Depth =   34.84(In.)
Pipe flow velocity =      9.14(Ft/s)
Travel time through pipe =    0.40 min.
Time of concentration (TC) =    15.85 min.


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Process from Point/Station        1.210 to Point/Station        1.070
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 4
Stream flow area =     31.695(Ac.)
Runoff from this stream =     91.835(CFS)
Time of concentration =   15.85 min.
Rainfall intensity =     3.036(In/Hr)
Summary of stream data:
```

```
Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       78.749     27.62                2.299
2        6.712     13.65                3.271
3       29.292     10.21                3.782
4       91.835     15.85                3.036
Largest stream flow has longer or shorter time of concentration
Qp =     91.835 + sum of
          Qa          Tb/Ta
          78.749 *    0.574 =     45.173
          Qb         Ia/Ib
           6.712 *    0.928 =      6.229
          Qb         Ia/Ib
          29.292 *    0.803 =     23.514
Qp =    166.751

Total of 4 main streams to confluence:
Flow rates before confluence point:
      78.749       6.712      29.292      91.835
Area of streams before confluence:
       28.030        2.312        8.744       31.695


Results of confluence:
Total flow rate =    166.751(CFS)
Time of concentration =    15.846 min.
Effective stream area after confluence  =     70.781(Ac.)


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Process from Point/Station        1.070 to Point/Station        1.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2357.000(Ft.)
Downstream point/station elevation =  2330.000(Ft.)
Pipe length  =  1024.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   166.751(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   166.751(CFS)
Normal flow depth in pipe =   35.25(In.)
Flow top width inside pipe =   30.85(In.)
Critical depth could not be calculated.
Pipe flow velocity =     19.34(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    16.73 min.


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Process from Point/Station        1.220 to Point/Station        1.230
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   2330.000(Ft.)
End of natural channel elevation =   2328.000(Ft.)
Length of natural channel  =  1164.800(Ft.)
Estimated mean flow rate at midpoint of channel =    252.551(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   2.61(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0017
Corrected/adjusted channel slope =  0.0017
Travel time =    7.43 min.     TC =   24.16  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.200
Decimal fraction soil group B = 0.440
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.360
RI index for soil(AMC 3)  =  90.86
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.459(In/Hr) for a   100.0 year storm
Subarea runoff =    152.829(CFS) for     72.839(Ac.)
Total runoff =    319.580(CFS)  Total area =     143.620(Ac.)


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Process from Point/Station        1.230 to Point/Station        1.240
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2328.000(Ft.)
Downstream point/station elevation =  2270.000(Ft.)
Pipe length  =   991.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   319.580(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   319.580(CFS)
Normal flow depth in pipe =   36.28(In.)
Flow top width inside pipe =   41.24(In.)
Critical depth could not be calculated.
Pipe flow velocity =     31.36(Ft/s)
Travel time through pipe =    0.53 min.
Time of concentration (TC) =    24.68 min.
```

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Process from Point/Station        1.240 to Point/Station        1.250
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   2270.000(Ft.)
End of natural channel elevation =   2230.000(Ft.)
Length of natural channel  =   938.100(Ft.)
Estimated mean flow rate at midpoint of channel =    357.928(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  14.54(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0426
Corrected/adjusted channel slope =  0.0426
Travel time =    1.08 min.     TC =   25.76  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.360
Decimal fraction soil group B = 0.060
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.580
RI index for soil(AMC 3)  =  91.25
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.381(In/Hr) for a   100.0 year storm
Subarea runoff =     70.091(CFS) for     34.467(Ac.)
Total runoff =    389.671(CFS)  Total area =     178.087(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.250 to Point/Station        1.260
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2230.000(Ft.)
Downstream point/station elevation =  2218.900(Ft.)
Pipe length  =   118.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   389.671(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   389.671(CFS)
Normal flow depth in pipe =   39.56(In.)
Flow top width inside pipe =   29.33(In.)
Critical depth could not be calculated.
```

Pipe flow velocity = 37.91(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 25.81 min.
End of computations, total study area = 178.09 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.656
Area averaged RI index number = 67.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/20 File:AREA02.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 2 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 2.000 to Point/Station 2.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 584.200(Ft.)
Top (of initial area) elevation = 2390.000(Ft.)
Bottom (of initial area) elevation = 2250.000(Ft.)
Difference in elevation = 140.000(Ft.)
Slope = 0.23964 s(percent)= 23.96
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.015 min.
Rainfall intensity = 4.024(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.520
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 86.37
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 8.994(CFS)
Total initial stream area = 2.613(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 2.010 to Point/Station 2.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2250.000(Ft.)
Downstream point/station elevation = 2219.600(Ft.)
Pipe length = 167.30(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.994(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 8.994(CFS)
Normal flow depth in pipe = 6.64(In.)
Flow top width inside pipe = 11.93(In.)
Critical depth could not be calculated.
Pipe flow velocity = 20.15(Ft/s)
Travel time through pipe = 0.14 min.
Time of concentration (TC) = 9.15 min.
End of computations, total study area = 2.61 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 72.3

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/20 File:AREA03.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 3 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 3.000 to Point/Station 3.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 965.600(Ft.)
Top (of initial area) elevation = 2390.000(Ft.)
Bottom (of initial area) elevation = 2224.800(Ft.)
Difference in elevation = 165.200(Ft.)
Slope = 0.17109 s(percent)= 17.11
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.791 min.
Rainfall intensity = 3.519(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.853
Decimal fraction soil group A = 0.360
Decimal fraction soil group B = 0.640
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.42
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 20.021(CFS)
Total initial stream area = 6.666(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 3.010 to Point/Station 3.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2224.800(Ft.)
Downstream point/station elevation = 2211.100(Ft.)
Pipe length = 173.90(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 20.021(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 20.021(CFS)
Normal flow depth in pipe = 10.88(In.)
Flow top width inside pipe = 17.61(In.)
Critical depth could not be calculated.
Pipe flow velocity = 17.93(Ft/s)
Travel time through pipe = 0.16 min.
Time of concentration (TC) = 11.95 min.
End of computations, total study area = 6.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 74.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/20 File:AREA04.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 4 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 4.000 to Point/Station 4.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 749.200(Ft.)
Top (of initial area) elevation = 2386.000(Ft.)
Bottom (of initial area) elevation = 2225.400(Ft.)
Difference in elevation = 160.600(Ft.)
Slope = 0.21436 s(percent)= 21.44
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.183 min.
Rainfall intensity = 3.787(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.380
Decimal fraction soil group B = 0.620
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.29
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 21.623(CFS)
Total initial stream area = 6.670(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 4.010 to Point/Station 4.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2225.400(Ft.)
Downstream point/station elevation = 2214.400(Ft.)
Pipe length = 145.90(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 21.623(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 21.623(CFS)
Normal flow depth in pipe = 11.63(In.)
Flow top width inside pipe = 17.22(In.)
Critical depth could not be calculated.
Pipe flow velocity = 17.91(Ft/s)
Travel time through pipe = 0.14 min.
Time of concentration (TC) = 10.32 min.
End of computations, total study area = 6.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 73.8

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 04/21/22 File:AREA45.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 45 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 45.000 to Point/Station 45.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 152.500(Ft.)
Top (of initial area) elevation = 2290.000(Ft.)
Bottom (of initial area) elevation = 2233.900(Ft.)
Difference in elevation = 56.100(Ft.)
Slope = 0.36787 s(percent)= 36.79
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Warning: TC computed to be less than 5 min.; program is assuming the

```
time of concentration is 5 minutes.
Initial area time of concentration =    5.000 min.
Rainfall intensity =      5.404(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.875
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.803(CFS)
Total initial stream area =        0.381(Ac.)
Pervious area fraction = 1.000
End of computations, total study area =            0.38 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number =  78.0
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/03/20 File:AREA05.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 5 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 5.000 to Point/Station 5.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 872.400(Ft.)
Top (of initial area) elevation = 2377.000(Ft.)
Bottom (of initial area) elevation = 2222.300(Ft.)
Difference in elevation = 154.700(Ft.)
Slope = 0.17733 s(percent)= 17.73
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 11.241 min.
Rainfall intensity = 3.604(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.290
Decimal fraction soil group B = 0.710
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.89
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 15.601(CFS)
Total initial stream area = 5.055(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 5.010 to Point/Station 5.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2222.300(Ft.)
Downstream point/station elevation = 2215.500(Ft.)
Pipe length = 145.70(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 15.601(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 15.601(CFS)
Normal flow depth in pipe = 10.97(In.)
Flow top width inside pipe = 17.56(In.)
Critical Depth = 17.00(In.)
Pipe flow velocity = 13.84(Ft/s)
Travel time through pipe = 0.18 min.
Time of concentration (TC) = 11.42 min.
End of computations, total study area = 5.05 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 74.8

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/05/20 File:AREA06.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 6 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 6.000 to Point/Station 6.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 502.400(Ft.)
Top (of initial area) elevation = 2370.500(Ft.)
Bottom (of initial area) elevation = 2366.400(Ft.)
Difference in elevation = 4.100(Ft.)
Slope = 0.00816 s(percent)= 0.82
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.445 min.
Rainfall intensity = 3.932(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.660
Decimal fraction soil group B = 0.340
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 60.16
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 8.744(CFS)
Total initial stream area = 2.517(Ac.)
Pervious area fraction = 0.100

++

Process from Point/Station 6.010 to Point/Station 6.020

```
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2362.900(Ft.)
Downstream point/station elevation =  2355.100(Ft.)
Pipe length  =   784.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.744(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.744(CFS)
Normal flow depth in pipe =   12.56(In.)
Flow top width inside pipe =   16.53(In.)
Critical Depth =   13.74(In.)
Pipe flow velocity =      6.63(Ft/s)
Travel time through pipe =    1.97 min.
Time of concentration (TC) =    11.41 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.020 to Point/Station        6.020
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.41 min.
Rainfall intensity =      3.577(In/Hr) for a   100.0 year storm
Subarea runoff =      5.956(CFS) for      1.871(Ac.)
Total runoff =     14.699(CFS)   Total area =       4.388(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.020 to Point/Station        6.030
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2355.100(Ft.)
Downstream point/station elevation =  2350.500(Ft.)
Pipe length  =   224.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.699(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    14.699(CFS)
Normal flow depth in pipe =   14.41(In.)
Flow top width inside pipe =   14.38(In.)
Critical Depth =   16.78(In.)
Pipe flow velocity =      9.69(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    11.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.020 to Point/Station        6.030
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      4.388(Ac.)
Runoff from this stream =     14.699(CFS)
Time of concentration =   11.80 min.
Rainfall intensity =     3.518(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station        6.040 to Point/Station        6.050
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   468.000(Ft.)
Top (of initial area) elevation =  2370.200(Ft.)
Bottom (of initial area) elevation =  2367.600(Ft.)
Difference in elevation =     2.600(Ft.)
Slope =    0.00556  s(percent)=       0.56
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.915 min.
Rainfall intensity =      3.838(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.730
Decimal fraction soil group B = 0.270
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  58.48
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.765(CFS)
Total initial stream area =        0.226(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.050 to Point/Station        6.060
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
Top of street segment elevation =  2367.600(Ft.)
End of street segment elevation =  2358.400(Ft.)
Length of street segment  =   848.900(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   2.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      1.382(CFS)
Depth of flow =   0.275(Ft.), Average velocity =   2.039(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   7.423(Ft.)
Flow velocity =   2.04(Ft/s)
Travel time =    6.94 min.     TC =   16.85  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.944(In/Hr) for a   100.0 year storm
Subarea runoff =      1.148(CFS) for      0.439(Ac.)
Total runoff =      1.913(CFS)   Total area =       0.665(Ac.)
Street flow at end of street =      1.913(CFS)
Half street flow at end of street =      1.913(CFS)
Depth of flow =   0.300(Ft.), Average velocity =   2.187(Ft/s)
Flow width (from curb towards crown)=   8.648(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.060 to Point/Station        6.070
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  2352.000(Ft.)
Downstream point/station elevation =  2351.300(Ft.)
Pipe length  =    70.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.913(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.913(CFS)
Normal flow depth in pipe =    6.27(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    7.08(In.)
Pipe flow velocity =      4.61(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =    17.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.070 to Point/Station        6.070
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.110
Decimal fraction soil group B = 0.890
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  72.69
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.11 min.
Rainfall intensity =      2.922(In/Hr) for a   100.0 year storm
Subarea runoff =      3.205(CFS) for      1.237(Ac.)
Total runoff =      5.118(CFS)   Total area =       1.902(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.070 to Point/Station        6.030
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =  2351.300(Ft.)
Downstream point/station elevation =  2350.500(Ft.)
Pipe length  =    75.20(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.118(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.118(CFS)
Normal flow depth in pipe =    9.86(In.)
Flow top width inside pipe =   14.24(In.)
Critical Depth =   11.00(In.)
Pipe flow velocity =      5.99(Ft/s)
Travel time through pipe =    0.21 min.
Time of concentration (TC) =    17.32 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.070 to Point/Station        6.030
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.902(Ac.)
Runoff from this stream =      5.118(CFS)
Time of concentration =   17.32 min.
Rainfall intensity =     2.904(In/Hr)
```

```
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       14.699     11.80           3.518
2        5.118     17.32           2.904
Largest stream flow has longer or shorter time of concentration
Qp =     14.699 + sum of
         Qa          Tb/Ta
          5.118 *    0.681 =      3.488
Qp =     18.187

Total of 2 main streams to confluence:
Flow rates before confluence point:
      14.699       5.118
Area of streams before confluence:
        4.388        1.902


Results of confluence:
Total flow rate =     18.187(CFS)
Time of concentration =    11.801 min.
Effective stream area after confluence  =      6.290(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.030 to Point/Station        6.080
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2350.500(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    42.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.187(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    18.187(CFS)
Normal flow depth in pipe =   15.40(In.)
Flow top width inside pipe =   23.02(In.)
Critical Depth =   18.43(In.)
Pipe flow velocity =      8.54(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    11.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.080 to Point/Station        6.080
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.833
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.750
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.250
RI index for soil(AMC 3)  =  82.45
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    11.88 min.
Rainfall intensity =      3.505(In/Hr) for a   100.0 year storm
Subarea runoff =      8.948(CFS) for      3.066(Ac.)
Total runoff =     27.135(CFS)   Total area =       9.356(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.030 to Point/Station        6.080
**** CONFLUENCE OF MAIN STREAMS ****
```

```
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      9.356(Ac.)
Runoff from this stream =     27.135(CFS)
Time of concentration =   11.88 min.
Rainfall intensity =     3.505(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.090 to Point/Station        6.100
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   401.900(Ft.)
Top (of initial area) elevation =  2357.000(Ft.)
Bottom (of initial area) elevation =  2355.000(Ft.)
Difference in elevation =     2.000(Ft.)
Slope =    0.00498  s(percent)=       0.50
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.536 min.
Rainfall intensity =      3.913(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      6.695(CFS)
Total initial stream area =        1.921(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.100 to Point/Station        6.080
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2351.500(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    15.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.695(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     6.695(CFS)
Normal flow depth in pipe =    6.76(In.)
Flow top width inside pipe =   11.90(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.70(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     9.55 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.100 to Point/Station        6.080
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      1.921(Ac.)
Runoff from this stream =      6.695(CFS)
Time of concentration =    9.55 min.
Rainfall intensity =     3.909(In/Hr)
Program is now starting with Main Stream No. 3
```

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Process from Point/Station        6.110 to Point/Station        6.120
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   647.400(Ft.)
Top (of initial area) elevation =  2369.900(Ft.)
Bottom (of initial area) elevation =  2360.100(Ft.)
Difference in elevation =     9.800(Ft.)
Slope =    0.01514  s(percent)=       1.51
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.238 min.
Rainfall intensity =      3.976(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.810
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.020
RI index for soil(AMC 3)  =  71.84
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     29.806(CFS)
Total initial stream area =        8.428(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.120 to Point/Station        6.080
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2354.600(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    24.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    29.806(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    29.806(CFS)
Normal flow depth in pipe =   10.68(In.)
Flow top width inside pipe =   17.69(In.)
Critical depth could not be calculated.
Pipe flow velocity =     27.29(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     9.25 min.


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Process from Point/Station        6.120 to Point/Station        6.080
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      8.428(Ac.)
Runoff from this stream =     29.806(CFS)
Time of concentration =    9.25 min.
Rainfall intensity =     3.972(In/Hr)
Program is now starting with Main Stream No. 4


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.130 to Point/Station        6.140
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   552.600(Ft.)
Top (of initial area) elevation =  2370.500(Ft.)
Bottom (of initial area) elevation =  2366.400(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.00742  s(percent)=       0.74
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
```

```
Initial area time of concentration =   10.000 min.
Rainfall intensity =      3.821(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.070
Decimal fraction soil group B = 0.930
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  73.46
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      7.267(CFS)
Total initial stream area =        2.137(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.140 to Point/Station        6.150
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2360.900(Ft.)
Downstream point/station elevation =  2356.000(Ft.)
Pipe length  =   491.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.267(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     7.267(CFS)
Normal flow depth in pipe =   11.02(In.)
Flow top width inside pipe =   17.54(In.)
Critical Depth =   12.53(In.)
Pipe flow velocity =      6.41(Ft/s)
Travel time through pipe =    1.28 min.
Time of concentration (TC) =    11.28 min.


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Process from Point/Station        6.150 to Point/Station        6.150
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.750
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.250
RI index for soil(AMC 3)  =  78.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    11.28 min.
Rainfall intensity =      3.598(In/Hr) for a   100.0 year storm
Subarea runoff =     10.111(CFS) for      3.272(Ac.)
Total runoff =     17.378(CFS)   Total area =       5.409(Ac.)


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Process from Point/Station        6.150 to Point/Station        6.160
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2356.000(Ft.)
Downstream point/station elevation =  2352.600(Ft.)
Pipe length  =   341.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.378(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    17.378(CFS)
Normal flow depth in pipe =   15.80(In.)
Flow top width inside pipe =   22.77(In.)
Critical Depth =   18.02(In.)
Pipe flow velocity =      7.93(Ft/s)
Travel time through pipe =    0.72 min.
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Time of concentration (TC) =    12.00 min.


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Process from Point/Station        6.160 to Point/Station        6.160
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.820
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.180
RI index for soil(AMC 3)  =  77.54
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.00 min.
Rainfall intensity =      3.489(In/Hr) for a   100.0 year storm
Subarea runoff =      6.513(CFS) for      2.095(Ac.)
Total runoff =     23.890(CFS)   Total area =       7.504(Ac.)


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Process from Point/Station        6.160 to Point/Station        6.170
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2352.600(Ft.)
Downstream point/station elevation =  2350.600(Ft.)
Pipe length  =   198.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    23.890(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    23.890(CFS)
Normal flow depth in pipe =   17.74(In.)
Flow top width inside pipe =   25.63(In.)
Critical Depth =   20.52(In.)
Pipe flow velocity =      8.62(Ft/s)
Travel time through pipe =    0.38 min.
Time of concentration (TC) =    12.38 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.170 to Point/Station        6.170
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.030
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.970
RI index for soil(AMC 3)  =  87.66
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.38 min.
Rainfall intensity =      3.434(In/Hr) for a   100.0 year storm
Subarea runoff =      2.823(CFS) for      0.918(Ac.)
Total runoff =     26.713(CFS)   Total area =       8.422(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.170 to Point/Station        6.080
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2350.600(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    60.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.713(CFS)
Nearest computed pipe diameter  =     27.00(In.)
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Calculated individual pipe flow  =    26.713(CFS)
Normal flow depth in pipe =   19.45(In.)
Flow top width inside pipe =   24.23(In.)
Critical Depth =   21.62(In.)
Pipe flow velocity =      8.71(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    12.50 min.


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Process from Point/Station        6.170 to Point/Station        6.080
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 4
Stream flow area =      8.422(Ac.)
Runoff from this stream =     26.713(CFS)
Time of concentration =   12.50 min.
Rainfall intensity =     3.418(In/Hr)
Program is now starting with Main Stream No. 5


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.180 to Point/Station        6.190
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   422.100(Ft.)
Top (of initial area) elevation =  2434.500(Ft.)
Bottom (of initial area) elevation =  2366.300(Ft.)
Difference in elevation =    68.200(Ft.)
Slope =    0.16157  s(percent)=      16.16
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.192 min.
Rainfall intensity =      3.100(In/Hr) for a   100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.060
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.940
RI index for soil(AMC 3)  =  90.32
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.787(CFS)
Total initial stream area =        0.670(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station        6.190 to Point/Station        6.200
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Top of street segment elevation =  2366.300(Ft.)
End of street segment elevation =  2359.300(Ft.)
Length of street segment  =   663.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  13.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
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```
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.222(CFS)
Depth of flow =   0.345(Ft.), Average velocity =   2.437(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.933(Ft.)
Flow velocity =   2.44(Ft/s)
Travel time =    4.53 min.     TC =   19.73  min.
 Adding area flow to street
MOBILE HOME PARK subarea type
Runoff Coefficient = 0.886
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
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.250; Impervious fraction =  0.750
Rainfall intensity =      2.721(In/Hr) for a   100.0 year storm
Subarea runoff =      2.793(CFS) for      1.159(Ac.)
Total runoff =      4.580(CFS)   Total area =       1.829(Ac.)
Street flow at end of street =      4.580(CFS)
Half street flow at end of street =      4.580(CFS)
Depth of flow =   0.380(Ft.), Average velocity =   2.647(Ft/s)
Flow width (from curb towards crown)=  12.665(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.200 to Point/Station        6.210
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2354.600(Ft.)
Downstream point/station elevation =  2353.900(Ft.)
Pipe length  =    57.40(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.580(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.580(CFS)
Normal flow depth in pipe =    8.74(In.)
Flow top width inside pipe =   14.79(In.)
Critical Depth =   10.42(In.)
Pipe flow velocity =      6.17(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    19.88 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.210 to Point/Station        6.210
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.590
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.410
RI index for soil(AMC 3)  =  81.03
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    19.88 min.
Rainfall intensity =      2.710(In/Hr) for a   100.0 year storm
Subarea runoff =      3.737(CFS) for      1.548(Ac.)
Total runoff =      8.317(CFS)   Total area =       3.377(Ac.)


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Process from Point/Station        6.210 to Point/Station        6.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2353.900(Ft.)
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Downstream point/station elevation =  2350.500(Ft.)
Pipe length  =   389.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.317(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.317(CFS)
Normal flow depth in pipe =   12.71(In.)
Flow top width inside pipe =   16.40(In.)
Critical Depth =   13.40(In.)
Pipe flow velocity =      6.23(Ft/s)
Travel time through pipe =    1.04 min.
Time of concentration (TC) =    20.92 min.


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Process from Point/Station        6.220 to Point/Station        6.220
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.640
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.360
RI index for soil(AMC 3)  =  80.27
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    20.92 min.
Rainfall intensity =      2.642(In/Hr) for a   100.0 year storm
Subarea runoff =      5.298(CFS) for      2.253(Ac.)
Total runoff =     13.615(CFS)   Total area =       5.630(Ac.)


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Process from Point/Station        6.220 to Point/Station        6.080
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2350.500(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    14.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.615(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    13.615(CFS)
Normal flow depth in pipe =   11.13(In.)
Flow top width inside pipe =   17.49(In.)
Critical Depth =   16.44(In.)
Pipe flow velocity =     11.87(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    20.94 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.220 to Point/Station        6.080
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 5
Stream flow area =      5.630(Ac.)
Runoff from this stream =     13.615(CFS)
Time of concentration =   20.94 min.
Rainfall intensity =     2.640(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       27.135     11.88           3.505
```

```
2        6.695      9.55            3.909
3       29.806      9.25            3.972
4       26.713     12.50            3.418
5       13.615     20.94            2.640
Largest stream flow has longer or shorter time of concentration
Qp =     29.806 + sum of
         Qa          Tb/Ta
         27.135 *    0.779 =     21.129
         Qa          Tb/Ta
          6.695 *    0.968 =      6.485
         Qa          Tb/Ta
         26.713 *    0.741 =     19.781
         Qa          Tb/Ta
         13.615 *    0.442 =      6.015
Qp =     83.216

Total of 5 main streams to confluence:
Flow rates before confluence point:
      27.135       6.695      29.806      26.713      13.615
Area of streams before confluence:
        9.356        1.921        8.428        8.422        5.630


Results of confluence:
Total flow rate =     83.216(CFS)
Time of concentration =     9.253 min.
Effective stream area after confluence  =     33.757(Ac.)


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Process from Point/Station        6.080 to Point/Station        6.230
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2345.000(Ft.)
Downstream point/station elevation =  2240.500(Ft.)
Pipe length  =  1735.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    83.216(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    83.216(CFS)
Normal flow depth in pipe =   20.81(In.)
Flow top width inside pipe =   27.66(In.)
Critical depth could not be calculated.
Pipe flow velocity =     22.91(Ft/s)
Travel time through pipe =    1.26 min.
Time of concentration (TC) =    10.52 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.230 to Point/Station        6.240
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   2240.500(Ft.)
End of natural channel elevation =   2225.200(Ft.)
Length of natural channel  =   331.500(Ft.)
Estimated mean flow rate at midpoint of channel =     95.521(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  10.06(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0462
Corrected/adjusted channel slope =  0.0462
Travel time =    0.55 min.     TC =   11.07  min.
```

```
 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.847
Decimal fraction soil group A = 0.660
Decimal fraction soil group B = 0.340
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  85.44
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      3.633(In/Hr) for a   100.0 year storm
Subarea runoff =     30.718(CFS) for      9.983(Ac.)
Total runoff =    113.934(CFS)   Total area =      43.740(Ac.)


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Process from Point/Station        6.240 to Point/Station        6.250
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2225.200(Ft.)
Downstream point/station elevation =  2222.100(Ft.)
Pipe length  =   154.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   113.934(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =   113.934(CFS)
Normal flow depth in pipe =   31.08(In.)
Flow top width inside pipe =   31.38(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.08(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    11.23 min.
End of computations, total study area =           43.74 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.416
Area averaged RI index number =  60.6
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/04/20 File:AREA07.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 7 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 7.000 to Point/Station 7.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 512.000(Ft.)
Top (of initial area) elevation = 2368.600(Ft.)
Bottom (of initial area) elevation = 2240.100(Ft.)
Difference in elevation = 128.500(Ft.)
Slope = 0.25098 s(percent)= 25.10
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.473 min.
Rainfall intensity = 4.151(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.865
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.830
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.68
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 15.192(CFS)
Total initial stream area = 4.233(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 7.010 to Point/Station 7.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2240.100(Ft.)
Downstream point/station elevation = 2228.700(Ft.)
Pipe length = 144.20(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 15.192(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 15.192(CFS)
Normal flow depth in pipe = 10.50(In.)
Flow top width inside pipe = 13.75(In.)
Critical depth could not be calculated.
Pipe flow velocity = 16.57(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 8.62 min.
End of computations, total study area = 4.23 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 76.1

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/04/20 File:AREA08.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 8 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 8.000 to Point/Station 8.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 684.700(Ft.)
Top (of initial area) elevation = 2367.000(Ft.)
Bottom (of initial area) elevation = 2243.400(Ft.)
Difference in elevation = 123.600(Ft.)
Slope = 0.18052 s(percent)= 18.05
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.167 min.
Rainfall intensity = 3.790(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.190
Decimal fraction soil group B = 0.810
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.55
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 16.915(CFS)
Total initial stream area = 5.185(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 8.010 to Point/Station 8.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2243.400(Ft.)
Downstream point/station elevation = 2234.700(Ft.)
Pipe length = 124.30(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 16.915(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 16.915(CFS)
Normal flow depth in pipe = 12.16(In.)
Flow top width inside pipe = 11.75(In.)
Critical depth could not be calculated.
Pipe flow velocity = 15.88(Ft/s)
Travel time through pipe = 0.13 min.
Time of concentration (TC) = 10.30 min.
End of computations, total study area = 5.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 75.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/04/20 File:AREA09.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 9 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 9.000 to Point/Station 9.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 648.700(Ft.)
Top (of initial area) elevation = 2367.200(Ft.)
Bottom (of initial area) elevation = 2241.600(Ft.)
Difference in elevation = 125.600(Ft.)
Slope = 0.19362 s(percent)= 19.36
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.811 min.
Rainfall intensity = 3.858(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.750
Decimal fraction soil group B = 0.250
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.85
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 31.264(CFS)
Total initial stream area = 9.560(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 9.010 to Point/Station 9.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2241.600(Ft.)
Downstream point/station elevation = 2236.100(Ft.)
Pipe length = 146.50(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 31.264(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 31.264(CFS)
Normal flow depth in pipe = 17.58(In.)
Flow top width inside pipe = 15.51(In.)
Critical depth could not be calculated.
Pipe flow velocity = 14.54(Ft/s)
Travel time through pipe = 0.17 min.
Time of concentration (TC) = 9.98 min.
End of computations, total study area = 9.56 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 69.8

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/04/20 File:AREA10.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 10 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 10.000 to Point/Station 10.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 233.700(Ft.)
Top (of initial area) elevation = 2340.000(Ft.)
Bottom (of initial area) elevation = 2258.500(Ft.)
Difference in elevation = 81.500(Ft.)
Slope = 0.34874 s(percent)= 34.87
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.797 min.
Rainfall intensity = 5.019(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.874
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 89.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 2.083(CFS)
Total initial stream area = 0.475(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 10.010 to Point/Station 10.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2258.500(Ft.)
Downstream point/station elevation = 2237.100(Ft.)
Pipe length = 125.70(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.083(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 2.083(CFS)
Normal flow depth in pipe = 4.45(In.)
Flow top width inside pipe = 5.26(In.)
Critical depth could not be calculated.
Pipe flow velocity = 13.34(Ft/s)
Travel time through pipe = 0.16 min.
Time of concentration (TC) = 5.95 min.
End of computations, total study area = 0.47 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 78.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/05/20 File:AREA11.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 11 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 11.000 to Point/Station 11.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 693.100(Ft.)
Top (of initial area) elevation = 2346.600(Ft.)
Bottom (of initial area) elevation = 2255.000(Ft.)
Difference in elevation = 91.600(Ft.)
Slope = 0.13216 s(percent)= 13.22
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 10.874 min.
Rainfall intensity = 3.664(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.200
Decimal fraction soil group B = 0.800
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.48
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 8.442(CFS)
Total initial stream area = 2.681(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 11.010 to Point/Station 11.020

**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2255.000(Ft.)
End of natural channel elevation = 2246.900(Ft.)
Length of natural channel = 292.800(Ft.)
Estimated mean flow rate at midpoint of channel = 23.261(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 5.19(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0277
Corrected/adjusted channel slope = 0.0277
Travel time = 0.94 min. TC = 11.81 min.

Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.854
Decimal fraction soil group A = 0.340
Decimal fraction soil group B = 0.660
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.56
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.516(In/Hr) for a 100.0 year storm
Subarea runoff = 28.258(CFS) for 9.412(Ac.)
Total runoff = 36.700(CFS) Total area = 12.093(Ac.)

++
Process from Point/Station 11.020 to Point/Station 11.030
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2246.900(Ft.)
Downstream point/station elevation = 2246.300(Ft.)
Pipe length = 159.50(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 36.700(CFS)
Nearest computed pipe diameter = 36.00(In.)
Calculated individual pipe flow = 36.700(CFS)
Normal flow depth in pipe = 26.63(In.)
Flow top width inside pipe = 31.60(In.)
Critical Depth = 23.65(In.)
Pipe flow velocity = 6.55(Ft/s)
Travel time through pipe = 0.41 min.
Time of concentration (TC) = 12.22 min.
End of computations, total study area = 12.09 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 74.6

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/05/20 File:AREA12.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 12 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 12.000 to Point/Station 12.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 507.300(Ft.)
Top (of initial area) elevation = 2370.400(Ft.)
Bottom (of initial area) elevation = 2269.500(Ft.)
Difference in elevation = 100.900(Ft.)
Slope = 0.19890 s(percent)= 19.89
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.844 min.
Rainfall intensity = 4.063(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.360
Decimal fraction soil group B = 0.640
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.42
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 10.221(CFS)
Total initial stream area = 2.927(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 12.010 to Point/Station 12.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2269.500(Ft.)
Downstream point/station elevation = 2259.500(Ft.)
Pipe length = 113.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.221(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 10.221(CFS)
Normal flow depth in pipe = 9.49(In.)
Flow top width inside pipe = 9.76(In.)
Critical depth could not be calculated.
Pipe flow velocity = 15.35(Ft/s)
Travel time through pipe = 0.12 min.
Time of concentration (TC) = 8.97 min.
End of computations, total study area = 2.93 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 74.0

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/05/20 File:AREA13.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 13 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 13.000 to Point/Station 13.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 227.100(Ft.)
Top (of initial area) elevation = 2356.900(Ft.)
Bottom (of initial area) elevation = 2352.900(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.01761 s(percent)= 1.76
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.894 min.
Rainfall intensity = 4.977(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.893
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 74.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.955(CFS)
Total initial stream area = 0.440(Ac.)
Pervious area fraction = 0.100

++

Process from Point/Station 13.010 to Point/Station 13.020

```
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  2352.900(Ft.)
End of street segment elevation =  2345.100(Ft.)
Length of street segment  =   816.600(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   2.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      5.182(CFS)
Depth of flow =   0.399(Ft.), Average velocity =   2.623(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.596(Ft.)
Flow velocity =   2.62(Ft/s)
Travel time =    5.19 min.     TC =   11.08  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.460
Decimal fraction soil group B = 0.540
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  64.96
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      3.630(In/Hr) for a   100.0 year storm
Subarea runoff =      6.368(CFS) for      1.982(Ac.)
Total runoff =      8.322(CFS)   Total area =       2.422(Ac.)
Street flow at end of street =      8.322(CFS)
Half street flow at end of street =      8.322(CFS)
Depth of flow =   0.456(Ft.), Average velocity =   2.941(Ft/s)
Flow width (from curb towards crown)=  16.442(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.020 to Point/Station       13.030
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2340.300(Ft.)
Downstream point/station elevation =  2339.400(Ft.)
Pipe length  =    93.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.322(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     8.322(CFS)
Normal flow depth in pipe =   12.27(In.)
Flow top width inside pipe =   16.77(In.)
Critical Depth =   13.40(In.)
Pipe flow velocity =      6.49(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =    11.32 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.020 to Point/Station       13.030
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.884
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Decimal fraction soil group A = 0.530
Decimal fraction soil group B = 0.470
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  63.28
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.32 min.
Rainfall intensity =      3.591(In/Hr) for a   100.0 year storm
Subarea runoff =      2.210(CFS) for      0.696(Ac.)
Total runoff =     10.532(CFS)   Total area =       3.118(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.030 to Point/Station       13.040
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2339.400(Ft.)
Downstream point/station elevation =  2337.500(Ft.)
Pipe length  =   193.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.532(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.532(CFS)
Normal flow depth in pipe =   14.98(In.)
Flow top width inside pipe =   13.46(In.)
Critical Depth =   14.96(In.)
Pipe flow velocity =      6.70(Ft/s)
Travel time through pipe =    0.48 min.
Time of concentration (TC) =    11.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.040 to Point/Station       13.040
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.370
Decimal fraction soil group B = 0.630
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  67.12
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.80 min.
Rainfall intensity =      3.517(In/Hr) for a   100.0 year storm
Subarea runoff =     29.656(CFS) for      9.518(Ac.)
Total runoff =     40.188(CFS)   Total area =      12.636(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.040 to Point/Station       13.050
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2337.500(Ft.)
Downstream point/station elevation =  2335.000(Ft.)
Pipe length  =   248.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    40.188(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    40.188(CFS)
Normal flow depth in pipe =   24.00(In.)
Flow top width inside pipe =   24.00(In.)
Critical Depth =   25.59(In.)
Pipe flow velocity =      9.55(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    12.24 min.
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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.050 to Point/Station       13.050
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.791
Decimal fraction soil group A = 0.340
Decimal fraction soil group B = 0.580
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.080
RI index for soil(AMC 3)  =  73.76
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    12.24 min.
Rainfall intensity =      3.454(In/Hr) for a   100.0 year storm
Subarea runoff =     14.246(CFS) for      5.212(Ac.)
Total runoff =     54.433(CFS)   Total area =      17.848(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.050 to Point/Station       13.050
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     17.848(Ac.)
Runoff from this stream =     54.433(CFS)
Time of concentration =   12.24 min.
Rainfall intensity =     3.454(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.060 to Point/Station       13.070
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   781.400(Ft.)
Top (of initial area) elevation =  2356.600(Ft.)
Bottom (of initial area) elevation =  2347.700(Ft.)
Difference in elevation =     8.900(Ft.)
Slope =    0.01139  s(percent)=       1.14
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   10.543 min.
Rainfall intensity =      3.721(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.180
Decimal fraction soil group B = 0.590
Decimal fraction soil group C = 0.230
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  73.74
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      9.845(CFS)
Total initial stream area =        2.973(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.070 to Point/Station       13.080
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  2343.300(Ft.)
Downstream point/station elevation =  2339.200(Ft.)
Pipe length  =   816.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.845(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.845(CFS)
```

```
Normal flow depth in pipe =   15.23(In.)
Flow top width inside pipe =   18.74(In.)
Critical Depth =   14.03(In.)
Pipe flow velocity =      5.26(Ft/s)
Travel time through pipe =    2.59 min.
Time of concentration (TC) =    13.13 min.


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Process from Point/Station       13.080 to Point/Station       13.080
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.889
Decimal fraction soil group A = 0.140
Decimal fraction soil group B = 0.720
Decimal fraction soil group C = 0.140
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  73.57
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.13 min.
Rainfall intensity =      3.335(In/Hr) for a   100.0 year storm
Subarea runoff =     54.630(CFS) for     18.433(Ac.)
Total runoff =     64.475(CFS)   Total area =      21.406(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.080 to Point/Station       13.090
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2339.200(Ft.)
Downstream point/station elevation =  2336.700(Ft.)
Pipe length  =   497.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    64.475(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    64.475(CFS)
Normal flow depth in pipe =   31.27(In.)
Flow top width inside pipe =   36.64(In.)
Critical Depth =   30.22(In.)
Pipe flow velocity =      8.39(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =    14.12 min.


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Process from Point/Station       13.080 to Point/Station       13.090
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     21.406(Ac.)
Runoff from this stream =     64.475(CFS)
Time of concentration =   14.12 min.
Rainfall intensity =     3.216(In/Hr)


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Process from Point/Station       13.100 to Point/Station       13.110
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   483.400(Ft.)
Top (of initial area) elevation =  2357.800(Ft.)
Bottom (of initial area) elevation =  2348.100(Ft.)
Difference in elevation =     9.700(Ft.)
Slope =    0.02007  s(percent)=       2.01
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.769 min.
```

```
Rainfall intensity =      4.335(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.904(CFS)
Total initial stream area =        0.234(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.110 to Point/Station       13.120
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Top of street segment elevation =  2348.100(Ft.)
End of street segment elevation =  2342.600(Ft.)
Length of street segment  =  1106.600(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  20.000(Ft.)
Distance from crown to crossfall grade break  =  18.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   2.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      3.512(CFS)
Depth of flow =   0.392(Ft.), Average velocity =   1.864(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.255(Ft.)
Flow velocity =   1.86(Ft/s)
Travel time =    9.89 min.     TC =   17.66  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.879
Decimal fraction soil group A = 0.650
Decimal fraction soil group B = 0.350
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  60.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.875(In/Hr) for a   100.0 year storm
Subarea runoff =      5.161(CFS) for      2.042(Ac.)
Total runoff =      6.066(CFS)   Total area =       2.276(Ac.)
Street flow at end of street =      6.066(CFS)
Half street flow at end of street =      6.066(CFS)
Depth of flow =   0.457(Ft.), Average velocity =   2.127(Ft/s)
Flow width (from curb towards crown)=  16.509(Ft.)


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Process from Point/Station       13.120 to Point/Station       13.130
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2339.000(Ft.)
Downstream point/station elevation =  2338.800(Ft.)
Pipe length  =    41.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.066(CFS)
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```
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     6.066(CFS)
Normal flow depth in pipe =   12.52(In.)
Flow top width inside pipe =   16.57(In.)
Critical Depth =   11.42(In.)
Pipe flow velocity =      4.63(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    17.81 min.


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Process from Point/Station       13.130 to Point/Station       13.130
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.460
Decimal fraction soil group B = 0.540
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  64.96
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    17.81 min.
Rainfall intensity =      2.863(In/Hr) for a   100.0 year storm
Subarea runoff =      2.003(CFS) for      0.793(Ac.)
Total runoff =      8.068(CFS)   Total area =       3.069(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.130 to Point/Station       13.090
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2338.800(Ft.)
Downstream point/station elevation =  2336.700(Ft.)
Pipe length  =   422.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.068(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.068(CFS)
Normal flow depth in pipe =   13.22(In.)
Flow top width inside pipe =   20.28(In.)
Critical Depth =   12.65(In.)
Pipe flow velocity =      5.06(Ft/s)
Travel time through pipe =    1.39 min.
Time of concentration (TC) =    19.20 min.


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Process from Point/Station       13.130 to Point/Station       13.090
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      3.069(Ac.)
Runoff from this stream =      8.068(CFS)
Time of concentration =   19.20 min.
Rainfall intensity =     2.758(In/Hr)


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Process from Point/Station       13.140 to Point/Station       13.150
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   322.500(Ft.)
Top (of initial area) elevation =  2346.600(Ft.)
Bottom (of initial area) elevation =  2342.400(Ft.)
Difference in elevation =     4.200(Ft.)
Slope =    0.01302  s(percent)=       1.30
```

```
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.204 min.
Rainfall intensity =      4.502(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.840
Decimal fraction soil group B = 0.160
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  55.84
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.760(CFS)
Total initial stream area =        1.449(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.150 to Point/Station       13.090
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2337.100(Ft.)
Downstream point/station elevation =  2336.700(Ft.)
Pipe length  =    37.90(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.760(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.760(CFS)
Normal flow depth in pipe =   10.80(In.)
Flow top width inside pipe =   13.47(In.)
Critical Depth =   11.66(In.)
Pipe flow velocity =      6.09(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =     7.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.150 to Point/Station       13.090
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      1.449(Ac.)
Runoff from this stream =      5.760(CFS)
Time of concentration =    7.31 min.
Rainfall intensity =     4.470(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       64.475     14.12                3.216
2        8.068     19.20                2.758
3        5.760      7.31                4.470
Largest stream flow has longer or shorter time of concentration
Qp =     64.475 + sum of
         Qa          Tb/Ta
          8.068 *    0.735 =      5.933
         Qb          Ia/Ib
          5.760 *    0.719 =      4.144
Qp =     74.551

Total of 3 streams to confluence:
Flow rates before confluence point:
      64.475       8.068       5.760
Area of streams before confluence:
       21.406        3.069        1.449
Results of confluence:
```

```
Total flow rate =     74.551(CFS)
Time of concentration =    14.118 min.
Effective stream area after confluence =     25.924(Ac.)


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Process from Point/Station       13.090 to Point/Station       13.050
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  2336.700(Ft.)
Downstream point/station elevation =  2335.000(Ft.)
Pipe length  =   341.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    74.551(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    74.551(CFS)
Normal flow depth in pipe =   36.75(In.)
Flow top width inside pipe =   27.78(In.)
Critical Depth =   32.45(In.)
Pipe flow velocity =      8.36(Ft/s)
Travel time through pipe =    0.68 min.
Time of concentration (TC) =    14.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.090 to Point/Station       13.090
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.350
Decimal fraction soil group B = 0.650
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  67.60
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.80 min.
Rainfall intensity =      3.141(In/Hr) for a   100.0 year storm
Subarea runoff =      1.912(CFS) for      0.688(Ac.)
Total runoff =     76.463(CFS)   Total area =      26.612(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.090 to Point/Station       13.050
**** CONFLUENCE OF MAIN STREAMS ****
----------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     26.612(Ac.)
Runoff from this stream =     76.463(CFS)
Time of concentration =   14.80 min.
Rainfall intensity =     3.141(In/Hr)
Program is now starting with Main Stream No. 3


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.160 to Point/Station       13.170
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   337.000(Ft.)
Top (of initial area) elevation =  2445.000(Ft.)
Bottom (of initial area) elevation =  2359.000(Ft.)
Difference in elevation =    86.000(Ft.)
Slope =    0.25519  s(percent)=      25.52
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.671 min.
Rainfall intensity =      3.395(In/Hr) for a   100.0 year storm
```

```
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.866
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
RI index for soil(AMC 3)  =  91.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      3.000(CFS)
Total initial stream area =        1.020(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.170 to Point/Station       13.180
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  2359.000(Ft.)
End of street segment elevation =  2351.800(Ft.)
Length of street segment  =   864.900(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  13.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.582(CFS)
Depth of flow =   0.452(Ft.), Average velocity =   2.729(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.284(Ft.)
Flow velocity =   2.73(Ft/s)
Travel time =    5.28 min.     TC =   17.95  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.869
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.130
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.870
RI index for soil(AMC 3)  =  86.52
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.852(In/Hr) for a   100.0 year storm
Subarea runoff =      9.107(CFS) for      3.673(Ac.)
Total runoff =     12.107(CFS)   Total area =       4.693(Ac.)
Street flow at end of street =     12.107(CFS)
Half street flow at end of street =     12.107(CFS)
Depth of flow =   0.523(Ft.), Average velocity =   2.980(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    1.14(Ft.)
Flow width (from curb towards crown)=  19.806(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.180 to Point/Station       13.190
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2345.800(Ft.)
Downstream point/station elevation =  2337.000(Ft.)
Pipe length  =   132.20(Ft.)   Manning's N = 0.013
```

```
No. of pipes = 1  Required pipe flow  =    12.107(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    12.107(CFS)
Normal flow depth in pipe =    9.48(In.)
Flow top width inside pipe =   14.47(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.81(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    18.10 min.


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Process from Point/Station       13.190 to Point/Station       13.190
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.690
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.310
RI index for soil(AMC 3)  =  79.51
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.10 min.
Rainfall intensity =      2.840(In/Hr) for a   100.0 year storm
Subarea runoff =      3.869(CFS) for      1.530(Ac.)
Total runoff =     15.976(CFS)   Total area =       6.223(Ac.)


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Process from Point/Station       13.190 to Point/Station       13.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2337.000(Ft.)
Downstream point/station elevation =  2335.300(Ft.)
Pipe length  =   168.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.976(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    15.976(CFS)
Normal flow depth in pipe =   17.25(In.)
Flow top width inside pipe =   16.09(In.)
Critical Depth =   17.70(In.)
Pipe flow velocity =      7.55(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =    18.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.200 to Point/Station       13.200
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.240
Decimal fraction soil group B = 0.660
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
RI index for soil(AMC 3)  =  71.71
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.47 min.
Rainfall intensity =      2.812(In/Hr) for a   100.0 year storm
Subarea runoff =     23.797(CFS) for      9.555(Ac.)
Total runoff =     39.772(CFS)   Total area =      15.778(Ac.)


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Process from Point/Station       13.200 to Point/Station       13.050
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2335.300(Ft.)
Downstream point/station elevation =  2335.000(Ft.)
Pipe length  =    33.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    39.772(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    39.772(CFS)
Normal flow depth in pipe =   25.13(In.)
Flow top width inside pipe =   22.13(In.)
Critical Depth =   25.48(In.)
Pipe flow velocity =      9.06(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    18.53 min.


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Process from Point/Station       13.200 to Point/Station       13.050
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =     15.778(Ac.)
Runoff from this stream =     39.772(CFS)
Time of concentration =   18.53 min.
Rainfall intensity =     2.807(In/Hr)
Program is now starting with Main Stream No. 4


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.210 to Point/Station       13.220
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   268.800(Ft.)
Top (of initial area) elevation =  2356.600(Ft.)
Bottom (of initial area) elevation =  2346.200(Ft.)
Difference in elevation =    10.400(Ft.)
Slope =    0.03869  s(percent)=       3.87
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.004 min.
Rainfall intensity =      4.566(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.883
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
RI index for soil(AMC 3)  =  88.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.733(CFS)
Total initial stream area =        0.430(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.220 to Point/Station       13.230
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  2346.200(Ft.)
End of street segment elevation =  2341.900(Ft.)
Length of street segment  =   850.300(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
```

```
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  13.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.127(CFS)
Depth of flow =   0.477(Ft.), Average velocity =   2.226(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  17.535(Ft.)
Flow velocity =   2.23(Ft/s)
Travel time =    6.37 min.     TC =   13.37  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.040
Decimal fraction soil group B = 0.570
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.390
RI index for soil(AMC 3)  =  79.96
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.305(In/Hr) for a   100.0 year storm
Subarea runoff =     10.701(CFS) for      3.771(Ac.)
Total runoff =     12.434(CFS)   Total area =       4.201(Ac.)
Street flow at end of street =     12.434(CFS)
Half street flow at end of street =     12.434(CFS)
Depth of flow =   0.572(Ft.), Average velocity =   2.390(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    3.58(Ft.)
Flow width (from curb towards crown)=  22.245(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.230 to Point/Station       13.240
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2339.100(Ft.)
Downstream point/station elevation =  2338.900(Ft.)
Pipe length  =    45.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.434(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    12.434(CFS)
Normal flow depth in pipe =   16.62(In.)
Flow top width inside pipe =   22.15(In.)
Critical Depth =   15.21(In.)
Pipe flow velocity =      5.36(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =    13.51 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.240 to Point/Station       13.240
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.060
Decimal fraction soil group B = 0.450
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.490
RI index for soil(AMC 3)  =  81.10
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    13.51 min.
```

```
Rainfall intensity =      3.288(In/Hr) for a   100.0 year storm
Subarea runoff =      9.011(CFS) for      3.072(Ac.)
Total runoff =     21.445(CFS)   Total area =       7.273(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.240 to Point/Station       13.050
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2338.900(Ft.)
Downstream point/station elevation =  2335.000(Ft.)
Pipe length  =   784.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.445(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    21.445(CFS)
Normal flow depth in pipe =   21.70(In.)
Flow top width inside pipe =   21.44(In.)
Critical Depth =   19.45(In.)
Pipe flow velocity =      6.26(Ft/s)
Travel time through pipe =    2.09 min.
Time of concentration (TC) =    15.60 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.240 to Point/Station       13.050
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 4
Stream flow area =      7.273(Ac.)
Runoff from this stream =     21.445(CFS)
Time of concentration =   15.60 min.
Rainfall intensity =     3.060(In/Hr)
Program is now starting with Main Stream No. 5


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.060 to Point/Station       13.250
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   472.000(Ft.)
Top (of initial area) elevation =  2356.600(Ft.)
Bottom (of initial area) elevation =  2351.600(Ft.)
Difference in elevation =     5.000(Ft.)
Slope =    0.01059  s(percent)=       1.06
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.744 min.
Rainfall intensity =      4.087(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      4.534(CFS)
Total initial stream area =        1.245(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.250 to Point/Station       13.260
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2347.100(Ft.)
```

```
Downstream point/station elevation =  2338.800(Ft.)
Pipe length  =   829.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.534(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     4.534(CFS)
Normal flow depth in pipe =    9.26(In.)
Flow top width inside pipe =   14.58(In.)
Critical Depth =   10.35(In.)
Pipe flow velocity =      5.70(Ft/s)
Travel time through pipe =    2.43 min.
Time of concentration (TC) =    11.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.260 to Point/Station       13.260
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.290
Decimal fraction soil group B = 0.670
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.040
RI index for soil(AMC 3)  =  69.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    11.17 min.
Rainfall intensity =      3.616(In/Hr) for a   100.0 year storm
Subarea runoff =     59.156(CFS) for     18.433(Ac.)
Total runoff =     63.689(CFS)   Total area =      19.678(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.260 to Point/Station       13.270
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2338.800(Ft.)
Downstream point/station elevation =  2335.100(Ft.)
Pipe length  =   744.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    63.689(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    63.689(CFS)
Normal flow depth in pipe =   31.08(In.)
Flow top width inside pipe =   36.85(In.)
Critical Depth =   30.02(In.)
Pipe flow velocity =      8.34(Ft/s)
Travel time through pipe =    1.49 min.
Time of concentration (TC) =    12.66 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.270 to Point/Station       13.270
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
COMMERCIAL subarea type
Runoff Coefficient = 0.892
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.620
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.380
RI index for soil(AMC 3)  =  80.58
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.66 min.
Rainfall intensity =      3.396(In/Hr) for a   100.0 year storm
Subarea runoff =      4.657(CFS) for      1.537(Ac.)
Total runoff =     68.347(CFS)   Total area =      21.215(Ac.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.270 to Point/Station       13.050
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  2335.100(Ft.)
Downstream point/station elevation =  2335.000(Ft.)
Pipe length  =    24.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    68.347(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    68.347(CFS)
Normal flow depth in pipe =   37.80(In.)
Flow top width inside pipe =   25.20(In.)
Critical Depth =   31.07(In.)
Pipe flow velocity =      7.50(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    12.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.270 to Point/Station       13.050
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 5
Stream flow area =     21.215(Ac.)
Runoff from this stream =     68.347(CFS)
Time of concentration =   12.71 min.
Rainfall intensity =     3.389(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       54.433     12.24            3.454
2       76.463     14.80            3.141
3       39.772     18.53            2.807
4       21.445     15.60            3.060
5       68.347     12.71            3.389
Largest stream flow has longer or shorter time of concentration
Qp =     76.463 + sum of
         Qb         Ia/Ib
         54.433 *    0.909 =     49.502
         Qa         Tb/Ta
         39.772 *    0.799 =     31.759
         Qa         Tb/Ta
         21.445 *    0.949 =     20.346
         Qb         Ia/Ib
         68.347 *    0.927 =     63.348
Qp =    241.418

Total of 5 main streams to confluence:
Flow rates before confluence point:
      54.433      76.463      39.772      21.445      68.347
Area of streams before confluence:
       17.848       26.612       15.778        7.273       21.215


Results of confluence:
Total flow rate =    241.418(CFS)
Time of concentration =    14.799 min.
Effective stream area after confluence  =     88.726(Ac.)


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Process from Point/Station       13.050 to Point/Station       13.280
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2330.000(Ft.)
Downstream point/station elevation =  2304.000(Ft.)
Pipe length  =  1640.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   241.418(CFS)
Nearest computed pipe diameter  =     54.00(In.)
Calculated individual pipe flow  =   241.418(CFS)
Normal flow depth in pipe =   43.13(In.)
Flow top width inside pipe =   43.31(In.)
Critical Depth =   50.92(In.)
Pipe flow velocity =     17.74(Ft/s)
Travel time through pipe =    1.54 min.
Time of concentration (TC) =    16.34 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.280 to Point/Station       13.290
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of natural channel elevation =   2304.000(Ft.)
End of natural channel elevation =   2258.000(Ft.)
Length of natural channel  =   713.400(Ft.)
Estimated mean flow rate at midpoint of channel =    281.131(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  16.56(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
       Normal channel slope =  0.0645
Corrected/adjusted channel slope =  0.0645
Travel time =    0.72 min.     TC =   17.06  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.840
Decimal fraction soil group A = 0.510
Decimal fraction soil group B = 0.490
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  86.43
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.926(In/Hr) for a   100.0 year storm
Subarea runoff =     71.731(CFS) for     29.190(Ac.)
Total runoff =    313.149(CFS)   Total area =     117.916(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.290 to Point/Station       13.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2258.000(Ft.)
Downstream point/station elevation =  2249.600(Ft.)
Pipe length  =   168.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   313.149(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   313.149(CFS)
Normal flow depth in pipe =   38.34(In.)
Flow top width inside pipe =   38.48(In.)
Critical depth could not be calculated.
Pipe flow velocity =     29.10(Ft/s)
```

```
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    17.15 min.
End of computations, total study area =          117.92 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.397
Area averaged RI index number =  58.2
```

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/05/20 File:AREA14.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 14 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 14.000 to Point/Station 14.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 595.000(Ft.)
Top (of initial area) elevation = 2370.000(Ft.)
Bottom (of initial area) elevation = 2279.500(Ft.)
Difference in elevation = 90.500(Ft.)
Slope = 0.15210 s(percent)= 15.21
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.946 min.
Rainfall intensity = 3.832(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.240
Decimal fraction soil group B = 0.760
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 88.22
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 13.715(CFS)
Total initial stream area = 4.162(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 14.010 to Point/Station 14.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2279.500(Ft.)
Downstream point/station elevation = 2274.400(Ft.)
Pipe length = 141.40(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 13.715(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 13.715(CFS)
Normal flow depth in pipe = 10.97(In.)
Flow top width inside pipe = 17.56(In.)
Critical Depth = 16.48(In.)
Pipe flow velocity = 12.17(Ft/s)
Travel time through pipe = 0.19 min.
Time of concentration (TC) = 10.14 min.
End of computations, total study area = 4.16 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 75.4

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 11/05/20 File:AREA15.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 15 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 15.000 to Point/Station 15.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 838.600(Ft.)
Top (of initial area) elevation = 2366.000(Ft.)
Bottom (of initial area) elevation = 2287.800(Ft.)
Difference in elevation = 78.200(Ft.)
Slope = 0.09325 s(percent)= 9.33
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 12.583 min.
Rainfall intensity = 3.407(In/Hr) for a 100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.848
Decimal fraction soil group A = 0.520
Decimal fraction soil group B = 0.480
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 86.37
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 22.150(CFS)
Total initial stream area = 7.671(Ac.)
Pervious area fraction = 1.000

++

Process from Point/Station 15.010 to Point/Station 15.020

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2287.800(Ft.)
Downstream point/station elevation = 2283.200(Ft.)
Pipe length = 123.60(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 22.150(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 22.150(CFS)
Normal flow depth in pipe = 13.25(In.)
Flow top width inside pipe = 20.26(In.)
Critical Depth = 19.70(In.)
Pipe flow velocity = 13.85(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 12.73 min.
End of computations, total study area = 7.67 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000
Area averaged RI index number = 72.3

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2005 Version 7.1
Rational Hydrology Study Date: 04/22/22 File:AREA16.out

BEAUMONT POINTE
PRELIMINARY HYDROLOGY STUDY
AREA 16 DEVELOPED
100-YEAR

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6094

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.551(In.)
100 year, 1 hour precipitation = 1.560(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.560(In/Hr)
Slope of intensity duration curve = 0.5000

++

Process from Point/Station 16.000 to Point/Station 16.010
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 235.000(Ft.)
Top (of initial area) elevation = 2500.000(Ft.)
Bottom (of initial area) elevation = 2414.400(Ft.)
Difference in elevation = 85.600(Ft.)
Slope = 0.36426 s(percent)= 36.43
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.217 min.

```
Rainfall intensity =      5.291(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.846
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.950
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.050
RI index for soil(AMC 3)  =  75.56
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      2.465(CFS)
Total initial stream area =        0.551(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.010 to Point/Station       16.020
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  2414.400(Ft.)
End of street segment elevation =  2395.700(Ft.)
Length of street segment  =  1303.900(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  13.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      7.360(CFS)
Depth of flow =   0.415(Ft.), Average velocity =   3.330(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  14.434(Ft.)
Flow velocity =   3.33(Ft/s)
Travel time =    6.53 min.     TC =   11.74  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.080
Decimal fraction soil group B = 0.780
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.140
RI index for soil(AMC 3)  =  75.39
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      3.526(In/Hr) for a   100.0 year storm
```

```
Subarea runoff =      9.697(CFS) for      3.233(Ac.)
Total runoff =     12.163(CFS)  Total area =       3.784(Ac.)
Street flow at end of street =     12.163(CFS)
Half street flow at end of street =     12.163(CFS)
Depth of flow =   0.479(Ft.), Average velocity =   3.761(Ft/s)
Flow width (from curb towards crown)=  17.627(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.020 to Point/Station       16.030
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2389.700(Ft.)
Downstream point/station elevation =  2357.800(Ft.)
Pipe length  =  1023.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.163(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    12.163(CFS)
Normal flow depth in pipe =   13.50(In.)
Flow top width inside pipe =    9.00(In.)
Critical depth could not be calculated.
Pipe flow velocity =     10.45(Ft/s)
Travel time through pipe =    1.63 min.
Time of concentration (TC) =    13.38 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.020 to Point/Station       16.030
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      3.784(Ac.)
Runoff from this stream =     12.163(CFS)
Time of concentration =   13.38 min.
Rainfall intensity =     3.304(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.040 to Point/Station       16.050
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   557.600(Ft.)
Top (of initial area) elevation =  2485.000(Ft.)
Bottom (of initial area) elevation =  2393.600(Ft.)
Difference in elevation =    91.400(Ft.)
Slope =    0.16392  s(percent)=      16.39
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   16.933 min.
```

```
Rainfall intensity =      2.937(In/Hr) for a   100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.950
RI index for soil(AMC 3)  =  90.43
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.932(CFS)
Total initial stream area =        0.766(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station       16.050 to Point/Station       16.060
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  2393.600(Ft.)
End of street segment elevation =  2365.000(Ft.)
Length of street segment  =   919.300(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  13.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      6.687(CFS)
Depth of flow =   0.364(Ft.), Average velocity =   4.373(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.843(Ft.)
Flow velocity =   4.37(Ft/s)
Travel time =    3.50 min.     TC =   20.44  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.841
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.860
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.140
RI index for soil(AMC 3)  =  76.93
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.673(In/Hr) for a   100.0 year storm
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Subarea runoff =      9.435(CFS) for      4.195(Ac.)
Total runoff =     11.367(CFS)  Total area =       4.961(Ac.)
Street flow at end of street =     11.367(CFS)
Half street flow at end of street =     11.367(CFS)
Depth of flow =   0.421(Ft.), Average velocity =   4.961(Ft/s)
Flow width (from curb towards crown)=  14.712(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.060 to Point/Station       16.070
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2359.400(Ft.)
Downstream point/station elevation =  2358.800(Ft.)
Pipe length  =    57.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.367(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    11.367(CFS)
Normal flow depth in pipe =   12.96(In.)
Flow top width inside pipe =   20.42(In.)
Critical Depth =   15.08(In.)
Pipe flow velocity =      7.30(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    20.57 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.070 to Point/Station       16.070
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.120
Decimal fraction soil group B = 0.790
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.090
RI index for soil(AMC 3)  =  73.86
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    20.57 min.
Rainfall intensity =      2.664(In/Hr) for a   100.0 year storm
Subarea runoff =      7.046(CFS) for      2.983(Ac.)
Total runoff =     18.412(CFS)  Total area =       7.944(Ac.)


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Process from Point/Station       16.070 to Point/Station       16.080
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2358.800(Ft.)
Downstream point/station elevation =  2358.600(Ft.)
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Pipe length  =    23.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.412(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    18.412(CFS)
Normal flow depth in pipe =   17.44(In.)
Flow top width inside pipe =   21.39(In.)
Critical Depth =   18.54(In.)
Pipe flow velocity =      7.53(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    20.62 min.


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Process from Point/Station       16.080 to Point/Station       16.080
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.180
Decimal fraction soil group B = 0.640
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.180
RI index for soil(AMC 3)  =  74.08
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    20.62 min.
Rainfall intensity =      2.661(In/Hr) for a   100.0 year storm
Subarea runoff =     40.764(CFS) for     17.278(Ac.)
Total runoff =     59.176(CFS)  Total area =      25.222(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.080 to Point/Station       16.030
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2358.600(Ft.)
Downstream point/station elevation =  2357.800(Ft.)
Pipe length  =    75.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    59.176(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    59.176(CFS)
Normal flow depth in pipe =   25.80(In.)
Flow top width inside pipe =   32.44(In.)
Critical Depth =   29.84(In.)
Pipe flow velocity =     10.91(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    20.73 min.


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Process from Point/Station       16.080 to Point/Station       16.030
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**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 25.222(Ac.)
Runoff from this stream = 59.176(CFS)
Time of concentration = 20.73 min.
Rainfall intensity = 2.654(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	12.163	13.38	3.304
2	59.176	20.73	2.654

Largest stream flow has longer time of concentration
Qp = 59.176 + sum of

Qb	Ia/Ib	
12.163 *	0.803 =	9.768

Qp = 68.944

Total of 2 main streams to confluence:
Flow rates before confluence point:
12.163 59.176
Area of streams before confluence:
3.784 25.222

Results of confluence:
Total flow rate = 68.944(CFS)
Time of concentration = 20.735 min.
Effective stream area after confluence = 29.006(Ac.)

++
Process from Point/Station 16.030 to Point/Station 16.090
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2357.800(Ft.)
Downstream point/station elevation = 2352.400(Ft.)
Pipe length = 1080.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 68.944(CFS)
Nearest computed pipe diameter = 42.00(In.)
Calculated individual pipe flow = 68.944(CFS)
Normal flow depth in pipe = 33.28(In.)
Flow top width inside pipe = 34.07(In.)
Critical Depth = 31.20(In.)
Pipe flow velocity = 8.42(Ft/s)
Travel time through pipe = 2.14 min.

```
Time of concentration (TC) =    22.87 min.


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Process from Point/Station       16.090 to Point/Station       16.090
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.150
Decimal fraction soil group B = 0.850
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  71.92
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    22.87 min.
Rainfall intensity =      2.527(In/Hr) for a   100.0 year storm
Subarea runoff =     18.534(CFS) for      8.292(Ac.)
Total runoff =     87.478(CFS)  Total area =      37.298(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.090 to Point/Station       16.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  2352.400(Ft.)
Downstream point/station elevation =  2350.100(Ft.)
Pipe length  =   463.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    87.478(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =    87.478(CFS)
Normal flow depth in pipe =   38.06(In.)
Flow top width inside pipe =   32.50(In.)
Critical Depth =   34.56(In.)
Pipe flow velocity =      8.78(Ft/s)
Travel time through pipe =    0.88 min.
Time of concentration (TC) =    23.75 min.


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Process from Point/Station       16.100 to Point/Station       16.100
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.80
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```
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    23.75 min.
Rainfall intensity =      2.479(In/Hr) for a   100.0 year storm
Subarea runoff =      5.236(CFS) for      2.383(Ac.)
Total runoff =     92.714(CFS)  Total area =      39.681(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.100 to Point/Station       16.110
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2350.100(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    23.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    92.714(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =    92.714(CFS)
Normal flow depth in pipe =   38.91(In.)
Flow top width inside pipe =   37.62(In.)
Critical Depth =   35.03(In.)
Pipe flow velocity =      8.50(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    23.80 min.


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Process from Point/Station       16.110 to Point/Station       16.110
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.748
Decimal fraction soil group A = 0.340
Decimal fraction soil group B = 0.660
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  72.54
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    23.80 min.
Rainfall intensity =      2.477(In/Hr) for a   100.0 year storm
Subarea runoff =      5.671(CFS) for      3.062(Ac.)
Total runoff =     98.385(CFS)  Total area =      42.743(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.110 to Point/Station       16.110
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     42.743(Ac.)
```

```
Runoff from this stream =     98.385(CFS)
Time of concentration =   23.80 min.
Rainfall intensity =     2.477(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.120 to Point/Station       16.130
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   384.100(Ft.)
Top (of initial area) elevation =  2450.000(Ft.)
Bottom (of initial area) elevation =  2366.300(Ft.)
Difference in elevation =    83.700(Ft.)
Slope =    0.21791  s(percent)=      21.79
TC = k(0.940)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   13.780 min.
Rainfall intensity =      3.255(In/Hr) for a   100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.120
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.880
RI index for soil(AMC 3)  =  89.63
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.506(CFS)
Total initial stream area =        1.611(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.130 to Point/Station       16.140
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of street segment elevation =  2366.300(Ft.)
End of street segment elevation =  2359.800(Ft.)
Length of street segment  =  1402.700(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  28.000(Ft.)
Distance from crown to crossfall grade break  =  26.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  13.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
```

```
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      8.899(CFS)
Depth of flow =   0.520(Ft.), Average velocity =   2.222(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    1.00(Ft.)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  19.669(Ft.)
Flow velocity =   2.22(Ft/s)
Travel time =   10.52 min.     TC =   24.30  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.839
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.820
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.180
RI index for soil(AMC 3)  =  77.54
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.451(In/Hr) for a   100.0 year storm
Subarea runoff =      8.735(CFS) for      4.249(Ac.)
Total runoff =     13.242(CFS)  Total area =       5.860(Ac.)
Street flow at end of street =     13.242(CFS)
Half street flow at end of street =     13.242(CFS)
Depth of flow =   0.590(Ft.), Average velocity =   2.323(Ft/s)
Warning: depth of flow exceeds top of curb
Distance that curb overflow reaches into property =    4.51(Ft.)
Flow width (from curb towards crown)=  23.174(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.140 to Point/Station       16.150
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2352.900(Ft.)
Downstream point/station elevation =  2351.800(Ft.)
Pipe length  =    57.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    13.242(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    13.242(CFS)
Normal flow depth in pipe =   13.48(In.)
Flow top width inside pipe =   15.62(In.)
Critical Depth =   16.30(In.)
Pipe flow velocity =      9.33(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    24.40 min.


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Process from Point/Station       16.150 to Point/Station       16.150
**** SUBAREA FLOW ADDITION ****
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```
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.830
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.170
RI index for soil(AMC 3)  =  77.38
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    24.40 min.
Rainfall intensity =      2.446(In/Hr) for a   100.0 year storm
Subarea runoff =      3.691(CFS) for      1.700(Ac.)
Total runoff =     16.933(CFS)  Total area =       7.560(Ac.)


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Process from Point/Station       16.150 to Point/Station       16.110
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  2351.800(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    91.20(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.933(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.933(CFS)
Normal flow depth in pipe =   13.71(In.)
Flow top width inside pipe =   19.99(In.)
Critical Depth =   18.11(In.)
Pipe flow velocity =     10.19(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    24.55 min.


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Process from Point/Station       16.150 to Point/Station       16.110
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      7.560(Ac.)
Runoff from this stream =     16.933(CFS)
Time of concentration =   24.55 min.
Rainfall intensity =     2.439(In/Hr)
Program is now starting with Main Stream No. 3


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Process from Point/Station       16.160 to Point/Station       16.170
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
```

```
Initial area flow distance =   328.400(Ft.)
Top (of initial area) elevation =  2364.100(Ft.)
Bottom (of initial area) elevation =  2360.000(Ft.)
Difference in elevation =     4.100(Ft.)
Slope =    0.01248  s(percent)=       1.25
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.318 min.
Rainfall intensity =      4.467(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.410
Decimal fraction soil group B = 0.590
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  66.16
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      5.462(CFS)
Total initial stream area =        1.377(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.170 to Point/Station       16.110
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2354.000(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    24.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.462(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     5.462(CFS)
Normal flow depth in pipe =    6.20(In.)
Flow top width inside pipe =    8.33(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.85(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     7.34 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.170 to Point/Station       16.110
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area =      1.377(Ac.)
Runoff from this stream =      5.462(CFS)
Time of concentration =    7.34 min.
Rainfall intensity =     4.459(In/Hr)
Program is now starting with Main Stream No. 4
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.180 to Point/Station       16.190
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
Initial area flow distance =   490.700(Ft.)
Top (of initial area) elevation =  2367.800(Ft.)
Bottom (of initial area) elevation =  2360.000(Ft.)
Difference in elevation =     7.800(Ft.)
Slope =    0.01590  s(percent)=       1.59
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.188 min.
Rainfall intensity =      4.223(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.360
Decimal fraction soil group B = 0.640
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  67.36
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     10.857(CFS)
Total initial stream area =        2.895(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       19.190 to Point/Station       16.110
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  2354.000(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =    24.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.857(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =    10.857(CFS)
Normal flow depth in pipe =    7.79(In.)
Flow top width inside pipe =   11.45(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.10(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     8.21 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       19.190 to Point/Station       16.110
**** CONFLUENCE OF MAIN STREAMS ****
_____________________________________________________________________________
The following data inside Main Stream is listed:
```

```
In Main Stream number: 4
Stream flow area =      2.895(Ac.)
Runoff from this stream =     10.857(CFS)
Time of concentration =    8.21 min.
Rainfall intensity =     4.218(In/Hr)
Program is now starting with Main Stream No. 5


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.200 to Point/Station       16.210
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   912.000(Ft.)
Top (of initial area) elevation =  2394.400(Ft.)
Bottom (of initial area) elevation =  2368.700(Ft.)
Difference in elevation =    25.700(Ft.)
Slope =    0.02818  s(percent)=       2.82
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.357 min.
Rainfall intensity =      3.950(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.610
Decimal fraction soil group B = 0.390
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  61.36
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =     18.747(CFS)
Total initial stream area =        5.367(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.210 to Point/Station       16.220
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2364.700(Ft.)
Downstream point/station elevation =  2354.700(Ft.)
Pipe length  =   580.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.747(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    18.747(CFS)
Normal flow depth in pipe =   15.61(In.)
Flow top width inside pipe =   18.35(In.)
Critical Depth =   18.79(In.)
Pipe flow velocity =      9.79(Ft/s)
Travel time through pipe =    0.99 min.
Time of concentration (TC) =    10.35 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.220 to Point/Station       16.220
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.888
Decimal fraction soil group A = 0.370
Decimal fraction soil group B = 0.440
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.190
RI index for soil(AMC 3)  =  70.58
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.35 min.
Rainfall intensity =      3.757(In/Hr) for a   100.0 year storm
Subarea runoff =     50.083(CFS) for     15.006(Ac.)
Total runoff =     68.830(CFS)  Total area =      20.373(Ac.)


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Process from Point/Station       16.220 to Point/Station       16.230
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =  2354.700(Ft.)
Downstream point/station elevation =  2353.000(Ft.)
Pipe length  =   338.10(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    68.830(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =    68.830(CFS)
Normal flow depth in pipe =   33.19(In.)
Flow top width inside pipe =   34.20(In.)
Critical Depth =   31.20(In.)
Pipe flow velocity =      8.45(Ft/s)
Travel time through pipe =    0.67 min.
Time of concentration (TC) =    11.01 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.220 to Point/Station       16.230
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 5 in normal stream number 1
Stream flow area =     20.373(Ac.)
Runoff from this stream =     68.830(CFS)
Time of concentration =   11.01 min.
Rainfall intensity =     3.641(In/Hr)


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Process from Point/Station       16.240 to Point/Station       16.250
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**** INITIAL AREA EVALUATION ****

Initial area flow distance = 585.600(Ft.)
Top (of initial area) elevation = 2380.000(Ft.)
Bottom (of initial area) elevation = 2370.000(Ft.)
Difference in elevation = 10.000(Ft.)
Slope = 0.01708 s(percent)= 1.71
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.663 min.
Rainfall intensity = 4.105(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.880
Decimal fraction soil group A = 0.950
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 53.20
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.203(CFS)
Total initial stream area = 0.333(Ac.)
Pervious area fraction = 0.100

++
Process from Point/Station 16.250 to Point/Station 16.260
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 2370.000(Ft.)
End of street segment elevation = 2363.100(Ft.)
Length of street segment = 1120.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 20.000(Ft.)
Distance from crown to crossfall grade break = 18.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.065
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 2.000(Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 2.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 2.451(CFS)
Depth of flow = 0.345(Ft.), Average velocity = 1.860(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 10.915(Ft.)
Flow velocity = 1.86(Ft/s)
Travel time = 10.04 min. TC = 18.70 min.
Adding area flow to street

```
COMMERCIAL subarea type
Runoff Coefficient = 0.881
Decimal fraction soil group A = 0.470
Decimal fraction soil group B = 0.530
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  64.72
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      2.794(In/Hr) for a   100.0 year storm
Subarea runoff =      2.419(CFS) for      0.982(Ac.)
Total runoff =      3.622(CFS)  Total area =       1.315(Ac.)
Street flow at end of street =      3.622(CFS)
Half street flow at end of street =      3.622(CFS)
Depth of flow =   0.384(Ft.), Average velocity =   2.038(Ft/s)
Flow width (from curb towards crown)=  12.846(Ft.)


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Process from Point/Station       16.260 to Point/Station       16.270
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  2355.400(Ft.)
Downstream point/station elevation =  2354.600(Ft.)
Pipe length  =    42.20(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.622(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.622(CFS)
Normal flow depth in pipe =    7.67(In.)
Flow top width inside pipe =   11.53(In.)
Critical Depth =    9.74(In.)
Pipe flow velocity =      6.83(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    18.80 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.270 to Point/Station       16.270
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.460
Decimal fraction soil group B = 0.540
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  64.96
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    18.80 min.
Rainfall intensity =      2.787(In/Hr) for a   100.0 year storm
Subarea runoff =      2.100(CFS) for      0.855(Ac.)
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```
Total runoff =      5.722(CFS)  Total area =       2.170(Ac.)


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Process from Point/Station       16.270 to Point/Station       16.230
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2354.600(Ft.)
Downstream point/station elevation =  2353.000(Ft.)
Pipe length  =    77.60(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.722(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.722(CFS)
Normal flow depth in pipe =    8.52(In.)
Flow top width inside pipe =   14.86(In.)
Critical Depth =   11.61(In.)
Pipe flow velocity =      7.95(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    18.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.270 to Point/Station       16.230
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 5 in normal stream number 2
Stream flow area =      2.170(Ac.)
Runoff from this stream =      5.722(CFS)
Time of concentration =   18.97 min.
Rainfall intensity =     2.775(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       68.830     11.01                3.641
2        5.722     18.97                2.775
Largest stream flow has longer or shorter time of concentration
Qp =     68.830 + sum of
          Qa          Tb/Ta
           5.722 *    0.581 =      3.322
Qp =     72.153

Total of 2 streams to confluence:
Flow rates before confluence point:
      68.830       5.722
Area of streams before confluence:
       20.373        2.170
Results of confluence:
```

```
Total flow rate =     72.153(CFS)
Time of concentration =    11.013 min.
Effective stream area after confluence =     22.543(Ac.)


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Process from Point/Station       16.230 to Point/Station       16.280
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2353.000(Ft.)
Downstream point/station elevation =  2352.600(Ft.)
Pipe length  =   761.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    72.153(CFS)
Nearest computed pipe diameter  =     63.00(In.)
Calculated individual pipe flow  =    72.153(CFS)
Normal flow depth in pipe =   56.25(In.)
Flow top width inside pipe =   38.97(In.)
Critical Depth =   28.37(In.)
Pipe flow velocity =      3.54(Ft/s)
Travel time through pipe =    3.59 min.
Time of concentration (TC) =    14.60 min.


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Process from Point/Station       16.280 to Point/Station       16.280
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.884
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.600
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  66.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    14.60 min.
Rainfall intensity =      3.162(In/Hr) for a   100.0 year storm
Subarea runoff =     23.731(CFS) for      8.487(Ac.)
Total runoff =     95.883(CFS)  Total area =      31.030(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.280 to Point/Station       16.110
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2352.600(Ft.)
Downstream point/station elevation =  2350.000(Ft.)
Pipe length  =   449.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    95.883(CFS)
Nearest computed pipe diameter  =     45.00(In.)
```

```
Calculated individual pipe flow  =    95.883(CFS)
Normal flow depth in pipe =   38.81(In.)
Flow top width inside pipe =   30.99(In.)
Critical Depth =   36.07(In.)
Pipe flow velocity =      9.46(Ft/s)
Travel time through pipe =    0.79 min.
Time of concentration (TC) =    15.39 min.


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Process from Point/Station       16.280 to Point/Station       16.110
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 5
Stream flow area =     31.030(Ac.)
Runoff from this stream =     95.883(CFS)
Time of concentration =   15.39 min.
Rainfall intensity =     3.080(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       98.385     23.80                2.477
2       16.933     24.55                2.439
3        5.462      7.34                4.459
4       10.857      8.21                4.218
5       95.883     15.39                3.080
Largest stream flow has longer or shorter time of concentration
Qp =     98.385 + sum of
          Qa          Tb/Ta
          16.933 *    0.969 =     16.411
          Qb         Ia/Ib
           5.462 *    0.555 =      3.034
          Qb         Ia/Ib
          10.857 *    0.587 =      6.376
          Qb         Ia/Ib
          95.883 *    0.804 =     77.110
Qp =    201.317

Total of 5 main streams to confluence:
Flow rates before confluence point:
      98.385      16.933       5.462      10.857      95.883
Area of streams before confluence:
       42.743        7.560        1.377        2.895       31.030


Results of confluence:
```

```
Total flow rate =    201.317(CFS)
Time of concentration =    23.798 min.
Effective stream area after confluence  =     85.605(Ac.)


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Process from Point/Station       16.110 to Point/Station       16.290
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2345.000(Ft.)
Downstream point/station elevation =  2310.000(Ft.)
Pipe length  =  1962.50(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   201.317(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   201.317(CFS)
Normal flow depth in pipe =   41.91(In.)
Flow top width inside pipe =   31.96(In.)
Critical depth could not be calculated.
Pipe flow velocity =     17.29(Ft/s)
Travel time through pipe =    1.89 min.
Time of concentration (TC) =    25.69 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.110 to Point/Station       16.290
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     85.605(Ac.)
Runoff from this stream =    201.317(CFS)
Time of concentration =   25.69 min.
Rainfall intensity =     2.384(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.300 to Point/Station       16.310
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   635.400(Ft.)
Top (of initial area) elevation =  2510.000(Ft.)
Bottom (of initial area) elevation =  2420.000(Ft.)
Difference in elevation =    90.000(Ft.)
Slope =    0.14164  s(percent)=      14.16
TC = k(0.480)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    9.380 min.
Rainfall intensity =      3.945(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.842
```

```
Decimal fraction soil group A = 0.070
Decimal fraction soil group B = 0.540
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.390
RI index for soil(AMC 3)  =  79.38
Pervious area fraction =  0.800; Impervious fraction =  0.200
Initial subarea runoff =      9.942(CFS)
Total initial stream area =        2.993(Ac.)
Pervious area fraction = 0.800


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.310 to Point/Station       16.320
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   2420.000(Ft.)
End of natural channel elevation =   2396.700(Ft.)
Length of natural channel  =   552.000(Ft.)
Estimated mean flow rate at midpoint of channel =     30.755(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =   6.93(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0422
Corrected/adjusted channel slope =  0.0422
Travel time =    1.33 min.     TC =   10.71  min.


 Adding area flow to channel
SINGLE FAMILY (1 Acre Lot)
Runoff Coefficient = 0.804
Decimal fraction soil group A = 0.260
Decimal fraction soil group B = 0.720
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.020
RI index for soil(AMC 3)  =  70.11
Pervious area fraction =  0.800; Impervious fraction =  0.200
Rainfall intensity =      3.693(In/Hr) for a   100.0 year storm
Subarea runoff =     37.204(CFS) for     12.532(Ac.)
Total runoff =     47.146(CFS)  Total area =      15.525(Ac.)


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Process from Point/Station       16.320 to Point/Station       16.330
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
```

```
Upstream point/station elevation =  2396.700(Ft.)
Downstream point/station elevation =  2359.100(Ft.)
Pipe length  =  1340.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    47.146(CFS)
Nearest computed pipe diameter  =     27.00(In.)
Calculated individual pipe flow  =    47.146(CFS)
Normal flow depth in pipe =   20.20(In.)
Flow top width inside pipe =   23.44(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.78(Ft/s)
Travel time through pipe =    1.51 min.
Time of concentration (TC) =    12.22 min.


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Process from Point/Station       16.330 to Point/Station       16.330
**** SUBAREA FLOW ADDITION ****
_______________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.600
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  66.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    12.22 min.
Rainfall intensity =      3.457(In/Hr) for a   100.0 year storm
Subarea runoff =     64.231(CFS) for     20.989(Ac.)
Total runoff =    111.377(CFS)  Total area =      36.514(Ac.)


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Process from Point/Station       16.330 to Point/Station       16.340
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_______________________________________________________________________________
Upstream point/station elevation =  2359.100(Ft.)
Downstream point/station elevation =  2336.000(Ft.)
Pipe length  =   488.80(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   111.377(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =   111.377(CFS)
Normal flow depth in pipe =   26.16(In.)
Flow top width inside pipe =   26.76(In.)
Critical depth could not be calculated.
Pipe flow velocity =     22.05(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =    12.59 min.
```

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Process from Point/Station       16.330 to Point/Station       16.340
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 1
Stream flow area =     36.514(Ac.)
Runoff from this stream =    111.377(CFS)
Time of concentration =   12.59 min.
Rainfall intensity =     3.406(In/Hr)


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Process from Point/Station       16.350 to Point/Station       16.360
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
Initial area flow distance =   384.900(Ft.)
Top (of initial area) elevation =  2415.900(Ft.)
Bottom (of initial area) elevation =  2402.500(Ft.)
Difference in elevation =    13.400(Ft.)
Slope =    0.03481  s(percent)=       3.48
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.352 min.
Rainfall intensity =      4.795(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.370
Decimal fraction soil group B = 0.570
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.060
RI index for soil(AMC 3)  =  68.26
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.734(CFS)
Total initial stream area =        0.641(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station       16.360 to Point/Station       16.370
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
____________________________________________________________________________
Top of street segment elevation =  2402.500(Ft.)
End of street segment elevation =  2345.000(Ft.)
Length of street segment  =  1271.800(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  25.000(Ft.)
Distance from crown to crossfall grade break  =  23.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.065
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =   2.000(Ft.)
```

```
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0150
 Manning's N from grade break to crown =  0.0150
Estimated mean flow rate at midpoint of street =      4.323(CFS)
Depth of flow =   0.308(Ft.), Average velocity =   4.568(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.054(Ft.)
Flow velocity =   4.57(Ft/s)
Travel time =    4.64 min.     TC =   10.99  min.
 Adding area flow to street
COMMERCIAL subarea type
Runoff Coefficient = 0.890
Decimal fraction soil group A = 0.030
Decimal fraction soil group B = 0.970
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  74.22
Pervious area fraction =  0.100; Impervious fraction =  0.900
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
Subarea runoff =      3.114(CFS) for      0.960(Ac.)
Total runoff =      5.848(CFS)  Total area =       1.601(Ac.)
Street flow at end of street =      5.848(CFS)
Half street flow at end of street =      5.848(CFS)
Depth of flow =   0.333(Ft.), Average velocity =   4.892(Ft/s)
Flow width (from curb towards crown)=  10.338(Ft.)


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Process from Point/Station       16.370 to Point/Station       16.370
**** SUBAREA FLOW ADDITION ****
_____________________________________________________________________________
COMMERCIAL subarea type
Runoff Coefficient = 0.887
Decimal fraction soil group A = 0.290
Decimal fraction soil group B = 0.710
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  69.04
Pervious area fraction =  0.100; Impervious fraction =  0.900
Time of concentration =    10.99 min.
Rainfall intensity =      3.645(In/Hr) for a   100.0 year storm
Subarea runoff =     11.520(CFS) for      3.562(Ac.)
Total runoff =     17.367(CFS)  Total area =       5.163(Ac.)


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Process from Point/Station       16.370 to Point/Station       16.371
```

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 2341.000(Ft.)
Downstream point/station elevation = 2340.000(Ft.)
Pipe length = 29.50(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 17.367(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 17.367(CFS)
Normal flow depth in pipe = 13.34(In.)
Flow top width inside pipe = 15.77(In.)
Critical depth could not be calculated.
Pipe flow velocity = 12.38(Ft/s)
Travel time through pipe = 0.04 min.
Time of concentration (TC) = 11.03 min.

++
Process from Point/Station 16.371 to Point/Station 16.372
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****

Top of natural channel elevation = 2340.000(Ft.)
End of natural channel elevation = 2339.500(Ft.)
Length of natural channel = 70.600(Ft.)
Estimated mean flow rate at midpoint of channel = 19.152(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow = 2.49(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
Normal channel slope = 0.0071
Corrected/adjusted channel slope = 0.0071
Travel time = 0.47 min. TC = 11.50 min.

Adding area flow to channel
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.708
Decimal fraction soil group A = 1.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 58.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Rainfall intensity = 3.563(In/Hr) for a 100.0 year storm
Subarea runoff = 2.677(CFS) for 1.061(Ac.)
Total runoff = 20.044(CFS) Total area = 6.224(Ac.)

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.372 to Point/Station       16.340
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  2337.000(Ft.)
Downstream point/station elevation =  2336.000(Ft.)
Pipe length  =    72.70(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    20.044(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    20.044(CFS)
Normal flow depth in pipe =   15.59(In.)
Flow top width inside pipe =   22.90(In.)
Critical Depth =   19.29(In.)
Pipe flow velocity =      9.28(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    11.63 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.372 to Point/Station       16.340
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      6.224(Ac.)
Runoff from this stream =     20.044(CFS)
Time of concentration =   11.63 min.
Rainfall intensity =     3.543(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.380 to Point/Station       16.390
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   364.100(Ft.)
Top (of initial area) elevation =  2376.200(Ft.)
Bottom (of initial area) elevation =  2371.500(Ft.)
Difference in elevation =     4.700(Ft.)
Slope =    0.01291  s(percent)=       1.29
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    7.576 min.
Rainfall intensity =      4.390(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.882
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.100
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  54.40
Pervious area fraction =  0.100; Impervious fraction =  0.900
```

```
Initial subarea runoff =      8.249(CFS)
Total initial stream area =        2.131(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.390 to Point/Station       16.340
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  2366.500(Ft.)
Downstream point/station elevation =  2336.000(Ft.)
Pipe length  =    91.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.249(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     8.249(CFS)
Normal flow depth in pipe =    6.45(In.)
Flow top width inside pipe =    8.12(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.35(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     7.64 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.390 to Point/Station       16.340
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 2 in normal stream number 3
Stream flow area =      2.131(Ac.)
Runoff from this stream =      8.249(CFS)
Time of concentration =    7.64 min.
Rainfall intensity =     4.372(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      111.377     12.59                3.406
2       20.044     11.63                3.543
3        8.249      7.64                4.372
Largest stream flow has longer time of concentration
Qp =    111.377 + sum of
          Qb         Ia/Ib
          20.044 *    0.961 =     19.269
          Qb         Ia/Ib
           8.249 *    0.779 =      6.425
Qp =    137.071

Total of 3 streams to confluence:
```

```
Flow rates before confluence point:
     111.377      20.044       8.249
Area of streams before confluence:
       36.514        6.224        2.131
Results of confluence:
Total flow rate =    137.071(CFS)
Time of concentration =    12.590 min.
Effective stream area after confluence =     44.869(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.340 to Point/Station       16.290
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  2336.000(Ft.)
Downstream point/station elevation =  2310.000(Ft.)
Pipe length  =   482.30(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   137.071(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   137.071(CFS)
Normal flow depth in pipe =   26.34(In.)
Flow top width inside pipe =   31.90(In.)
Critical depth could not be calculated.
Pipe flow velocity =     24.74(Ft/s)
Travel time through pipe =    0.32 min.
Time of concentration (TC) =    12.91 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.340 to Point/Station       16.290
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     44.869(Ac.)
Runoff from this stream =    137.071(CFS)
Time of concentration =   12.91 min.
Rainfall intensity =     3.362(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1      201.317     25.69                2.384
2      137.071     12.91                3.362
Largest stream flow has longer time of concentration
Qp =    201.317 + sum of
          Qb         Ia/Ib
         137.071 *    0.709 =     97.187
```

```
Qp =    298.504

Total of 2 main streams to confluence:
Flow rates before confluence point:
     201.317     137.071
Area of streams before confluence:
       85.605       44.869


Results of confluence:
Total flow rate =    298.504(CFS)
Time of concentration =    25.689 min.
Effective stream area after confluence  =    130.474(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.290 to Point/Station       16.420
**** NATURAL CHANNEL TIME + SUBAREA FLOW ADDITION ****
________________________________________________________________________
Top of natural channel elevation =   2310.000(Ft.)
End of natural channel elevation =   2301.500(Ft.)
Length of natural channel  =   252.000(Ft.)
Estimated mean flow rate at midpoint of channel =    306.303(CFS)

Natural valley channel type used
L.A. County flood control district formula for channel velocity:
 Velocity(ft/s) = (7 + 8(q(English Units)^.352)(slope^0.5)
Velocity using mean channel flow =  12.31(Ft/s)

Correction to map slope used on extremely rugged channels with
drops and waterfalls (Plate D-6.2)
        Normal channel slope =  0.0337
Corrected/adjusted channel slope =  0.0337
Travel time =    0.34 min.     TC =   26.03  min.


 Adding area flow to channel
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.816
Decimal fraction soil group A = 0.790
Decimal fraction soil group B = 0.210
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3)  =  84.59
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      2.368(In/Hr) for a   100.0 year storm
Subarea runoff =     13.181(CFS) for      6.818(Ac.)
Total runoff =    311.685(CFS)  Total area =     137.292(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.420 to Point/Station       16.430
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
____________________________________________________________________________
Upstream point/station elevation =  2301.500(Ft.)
Downstream point/station elevation =  2295.200(Ft.)
Pipe length  =   184.90(Ft.)   Manning's N = 0.013
No. of pipes = 2  Required pipe flow  =   311.685(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =   155.842(CFS)
Normal flow depth in pipe =   32.81(In.)
Flow top width inside pipe =   28.50(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.92(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =    26.18 min.
End of computations, total study area =          137.29 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.303
Area averaged RI index number =  52.1
```

Existing Culvert Hydraulic Analysis ..... D

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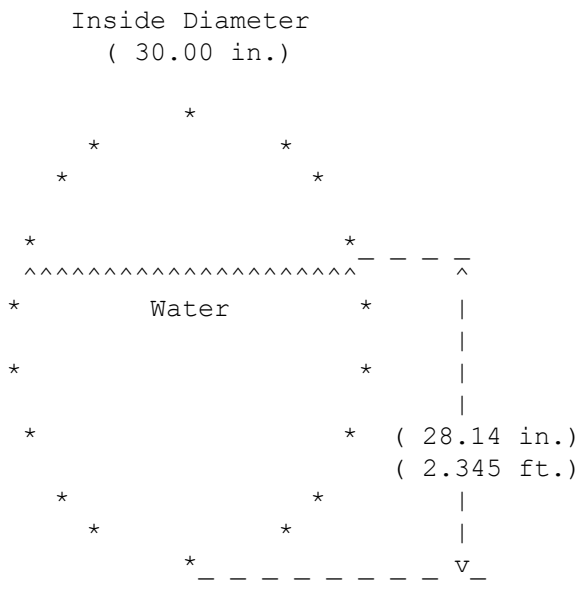
CULVERT 3



Circular Channel Section

Flowrate	95.980	CFS
Velocity	20.069	fps
Pipe Diameter	30.000	inches
Depth of Flow	28.140	inches
Depth of Flow	2.345	feet
Critical Depth	Greater than Pipe Diameter	
Depth/Diameter (D/d)	0.938	
Slope of Pipe	6.300	%
X-Sectional Area	4.783	sq. ft.
Wetted Perimeter	6.596	feet
AR^(2/3)	3.860	
Mannings 'n'	0.015	
Min. Fric. Slope, 30 inch Pipe Flowing Full	7.290	%

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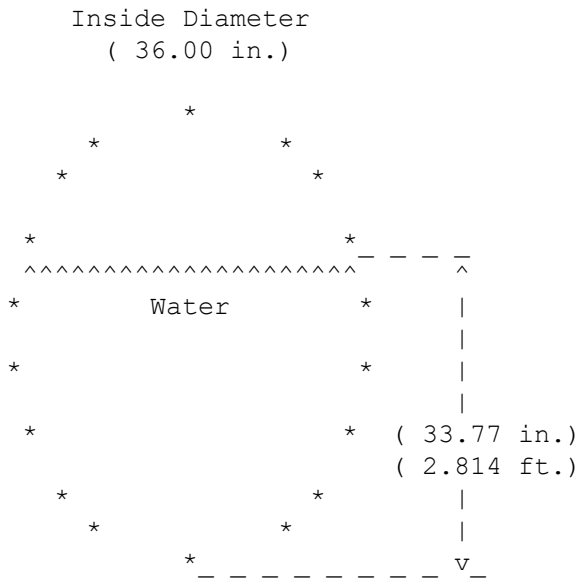
CULVERT 4



Circular Channel Section

Flowrate	154.080	CFS
Velocity	22.373	fps
Pipe Diameter	36.000	inches
Depth of Flow	33.768	inches
Depth of Flow	2.814	feet
Critical Depth	Greater than Pipe Diameter	
Depth/Diameter (D/d)	0.938	
Slope of Pipe	6.140	%
X-Sectional Area	6.887	sq. ft.
Wetted Perimeter	7.915	feet
AR^(2/3)	6.277	
Mannings 'n'	0.015	
Min. Fric. Slope, 36 inch Pipe Flowing Full	7.105	%

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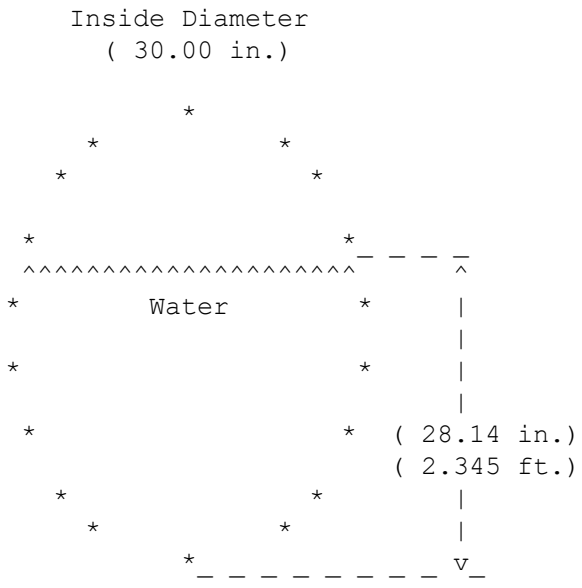
CULVERT 5



Circular Channel Section

Flowrate	71.845	CFS
Velocity	15.023	fps
Pipe Diameter	30.000	inches
Depth of Flow	28.140	inches
Depth of Flow	2.345	feet
Critical Depth	2.451	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	3.530	%
X-Sectional Area	4.783	sq. ft.
Wetted Perimeter	6.596	feet
AR^(2/3)	3.860	
Mannings 'n'	0.015	
Min. Fric. Slope, 30 inch Pipe Flowing Full	4.085	%

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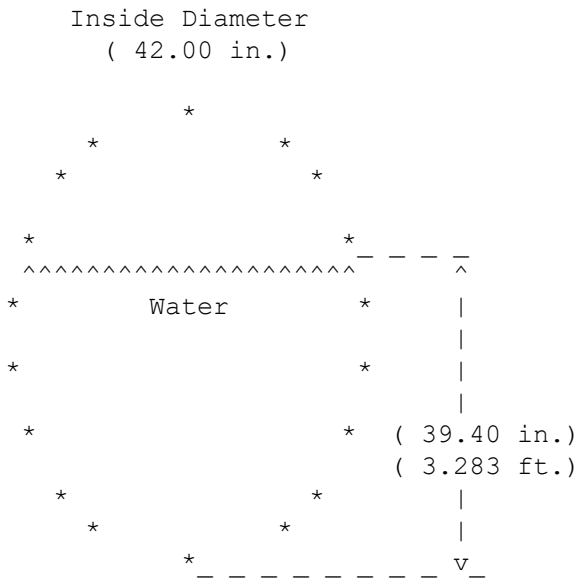
CULVERT 6



Circular Channel Section

Flowrate	131.983	CFS
Velocity	14.080	fps
Pipe Diameter	42.000	inches
Depth of Flow	39.396	inches
Depth of Flow	3.283	feet
Critical Depth	3.315	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	1.980	%
X-Sectional Area	9.374	sq. ft.
Wetted Perimeter	9.234	feet
AR^(2/3)	9.468	
Mannings 'n'	0.015	
Min. Fric. Slope, 42 inch Pipe Flowing Full	2.291	%

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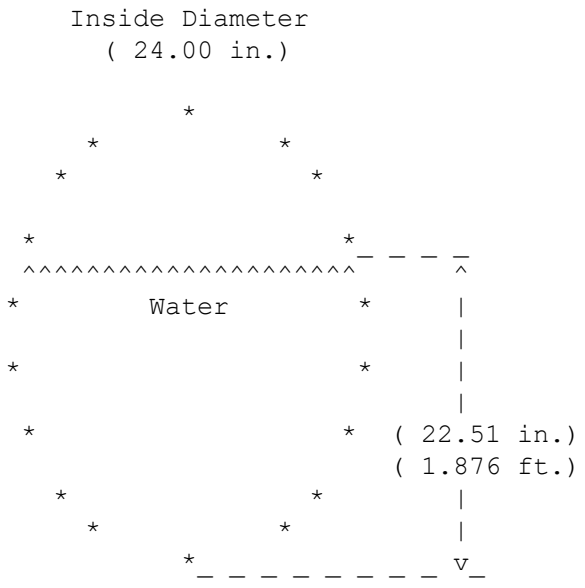
CULVERT 7



Circular Channel Section

Flowrate	59.541	CFS
Velocity	19.453	fps
Pipe Diameter	24.000	inches
Depth of Flow	22.512	inches
Depth of Flow	1.876	feet
Critical Depth	Greater than Pipe Diameter	
Depth/Diameter (D/d)	0.938	
Slope of Pipe	7.970	%
X-Sectional Area	3.061	sq. ft.
Wetted Perimeter	5.277	feet
AR^(2/3)	2.129	
Mannings 'n'	0.015	
Min. Fric. Slope, 24 inch Pipe Flowing Full	9.222	%

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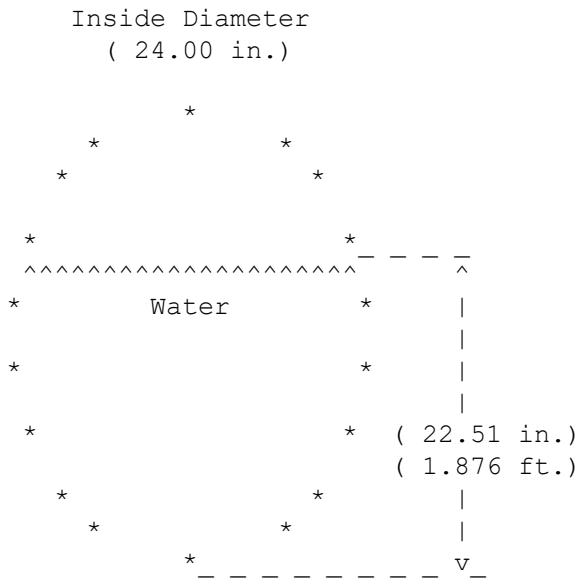
CULVERT 8



Circular Channel Section

Flowrate	51.488	CFS
Velocity	16.822	fps
Pipe Diameter	24.000	inches
Depth of Flow	22.512	inches
Depth of Flow	1.876	feet
Critical Depth	Greater than Pipe Diameter	
Depth/Diameter (D/d)	0.938	
Slope of Pipe	5.960	%
X-Sectional Area	3.061	sq. ft.
Wetted Perimeter	5.277	feet
AR^(2/3)	2.129	
Mannings 'n'	0.015	
Min. Fric. Slope, 24 inch Pipe Flowing Full	6.897	%

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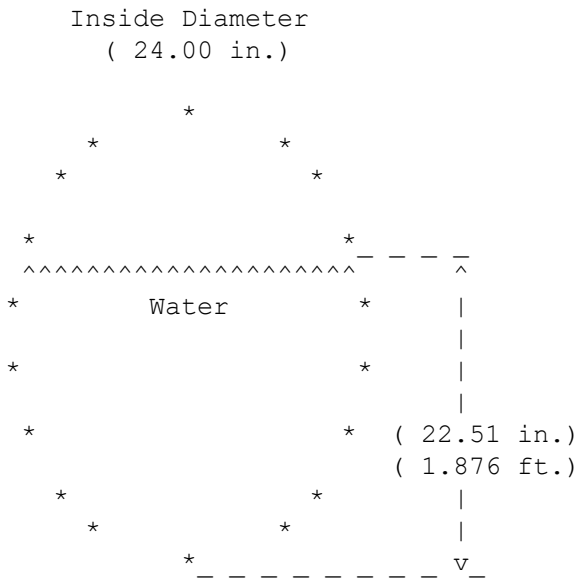
CULVERT 9



Circular Channel Section

Flowrate	38.659	CFS
Velocity	12.630	fps
Pipe Diameter	24.000	inches
Depth of Flow	22.512	inches
Depth of Flow	1.876	feet
Critical Depth	1.941	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	3.360	%
X-Sectional Area	3.061	sq. ft.
Wetted Perimeter	5.277	feet
AR^(2/3)	2.129	
Mannings 'n'	0.015	
Min. Fric. Slope, 24 inch Pipe Flowing Full	3.888	%

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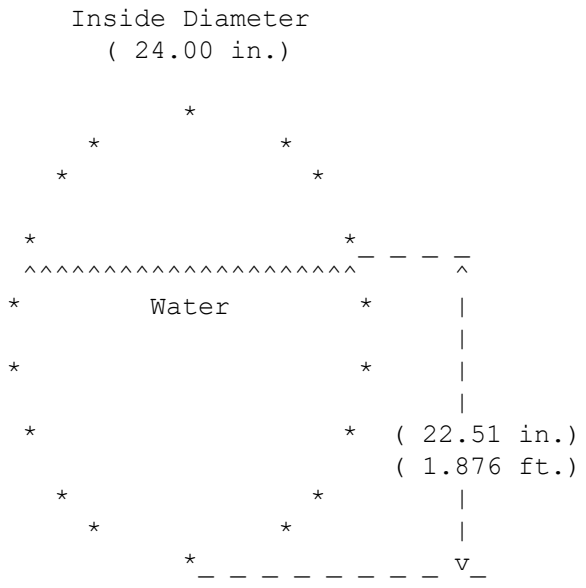
CULVERT 10



Circular Channel Section

Flowrate	77.777	CFS
Velocity	25.411	fps
Pipe Diameter	24.000	inches
Depth of Flow	22.512	inches
Depth of Flow	1.876	feet
Critical Depth	Greater than Pipe Diameter	
Depth/Diameter (D/d)	0.938	
Slope of Pipe	13.600	%
X-Sectional Area	3.061	sq. ft.
Wetted Perimeter	5.277	feet
AR^(2/3)	2.129	
Mannings 'n'	0.015	
Min. Fric. Slope, 24 inch Pipe Flowing Full	15.737	%

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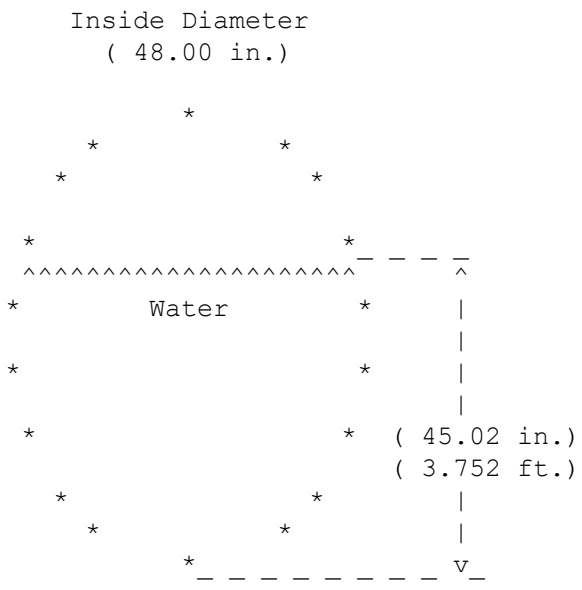
CULVERT 11



Circular Channel Section

Flowrate	79.225	CFS
Velocity	6.471	fps
Pipe Diameter	48.000	inches
Depth of Flow	45.024	inches
Depth of Flow	3.752	feet
Critical Depth	2.699	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	0.350	%
X-Sectional Area	12.243	sq. ft.
Wetted Perimeter	10.553	feet
AR^(2/3)	13.518	
Mannings 'n'	0.015	
Min. Fric. Slope, 48 inch Pipe Flowing Full	0.405	%

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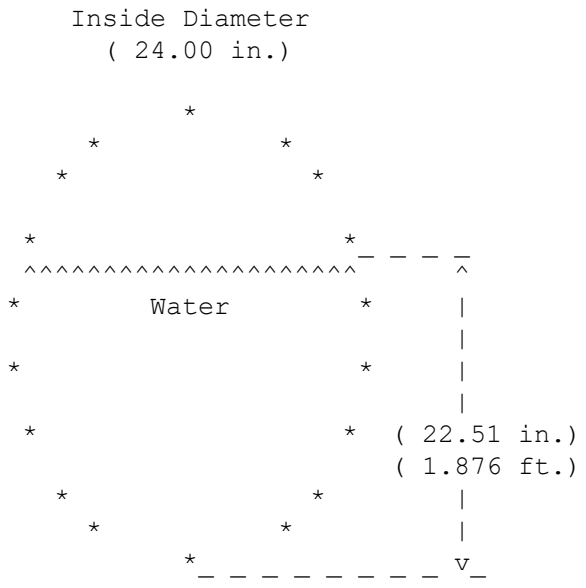
CULVERT 12



Circular Channel Section

Flowrate	54.100	CFS
Velocity	17.675	fps
Pipe Diameter	24.000	inches
Depth of Flow	22.512	inches
Depth of Flow	1.876	feet
Critical Depth	Greater than Pipe Diameter	
Depth/Diameter (D/d)	0.938	
Slope of Pipe	6.580	%
X-Sectional Area	3.061	sq. ft.
Wetted Perimeter	5.277	feet
AR^(2/3)	2.129	
Mannings 'n'	0.015	
Min. Fric. Slope, 24 inch Pipe Flowing Full	7.614	%

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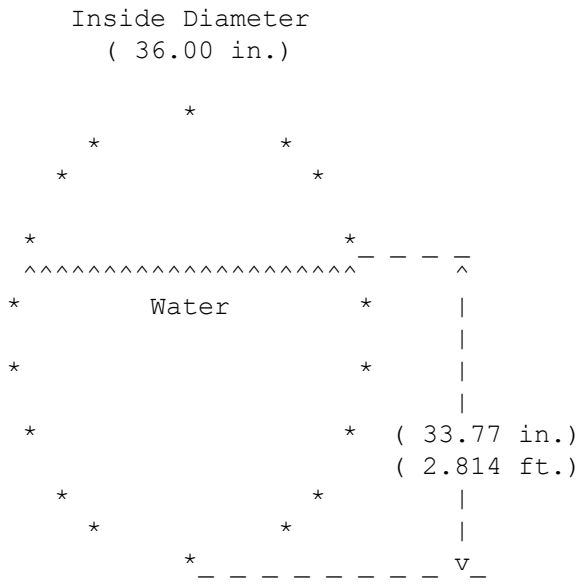
CULVERT 13



Circular Channel Section

Flowrate	138.764	CFS
Velocity	20.149	fps
Pipe Diameter	36.000	inches
Depth of Flow	33.768	inches
Depth of Flow	2.814	feet
Critical Depth	Greater than Pipe Diameter	
Depth/Diameter (D/d)	0.938	
Slope of Pipe	4.980	%
X-Sectional Area	6.887	sq. ft.
Wetted Perimeter	7.915	feet
AR^(2/3)	6.277	
Mannings 'n'	0.015	
Min. Fric. Slope, 36 inch Pipe Flowing Full	5.763	%

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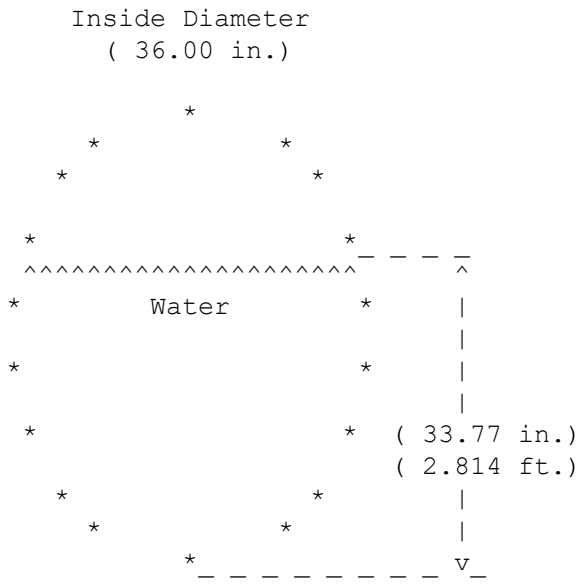
CULVERT 14



Circular Channel Section

Flowrate	118.635	CFS
Velocity	17.226	fps
Pipe Diameter	36.000	inches
Depth of Flow	33.768	inches
Depth of Flow	2.814	feet
Critical Depth	2.941	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	3.640	%
X-Sectional Area	6.887	sq. ft.
Wetted Perimeter	7.915	feet
AR^(2/3)	6.277	
Mannings 'n'	0.015	
Min. Fric. Slope, 36 inch Pipe Flowing Full	4.212	%

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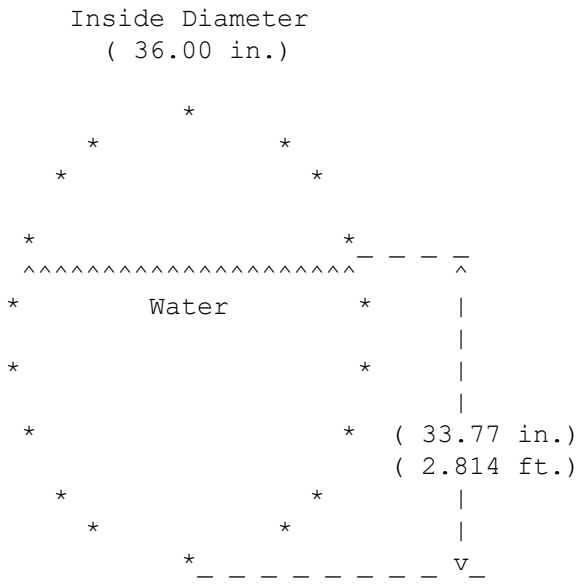
CULVERT 15



Circular Channel Section

Flowrate	119.608	CFS
Velocity	17.368	fps
Pipe Diameter	36.000	inches
Depth of Flow	33.768	inches
Depth of Flow	2.814	feet
Critical Depth	2.941	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	3.700	%
X-Sectional Area	6.887	sq. ft.
Wetted Perimeter	7.915	feet
AR^(2/3)	6.277	
Mannings 'n'	0.015	
Min. Fric. Slope, 36 inch Pipe Flowing Full	4.281	%

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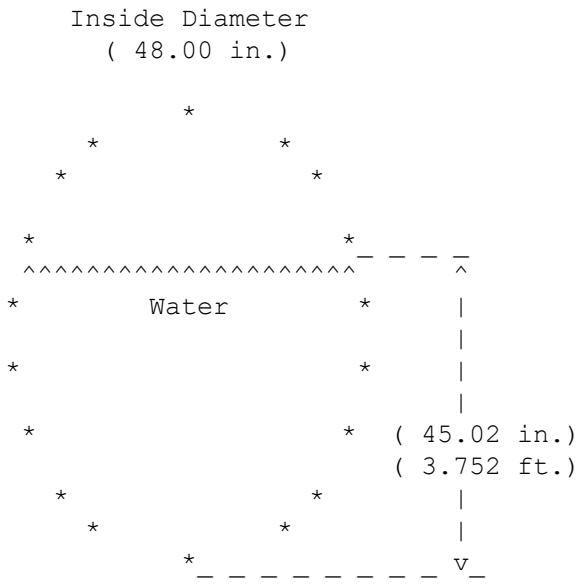
CULVERT 16



Circular Channel Section

Flowrate	238.430	CFS
Velocity	19.474	fps
Pipe Diameter	48.000	inches
Depth of Flow	45.024	inches
Depth of Flow	3.752	feet
Critical Depth	3.922	feet
Depth/Diameter (D/d)	0.938	
Slope of Pipe	3.170	%
X-Sectional Area	12.243	sq. ft.
Wetted Perimeter	10.553	feet
AR^(2/3)	13.518	
Mannings 'n'	0.015	
Min. Fric. Slope, 48 inch Pipe Flowing Full	3.668	%

Developed Unit Hydrograph.....E

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/09/20 File: AREA011100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6094

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

BEAUMONT POINTE
DEVELOPED UNIT HYDROGRAPH ANALYSIS
AREA 1
100-YEAR

Drainage Area = 70.78(Ac.) = 0.111 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 70.78(Ac.) = 0.111 Sq. Mi.
Length along longest watercourse = 2674.70(Ft.)
Length along longest watercourse measured to centroid = 1652.60(Ft.)
Length along longest watercourse = 0.507 Mi.
Length along longest watercourse measured to centroid = 0.313 Mi.
Difference in elevation = 19.30(Ft.)
Slope along watercourse = 38.0992 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.090 Hr.
Lag time = 5.37 Min.
25% of lag time = 1.34 Min.
40% of lag time = 2.15 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
70.78	0.55	39.00

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
70.78	1.56	110.42

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.551(In)
Area Averaged 100-Year Rainfall = 1.560(In)

Point rain (area averaged) = 1.560(In)
Areal adjustment factor = 99.94 %

Adjusted average point rain = 1.559(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
70.780	67.90	0.344

Total Area Entered = 70.78(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
67.9	83.7	0.201	0.344	0.139	1.000	0.139
					Sum (F) =	0.139

Area averaged mean soil loss (F) (In/Hr) = 0.139
Minimum soil loss rate ((In/Hr)) = 0.070
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.625

Slope of intensity-duration curve for a 1 hour storm =0.5300

U n i t H y d r o g r a p h
FOOTHILL S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	93.073	12.124	8.649
2	0.167	186.146	54.527	38.895
3	0.250	279.219	19.924	14.212
4	0.333	372.292	8.223	5.866
5	0.417	465.365	3.259	2.325
6	0.500	558.438	0.989	0.706
7	0.583	651.511	0.636	0.454
8	0.667	744.584	0.317	0.226
			Sum = 100.000	Sum= 71.333

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	(Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	3.40	0.636	0.139	(0.398)	0.497
2	0.17	4.70	0.879	0.139	(0.550)	0.740
3	0.25	4.70	0.879	0.139	(0.550)	0.740
4	0.33	5.10	0.954	0.139	(0.596)	0.815
5	0.42	5.80	1.085	0.139	(0.678)	0.946
6	0.50	5.90	1.104	0.139	(0.690)	0.965
7	0.58	7.10	1.328	0.139	(0.830)	1.189
8	0.67	8.70	1.628	0.139	(1.017)	1.489
9	0.75	13.20	2.469	0.139	(1.543)	2.330
10	0.83	29.70	5.556	0.139	(3.473)	5.417
11	0.92	7.70	1.441	0.139	(0.900)	1.301
12	1.00	4.00	0.748	0.139	(0.468)	0.609
		(Loss Rate Not Used)				
Sum =		100.0			Sum =	17.0

Flood volume = Effective rainfall 1.42(In)
times area 70.8(Ac.)/[(In)/(Ft.)] = 8.4(Ac.Ft)
Total soil loss = 0.14(In)
Total soil loss = 0.820(Ac.Ft)
Total rainfall = 1.56(In)
Flood volume = 364836.8 Cubic Feet
Total soil loss = 35719.0 Cubic Feet

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 Peak flow rate of this hydrograph =    268.013(CFS)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                    1 - H O U R    S T O R M
                 R u n o f f     H y d r o g r a p h
            Hydrograph in   5   Minute intervals ((CFS))
```

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	75.0	150.0	225.0	300.0
0+ 5	0.0296	4.30	Q				
0+10	0.2070	25.75	V Q				
0+15	0.4981	42.28	V Q				
0+20	0.8377	49.30	V Q				
0+25	1.2229	55.93	V Q				
0+30	1.6580	63.17	VQ				
0+35	2.1300	68.54	QV				
0+40	2.6899	81.30	Q V				
0+45	3.4058	103.95	Q V				
0+50	4.5708	169.16	VQ				
0+55	6.4167	268.01	V Q				
1+ 0	7.4606	151.58	Q V				
1+ 5	8.0201	81.24	Q V				
1+10	8.2370	31.49	Q V				
1+15	8.3185	11.82	Q V				
1+20	8.3551	5.32	Q V				
1+25	8.3706	2.25	Q V				
1+30	8.3746	0.57	Q V				
1+35	8.3755	0.14	Q V				

U n i t H y d r o g r a p h A n a l y s i s

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Study date 11/09/20 File: AREA0124100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6094

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

JACKRABBIT TRAIL
DEVELOPED UNIT HYDROGRAPH ANALYSIS
AREA 1
100-YEAR

Drainage Area = 70.78(Ac.) = 0.111 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 70.78(Ac.) = 0.111 Sq. Mi.
Length along longest watercourse = 2674.70(Ft.)
Length along longest watercourse measured to centroid = 1652.60(Ft.)
Length along longest watercourse = 0.507 Mi.
Length along longest watercourse measured to centroid = 0.313 Mi.
Difference in elevation = 19.30(Ft.)
Slope along watercourse = 38.0992 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.090 Hr.
Lag time = 5.37 Min.
25% of lag time = 1.34 Min.
40% of lag time = 2.15 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
70.78	2.54	179.78

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
70.78	6.18	437.42

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 2.540(In)
Area Averaged 100-Year Rainfall = 6.180(In)

Point rain (area averaged) = 6.180(In)
Areal adjustment factor = 99.99 %