PRIORITY PROJECT

HYDROLOGY STUDY

FOR:
Oakcrest Subdivision N. Twin Oaks Valley Rd.
APN No. 218-110-02,03; . 218-330-05,08,09,13,26,27,28

PREPARED FOR:
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Project No: 21-088

DATE PREPARED:
9/3/2025

DATE REVISED:
11/28/2025



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1.0 PROJECT DESCRIPTION

1.1 Project Purpose

The purpose of this project is to support the development plans of a 258 - lot residential subdivision located North Twin Oaks Valley Rd in the City of San Marcos. The total development area is 68.510 acres. This study will demonstrate that the post development 100-year peak flow runoff will not exceed the pre-development runoff peak flow runoff values.

1.2 Project Proposed Drainage Facilities

The project is proposing to build approximately 28.648 acres of impervious area consisting of a residential subdivision with associated driveways and utilities. The project proposes to build street which slopes at 1% to onsite biofiltration basins (BMP A, BMP B, BMP C, BMP D and BMP F).

2.0 VICINITY MAP

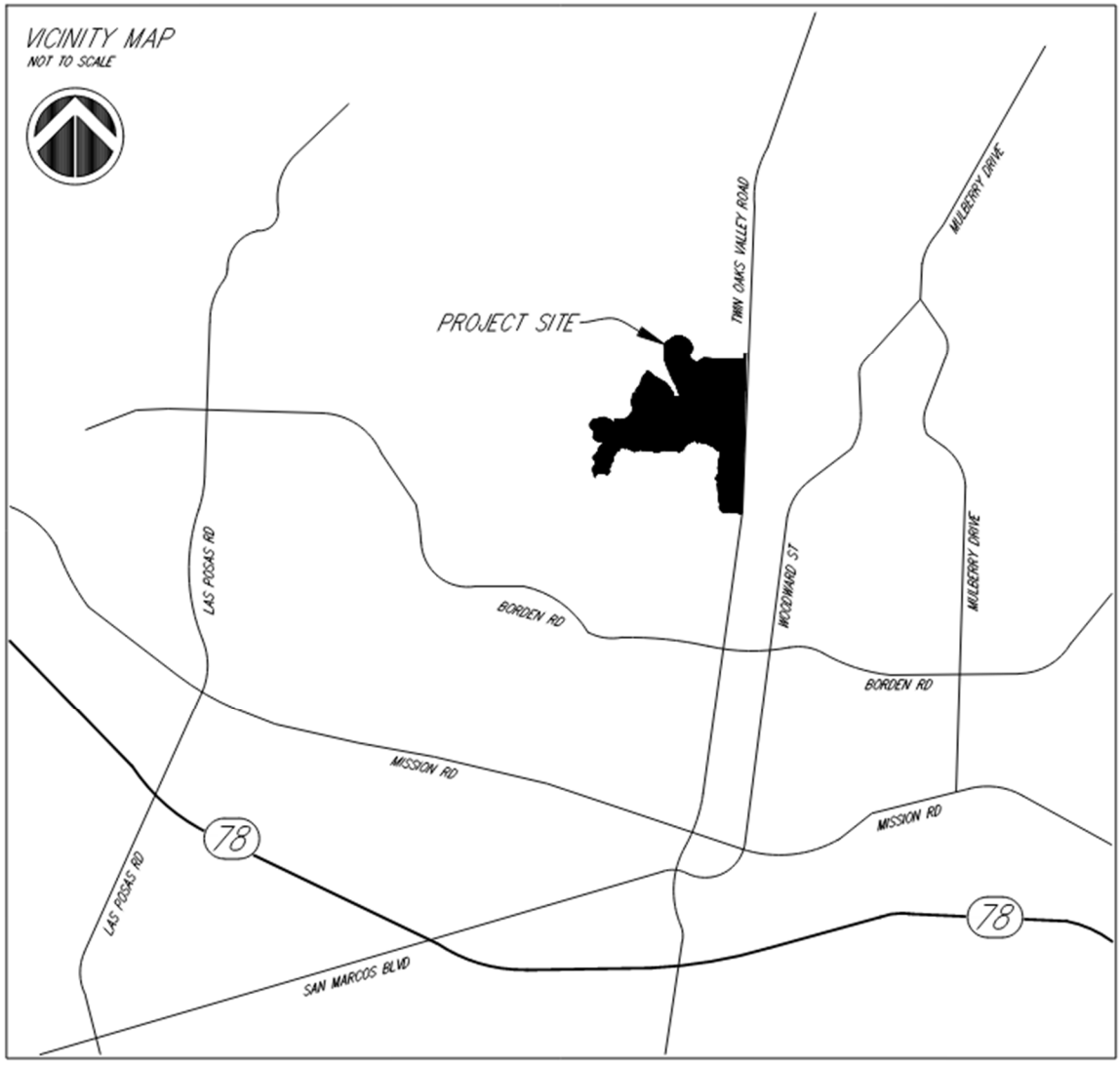


Figure 1. Project Site Map

3.0 Site Map

Please see Attachment 1 – Site Map

4.0 DESCRIPTION OF WATERSHED

4.1 Pre-Development Topography

The majority of the existing offsite surface slopes generally go from the west to the east. When the water reaches Twin Oaks Rd, it flows in two directions traveling both North and South for various POCs into existing storm drainpipes. The storm water gets discharged into upper San Marcos Creek into Lake San

Marcos to be discharged again into lower San Marcos Creek to continue to Batiquitos Lagoon with the ultimate discharge to Pacific Ocean.

The site is currently mostly undeveloped with a couple single family residences and a barn on site. The existing onsite surface slope is approximately 25% (with the offsite getting up to 50% in some areas) and runs generally from the west to the east into Twin Oaks Rd. Water runs easterly to N. Twin Valley Oaks Road. Once to the road there are 4 POCs that water discharges to. The most northern Poc being Poc 4 is on Deerbrook dr. Moving southward the existing channel along Twin Oaks Valley Rd. would contain the 3 Poc. Further south where the existing channel and the existing box culverts converge has the 2nd poc before the confluence of water. The first Poc is located behind the homes along Legacy dr in a brow ditch that discharges to N. Twin Oaks Valley Rd.

According to the Web Soil Survey, the entire existing site consist of Soil Type A, C, and D.

The land use of the existing **offsite** area was estimated based on the City of San Marcos Land Use Plan. The runoff coefficient C of the offsite area is calculated using weighted average value. The land use of the existing **onsite** area was estimated based on the aerial photography and detailed aerial topographic mapping, and the value of the undisturbed natural terrain is used in the pre-development onsite runoff calculations.

A pre-developed drainage map can be found as Attachment 7 in this report.

4.2 Post-Development Topography

The project proposes to build a residential subdivision that will receive water through the existing surface slopes. The proposed streets will slope into biofiltration basins (BMP A, B, C, D, E,F, G,H, and I) that will discharge back into Twin Oaks Road into the existing drainage system.

Offsite runoff will be collected in browditches and then be collected in culverts to be conveyed through the site to the respected Pocs. Onsite water will be runoff water and then be collected in pipes or sheet flow straight to basins for cleaning due to water quality then to a proposed pipe network that will confluence with offsite water and discharge to the respected Pocs.

According to the Web Soil Survey, the entire proposed project site is composed of type D soil. The land use of the post development condition includes Undisturbed Natural Terrain, High Density Residential 43.0 DU/A or less, and Medium Density Residential 14.5 DU/A or less. Values of runoff coefficient C related to these land use types were used in the post-development runoff calculations.
A post-developed drainage map can be found as Attachment 5 in this report.

4.3 Hydrologic Unit Contribution

The project is located in the upper San Marcos Creek watershed boundary in the Richland Hydrologic Sub Area of the San Marcos Hydrologic Area of the Carlsbad Hydrologic Unit (904.52).

Please find the watershed map as Attachment 3 in this report.

5.0 METHODOLOGY

This report is prepared in accordance with the 2003 San Diego County Hydrology Manual. Based on the overall tributary study area, calculations area on the Rational Method.

5.1 Hydrology Software

The "Rational Hydrology Method, San Diego County (2003 Manual)" module of the CIVILCADD/CIVIL DESIGN Engineering software version 7.4 is used in this study. Referred to as CivilD within this report, this software was also used to develop hydrographs from the rational method results. This procedure also complies with the 2003 San Diego Hydrology Manual as presented in Section 6.

5.2 Routing Software

HEC HMS Version 4.12 Build 99568 which is used for hydrologic routing of the entire project site. the hydrograph developed from the rational method is then manually entered into this software and routed into each detention pipe. The hydrograph report can be found in Attachment 8 in this report.

5.3 Soil Type Determination

The soil type for the proposed project was determined by mapping the project limits on the EPA Web Soil Survey website. The Web Soil Survey indicates that the entire site is composed 3 soil types, A, C and D. The soil report and soil index map can be found in Attachment 3 in this report.

5.4 Isopluvial Value Determination

The isopluvial values for the 100-year 6 hour and 24 hour storm events were determined by plotting the projects location on the respective exhibits from Appendix B of the Hydrology Manual. The rainfall isopluvial maps can be found in Attachment 3 in this report.

5.5 Conjunctive Use Considerations

Since BMP- D is being used to handle peak flows and Water Quality, conjunctive use as described by the County of San Diego Conjunctive Use Handout (January

2020) must be considered. For this site, the peak flow storage pond built in Hydraflow Hydrographs does not account for the first 9 inches of water quality ponding that accounts for the water up to the lowest surface outlet. An additional 6 inches is shown to be required for adequate storage space for water quality ponding and hydrology storage. When using a Biofiltration Basin for Conjunctive use, it is required that there be 1 foot of freeboard above the maximum depth achieved by the peak flows. The proposed design leaves 12 inches of freeboard in addition to the detained water storage needed for mitigation and 9 inches of water quality ponding.

6.0 CALCULATIONS

6.1 Determine the Watershed that affects the project

To ensure that the proposed project **onsite area** will not have a negative impact to the downstream facilities, the project design checks that the peak flow and velocity from the 100-year storm and make sure they are identical or less when comparing the Post Development conditions to the Pre Development conditions.

6.2 Calculate Runoff Coefficient

The proposed project and offsite runoff area lie primarily within hydraulic soil group D. Relevant soil properties are assigned according to this designation unless stated otherwise below. The runoff coefficient C is based on the land use for this project.

For both pre- and post- development **offsite** area, the runoff coefficient C value is estimated based on the City of San Marcos Land Use Plan. This was done closely match the City of San Marcos General Plan Land Use Map. The runoff coefficient C of the offsite area is calculated using the weighted average value.

For the pre-development **onsite** area, the site is an existing undeveloped area and not graded, therefore, the value of the undisturbed natural terrain is used in the pre-development onsite runoff calculations.

For the post-development **onsite** area, the land use condition includes Undisturbed Natural Terrain, Medium Density Residential, High Density Residential 43.0 DU/A or less, and Medium Density Residential 14.5 DU/A or less. Values of runoff coefficient C related to these land use types were used in the post-development runoff calculations.
The runoff coefficients for each of the drainage areas are taken from Table 3-1 of the Hydrology Manual. Table 3-1 is included in the CIVILD software, and the values chosen based on the program input parameters. The output file was checked to ensure that the correct C values are used.

In order to not have a negative impact on the post development downstream facilities, detention structure is needed in this project. Detention faculities will consist of a detention basin, biofiltration basins and the risers and orifices in the

riser structure. We are using the resulting outflow hydrograph to recalculate the runoff coefficient C based on the fix values of the outflow hydrograph to achieve a C_{out}. The detailed description and calculation of the C_{out} value can be found in Attachment 8 in this report.

Please find the City of San Marcos Land Use Plan in Attachment 7 in this report.

6.3 Manning Roughness Coefficient

Manning Roughness Coefficients are taken from Table A-1, Average Manning Roughness Coefficients for Pavement and Gutters, Table A-2, Average Manning Roughness Coefficients for Closed Conduits, and Table A-5, Average Manning Roughness Coefficients for Natural Channels. Values of 0.015 for concrete gutter, 0.013 for PVC pipe, and 0.03 for fairly regular section natural channels are used in the hydrology calculations. Table of Manning's n value can be found in Attachment 2 in this report.

6.4 Calculate Storm Flows using the Rational Method

The Rational Method (RM) is used to determine the maximum runoff rate from the 100-year storm event. The RM application is highly effective in urban and rural watersheds for the design of storm drains and small drainage structures. Application of the rational method is based on a simple formula that relates runoff producing potential of the watershed drainage area (A), runoff coefficient (C) rainfall intensity (I) for a particular length of time (T_c), which is the time required for water to flow from the most remote point of the basin to the location being analyzed. Thus, the following equation is used:

$Q = CIA$

Where:

Q = peak discharge, in cubic feet per second (cfs)
C = runoff coefficient I = average rainfall intensity for a duration equal to Tc
T_c = time of concentration (note: if the computed Tc is less than 5 minutes, then use 5 minutes for computing the peak discharge, Q)
A = Drainage area contributing to the design location, in acres

The peak runoff calculations for the 100-year storm are performed using the CIVILD software. A summary of the initial calculations is summarized in the table below:

Pre					
	Q	TC	A	I	C
Poc-1	46.81	10.1	21.2	5.691996	0.387916
Poc-2	324.266	15.12	193.858	4.387741	0.381221
Poc-3	244.668	10.86	91.601	5.431773	0.49174
Poc-4	16.023	6.68	7.185	7.431407	0.300086
Post					
	Q	TC	A	I	C
Poc-1	48.589	10.201	16.826	5.655582	0.510599
Poc-2	396.33	11.74	200.62	5.165542	0.382443
Poc-3	207.488	13.6	90.627	4.698068	0.487322
Poc-4	14.208	6.69	5.895	7.42424	0.324636
Postmit					
	Q	TC	A	I	C
Poc-1	34.882	10.83	16.826	5.441473	0.380982
Poc-2	315.703	10.06	200.62	5.706583	0.275758
Poc-3	165.704	16.704	90.639	4.114648	0.444309

Table 1. Q100 Onsite Analysis Results

The offsite tributary area flows from the existing housing development to the north were provided by the City of San Marcos some assumptions had to be made to backwards calculate an area and tc to use in the program. A tc was chosen that would not interfere with the current development then from the intensity equation and Q=CIA an area was calculated for the given Q. The flows for POC-1 and POC-2 in the post development condition are larger than those in the predevelopment condition. For POC-1 Detention will take place in BMP-D and for POC-2 there are two locations for detention of which only one is being used at node 3003. This basin is not a treatment facility and thus does not have media. All flows were reduced either through longer flow paths or detention. The offsite for POC2 has offsite water that controls from the Southwest and West; but only had the ability to offset tc in the 3000 series of nodes. This short detention reduced the amount of Q which can be seen in the confluence calculations at node 2004. All flows were reduced as per required by hydrology manual to be below predevelopment flows.

CIVILD data and output files can be found in Attachment 6 of this report.

By observation of the results in the summary table, the proposed development of the site will have an overall decrease in the 100-year peak flow discharge from the site.

7.0 CONCLUSION

Based on the results of this report the project does not increase the 100-year peak flow rate. The mitigated stormwater discharge from the site is lower than those of the Pre-development. The project meets the County of San Diego standards for peak flow control and therefore we can conclude that this project will not impact the existing downstream storm drainage facilities.

8.0 REFERENCES

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

9.0 DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the engineer of work for this project. That I have exercised responsible charge over the design of the project as defined in section 6703 of the business and professions codes, and that the design is consistent with current design.

I understand that the check of the project drawings and specifications by the City of San Marcos is confined to a review only and does not relieve me, as engineer of work, of my responsibilities for project design.



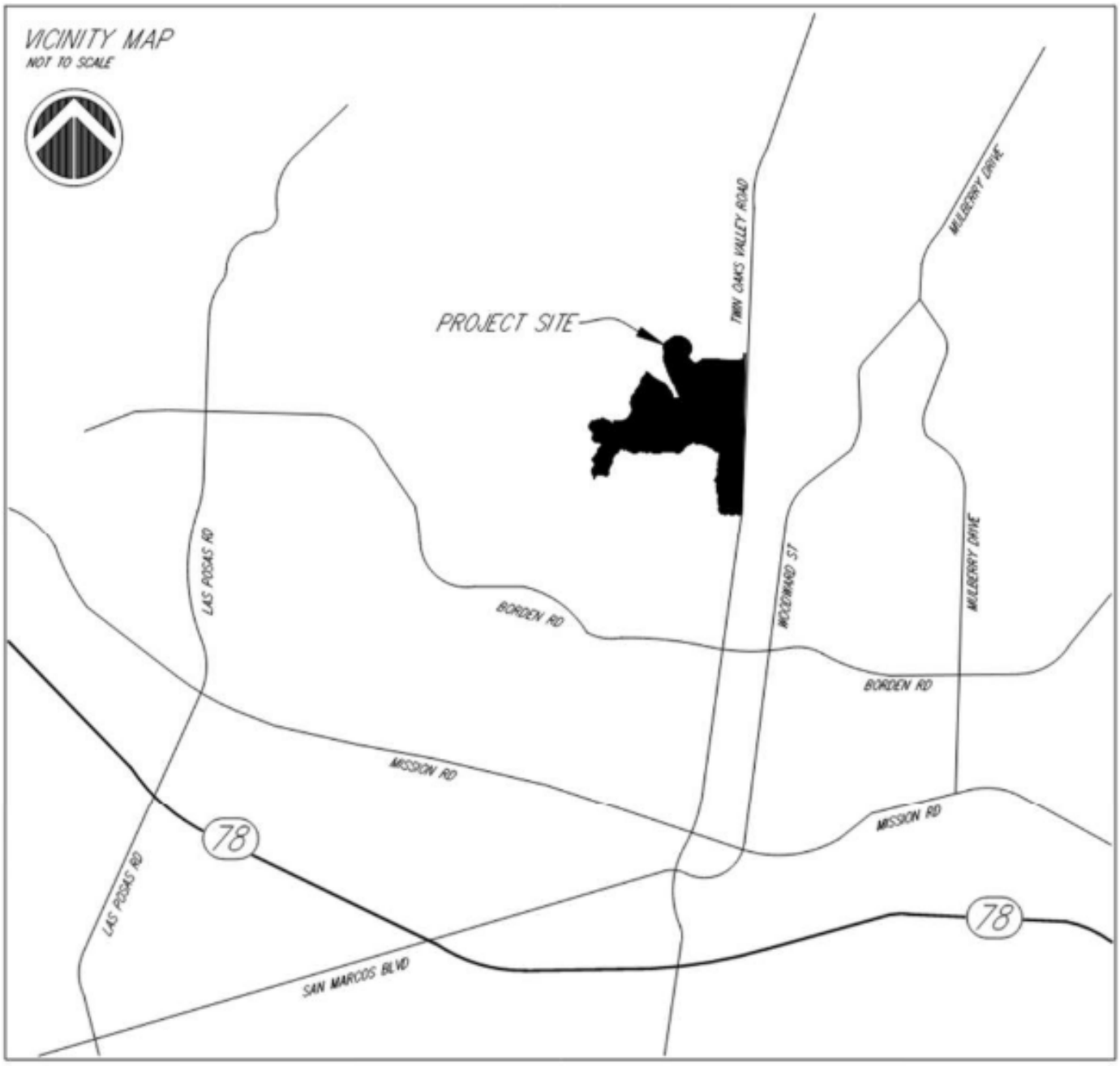
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Robert D. Dentino, RCE 45629
Registration Expire: December 31, 2026

11/28/2025
Date

ATTACHMENT 1 - SITE MAP


VICINITY MAP
NOT TO SCALE
PROJECT SITE
TWIN OAKS VALLEY ROAD
MULBERRY DRIVE
LAS POSAS RD
BORDEN RD
WOODWARD ST
MULBERRY DRIVE
BORDEN RD
MISSION RD
MISSION RD
78
LAS POSAS RD
78
SAN MARCOS BLVD

ATTACHMENT 2 - FIGURES & TABLES

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

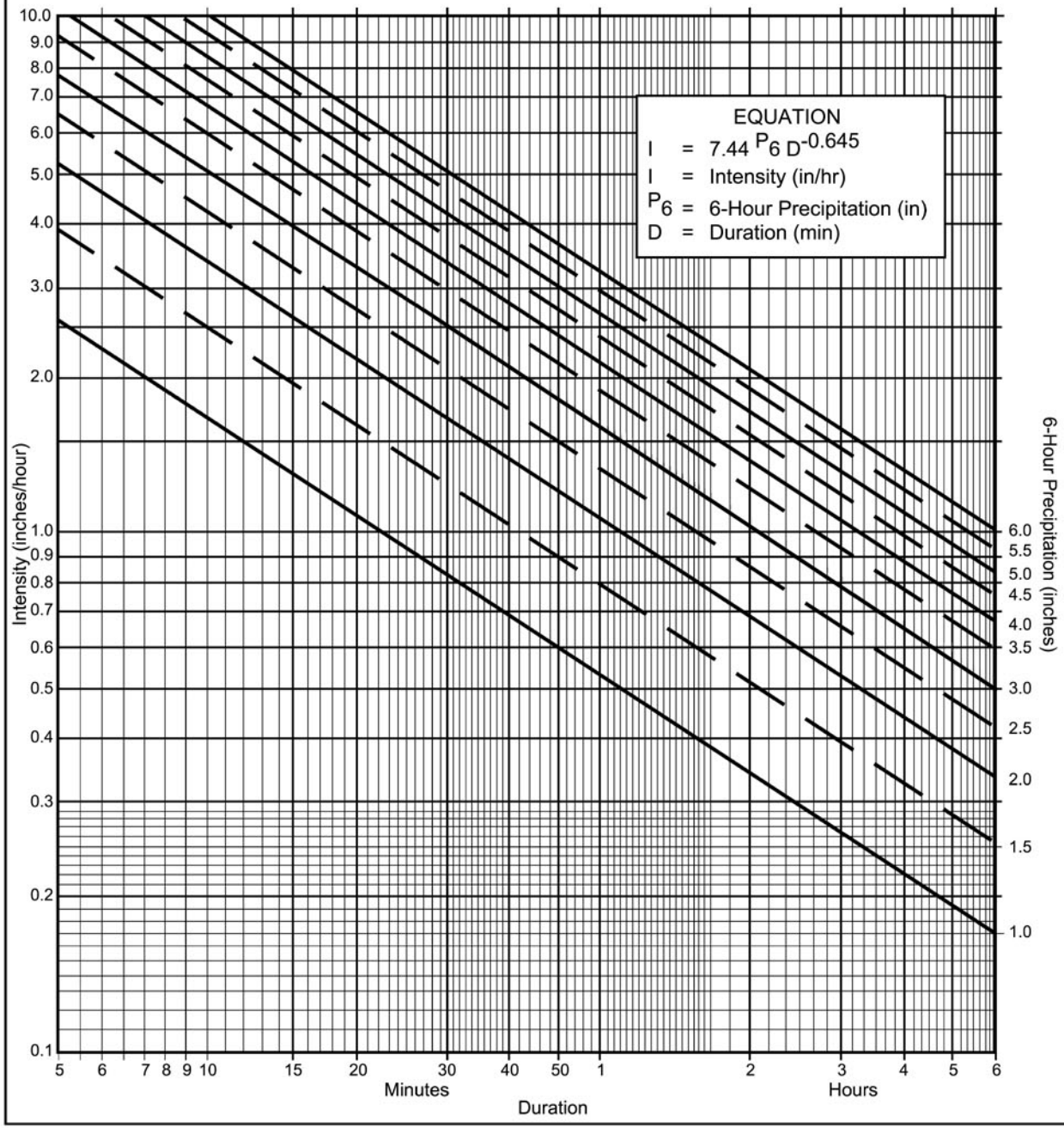
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 3.4 in., P_{24} = 6 , $\frac{P_6}{P_{24}}$ = 58.3 %(2)

(c) Adjusted P_6(2) = n/a in.

(d) t_x = varies min.

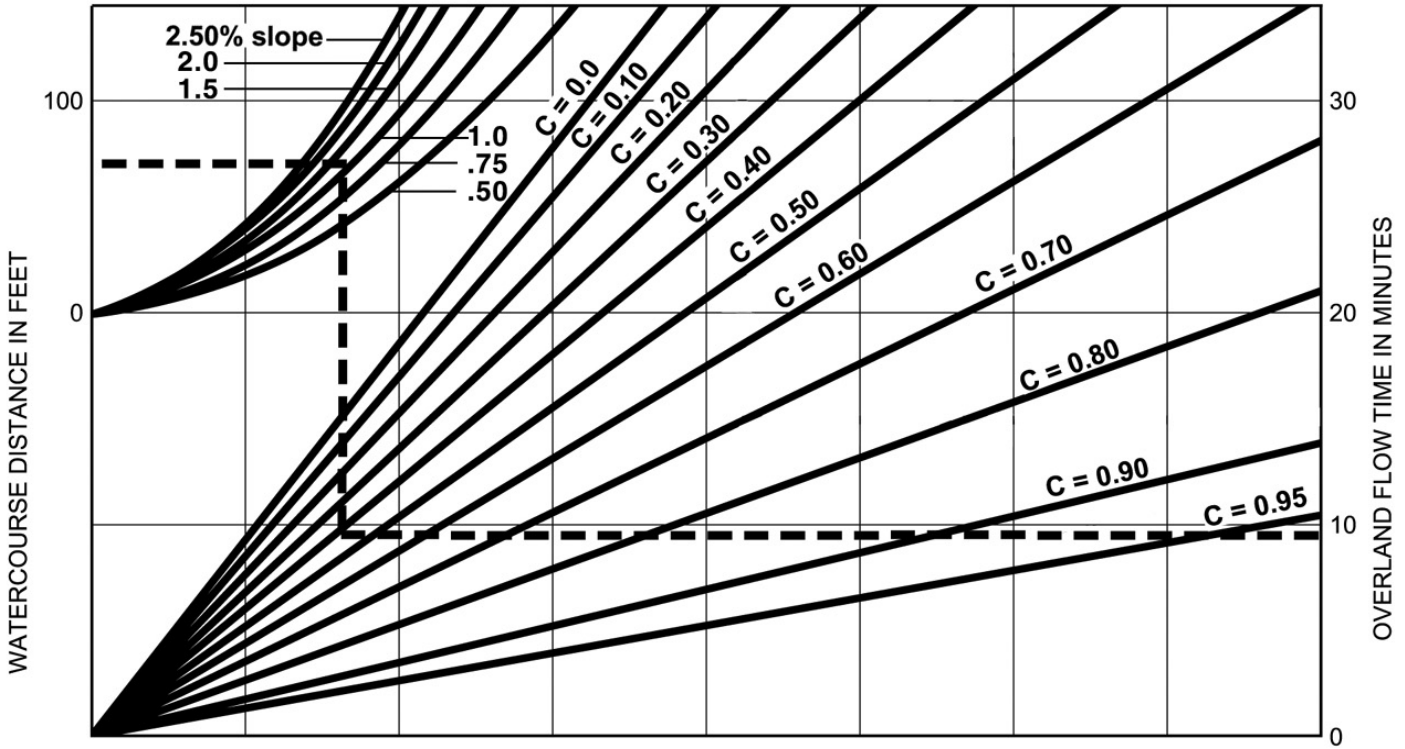
(e) I = varies in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1



EXAMPLE:

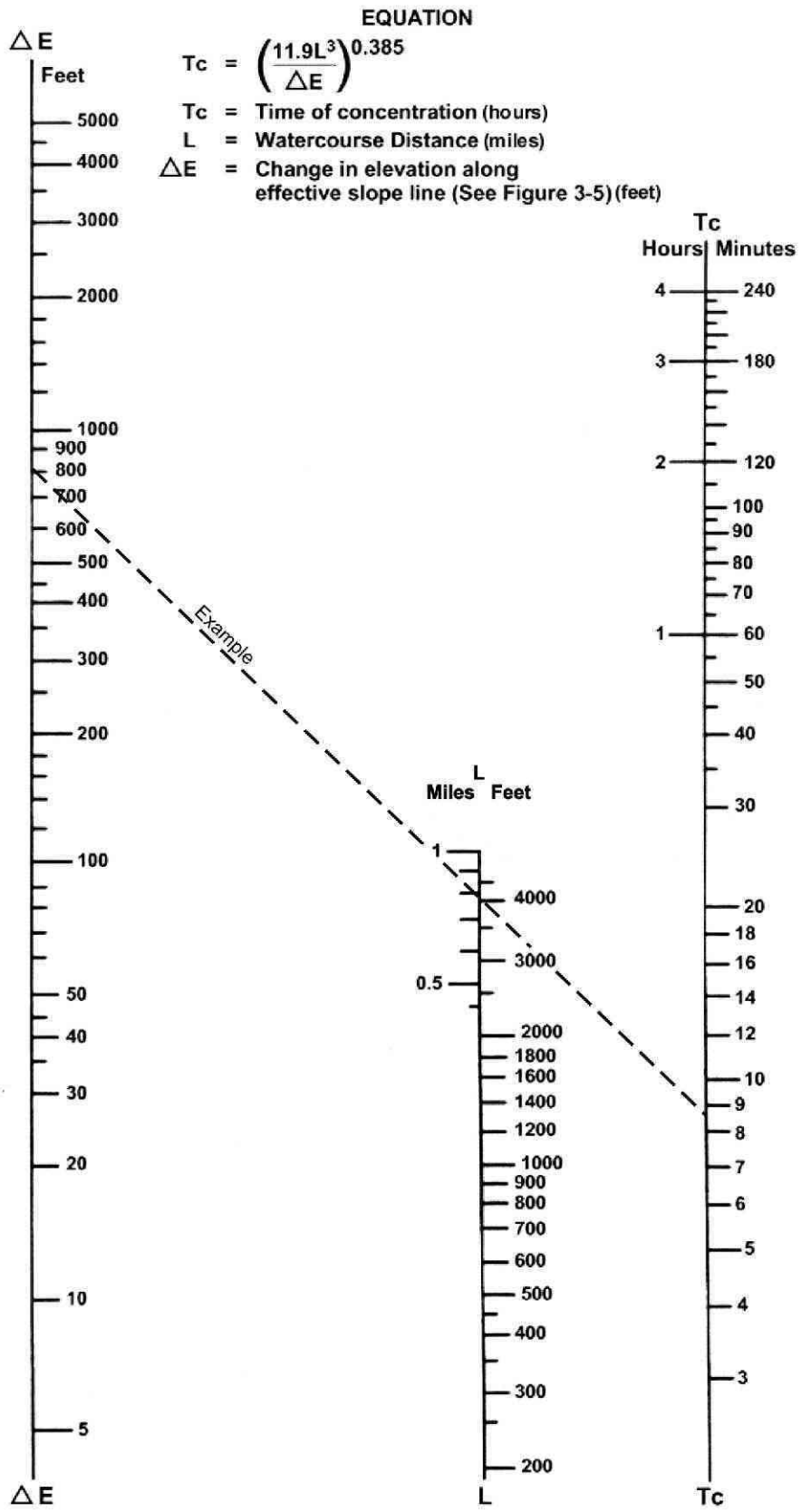
Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1\text{-}C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE 3-3

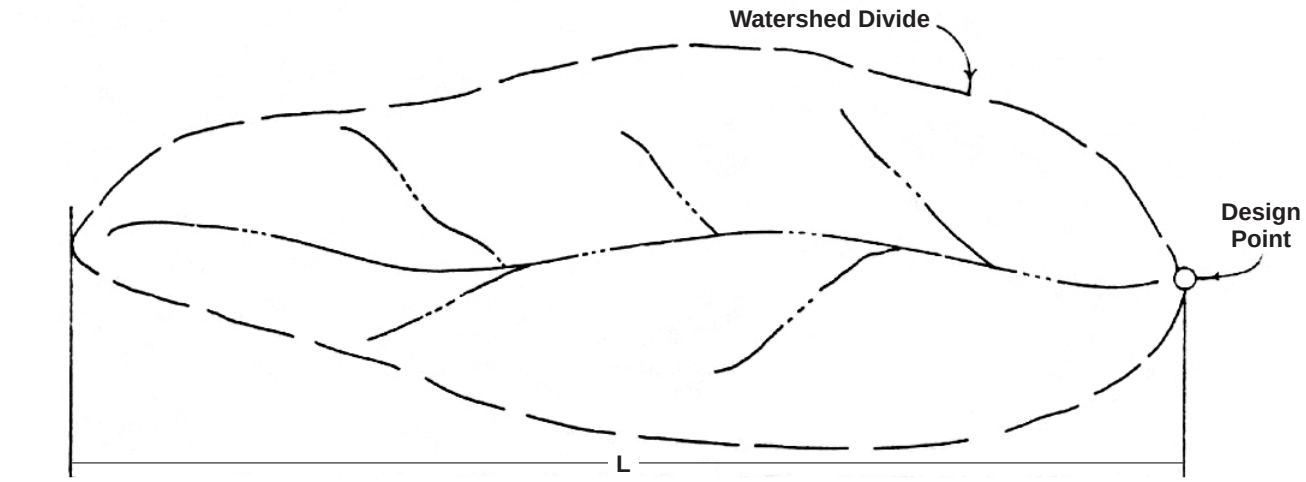
Rational Formula - Overland Time of Flow Nomograph

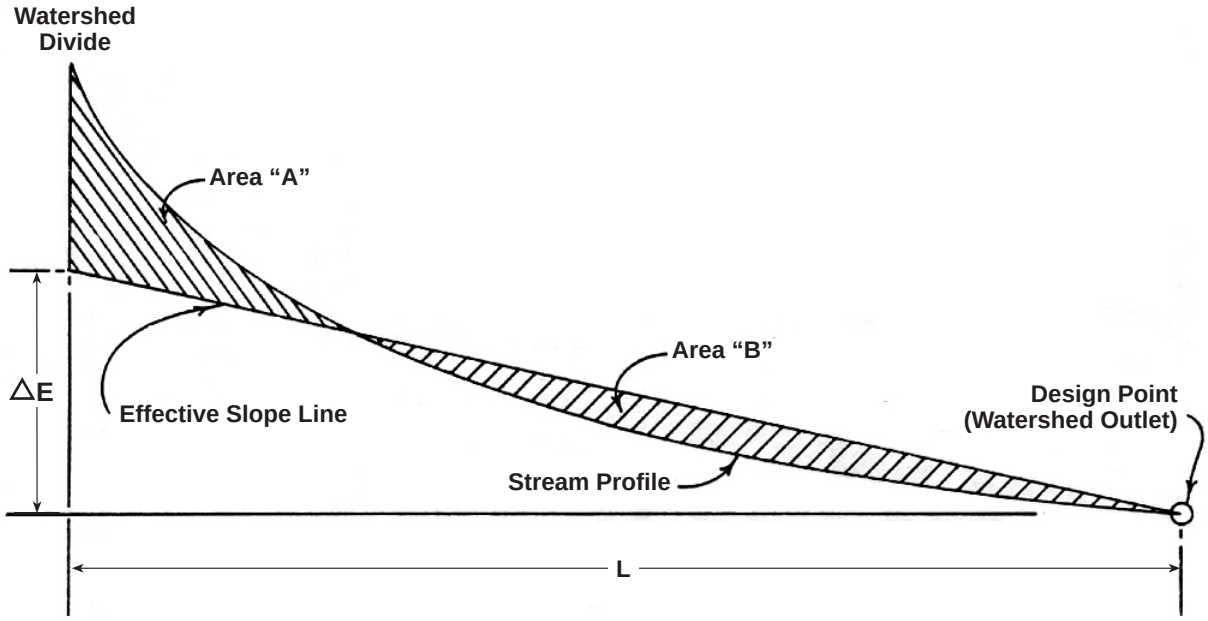


SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE 3-4

Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds





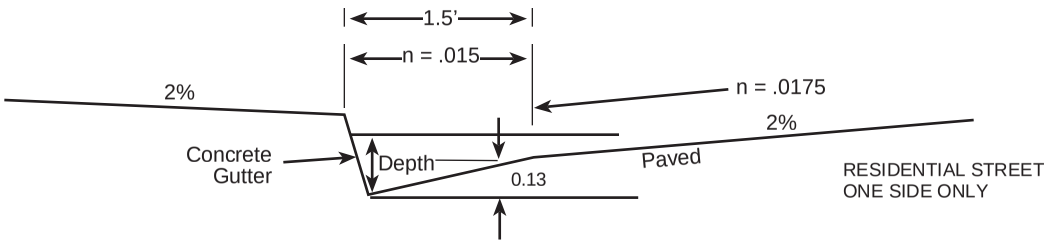
Area "A" = Area "B"

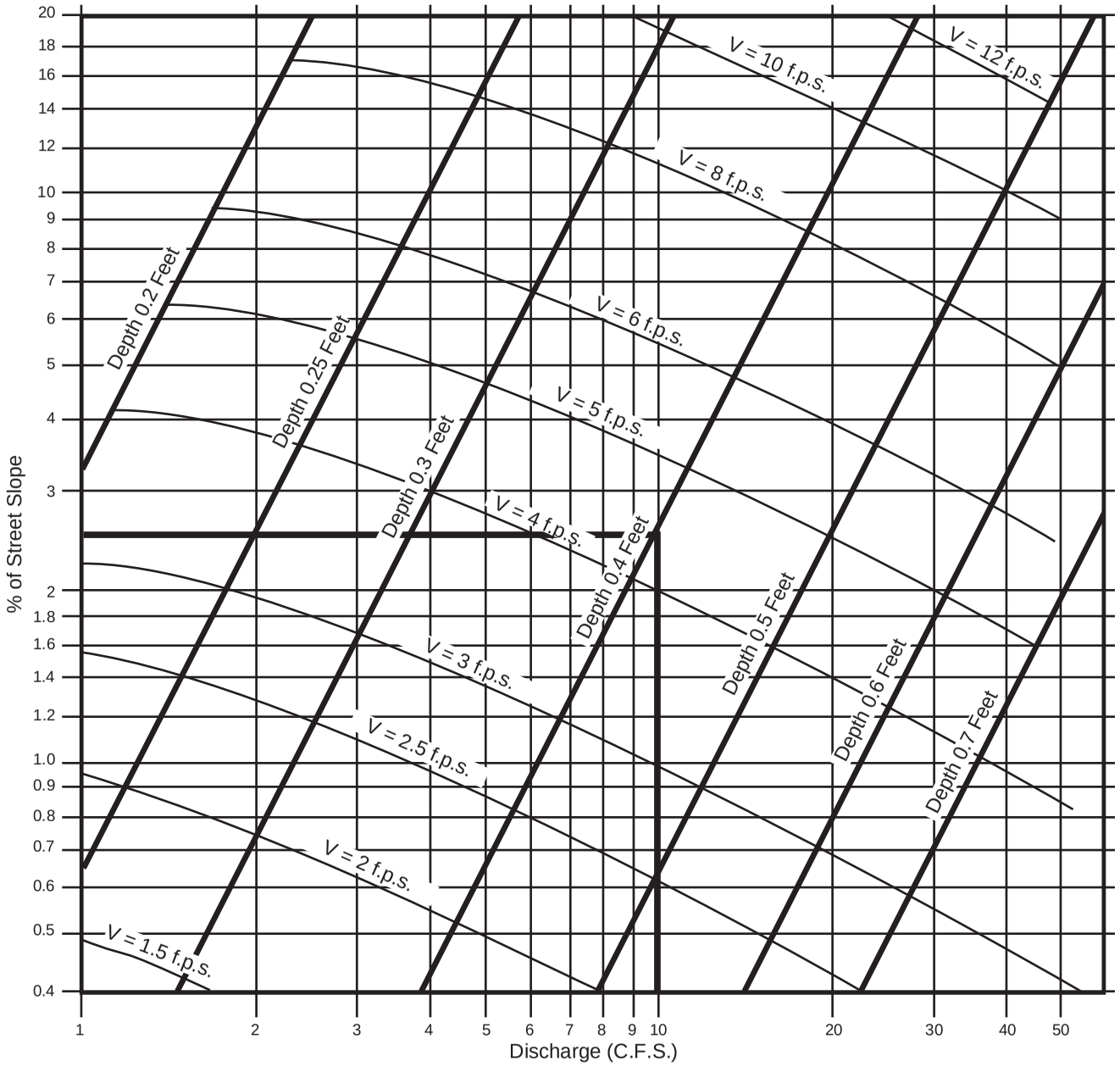
SOURCE: California Division of Highways (1941) and Kirpich (1940)

F I G U R E

3-5

Computation of Effective Slope for Natural Watersheds





EXAMPLE:
Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

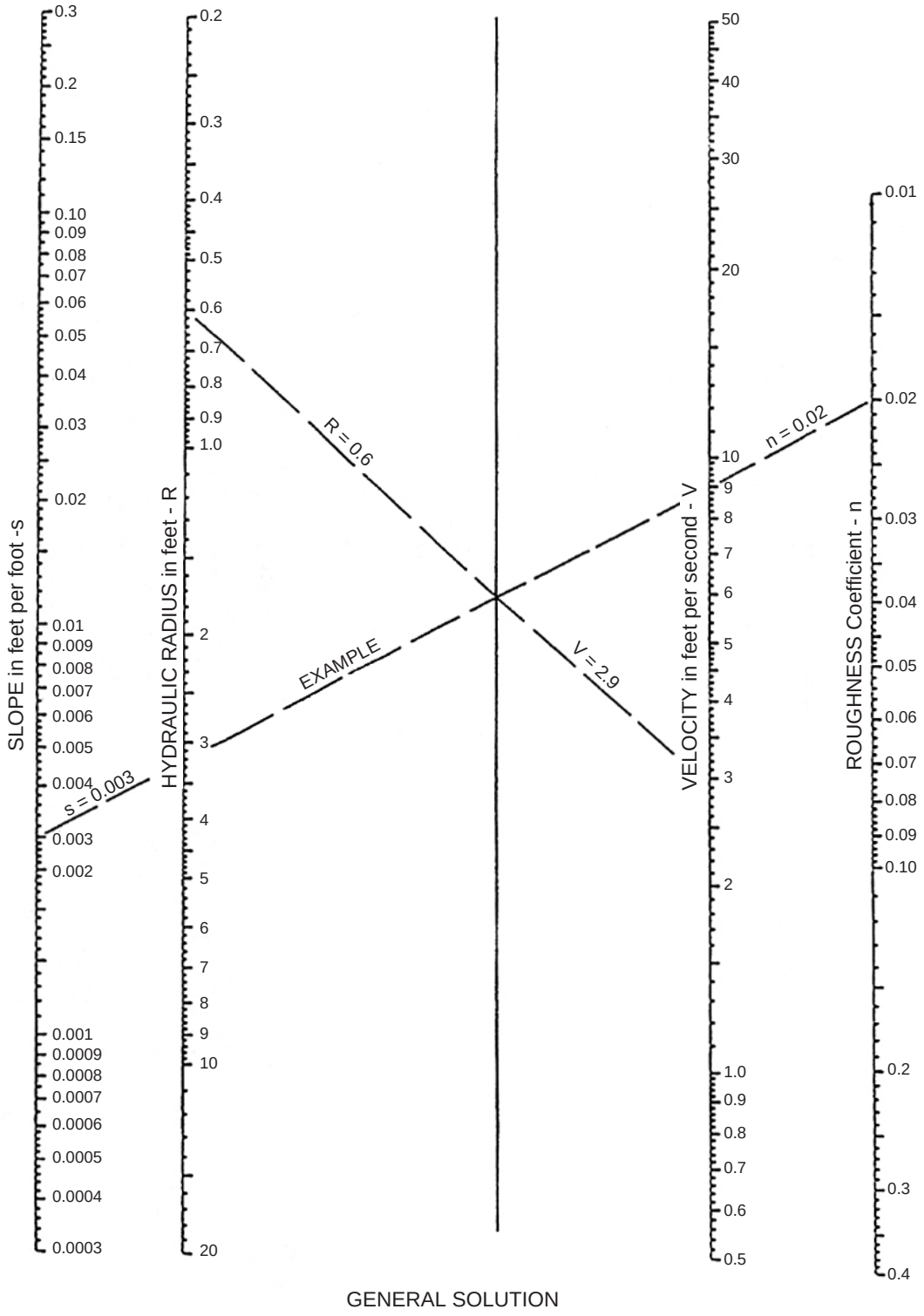
SOURCE: San Diego County Department of Special District Services Design Manual

F I G U R E

Gutter and Roadway Discharge - Velocity Chart

3-6

EQUATION: $V = \frac{1.49}{n} R^{2/3} s^{1/2}$



SOURCE: USDOT, FHWA, HDS-3 (1961)

FIGURE 3-7

Manning's Equation Nomograph

Table A-1 Average Manning Roughness Coefficients for Pavement and Gutters[1]

Concrete Gutter[2]	0.015
Concrete Pavement	
Float Finish	0.014
Broom Finish	0.016
Concrete Gutter with Asphalt Pavement	
Smooth Finish	0.013
Rough Texture	0.015
Asphalt Pavement	
Smooth Finish	0.013
Rough Texture	0.016

Based on FHWA HEC-22.

[1] Based on materials and workmanship required by standard specifications.
[2] Increase roughness coefficient in gutters with mild slopes where sediment might accumulate by 0.020.

Table A-2 Average Manning Roughness Coefficients for Closed Conduits[3]

Reinforced Concrete Pipe (RCP)	0.013
Corrugated Metal Pipe and Pipe Arch	
2-3/8 x 1/2 inch Corrugations	
Unlined	0.024
Half Lined	
Full Flow	0.018
d/D>=0.60	0.016
d/D<0.60	0.013
Fully Lined	0.013
3 x 1 inch Corrugations	0.027
6 x 2 inch Corrugations	0.032
Spiral Rib Pipe	0.013
Helically Wound Pipe	
18-inch	0.015
24-inch	0.017
30-inch	0.019
36-inch	0.021
42-inch	0.022
48-inch	0.023
Plastic Pipe (HPDE and PVC)	
Smooth	0.013
Corrugated	0.024
Vitrified Clay Pipe	0.014
Cast-Iron Pipe (Uncoated)	0.013
Steel Pipe	0.011
Brick	0.017
Cast-In-Place Concrete Pipe	
Rough Wood Forms	0.017
Smooth Wood or Steel Forms	0.014

[3] Based on materials and workmanship required by standard specifications.

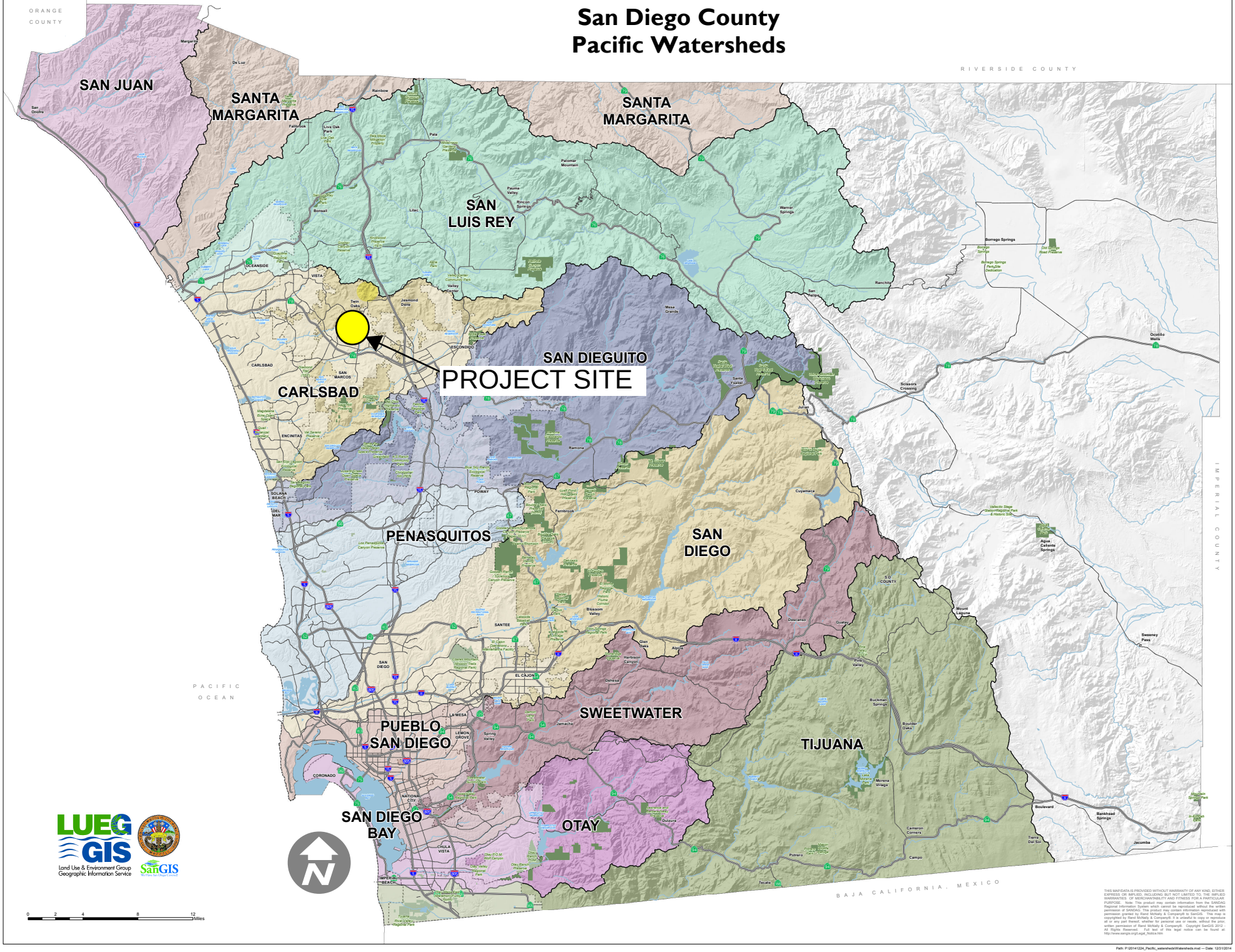
Table A-5 Average Manning Roughness Coefficients for Natural Channels

Minor Streams (Surface Width at Flood Stage < 100 ft)	
Fairly Regular Section	
(A) Some Grass and Weeds, Little or No Brush	0.030
(B) Dense Growth of Weeds, Depth of Flow Materially Greater Than Weed Height	0.040
(C) Some Weeds, Light Brush on Banks	0.040
(D) Some Weeds, Heavy Brush on Banks	0.060
(E) For Trees within Channel with Branches Submerged at High Stage, Increase All Above Values By	0.015
Irregular Section, with Pools, Slight Channel Meander	
Channels (A) to (E) Above, Increase All Values By	0.015
Mountain Streams; No Vegetation in Channel, Banks Usually Steep, Trees and Brush along Banks Submerged at High Stage	
(A) Bottom, Gravel, Cobbles and Few Boulders	0.050
(B) Bottom, Cobbles with Large Boulders	0.060
Flood Plains (Adjacent To Natural Streams)	
Pasture, No Brush	
(A) Short Grass	0.030
(B) High Grass	0.040
Cultivated Areas	
(A) No Crop	0.040
(B) Mature Row Crops	0.040
(C) Mature Field Crops	0.050
Heavy Weeds, Scattered Brush	0.050
Light Brush and Trees	0.060
Medium To Dense Brush	0.090
Dense Willows	0.170
Cleared Land with Tree Stumps, 100-150 Per Acre	0.060
Heavy Stand of Timber, Little Undergrowth	
(A) Flood Depth below Branches	0.110
(B) Flood Depth Reaches Branches	0.140

ATTACHMENT 3 - WATERSHED INFORMATION

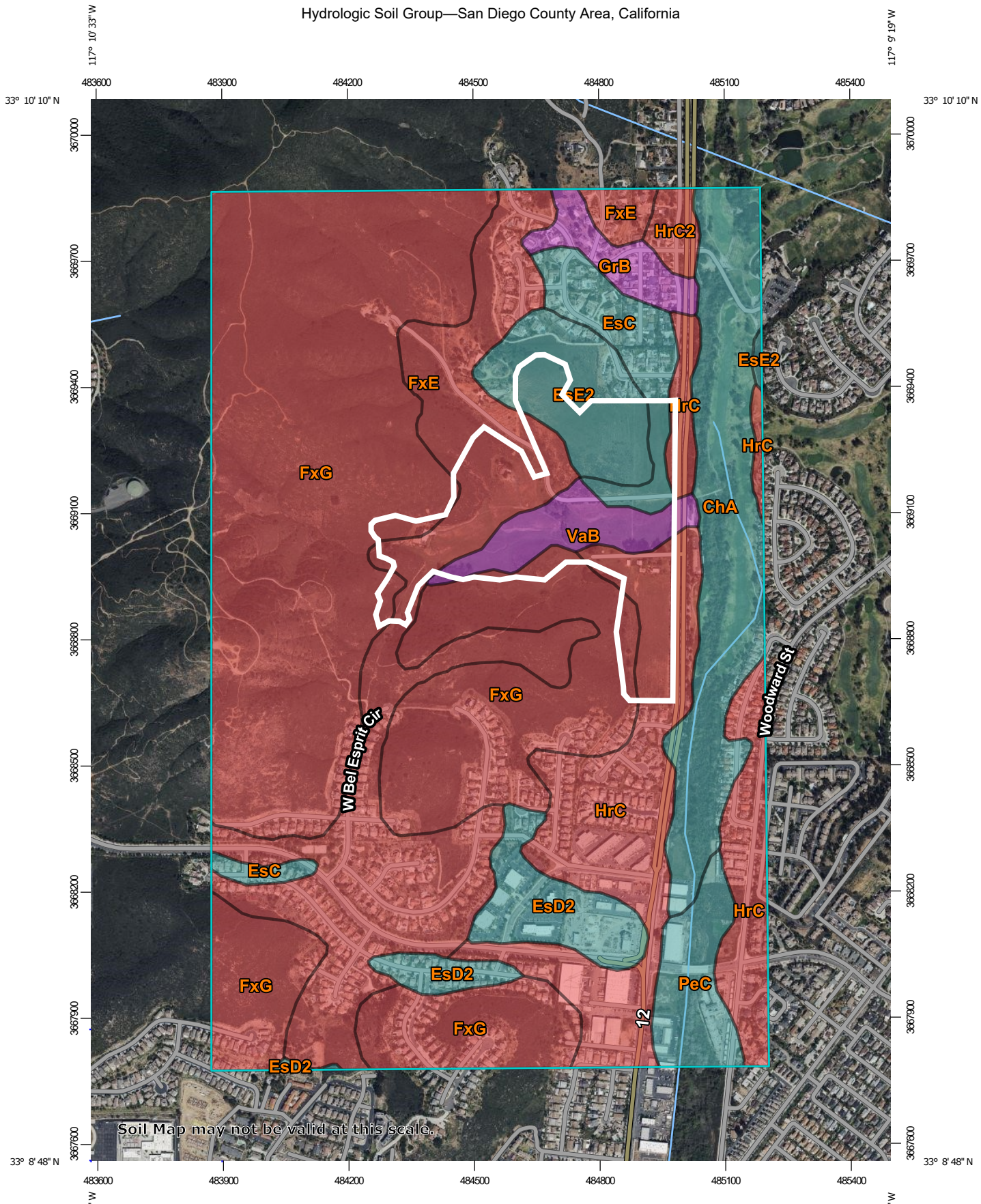
Watershed Map
Soils Index Map
Point Rainfall Isopluvial maps

San Diego County
Pacific Watersheds



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Path: P:\20141224_Pacific_watersheds\Watersheds.mxd — Date: 12/31/2014


117° 10' 33" W
117° 9' 19" W
33° 10' 10" N
33° 8' 48" N
483600
483900
484200
484500
484800
485100
485400
3670000
3669700
3669400
3669100
3668800
3668500
3668200
3667900
3667600
FxE
HrC2
GrB
EsC
EsE2
FxG
ChA
VaB
HrC
W Bel Esprit Cir
Woodward St
EsD2
PeC
12
Soil Map may not be valid at this scale.
Map Scale: 1:12,300 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 150 300 600 900
Feet
0 500 1000 2000 3000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 19, Aug 30, 2023

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ChA	Chino fine sandy loam, 0 to 2 percent slopes	C	59.1	8.6%
EsC	Escondido very fine sandy loam, 5 to 9 percent slopes	C	21.8	3.2%
EsD2	Escondido very fine sandy loam, 9 to 15 percent slopes, eroded	C	24.9	3.6%
EsE2	Escondido very fine sandy loam, 15 to 30 percent slopes , eroded	C	26.6	3.9%
FxE	Friant rocky fine sandy loam, 9 to 30 percent slopes	D	122.0	17.8%
FxG	Friant rocky fine sandy loam, 30 to 70 percent slopes	D	288.7	42.1%
GrB	Greenfield sandy loam, 2 to 5 percent slopes	A	10.7	1.6%
HrC	Huerhuero loam, 2 to 9 percent slopes	D	93.2	13.6%
HrC2	Huerhuero loam, 5 to 9 percent slopes, eroded	D	5.2	0.8%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	C	17.5	2.6%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	15.2	2.2%
Totals for Area of Interest			**685.1**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

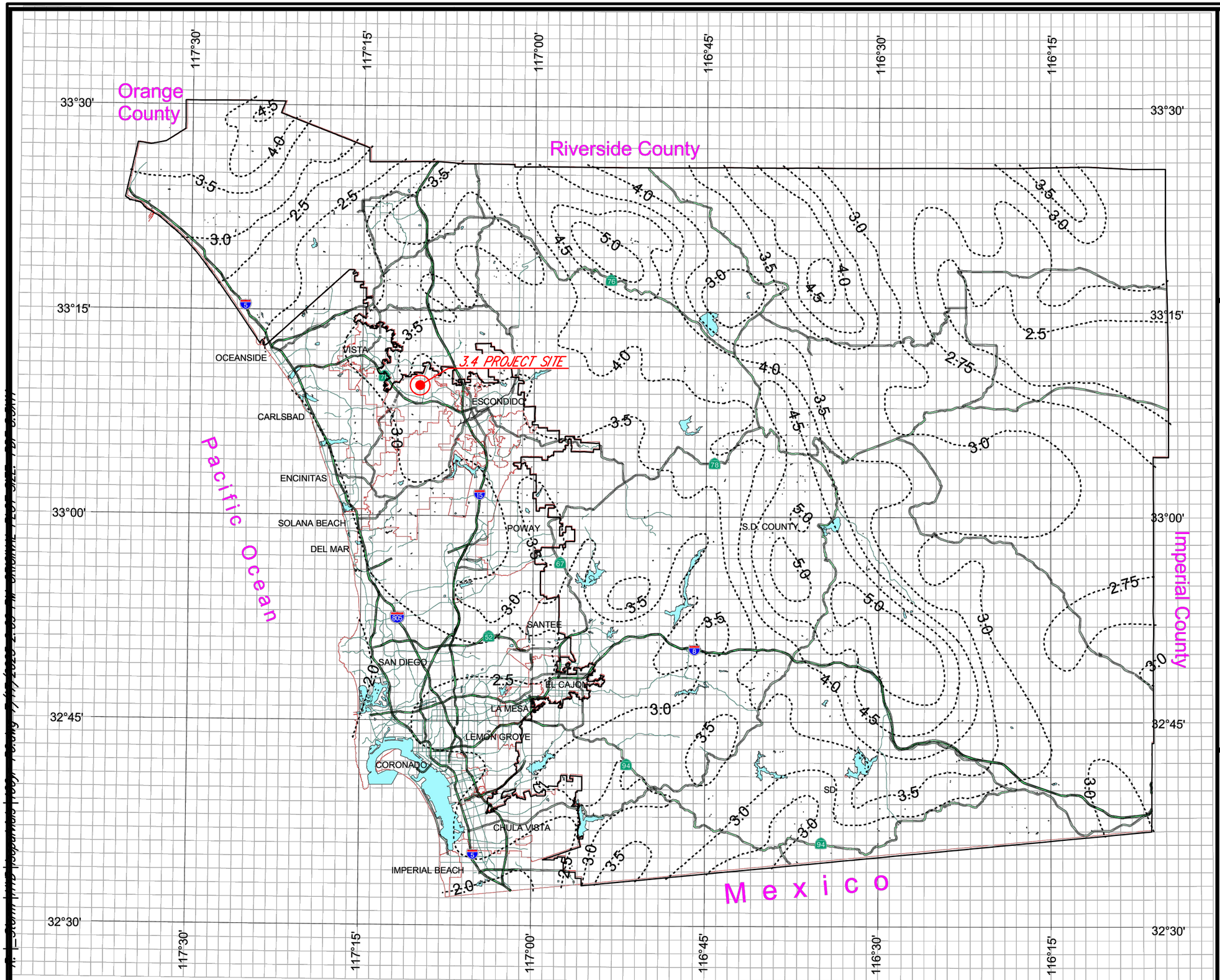
Tie-break Rule: Higher

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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N W E S

3 0 3 Miles

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County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

6.0 PROJECT SITE

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
SD
CHULA VISTA
IMPERIAL BEACH

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'

33°30' 33°15' 33°00' 32°45' 32°30'

DPW GIS
Department of Public Works
Geographic Information Services

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N
W E
S

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3 0 3 Miles

PLOT SIZE: PDF 8.5X11 | N:\Storm\HYD\Isopluvials\100yr_24hr.dwg 7/17/2025 2:00 PM DANIEL PUTT

ATTACHMENT 4 – PRE-DEVEOPMENT UNMITIGATED CALCULATIONS

Steps Taken To Analyze This Condition

The Rational Method as outlined in section 3 of the June 2003 San Diego County Hydrology Manual is followed here. The software that we are using is the "*Rational Hydrology Method, San Diego County (2003 Manual)"* module of the CIVILCADD/CIVIL DEISGN Engineering software version 7.9.

Please see subsequent pages for calculations. These calculations are for the Q100. The results are outlined/summarized in Section 6.4.

ATTACHMENT 4
PRE-DEVELOPMENT
POC-1

```
1
2               San Diego County Rational Hydrology Program
3
4       CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2014 Version 9.0
5
6       Rational method hydrology  program based on
7       San Diego County Flood Control Division 2003 hydrology manual
8           Rational Hydrology Study        Date: 07/17/25
9       ------------------------------------------------------------------------
10      24044 Pre Dev
11      100 Year Study
12      24044prepoc1
13      POC 1
14      ------------------------------------------------------------------------
15       *********   Hydrology Study Control Information **********
16
17      ------------------------------------------------------------------------
18
19
20      Program License Serial Number 6332
21
22      ------------------------------------------------------------------------
23      Rational hydrology study storm event year is   100.0
24      English (in-lb) input data Units used
25
26      Map data precipitation entered:
27      6 hour,  precipitation(inches) =  3.400
28      24 hour precipitation(inches) =  6.000
29      P6/P24 =    56.7%
30      San Diego hydrology manual 'C' values used
31
32
33      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
34      Process from Point/Station      101.000 to Point/Station      102.000
35      **** INITIAL AREA EVALUATION ****
36      ________________________________________________________________________
37      Decimal fraction soil group A = 0.000
38      Decimal fraction soil group B = 0.000
39      Decimal fraction soil group C = 0.000
40      Decimal fraction soil group D = 1.000
41      [UNDISTURBED NATURAL TERRAIN                ]
42      (Permanent Open Space   )
43      Impervious value, Ai = 0.000
44      Sub-Area C Value = 0.350
45      Initial subarea total flow distance  =  100.000(Ft.)
46      Highest elevation =  851.730(Ft.)
47      Lowest elevation =  843.660(Ft.)
48      Elevation difference =    8.070(Ft.) Slope =  8.070 %
49      INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
50      The maximum overland flow distance is 100.00 (Ft)
51      for the top area slope value of   8.07 %, in a development type of
52       Permanent Open Space
53      In Accordance With Figure 3-3
54      Initial Area Time of Concentration =   6.73 minutes
55      TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
56      TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   8.070^(1/3)]=   6.73
57      Rainfall intensity (I) =      7.395(In/Hr) for a   100.0 year storm
58      Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
59      Subarea runoff =      0.409(CFS)
60      Total initial stream area =        0.158(Ac.)
61
62
63      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
64      Process from Point/Station      102.000 to Point/Station      103.000
65      **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
66
67      ________________________________________________________________________
68      Estimated mean flow rate at midpoint of channel =     19.793(CFS)
69      Depth of flow =   0.696(Ft.), Average velocity =   5.445(Ft/s)
        ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              6.00
    2             35.00              1.00
    3             42.00              0.00
    4             50.00              1.00
    5             85.00              6.00
Manning's 'N' friction factor =   0.060
------------------------------------------------------------------
Sub-Channel flow  =     19.793(CFS)
  '     '    flow top width =     10.443(Ft.)
  '     '    velocity=    5.445(Ft/s)
  '     '    area =      3.635(Sq.Ft)
  '     '    Froude number =     1.626

Upstream point elevation =   843.660(Ft.)
Downstream point elevation =   625.930(Ft.)
Flow length =  1090.240(Ft.)
Travel time  =    3.34 min.
Time of concentration =   10.07 min.
Depth of flow =   0.696(Ft.)
Average velocity =   5.445(Ft/s)
Total irregular channel flow =    19.793(CFS)
Irregular channel normal depth above invert elev. =   0.696(Ft.)
Average velocity of channel(s) =   5.445(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.704(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.704(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      6.858
Subarea runoff =     38.705(CFS) for     19.435(Ac.)
Total runoff =     39.114(CFS)  Total area =      19.593(Ac.)
Depth of flow =   0.899(Ft.), Average velocity =   6.456(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      105.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   625.930(Ft.)
Downstream point/station elevation =   622.960(Ft.)
Pipe length  =    36.81(Ft.) Slope =   0.0807  Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    39.114(CFS)
Given pipe size =     27.00(In.)
Calculated individual pipe flow  =    39.114(CFS)
Normal flow depth in pipe =   13.71(In.)
Flow top width inside pipe =   27.00(In.)
Critical Depth =   24.95(In.)
Pipe flow velocity =     19.30(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    10.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     19.593(Ac.)
Runoff from this stream =     39.114(CFS)
```

```
Time of concentration =   10.10 min.
Rainfall intensity =     5.692(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****

------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Initial subarea total flow distance  =  182.000(Ft.)
Highest elevation =  640.970(Ft.)
Lowest elevation =  640.840(Ft.)
Elevation difference =    0.130(Ft.) Slope =  0.071 %
Top of Initial Area Slope adjusted by User to  0.055 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.06 %, in a development type of
 Limited Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration =   8.37 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  50.000^.5)/(   0.055^(1/3)]=   8.37
Rainfall intensity (I) =      6.427(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      1.344(CFS)
Total initial stream area =        0.246(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      602.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

------------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      3.697(CFS)
Depth of flow =   0.301(Ft.), Average velocity =   3.271(Ft/s)
    ******* Irregular Channel Data ***********
-------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2              0.00              0.00
    3              1.50              0.13
    4             21.50              0.53
Manning's 'N' friction factor =   0.015
-------------------------------------------------------------
Sub-Channel flow  =      3.697(CFS)
  '     '    flow top width =     10.289(Ft.)
  '     '    velocity=    3.272(Ft/s)
  '     '    area =      1.130(Sq.Ft)
  '     '    Froude number =     1.740

Upstream point elevation =   640.840(Ft.)
Downstream point elevation =   622.390(Ft.)
Flow length =   855.440(Ft.)
Travel time  =    4.36 min.
Time of concentration =   12.73 min.
Depth of flow =   0.301(Ft.)
Average velocity =   3.271(Ft/s)
Total irregular channel flow =     3.697(CFS)
Irregular channel normal depth above invert elev. =   0.301(Ft.)
Average velocity of channel(s) =   3.271(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.904(In/Hr) for a   100.0 year storm
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Rainfall intensity =      4.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.850  CA =      1.220
Subarea runoff =      4.638(CFS) for      1.189(Ac.)
Total runoff =      5.982(CFS)  Total area =      1.435(Ac.)
Depth of flow =   0.345(Ft.), Average velocity =   3.674(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      105.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.435(Ac.)
Runoff from this stream =      5.982(CFS)
Time of concentration =   12.73 min.
Rainfall intensity =     4.904(In/Hr)
Summary of stream data:

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


1       39.114     10.10             5.692
2        5.982     12.73             4.904
Qmax(1) =
       1.000 *    1.000 *    39.114) +
       1.000 *    0.794 *     5.982) + =      43.861
Qmax(2) =
       0.862 *    1.000 *    39.114) +
       1.000 *    1.000 *     5.982) + =      39.679

Total of 2 streams to confluence:
Flow rates before confluence point:
      39.114       5.982
Maximum flow rates at confluence using above data:
       43.861       39.679
Area of streams before confluence:
       19.593        1.435
Results of confluence:
Total flow rate =     43.861(CFS)
Time of concentration =    10.100 min.
Effective stream area after confluence =     21.028(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station      105.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      5.692(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =    10.10 min.
Rainfall intensity =      5.692(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
```

```
277       (Q=KCIA) is C = 0.388  CA =      8.223
278       Subarea runoff =      2.948(CFS) for      0.172(Ac.)
279       Total runoff =     46.810(CFS)  Total area =      21.200(Ac.)
280       End of computations, total study area =          21.200 (Ac.)
281
282
283
```

ATTACHMENT 4
PRE-DEVELOPMENT
POC-2

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/05/25
--------------------------------------------------------------------------
24044 Pre Dev
100 Year Study
24044prepoc2
POC 2
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
___________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1033.850(Ft.)
Lowest elevation = 1016.770(Ft.)
Elevation difference =   17.080(Ft.) Slope = 17.080 %
Top of Initial Area Slope adjusted by User to 13.220 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  13.22 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.71 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  13.220^(1/3)]=   5.71
Rainfall intensity (I) =      8.223(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      1.068(CFS)
Total initial stream area =        0.371(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      202.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
___________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     67.522(CFS)
Depth of flow =   1.350(Ft.), Average velocity =  10.822(Ft/s)
```

```
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              19.62
    2             20.00              11.97
    3             50.00               0.00
    4             80.00               6.91
    5            100.00              13.34
Manning's 'N' friction factor =   0.040
------------------------------------------------------------------
Sub-Channel flow  =     67.522(CFS)
  '     '    flow top width =      9.244(Ft.)
  '     '    velocity=   10.822(Ft/s)
  '     '    area =      6.239(Sq.Ft)
  '     '    Froude number =     2.321

Upstream point elevation =  1016.770(Ft.)
Downstream point elevation =   711.260(Ft.)
Flow length =  2011.000(Ft.)
Travel time  =    3.10 min.
Time of concentration =    8.81 min.
Depth of flow =   1.350(Ft.)
Average velocity =  10.822(Ft/s)
Total irregular channel flow =    67.522(CFS)
Irregular channel normal depth above invert elev. =   1.350(Ft.)
Average velocity of channel(s) =  10.822(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.218(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      6.218(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     21.535
Subarea runoff =    132.841(CFS) for     61.159(Ac.)
Total runoff =    133.909(CFS)  Total area =      61.530(Ac.)
Depth of flow =   1.745(Ft.), Average velocity =  12.842(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.100 to Point/Station      203.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =    163.853(CFS)
Depth of flow =   1.260(Ft.), Average velocity =   4.896(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.70
    2             76.00              0.70
    3             80.00              0.00
    4             83.00              0.70
    5            180.00              1.70
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =    163.853(CFS)
  '     '    flow top width =    103.833(Ft.)
  '     '    velocity=    4.896(Ft/s)
  '     '    area =     33.468(Sq.Ft)
  '     '    Froude number =     1.520

Upstream point elevation =   711.260(Ft.)
```

```
Downstream point elevation =   663.030(Ft.)
Flow length =  1089.000(Ft.)
Travel time  =    3.71 min.
Time of concentration =   12.51 min.
Depth of flow =   1.260(Ft.)
Average velocity =   4.896(Ft/s)
Total irregular channel flow =   163.853(CFS)
Irregular channel normal depth above invert elev. =   1.260(Ft.)
Average velocity of channel(s) =   4.896(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.957(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.220
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.780
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.317
Rainfall intensity =      4.957(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.334  CA =     39.079
Subarea runoff =     59.814(CFS) for     55.342(Ac.)
Total runoff =    193.722(CFS)  Total area =     116.872(Ac.)
Depth of flow =   1.302(Ft.), Average velocity =   5.094(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    116.872(Ac.)
Runoff from this stream =    193.722(CFS)
Time of concentration =   12.51 min.
Rainfall intensity =     4.957(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1283.000(Ft.)
Lowest elevation = 1267.030(Ft.)
Elevation difference =   15.970(Ft.) Slope = 15.970 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  15.97 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.36 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  15.970^(1/3)]=   5.36
Rainfall intensity (I) =      8.564(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      1.894(CFS)
Total initial stream area =        0.632(Ac.)


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

```
Process from Point/Station      302.000 to Point/Station      203.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     69.331(CFS)
Depth of flow =   1.098(Ft.), Average velocity =   9.907(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00             10.00
    2             25.00              5.00
    3             47.00              0.00
    4             83.00              5.00
    5            100.00             10.00
Manning's 'N' friction factor =   0.040
------------------------------------------------------------------------
Sub-Channel flow  =     69.332(CFS)
  '     '    flow top width =     12.742(Ft.)
  '     '    velocity=    9.907(Ft/s)
  '     '    area =      6.998(Sq.Ft)
  '     '    Froude number =     2.356

Upstream point elevation =  1267.030(Ft.)
Downstream point elevation =   663.030(Ft.)
Flow length =  3741.550(Ft.)
Travel time  =    6.29 min.
Time of concentration =   11.66 min.
Depth of flow =   1.098(Ft.)
Average velocity =   9.907(Ft/s)
Total irregular channel flow =    69.331(CFS)
Irregular channel normal depth above invert elev. =   1.098(Ft.)
Average velocity of channel(s) =   9.907(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.190(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.030
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.070
Decimal fraction soil group D = 0.900
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.342
Rainfall intensity =      5.190(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.342  CA =     26.334
Subarea runoff =    134.775(CFS) for     76.354(Ac.)
Total runoff =    136.669(CFS)  Total area =      76.986(Ac.)
Depth of flow =   1.417(Ft.), Average velocity =  11.739(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     76.986(Ac.)
Runoff from this stream =    136.669(CFS)
Time of concentration =   11.66 min.
Rainfall intensity =     5.190(In/Hr)
Summary of stream data:

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


1      193.722     12.51             4.957
2      136.669     11.66             5.190
Qmax(1) =
       1.000 *    1.000 *   193.722) +
```

```
       0.955 *    1.000 *   136.669) + =     324.266
Qmax(2) =
       1.000 *    0.931 *   193.722) +
       1.000 *    1.000 *   136.669) + =     317.098

Total of 2 streams to confluence:
Flow rates before confluence point:
     193.722     136.669
Maximum flow rates at confluence using above data:
      324.266      317.098
Area of streams before confluence:
      116.872       76.986
Results of confluence:
Total flow rate =    324.266(CFS)
Time of concentration =    12.514 min.
Effective stream area after confluence =    193.858(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Depth of flow =   1.501(Ft.), Average velocity =   5.098(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.70
    2             76.00              0.70
    3             80.00              0.00
    4             83.00              0.70
    5            180.00              1.70
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =    324.267(CFS)
  '     '    flow top width =    145.635(Ft.)
  '     '    velocity=    5.098(Ft/s)
  '     '    area =     63.608(Sq.Ft)
  '     '    Froude number =     1.359

Upstream point elevation =   663.030(Ft.)
Downstream point elevation =   637.540(Ft.)
Flow length =   796.360(Ft.)
Travel time  =    2.60 min.
Time of concentration =   15.12 min.
Depth of flow =   1.501(Ft.)
Average velocity =   5.098(Ft/s)
Total irregular channel flow =   324.266(CFS)
Irregular channel normal depth above invert elev. =   1.501(Ft.)
Average velocity of channel(s) =   5.098(Ft/s)
End of computations, total study area =         193.858 (Ac.)
```

ATTACHMENT 4
PRE-DEVELOPMENT
POC-3

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/10/25
--------------------------------------------------------------------------
24044 Pre Dev
100 Year Study
24044prepoc3
POC 3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Initial subarea total flow distance  =  101.760(Ft.)
Highest elevation =  755.110(Ft.)
Lowest elevation =  749.270(Ft.)
Elevation difference =    5.840(Ft.) Slope =  5.739 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   5.74 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   8.04 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3000)*( 100.000^.5)/(   5.739^(1/3)]=   8.04
Rainfall intensity (I) =      6.593(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.300
Subarea runoff =      1.189(CFS)
Total initial stream area =        0.601(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     10.204(CFS)
Depth of flow =   0.065(Ft.), Average velocity =   3.111(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00             10.00
    2             50.00              0.00
    3            100.00              0.00
    4            150.00             10.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =     10.204(CFS)
   '     '    flow top width =     50.652(Ft.)
   '     '    velocity=    3.111(Ft/s)
   '     '    area =      3.280(Sq.Ft)
   '     '    Froude number =     2.155

Upstream point elevation =   749.270(Ft.)
Downstream point elevation =   633.290(Ft.)
Flow length =   764.000(Ft.)
Travel time  =    4.09 min.
Time of concentration =   12.14 min.
Depth of flow =   0.065(Ft.)
Average velocity =   3.111(Ft/s)
Total irregular channel flow =    10.204(CFS)
Irregular channel normal depth above invert elev. =   0.065(Ft.)
Average velocity of channel(s) =   3.111(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.056(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.930
Decimal fraction soil group D = 0.070
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.304
Rainfall intensity =      5.056(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.303  CA =      3.788
Subarea runoff =     17.963(CFS) for     11.886(Ac.)
Total runoff =     19.152(CFS)  Total area =      12.487(Ac.)
Depth of flow =   0.095(Ft.), Average velocity =   3.993(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     12.487(Ac.)
Runoff from this stream =     19.152(CFS)
Time of concentration =   12.14 min.
Rainfall intensity =     5.056(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      405.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.480 given for subarea
Rainfall intensity (I) =      5.729(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       5.73(In/Hr)
Total area =       76.663(Ac.)  Total runoff =   217.000(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      405.000 to Point/Station      403.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
```

```
Depth of flow =   3.012(Ft.), Average velocity =   9.576(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              3.33
    2              5.00              0.00
    3              8.00              0.00
    4             13.00              3.33
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =    217.000(CFS)
  '     '    flow top width =     12.046(Ft.)
  '     '    velocity=    9.576(Ft/s)
  '     '    area =     22.660(Sq.Ft)
  '     '    Froude number =     1.230

Upstream point elevation =   629.250(Ft.)
Downstream point elevation =   626.850(Ft.)
Flow length =   494.310(Ft.)
Travel time  =    0.86 min.
Time of concentration =   10.86 min.
Depth of flow =   3.012(Ft.)
Average velocity =   9.576(Ft/s)
Total irregular channel flow =   217.000(CFS)
Irregular channel normal depth above invert elev. =   3.012(Ft.)
Average velocity of channel(s) =   9.576(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****

____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     76.663(Ac.)
Runoff from this stream =    217.000(CFS)
Time of concentration =   10.86 min.
Rainfall intensity =     5.432(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.100 to Point/Station      404.200
**** INITIAL AREA EVALUATION ****

____________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                         ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Initial subarea total flow distance  =  392.420(Ft.)
Highest elevation =  641.230(Ft.)
Lowest elevation =  638.560(Ft.)
Elevation difference =    2.670(Ft.) Slope =  0.680 %
Top of Initial Area Slope adjusted by User to  0.500 %
Bottom of Initial Area Slope adjusted by User to  0.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.50 %, in a development type of
 Limited Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.01 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8500)*(  50.000^.5)/(   0.500^(1/3)]=   4.01
The initial area total distance of  392.42 (Ft.) entered leaves a
remaining distance of  342.42 (Ft.)
Using Figure 3-4, the travel time for this distance is   5.37 minutes
```

```
for a distance of 342.42 (Ft.) and a slope of  0.50 %
with an elevation difference of   1.71(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    5.372 Minutes
Tt=[(11.9*0.0649^3)/(  1.71)]^.385=  5.37
Total initial area Ti =   4.01 minutes from Figure 3-3 formula plus
  5.37 minutes from the Figure 3-4 formula =   9.38 minutes
Rainfall intensity (I) =      5.970(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.850
Subarea runoff =      3.095(CFS)
Total initial stream area =        0.610(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.200 to Point/Station      403.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      6.759(CFS)
Depth of flow =   0.386(Ft.), Average velocity =   3.004(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2             10.00              0.50
    3             10.00              0.00
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------------
Sub-Channel flow  =      6.759(CFS)
  '     '    flow top width =     12.500(Ft.)
  '     '    velocity=    3.004(Ft/s)
  '     '    area =      2.250(Sq.Ft)
  '     '    Froude number =     1.248

Upstream point elevation =   638.560(Ft.)
Downstream point elevation =   633.290(Ft.)
Flow length =   559.000(Ft.)
Travel time  =    3.10 min.
Time of concentration =   12.48 min.
Depth of flow =   0.386(Ft.)
Average velocity =   3.004(Ft/s)
Total irregular channel flow =     6.759(CFS)
Irregular channel normal depth above invert elev. =   0.386(Ft.)
Average velocity of channel(s) =   3.004(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.965(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                         ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Rainfall intensity =      4.965(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.850  CA =      2.083
Subarea runoff =      7.249(CFS) for      1.841(Ac.)
Total runoff =     10.344(CFS)  Total area =       2.451(Ac.)
Depth of flow =   0.438(Ft.), Average velocity =   3.556(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      403.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
```

```
      Stream flow area =      2.451(Ac.)
      Runoff from this stream =     10.344(CFS)
      Time of concentration =   12.48 min.
      Rainfall intensity =     4.965(In/Hr)
      Summary of stream data:

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


      1       19.152     12.14             5.056
      2      217.000     10.86             5.432
      3       10.344     12.48             4.965
      Qmax(1) =
             1.000 *    1.000 *    19.152) +
             0.931 *    1.000 *   217.000) +
             1.000 *    0.972 *    10.344) + =     231.213
      Qmax(2) =
             1.000 *    0.895 *    19.152) +
             1.000 *    1.000 *   217.000) +
             1.000 *    0.870 *    10.344) + =     243.140
      Qmax(3) =
             0.982 *    1.000 *    19.152) +
             0.914 *    1.000 *   217.000) +
             1.000 *    1.000 *    10.344) + =     227.520

      Total of 3 streams to confluence:
      Flow rates before confluence point:
            19.152     217.000      10.344
      Maximum flow rates at confluence using above data:
            231.213      243.140      227.520
      Area of streams before confluence:
             12.487       76.663        2.451
      Results of confluence:
      Total flow rate =    243.140(CFS)
      Time of concentration =    10.860 min.
      Effective stream area after confluence =     91.601(Ac.)
      End of computations, total study area =          91.601 (Ac.)
```

ATTACHMENT 4
PRE-DEVELOPMENT
POC-4

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2014 Version 9.0

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 07/17/25
--------------------------------------------------------------------------
24044 Pre Dev
100 Year Study
24044prepoc4
POC 4
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6332

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  805.200(Ft.)
Lowest elevation =  778.410(Ft.)
Elevation difference =   26.790(Ft.) Slope = 26.790 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  26.79 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.81 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3000)*( 100.000^.5)/(  26.790^(1/3)]=   4.81
Calculated TC of    4.813 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      8.958(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.300
Subarea runoff =      0.658(CFS)
Total initial stream area =        0.245(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      4.337(CFS)
```

```
Depth of flow =   0.331(Ft.), Average velocity =   7.931(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2              5.00              0.00
    3             10.00              1.00
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =      4.337(CFS)
  '     '    flow top width =      3.307(Ft.)
  '     '    velocity=    7.931(Ft/s)
  '     '    area =      0.547(Sq.Ft)
  '     '    Froude number =     3.437

Upstream point elevation =   778.410(Ft.)
Downstream point elevation =   664.070(Ft.)
Flow length =   887.270(Ft.)
Travel time  =    1.86 min.
Time of concentration =    6.68 min.
Depth of flow =   0.331(Ft.)
Average velocity =   7.931(Ft/s)
Total irregular channel flow =     4.337(CFS)
Irregular channel normal depth above invert elev. =   0.331(Ft.)
Average velocity of channel(s) =   7.931(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      7.434(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Rainfall intensity =      7.434(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.300  CA =      1.070
Subarea runoff =      7.298(CFS) for      3.323(Ac.)
Total runoff =      7.957(CFS)  Total area =       3.568(Ac.)
Depth of flow =   0.415(Ft.), Average velocity =   9.230(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      503.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
Rainfall intensity (I) =      7.434(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Time of concentration =     6.68 min.
Rainfall intensity =      7.434(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.300  CA =      2.156
Subarea runoff =      8.066(CFS) for      3.617(Ac.)
Total runoff =     16.023(CFS)  Total area =       7.185(Ac.)
End of computations, total study area =          7.185 (Ac.)
```

ATTACHMENT 5 – POST-DEVEOPMENT UNMITIGATED CALCULATIONS

Steps Taken To Analyze This Condition

The Rational Method as outlined in section 3 of the June 2003 San Diego County Hydrology Manual is followed here. The software that we are using is the "*Rational Hydrology Method, San Diego County (2003 Manual)"* module of the CIVILCADD/CIVIL DEISGN Engineering software version 7.9.

Please see subsequent pages for calculations. These calculations are for the Q100. The results are outlined/summarized in Section 6.4.

ATTACHMENT 5

POST-DEVELOPMENT

POC-1

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/11/25
--------------------------------------------------------------------------
100 Year Study
24044 Post Dev
POC 1
24044postpoc1.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  851.730(Ft.)
Lowest elevation =  843.660(Ft.)
Elevation difference =    8.070(Ft.) Slope =  8.070 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   8.07 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.73 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   8.070^(1/3)]=   6.73
Rainfall intensity (I) =      7.395(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.412(CFS)
Total initial stream area =        0.159(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1002.000 to Point/Station     1003.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      5.265(CFS)
Depth of flow =   0.311(Ft.), Average velocity =   7.259(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              6.00
    2             35.00              1.00
    3             42.00              0.00
    4             50.00              1.00
    5             85.00              6.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      5.265(CFS)
  '     '    flow top width =      4.664(Ft.)
  '     '    velocity=    7.259(Ft/s)
  '     '    area =      0.725(Sq.Ft)
  '     '    Froude number =     3.244

Upstream point elevation =   843.660(Ft.)
Downstream point elevation =   665.330(Ft.)
Flow length =   686.000(Ft.)
Travel time  =    1.57 min.
Time of concentration =    8.31 min.
Depth of flow =   0.311(Ft.)
Average velocity =   7.259(Ft/s)
Total irregular channel flow =     5.265(CFS)
Irregular channel normal depth above invert elev. =   0.311(Ft.)
Average velocity of channel(s) =   7.259(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.457(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      6.457(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      1.552
Subarea runoff =      9.608(CFS) for      4.274(Ac.)
Total runoff =     10.019(CFS)  Total area =       4.433(Ac.)
Depth of flow =   0.396(Ft.), Average velocity =   8.526(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1003.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     12.409(CFS)
Depth of flow =   0.978(Ft.), Average velocity =  12.960(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2              1.00              0.00
    3              2.00              1.00
Manning's 'N' friction factor =   0.016
------------------------------------------------------------------
Sub-Channel flow  =     12.409(CFS)
  '     '    flow top width =      1.957(Ft.)
  '     '    velocity=   12.960(Ft/s)
  '     '    area =      0.957(Sq.Ft)
  '     '    Froude number =     3.265

Upstream point elevation =   665.330(Ft.)
Downstream point elevation =   643.520(Ft.)
Flow length =   272.000(Ft.)
Travel time  =    0.35 min.
```

```
Time of concentration =    8.66 min.
Depth of flow =   0.978(Ft.)
Average velocity =  12.960(Ft/s)
Total irregular channel flow =    12.409(CFS)
Irregular channel normal depth above invert elev. =   0.978(Ft.)
Average velocity of channel(s) =  12.960(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.288(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      6.288(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      2.338
Subarea runoff =      4.680(CFS) for      2.246(Ac.)
Total runoff =     14.699(CFS)  Total area =       6.679(Ac.)
Depth of flow =   1.035(Ft.), Average velocity =  13.749(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.100 to Point/Station     1003.200
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
!!Warning: Water is above left or right bank elevations
!!Warning: Water is above left or right bank elevations
!!Warning: Water is above left or right bank elevations
Estimated mean flow rate at midpoint of channel =     14.821(CFS)
Depth of flow =   1.007(Ft.), Average velocity =  14.612(Ft/s)
!!Warning: Water is above left or right bank elevations
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2              1.00              0.00
    3              2.00              1.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =     14.821(CFS)
  '     '    flow top width =      2.000(Ft.)
  '     '    velocity=   14.612(Ft/s)
  '     '    area =      1.014(Sq.Ft)
  '     '    Froude number =     3.616

Upstream point elevation =   643.520(Ft.)
Downstream point elevation =   623.370(Ft.)
Flow length =   236.000(Ft.)
Travel time  =    0.27 min.
Time of concentration =    8.92 min.
Depth of flow =   1.007(Ft.)
Average velocity =  14.612(Ft/s)
Total irregular channel flow =    14.821(CFS)
Irregular channel normal depth above invert elev. =   1.007(Ft.)
Average velocity of channel(s) =  14.612(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
Rainfall intensity (I) =      6.165(In/Hr) for a   100.0 year storm
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
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
```

```
Impervious value, Ai = 0.100
Sub-Area C Value = 0.410
Rainfall intensity =      6.165(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.352  CA =      2.415
Subarea runoff =      0.188(CFS) for      0.188(Ac.)
Total runoff =     14.887(CFS)  Total area =       6.867(Ac.)
Depth of flow =   1.009(Ft.), Average velocity =  14.637(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.200 to Point/Station     1004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   623.370(Ft.)
Downstream point/station elevation =   616.370(Ft.)
Pipe length  =    50.00(Ft.) Slope =   0.1400  Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    14.887(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    14.887(CFS)
Normal flow depth in pipe =    9.34(In.)
Flow top width inside pipe =   14.54(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.53(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     8.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.300 to Point/Station     1004.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      6.145(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =     8.97 min.
Rainfall intensity =      6.145(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.355  CA =      2.459
Subarea runoff =      0.223(CFS) for      0.052(Ac.)
Total runoff =     15.110(CFS)  Total area =       6.919(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station     1004.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      6.145(In/Hr) for a   100.0 year storm
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
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Time of concentration =     8.97 min.
Rainfall intensity =      6.145(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.363  CA =      2.554
Subarea runoff =      0.583(CFS) for      0.120(Ac.)
Total runoff =     15.693(CFS)  Total area =       7.039(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      7.039(Ac.)
Runoff from this stream =     15.693(CFS)
Time of concentration =    8.97 min.
Rainfall intensity =     6.145(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1006.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Initial subarea total flow distance  =  161.000(Ft.)
Highest elevation =  640.700(Ft.)
Lowest elevation =  639.300(Ft.)
Elevation difference =    1.400(Ft.) Slope =  0.870 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 70.00 (Ft)
for the top area slope value of   0.87 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   9.15 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5200)*(  70.000^.5)/(   0.870^(1/3)]=   9.15
Rainfall intensity (I) =      6.067(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      1.397(CFS)
Total initial stream area =        0.443(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1004.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      4.060(CFS)
Depth of flow =   0.456(Ft.), Average velocity =   6.871(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.50
    2              0.00              0.00
    3              1.50              0.13
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      4.060(CFS)
  '     '    flow top width =      1.500(Ft.)
  '     '    velocity=    6.871(Ft/s)
  '     '    area =      0.591(Sq.Ft)
  '     '    Froude number =     1.929

Upstream point elevation =   639.300(Ft.)
Downstream point elevation =   622.770(Ft.)
Flow length =   694.000(Ft.)
Travel time  =    1.68 min.
Time of concentration =   10.83 min.
```

```
Depth of flow =   0.456(Ft.)
Average velocity =   6.871(Ft/s)
Total irregular channel flow =     4.060(CFS)
Irregular channel normal depth above invert elev. =   0.456(Ft.)
Average velocity of channel(s) =   6.871(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.440(In/Hr) for a   100.0 year storm
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
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Rainfall intensity =      5.440(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.520  CA =      1.226
Subarea runoff =      5.273(CFS) for      1.915(Ac.)
Total runoff =      6.671(CFS)  Total area =       2.358(Ac.)
Depth of flow =   0.598(Ft.), Average velocity =   8.307(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.358(Ac.)
Runoff from this stream =      6.671(CFS)
Time of concentration =   10.83 min.
Rainfall intensity =     5.440(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      402.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =  134.800(Ft.)
Highest elevation =  658.000(Ft.)
Lowest elevation =  656.060(Ft.)
Elevation difference =    1.940(Ft.) Slope =  1.439 %
Top of Initial Area Slope adjusted by User to  1.450 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 65.00 (Ft)
for the top area slope value of   1.45 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.41 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*(  65.000^.5)/(   1.450^(1/3)]=   6.41
Rainfall intensity (I) =      7.631(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      2.340(CFS)
Total initial stream area =        0.511(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
```

```
415
416       ------------------------------------------------------------------------
417       !!Warning: Water is above left or right bank elevations
418       !!Warning: Water is above left or right bank elevations
419       !!Warning: Water is above left or right bank elevations
420       !!Warning: Water is above left or right bank elevations
421       !!Warning: Water is above left or right bank elevations
422       !!Warning: Water is above left or right bank elevations
423       !!Warning: Water is above left or right bank elevations
424       Estimated mean flow rate at midpoint of channel =    13.548(CFS)
425       Depth of flow =   0.850(Ft.), Average velocity =  11.466(Ft/s)
426       !!Warning: Water is above left or right bank elevations
427           ******* Irregular Channel Data ***********
428       ------------------------------------------------------------------
429       Information entered for subchannel number 1 :
430       Point number      'X' coordinate     'Y' coordinate
431           1              0.00              0.50
432           2              0.00              0.00
433           3              1.50              0.13
434       Manning's 'N' friction factor =   0.015
435       ------------------------------------------------------------------
436       Sub-Channel flow  =     13.548(CFS)
437         '     '    flow top width =      1.500(Ft.)
438         '     '    velocity=   11.466(Ft/s)
439         '     '    area =      1.182(Sq.Ft)
440         '     '    Froude number =     2.277
441
442       Upstream point elevation =   656.050(Ft.)
443       Downstream point elevation =   632.620(Ft.)
444       Flow length =   864.000(Ft.)
445       Travel time  =    1.26 min.
446       Time of concentration =    7.67 min.
447       Depth of flow =   0.850(Ft.)
448       Average velocity =  11.466(Ft/s)
449       Total irregular channel flow =    13.548(CFS)
450       Irregular channel normal depth above invert elev. =   0.850(Ft.)
451       Average velocity of channel(s) =  11.466(Ft/s)
452       !!Warning: Water is above left or right bank elevations
453        Adding area flow to channel
454       Rainfall intensity (I) =      6.800(In/Hr) for a   100.0 year storm
455       Decimal fraction soil group A = 0.000
456       Decimal fraction soil group B = 0.000
457       Decimal fraction soil group C = 0.000
458       Decimal fraction soil group D = 1.000
459       [MEDIUM DENSITY RESIDENTIAL                 ]
460       (10.9 DU/A or Less      )
461       Impervious value, Ai = 0.450
462       Sub-Area C Value = 0.600
463       Rainfall intensity =      6.800(In/Hr) for a   100.0 year storm
464       Effective runoff coefficient used for total area
465       (Q=KCIA) is C = 0.600  CA =      3.632
466       Subarea runoff =     22.359(CFS) for      5.543(Ac.)
467       Total runoff =     24.699(CFS)  Total area =       6.054(Ac.)
468       Depth of flow =   1.192(Ft.), Average velocity =  14.579(Ft/s)
469       !!Warning: Water is above left or right bank elevations
470
471
472       ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
473       Process from Point/Station      403.000 to Point/Station      404.000
474       **** PIPEFLOW TRAVEL TIME (Program estimated size) ****
475
476       ------------------------------------------------------------------------
477       Upstream point/station elevation =   629.490(Ft.)
478       Downstream point/station elevation =   629.380(Ft.)
479       Pipe length  =    15.00(Ft.) Slope =   0.0073  Manning's N = 0.013
480       No. of pipes = 1  Required pipe flow  =    24.699(CFS)
481       Nearest computed pipe diameter  =     27.00(In.)
482       Calculated individual pipe flow  =    24.699(CFS)
483       Normal flow depth in pipe =   20.63(In.)
484       Flow top width inside pipe =   22.93(In.)
485       Critical Depth =   20.86(In.)
```

```
Pipe flow velocity =      7.58(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     7.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      404.000
**** 6 HOUR HYDROGRAPH ****
________________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =   7.70
Basin Area =    15.45 Acres
6 Hour Rainfall =  3.400 Inches
Runoff Coefficient =  0.235
Peak Discharge =    24.70 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       7               0.741
       14              0.751
       21              0.771
       28              0.781
       35              0.804
       42              0.816
       49              0.841
       56              0.854
       63              0.883
       70              0.898
       77              0.930
       84              0.947
       91              0.985
       98              1.005
       105             1.048
       112             1.072
       119             1.123
       126             1.151
       133             1.214
       140             1.248
       147             1.325
       154             1.369
       161             1.468
       168             1.525
       175             1.657
       182             1.736
       189             1.925
       196             2.041
       203             2.340
       210             2.537
       217             3.101
       224             3.532
       231             5.186
       238             7.307
       245            24.699
       252             4.160
       259             2.783
       266             2.178
       273             1.824
       280             1.587
       287             1.416
       294             1.285
       301             1.181
       308             1.097
       315             1.026
       322             0.965
       329             0.914
       336             0.868
       343             0.828
```

	350	0.792					
	357	0.760					
	364	0.732					

++

6 - H O U R S T O R M

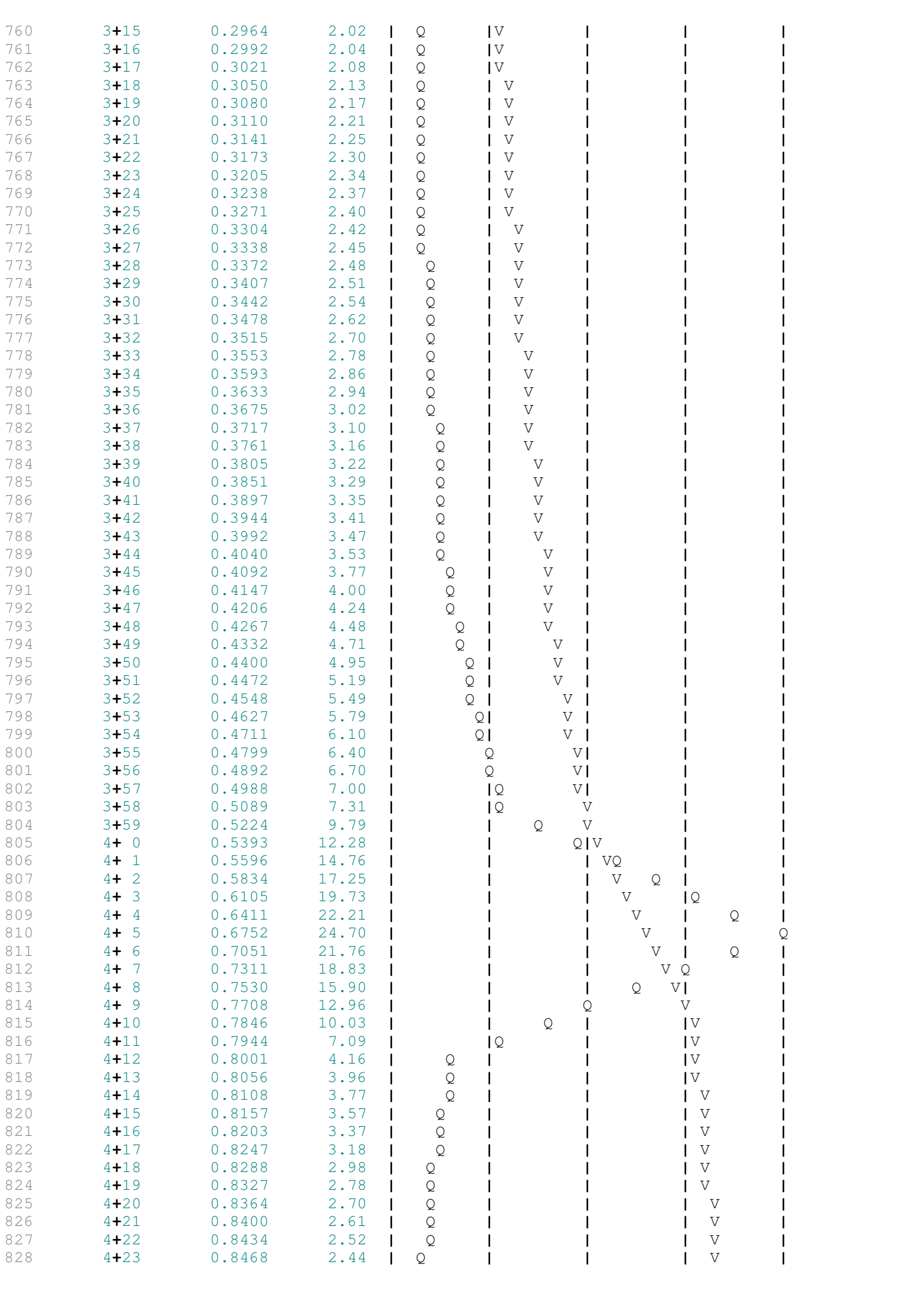
R u n o f f H y d r o g r a p h

Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	6.2	12.3	18.5	24.7
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0001	0.11	Q	|	|	|	|
0+ 2	0.0004	0.21	Q	|	|	|	|
0+ 3	0.0009	0.32	Q	|	|	|	|
0+ 4	0.0015	0.42	Q	|	|	|	|
0+ 5	0.0022	0.53	Q	|	|	|	|
0+ 6	0.0031	0.64	VQ	|	|	|	|
0+ 7	0.0041	0.74	VQ	|	|	|	|
0+ 8	0.0051	0.74	VQ	|	|	|	|
0+ 9	0.0061	0.74	VQ	|	|	|	|
0+10	0.0072	0.75	VQ	|	|	|	|
0+11	0.0082	0.75	VQ	|	|	|	|
0+12	0.0092	0.75	VQ	|	|	|	|
0+13	0.0102	0.75	VQ	|	|	|	|
0+14	0.0113	0.75	VQ	|	|	|	|
0+15	0.0123	0.75	VQ	|	|	|	|
0+16	0.0134	0.76	VQ	|	|	|	|
0+17	0.0144	0.76	VQ	|	|	|	|
0+18	0.0155	0.76	VQ	|	|	|	|
0+19	0.0165	0.76	VQ	|	|	|	|
0+20	0.0176	0.77	VQ	|	|	|	|
0+21	0.0186	0.77	VQ	|	|	|	|
0+22	0.0197	0.77	VQ	|	|	|	|
0+23	0.0208	0.77	VQ	|	|	|	|
0+24	0.0218	0.78	VQ	|	|	|	|
0+25	0.0229	0.78	VQ	|	|	|	|
0+26	0.0240	0.78	VQ	|	|	|	|
0+27	0.0250	0.78	VQ	|	|	|	|
0+28	0.0261	0.78	|Q	|	|	|	|
0+29	0.0272	0.78	|Q	|	|	|	|
0+30	0.0283	0.79	|Q	|	|	|	|
0+31	0.0294	0.79	|Q	|	|	|	|
0+32	0.0305	0.79	|Q	|	|	|	|
0+33	0.0316	0.80	|Q	|	|	|	|
0+34	0.0327	0.80	|Q	|	|	|	|
0+35	0.0338	0.80	|Q	|	|	|	|
0+36	0.0349	0.81	|Q	|	|	|	|
0+37	0.0360	0.81	|Q	|	|	|	|
0+38	0.0371	0.81	|Q	|	|	|	|
0+39	0.0382	0.81	|Q	|	|	|	|
0+40	0.0393	0.81	|Q	|	|	|	|
0+41	0.0405	0.81	|Q	|	|	|	|
0+42	0.0416	0.82	|Q	|	|	|	|
0+43	0.0427	0.82	|Q	|	|	|	|
0+44	0.0439	0.82	|Q	|	|	|	|
0+45	0.0450	0.83	|Q	|	|	|	|
0+46	0.0461	0.83	|Q	|	|	|	|
0+47	0.0473	0.83	|Q	|	|	|	|
0+48	0.0484	0.84	|Q	|	|	|	|
0+49	0.0496	0.84	|Q	|	|	|	|
0+50	0.0508	0.84	|QV	|	|	|	|
0+51	0.0519	0.84	|QV	|	|	|	|
0+52	0.0531	0.85	|QV	|	|	|	|
0+53	0.0543	0.85	|QV	|	|	|	|
0+54	0.0554	0.85	|QV	|	|	|	|
0+55	0.0566	0.85	|QV	|	|	|	|
0+56	0.0578	0.85	|QV	|	|	|	|

0+57	0.0590	0.86	|QV	|	|	|	|
0+58	0.0601	0.86	|QV	|	|	|	|
0+59	0.0613	0.87	|QV	|	|	|	|
1+ 0	0.0625	0.87	|QV	|	|	|	|
1+ 1	0.0637	0.87	|QV	|	|	|	|
1+ 2	0.0650	0.88	|QV	|	|	|	|
1+ 3	0.0662	0.88	|QV	|	|	|	|
1+ 4	0.0674	0.88	|QV	|	|	|	|
1+ 5	0.0686	0.89	|QV	|	|	|	|
1+ 6	0.0698	0.89	|QV	|	|	|	|
1+ 7	0.0711	0.89	|QV	|	|	|	|
1+ 8	0.0723	0.89	|QV	|	|	|	|
1+ 9	0.0735	0.90	|QV	|	|	|	|
1+10	0.0748	0.90	|QV	|	|	|	|
1+11	0.0760	0.90	|Q V	|	|	|	|
1+12	0.0773	0.91	|Q V	|	|	|	|
1+13	0.0785	0.91	|Q V	|	|	|	|
1+14	0.0798	0.92	|Q V	|	|	|	|
1+15	0.0810	0.92	|Q V	|	|	|	|
1+16	0.0823	0.93	|Q V	|	|	|	|
1+17	0.0836	0.93	|Q V	|	|	|	|
1+18	0.0849	0.93	|Q V	|	|	|	|
1+19	0.0862	0.93	|Q V	|	|	|	|
1+20	0.0875	0.94	|Q V	|	|	|	|
1+21	0.0888	0.94	|Q V	|	|	|	|
1+22	0.0901	0.94	|Q V	|	|	|	|
1+23	0.0914	0.94	|Q V	|	|	|	|
1+24	0.0927	0.95	|Q V	|	|	|	|
1+25	0.0940	0.95	|Q V	|	|	|	|
1+26	0.0953	0.96	|Q V	|	|	|	|
1+27	0.0966	0.96	|Q V	|	|	|	|
1+28	0.0980	0.97	|Q V	|	|	|	|
1+29	0.0993	0.97	|Q V	|	|	|	|
1+30	0.1006	0.98	|Q V	|	|	|	|
1+31	0.1020	0.98	|Q V	|	|	|	|
1+32	0.1034	0.99	|Q V	|	|	|	|
1+33	0.1047	0.99	|Q V	|	|	|	|
1+34	0.1061	0.99	|Q V	|	|	|	|
1+35	0.1075	1.00	|Q V	|	|	|	|
1+36	0.1088	1.00	|Q V	|	|	|	|
1+37	0.1102	1.00	|Q V	|	|	|	|
1+38	0.1116	1.00	|Q V	|	|	|	|
1+39	0.1130	1.01	|Q V	|	|	|	|
1+40	0.1144	1.02	|Q V	|	|	|	|
1+41	0.1158	1.02	|Q V	|	|	|	|
1+42	0.1172	1.03	|Q V	|	|	|	|
1+43	0.1187	1.04	|Q V	|	|	|	|
1+44	0.1201	1.04	|Q V	|	|	|	|
1+45	0.1215	1.05	|Q V	|	|	|	|
1+46	0.1230	1.05	|Q V	|	|	|	|
1+47	0.1244	1.05	|Q V	|	|	|	|
1+48	0.1259	1.06	|Q V	|	|	|	|
1+49	0.1273	1.06	|Q V	|	|	|	|
1+50	0.1288	1.06	|Q V	|	|	|	|
1+51	0.1303	1.07	|Q V	|	|	|	|
1+52	0.1318	1.07	|Q V	|	|	|	|
1+53	0.1333	1.08	|Q V	|	|	|	|
1+54	0.1347	1.09	|Q V	|	|	|	|
1+55	0.1363	1.09	|Q V	|	|	|	|
1+56	0.1378	1.10	|Q V	|	|	|	|
1+57	0.1393	1.11	|Q V	|	|	|	|
1+58	0.1408	1.12	|Q V	|	|	|	|
1+59	0.1424	1.12	|Q V	|	|	|	|
2+ 0	0.1439	1.13	|Q V	|	|	|	|
2+ 1	0.1455	1.13	|Q V	|	|	|	|
2+ 2	0.1471	1.14	|Q V	|	|	|	|
2+ 3	0.1486	1.14	|Q V	|	|	|	|
2+ 4	0.1502	1.14	|Q V	|	|	|	|
2+ 5	0.1518	1.15	|Q V	|	|	|	|

691	2+ 6	0.1534	1.15	|Q V |	|	|	|
692	2+ 7	0.1550	1.16	|Q V |	|	|	|
693	2+ 8	0.1566	1.17	|Q V |	|	|	|
694	2+ 9	0.1582	1.18	|Q V |	|	|	|
695	2+10	0.1598	1.19	|Q V |	|	|	|
696	2+11	0.1615	1.20	|Q V |	|	|	|
697	2+12	0.1631	1.20	|Q V |	|	|	|
698	2+13	0.1648	1.21	|Q V |	|	|	|
699	2+14	0.1665	1.22	|Q V |	|	|	|
700	2+15	0.1682	1.22	|Q V |	|	|	|
701	2+16	0.1699	1.23	|Q V |	|	|	|
702	2+17	0.1716	1.23	|Q V |	|	|	|
703	2+18	0.1733	1.24	| Q V |	|	|	|
704	2+19	0.1750	1.24	| Q V |	|	|	|
705	2+20	0.1767	1.25	| Q V |	|	|	|
706	2+21	0.1784	1.26	| Q V |	|	|	|
707	2+22	0.1802	1.27	| Q V |	|	|	|
708	2+23	0.1819	1.28	| Q V |	|	|	|
709	2+24	0.1837	1.29	| Q V |	|	|	|
710	2+25	0.1855	1.30	| Q V |	|	|	|
711	2+26	0.1873	1.31	| Q V |	|	|	|
712	2+27	0.1892	1.33	| Q V |	|	|	|
713	2+28	0.1910	1.33	| Q V |	|	|	|
714	2+29	0.1928	1.34	| Q V |	|	|	|
715	2+30	0.1947	1.34	| Q V |	|	|	|
716	2+31	0.1965	1.35	| Q V |	|	|	|
717	2+32	0.1984	1.36	| Q V |	|	|	|
718	2+33	0.2003	1.36	| Q V |	|	|	|
719	2+34	0.2022	1.37	| Q V |	|	|	|
720	2+35	0.2041	1.38	| Q V |	|	|	|
721	2+36	0.2060	1.40	| Q V |	|	|	|
722	2+37	0.2080	1.41	| Q V |	|	|	|
723	2+38	0.2099	1.43	| Q V |	|	|	|
724	2+39	0.2119	1.44	| Q V |	|	|	|
725	2+40	0.2139	1.45	| Q V |	|	|	|
726	2+41	0.2159	1.47	| Q V |	|	|	|
727	2+42	0.2180	1.48	| Q V |	|	|	|
728	2+43	0.2200	1.48	| Q V |	|	|	|
729	2+44	0.2221	1.49	| Q V |	|	|	|
730	2+45	0.2241	1.50	| Q V |	|	|	|
731	2+46	0.2262	1.51	| Q V |	|	|	|
732	2+47	0.2283	1.52	| Q V|	|	|	|
733	2+48	0.2304	1.52	| Q V|	|	|	|
734	2+49	0.2325	1.54	| Q V|	|	|	|
735	2+50	0.2347	1.56	| Q V|	|	|	|
736	2+51	0.2368	1.58	| Q V|	|	|	|
737	2+52	0.2391	1.60	| Q V|	|	|	|
738	2+53	0.2413	1.62	| Q V|	|	|	|
739	2+54	0.2435	1.64	| Q V|	|	|	|
740	2+55	0.2458	1.66	| Q V|	|	|	|
741	2+56	0.2481	1.67	| Q V|	|	|	|
742	2+57	0.2504	1.68	| Q V|	|	|	|
743	2+58	0.2528	1.69	| Q V	|	|	|
744	2+59	0.2551	1.70	| Q V	|	|	|
745	3+ 0	0.2575	1.71	| Q V	|	|	|
746	3+ 1	0.2598	1.72	| Q V	|	|	|
747	3+ 2	0.2622	1.74	| Q V	|	|	|
748	3+ 3	0.2647	1.76	| Q V	|	|	|
749	3+ 4	0.2671	1.79	| Q V	|	|	|
750	3+ 5	0.2696	1.82	| Q V	|	|	|
751	3+ 6	0.2722	1.84	| Q V	|	|	|
752	3+ 7	0.2747	1.87	| Q V	|	|	|
753	3+ 8	0.2774	1.90	| Q V	|	|	|
754	3+ 9	0.2800	1.92	| Q |V	|	|	|
755	3+10	0.2827	1.94	| Q |V	|	|	|
756	3+11	0.2854	1.96	| Q |V	|	|	|
757	3+12	0.2881	1.97	| Q |V	|	|	|
758	3+13	0.2908	1.99	| Q |V	|	|	|
759	3+14	0.2936	2.01	| Q |V	|	|	|



829	4+24	0.8500	2.35	| Q	|	|	| V	|
830	4+25	0.8532	2.26	| Q	|	|	| V	|
831	4+26	0.8562	2.18	| Q	|	|	| V	|
832	4+27	0.8591	2.13	| Q	|	|	| V	|
833	4+28	0.8619	2.08	| Q	|	|	| V	|
834	4+29	0.8647	2.03	| Q	|	|	| V	|
835	4+30	0.8675	1.98	| Q	|	|	| V	|
836	4+31	0.8701	1.92	| Q	|	|	| V	|
837	4+32	0.8727	1.87	| Q	|	|	| V	|
838	4+33	0.8752	1.82	| Q	|	|	| V	|
839	4+34	0.8777	1.79	| Q	|	|	| V	|
840	4+35	0.8801	1.76	| Q	|	|	| V	|
841	4+36	0.8825	1.72	| Q	|	|	| V	|
842	4+37	0.8848	1.69	| Q	|	|	| V	|
843	4+38	0.8871	1.66	| Q	|	|	| V	|
844	4+39	0.8893	1.62	| Q	|	|	| V	|
845	4+40	0.8915	1.59	| Q	|	|	| V	|
846	4+41	0.8936	1.56	| Q	|	|	| V	|
847	4+42	0.8958	1.54	| Q	|	|	| V	|
848	4+43	0.8978	1.51	| Q	|	|	| V	|
849	4+44	0.8999	1.49	| Q	|	|	| V	|
850	4+45	0.9019	1.47	| Q	|	|	| V	|
851	4+46	0.9039	1.44	| Q	|	|	| V	|
852	4+47	0.9058	1.42	| Q	|	|	| V	|
853	4+48	0.9078	1.40	| Q	|	|	| V	|
854	4+49	0.9097	1.38	| Q	|	|	| V	|
855	4+50	0.9115	1.36	| Q	|	|	| V	|
856	4+51	0.9134	1.34	| Q	|	|	| V	|
857	4+52	0.9152	1.32	| Q	|	|	| V	|
858	4+53	0.9170	1.30	| Q	|	|	| V	|
859	4+54	0.9188	1.29	| Q	|	|	| V	|
860	4+55	0.9205	1.27	| Q	|	|	| V	|
861	4+56	0.9223	1.26	| Q	|	|	| V	|
862	4+57	0.9240	1.24	| Q	|	|	| V	|
863	4+58	0.9257	1.23	|Q	|	|	| V	|
864	4+59	0.9273	1.21	|Q	|	|	| V	|
865	5+ 0	0.9290	1.20	|Q	|	|	| V	|
866	5+ 1	0.9306	1.18	|Q	|	|	| V	|
867	5+ 2	0.9322	1.17	|Q	|	|	| V	|
868	5+ 3	0.9338	1.16	|Q	|	|	| V	|
869	5+ 4	0.9354	1.15	|Q	|	|	| V	|
870	5+ 5	0.9369	1.13	|Q	|	|	| V	|
871	5+ 6	0.9385	1.12	|Q	|	|	| V	|
872	5+ 7	0.9400	1.11	|Q	|	|	| V	|
873	5+ 8	0.9415	1.10	|Q	|	|	| V	|
874	5+ 9	0.9430	1.09	|Q	|	|	| V	|
875	5+10	0.9445	1.08	|Q	|	|	| V	|
876	5+11	0.9460	1.07	|Q	|	|	| V	|
877	5+12	0.9474	1.06	|Q	|	|	| V	|
878	5+13	0.9489	1.05	|Q	|	|	| V	|
879	5+14	0.9503	1.04	|Q	|	|	| V	|
880	5+15	0.9517	1.03	|Q	|	|	| V	|
881	5+16	0.9531	1.02	|Q	|	|	| V	|
882	5+17	0.9545	1.01	|Q	|	|	| V	|
883	5+18	0.9559	1.00	|Q	|	|	| V	|
884	5+19	0.9572	0.99	|Q	|	|	| V	|
885	5+20	0.9586	0.98	|Q	|	|	| V	|
886	5+21	0.9599	0.97	|Q	|	|	| V	|
887	5+22	0.9613	0.97	|Q	|	|	| V	|
888	5+23	0.9626	0.96	|Q	|	|	| V	|
889	5+24	0.9639	0.95	|Q	|	|	| V	|
890	5+25	0.9652	0.94	|Q	|	|	| V	|
891	5+26	0.9665	0.94	|Q	|	|	| V	|
892	5+27	0.9678	0.93	|Q	|	|	| V	|
893	5+28	0.9690	0.92	|Q	|	|	| V	|
894	5+29	0.9703	0.91	|Q	|	|	| V	|
895	5+30	0.9715	0.91	|Q	|	|	| V	|
896	5+31	0.9728	0.90	|Q	|	|	| V	|
897	5+32	0.9740	0.89	|Q	|	|	| V	|

```
      5+33       0.9752      0.89  |Q        |         |         |        V |
      5+34       0.9764      0.88  |Q        |         |         |        V |
      5+35       0.9776      0.87  |Q        |         |         |        V |
      5+36       0.9788      0.87  |Q        |         |         |        V |
      5+37       0.9800      0.86  |Q        |         |         |        V |
      5+38       0.9812      0.86  |Q        |         |         |        V |
      5+39       0.9824      0.85  |Q        |         |         |        V |
      5+40       0.9835      0.85  |Q        |         |         |        V |
      5+41       0.9847      0.84  |Q        |         |         |         V|
      5+42       0.9859      0.83  |Q        |         |         |         V|
      5+43       0.9870      0.83  |Q        |         |         |         V|
      5+44       0.9881      0.82  |Q        |         |         |         V|
      5+45       0.9893      0.82  |Q        |         |         |         V|
      5+46       0.9904      0.81  |Q        |         |         |         V|
      5+47       0.9915      0.81  |Q        |         |         |         V|
      5+48       0.9926      0.80  |Q        |         |         |         V|
      5+49       0.9937      0.80  |Q        |         |         |         V|
      5+50       0.9948      0.79  |Q        |         |         |         V|
      5+51       0.9959      0.79  |Q        |         |         |         V|
      5+52       0.9969      0.78  |Q        |         |         |         V|
      5+53       0.9980      0.78  |Q        |         |         |         V|
      5+54       0.9991      0.77  |Q        |         |         |         V|
      5+55       1.0001      0.77  |Q        |         |         |         V|
      5+56       1.0012      0.77  |Q        |         |         |         V|
      5+57       1.0022      0.76  |Q        |         |         |         V|
      5+58       1.0033      0.76  |Q        |         |         |         V|
      5+59       1.0043      0.75  |Q        |         |         |         V|
      6+ 0       1.0054      0.75  |Q        |         |         |         V|
      6+ 1       1.0064      0.74  |Q        |         |         |         V|
      6+ 2       1.0074      0.74  |Q        |         |         |         V|
      6+ 3       1.0084      0.74  |Q        |         |         |         V|
      6+ 4       1.0094      0.73  |Q        |         |         |          V
-------------------------------------------------------------------------------



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.100 to Point/Station      404.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.781(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     7.70 min.
Rainfall intensity =      6.781(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.561  CA =      4.029
Subarea runoff =      2.621(CFS) for      1.133(Ac.)
Total runoff =     27.319(CFS)  Total area =       7.187(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station      404.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.781(In/Hr) for a   100.0 year storm
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
```

```
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     7.70 min.
Rainfall intensity =      6.781(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.554  CA =      4.104
Subarea runoff =      0.510(CFS) for      0.215(Ac.)
Total runoff =     27.830(CFS)  Total area =       7.402(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station     1004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   624.340(Ft.)
Downstream point/station elevation =   616.370(Ft.)
Pipe length  =   479.55(Ft.) Slope =   0.0166  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    27.830(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    27.830(CFS)
Normal flow depth in pipe =   18.75(In.)
Flow top width inside pipe =   19.84(In.)
Critical Depth =   21.90(In.)
Pipe flow velocity =     10.57(Ft/s)
Travel time through pipe =    0.76 min.
Time of concentration (TC) =     8.46 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      7.402(Ac.)
Runoff from this stream =     27.830(CFS)
Time of concentration =    8.46 min.
Rainfall intensity =     6.383(In/Hr)
Summary of stream data:

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


1       15.693      8.97             6.145
2        6.671     10.83             5.440
3       27.830      8.46             6.383
Qmax(1) =
       1.000 *    1.000 *    15.693) +
       1.000 *    0.828 *     6.671) +
       0.963 *    1.000 *    27.830) + =      48.007
Qmax(2) =
       0.885 *    1.000 *    15.693) +
       1.000 *    1.000 *     6.671) +
       0.852 *    1.000 *    27.830) + =      44.284
Qmax(3) =
       1.000 *    0.943 *    15.693) +
       1.000 *    0.781 *     6.671) +
       1.000 *    1.000 *    27.830) + =      47.831

Total of 3 streams to confluence:
Flow rates before confluence point:
      15.693       6.671      27.830
Maximum flow rates at confluence using above data:
       48.007       44.284       47.831
Area of streams before confluence:
        7.039        2.358        7.402
Results of confluence:
```

```
Total flow rate =     48.007(CFS)
Time of concentration =     8.969 min.
Effective stream area after confluence =     16.799(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.500 to Point/Station     1004.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Rainfall intensity (I) =      6.145(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =     8.97 min.
Rainfall intensity =      6.145(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.470  CA =      7.907
Subarea runoff =      0.581(CFS) for      0.027(Ac.)
Total runoff =     48.589(CFS)  Total area =      16.826(Ac.)
End of computations, total study area =          16.826 (Ac.)
```

ATTACHMENT 5

POST-DEVELOPMENT

POC-2

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/24/25
--------------------------------------------------------------------------
24044 Post Development Poc 2
File 1 of 2.
100 Year Study
24044post1poc2
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2001.000 to Point/Station     2002.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1033.850(Ft.)
Lowest elevation = 1020.630(Ft.)
Elevation difference =   13.220(Ft.) Slope = 13.220 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  13.22 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.71 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  13.220^(1/3)]=   5.71
Rainfall intensity (I) =      8.223(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      1.068(CFS)
Total initial stream area =        0.371(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2002.000 to Point/Station     2003.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     49.875(CFS)
Depth of flow =   1.163(Ft.), Average velocity =  10.772(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              19.62
    2             20.00              11.97
    3             50.00               0.00
    4             80.00               6.91
    5            100.00              13.34
Manning's 'N' friction factor =   0.040
------------------------------------------------------------------
Sub-Channel flow  =     49.875(CFS)
  '     '    flow top width =      7.963(Ft.)
  '     '    velocity=   10.772(Ft/s)
  '     '    area =      4.630(Sq.Ft)
  '     '    Froude number =     2.490

Upstream point elevation =  1020.630(Ft.)
Downstream point elevation =   735.210(Ft.)
Flow length =  1554.100(Ft.)
Travel time  =    2.40 min.
Time of concentration =    8.11 min.
Depth of flow =   1.163(Ft.)
Average velocity =  10.772(Ft/s)
Total irregular channel flow =    49.875(CFS)
Irregular channel normal depth above invert elev. =   1.163(Ft.)
Average velocity of channel(s) =  10.772(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.555(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.990
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.348
Rainfall intensity =      6.555(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     15.043
Subarea runoff =     97.542(CFS) for     42.791(Ac.)
Total runoff =     98.610(CFS)  Total area =      43.162(Ac.)
Depth of flow =   1.502(Ft.), Average velocity =  12.774(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.000 to Point/Station     2003.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      6.555(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.11 min.
Rainfall intensity =      6.555(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     15.153
Subarea runoff =      0.727(CFS) for      0.317(Ac.)
Total runoff =     99.337(CFS)  Total area =      43.479(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2003.100
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
```

```
Upstream point/station elevation =   731.700(Ft.)
Downstream point/station elevation =   718.780(Ft.)
Pipe length  =   404.50(Ft.) Slope =   0.0319  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    99.337(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =    99.337(CFS)
Normal flow depth in pipe =   22.29(In.)
Flow top width inside pipe =   41.92(In.)
Critical Depth =   36.72(In.)
Pipe flow velocity =     19.15(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =     8.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station     2003.100
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.378(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.47 min.
Rainfall intensity =      6.378(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     15.770
Subarea runoff =      1.247(CFS) for      1.761(Ac.)
Total runoff =    100.585(CFS)  Total area =      45.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station     2003.100
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.378(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.47 min.
Rainfall intensity =      6.378(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     18.504
Subarea runoff =     17.440(CFS) for      7.812(Ac.)
Total runoff =    118.024(CFS)  Total area =      53.052(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        8.000 to Point/Station     2003.100
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.378(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
```

```
Time of concentration =     8.47 min.
Rainfall intensity =      6.378(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     18.779
Subarea runoff =      1.757(CFS) for      0.787(Ac.)
Total runoff =    119.781(CFS)  Total area =      53.839(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.100 to Point/Station     2003.200
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   718.780(Ft.)
Downstream point/station elevation =   711.360(Ft.)
Pipe length  =   268.50(Ft.) Slope =   0.0276  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   119.781(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =   119.781(CFS)
Normal flow depth in pipe =   26.30(In.)
Flow top width inside pipe =   40.64(In.)
Critical Depth =   38.95(In.)
Pipe flow velocity =     18.90(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =     8.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        9.000 to Point/Station     2003.200
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      6.266(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.70 min.
Rainfall intensity =      6.266(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     21.202
Subarea runoff =     13.066(CFS) for      6.921(Ac.)
Total runoff =    132.847(CFS)  Total area =      60.760(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.200 to Point/Station     2003.300
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   711.360(Ft.)
Downstream point/station elevation =   705.160(Ft.)
Pipe length  =   110.50(Ft.) Slope =   0.0561  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   132.847(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =   132.847(CFS)
Normal flow depth in pipe =   22.41(In.)
Flow top width inside pipe =   41.91(In.)
Critical Depth =   39.87(In.)
Pipe flow velocity =     25.44(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     8.78 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station     2003.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
```

```
Rainfall intensity (I) =      6.232(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.78 min.
Rainfall intensity =      6.232(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     22.391
Subarea runoff =      6.702(CFS) for      3.397(Ac.)
Total runoff =    139.549(CFS)  Total area =      64.157(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station     2003.300
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Rainfall intensity (I) =      6.232(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.78 min.
Rainfall intensity =      6.232(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     22.625
Subarea runoff =      1.462(CFS) for      0.670(Ac.)
Total runoff =    141.010(CFS)  Total area =      64.827(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2003.500
**** PIPEFLOW TRAVEL TIME (User specified size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   705.160(Ft.)
Downstream point/station elevation =   693.560(Ft.)
Pipe length  =   110.50(Ft.) Slope =   0.1050  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   141.010(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =   141.010(CFS)
Normal flow depth in pipe =   19.31(In.)
Flow top width inside pipe =   41.86(In.)
Critical depth could not be calculated.
Pipe flow velocity =     32.66(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     8.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.500 to Point/Station     2003.500
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     64.827(Ac.)
Runoff from this stream =    141.010(CFS)
Time of concentration =    8.83 min.
Rainfall intensity =     6.207(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
```

```
**** INITIAL AREA EVALUATION ****

-------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                 ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  744.020(Ft.)
Lowest elevation =  744.000(Ft.)
Elevation difference =    0.020(Ft.) Slope =  0.020 %
Top of Initial Area Slope adjusted by User to  0.750 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 70.00 (Ft)
for the top area slope value of   0.75 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   9.61 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5200)*(  70.000^.5)/(   0.750^(1/3)]=   9.61
Rainfall intensity (I) =      5.876(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      0.461(CFS)
Total initial stream area =       0.151(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

-------------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      9.087(CFS)
Depth of flow =   0.349(Ft.), Average velocity =   5.081(Ft/s)
    ******* Irregular Channel Data ***********
-------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2             10.00              0.50
    3             10.00              0.00
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
-------------------------------------------------------------------
Sub-Channel flow  =      9.087(CFS)
  '     '    flow top width =     12.500(Ft.)
  '     '    velocity=    5.081(Ft/s)
  '     '    area =      1.788(Sq.Ft)
  '     '    Froude number =     2.367

Upstream point elevation =   744.000(Ft.)
Downstream point elevation =   709.520(Ft.)
Flow length =   944.640(Ft.)
Travel time  =    3.10 min.
Time of concentration =   12.71 min.
Depth of flow =   0.349(Ft.)
Average velocity =   5.081(Ft/s)
Total irregular channel flow =     9.087(CFS)
Irregular channel normal depth above invert elev. =   0.349(Ft.)
Average velocity of channel(s) =   5.081(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.907(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
[MEDIUM DENSITY RESIDENTIAL                 ]
```

```
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.509
Rainfall intensity =      4.907(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.509  CA =      3.593
Subarea runoff =     17.171(CFS) for      6.905(Ac.)
Total runoff =     17.632(CFS)  Total area =       7.056(Ac.)
Depth of flow =   0.419(Ft.), Average velocity =   6.610(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   709.520(Ft.)
Downstream point/station elevation =   695.000(Ft.)
Pipe length  =    43.93(Ft.) Slope =   0.3305  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.632(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =    17.632(CFS)
Normal flow depth in pipe =    8.58(In.)
Flow top width inside pipe =   10.84(In.)
Critical depth could not be calculated.
Pipe flow velocity =     29.33(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    12.74 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station     2003.500
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.056(Ac.)
Runoff from this stream =     17.632(CFS)
Time of concentration =   12.74 min.
Rainfall intensity =     4.901(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     5000.000 to Point/Station     5001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  231.000(Ft.)
Highest elevation = 1143.640(Ft.)
Lowest elevation = 1087.370(Ft.)
Elevation difference =   56.270(Ft.) Slope = 24.359 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  24.36 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.66 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  24.360^(1/3)]=   4.66
Calculated TC of    4.657 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      8.958(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      1.696(CFS)
```

```
      Total initial stream area =        0.541(Ac.)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station     5001.000 to Point/Station     5002.000
      **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
      ----------------------------------------------------------------------
      Estimated mean flow rate at midpoint of channel =     13.382(CFS)
      Depth of flow =   0.661(Ft.), Average velocity =   8.944(Ft/s)
          ******* Irregular Channel Data ***********
      ----------------------------------------------------------------------
      Information entered for subchannel number 1 :
      Point number      'X' coordinate     'Y' coordinate
          1              0.00              19.62
          2             20.00              11.97
          3             50.00               0.00
          4             80.00               6.91
          5            100.00              13.34
      Manning's 'N' friction factor =   0.040
      ----------------------------------------------------------------------
      Sub-Channel flow  =     13.382(CFS)
        '     '    flow top width =      4.527(Ft.)
        '     '    velocity=    8.944(Ft/s)
        '     '    area =      1.496(Sq.Ft)
        '     '    Froude number =     2.741

      Upstream point elevation =  1087.370(Ft.)
      Downstream point elevation =   731.450(Ft.)
      Flow length =  1324.000(Ft.)
      Travel time  =    2.47 min.
      Time of concentration =    7.12 min.
      Depth of flow =   0.661(Ft.)
      Average velocity =   8.944(Ft/s)
      Total irregular channel flow =    13.382(CFS)
      Irregular channel normal depth above invert elev. =   0.661(Ft.)
      Average velocity of channel(s) =   8.944(Ft/s)
       Adding area flow to channel
      Rainfall intensity (I) =      7.129(In/Hr) for a   100.0 year storm
      Decimal fraction soil group A = 0.010
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.990
      [UNDISTURBED NATURAL TERRAIN                ]
      (Permanent Open Space   )
      Impervious value, Ai = 0.000
      Sub-Area C Value = 0.348
      Rainfall intensity =      7.129(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for total area
      (Q=KCIA) is C = 0.349  CA =      3.507
      Subarea runoff =     23.303(CFS) for      9.519(Ac.)
      Total runoff =     25.000(CFS)  Total area =      10.060(Ac.)
      Depth of flow =   0.836(Ft.), Average velocity =  10.456(Ft/s)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station     5002.000 to Point/Station     5002.000
      **** 6 HOUR HYDROGRAPH ****
      ----------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


      Time of Concentration =   7.12
      Basin Area =    81.94 Acres
      6 Hour Rainfall =  3.400 Inches
      Runoff Coefficient =  0.043
      Peak Discharge =    25.00 CFS
           Time (Min)     Discharge (CFS)
             0              0.000
```

7	0.715	
14	0.725	
21	0.744	
28	0.754	
35	0.776	
42	0.788	
49	0.812	
56	0.825	
63	0.852	
70	0.867	
77	0.898	
84	0.915	
91	0.950	
98	0.970	
105	1.012	
112	1.035	
119	1.084	
126	1.111	
133	1.172	
140	1.205	
147	1.280	
154	1.322	
161	1.417	
168	1.472	
175	1.600	
182	1.675	
189	1.858	
196	1.971	
203	2.259	
210	2.449	
217	2.994	
224	3.410	
231	5.007	
238	7.054	
245	25.000	
252	4.016	
259	2.687	
266	2.102	
273	1.761	
280	1.533	
287	1.367	
294	1.241	
301	1.141	
308	1.059	
315	0.990	
322	0.932	
329	0.882	
336	0.838	
343	0.799	
350	0.765	
357	0.734	
364	0.706	

++

6 - 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

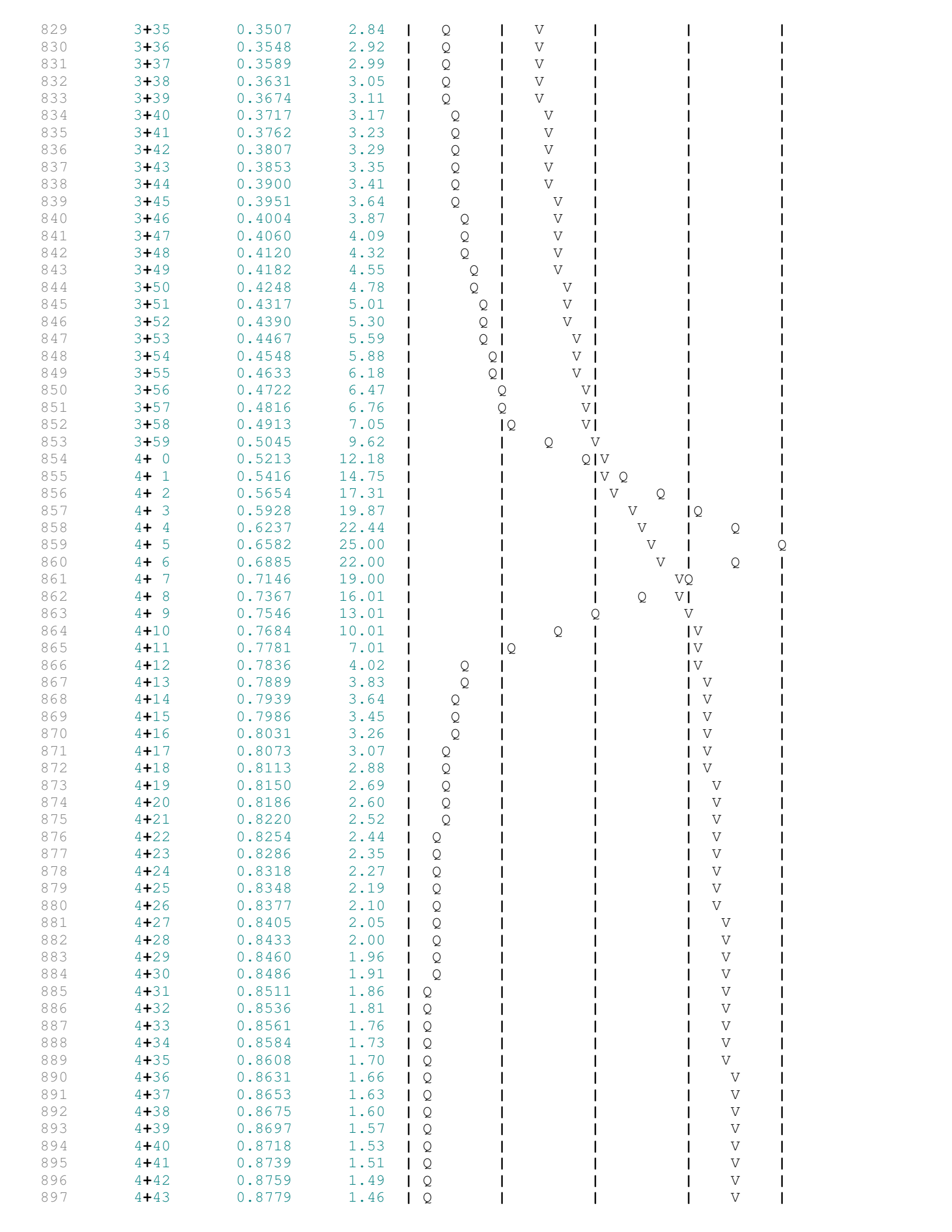
Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	6.2	12.5	18.7	25.0
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0001	0.10	Q	|	|	|	|
0+ 2	0.0004	0.20	Q	|	|	|	|
0+ 3	0.0008	0.31	Q	|	|	|	|
0+ 4	0.0014	0.41	Q	|	|	|	|
0+ 5	0.0021	0.51	Q	|	|	|	|
0+ 6	0.0030	0.61	Q	|	|	|	|
0+ 7	0.0039	0.72	VQ	|	|	|	|

622	0+ 8	0.0049	0.72	VQ	|	|	|	|
623	0+ 9	0.0059	0.72	VQ	|	|	|	|
624	0+10	0.0069	0.72	VQ	|	|	|	|
625	0+11	0.0079	0.72	VQ	|	|	|	|
626	0+12	0.0089	0.72	VQ	|	|	|	|
627	0+13	0.0099	0.72	VQ	|	|	|	|
628	0+14	0.0109	0.72	VQ	|	|	|	|
629	0+15	0.0119	0.73	VQ	|	|	|	|
630	0+16	0.0129	0.73	VQ	|	|	|	|
631	0+17	0.0139	0.73	VQ	|	|	|	|
632	0+18	0.0149	0.74	VQ	|	|	|	|
633	0+19	0.0159	0.74	VQ	|	|	|	|
634	0+20	0.0170	0.74	VQ	|	|	|	|
635	0+21	0.0180	0.74	VQ	|	|	|	|
636	0+22	0.0190	0.75	VQ	|	|	|	|
637	0+23	0.0200	0.75	VQ	|	|	|	|
638	0+24	0.0211	0.75	VQ	|	|	|	|
639	0+25	0.0221	0.75	VQ	|	|	|	|
640	0+26	0.0231	0.75	VQ	|	|	|	|
641	0+27	0.0242	0.75	VQ	|	|	|	|
642	0+28	0.0252	0.75	|Q	|	|	|	|
643	0+29	0.0263	0.76	|Q	|	|	|	|
644	0+30	0.0273	0.76	|Q	|	|	|	|
645	0+31	0.0284	0.76	|Q	|	|	|	|
646	0+32	0.0294	0.77	|Q	|	|	|	|
647	0+33	0.0305	0.77	|Q	|	|	|	|
648	0+34	0.0315	0.77	|Q	|	|	|	|
649	0+35	0.0326	0.78	|Q	|	|	|	|
650	0+36	0.0337	0.78	|Q	|	|	|	|
651	0+37	0.0348	0.78	|Q	|	|	|	|
652	0+38	0.0358	0.78	|Q	|	|	|	|
653	0+39	0.0369	0.78	|Q	|	|	|	|
654	0+40	0.0380	0.78	|Q	|	|	|	|
655	0+41	0.0391	0.79	|Q	|	|	|	|
656	0+42	0.0402	0.79	|Q	|	|	|	|
657	0+43	0.0412	0.79	|Q	|	|	|	|
658	0+44	0.0423	0.79	|Q	|	|	|	|
659	0+45	0.0434	0.80	|Q	|	|	|	|
660	0+46	0.0445	0.80	|Q	|	|	|	|
661	0+47	0.0456	0.80	|Q	|	|	|	|
662	0+48	0.0468	0.81	|Q	|	|	|	|
663	0+49	0.0479	0.81	|Q	|	|	|	|
664	0+50	0.0490	0.81	|Q	|	|	|	|
665	0+51	0.0501	0.82	|QV	|	|	|	|
666	0+52	0.0513	0.82	|QV	|	|	|	|
667	0+53	0.0524	0.82	|QV	|	|	|	|
668	0+54	0.0535	0.82	|QV	|	|	|	|
669	0+55	0.0546	0.82	|QV	|	|	|	|
670	0+56	0.0558	0.82	|QV	|	|	|	|
671	0+57	0.0569	0.83	|QV	|	|	|	|
672	0+58	0.0581	0.83	|QV	|	|	|	|
673	0+59	0.0592	0.84	|QV	|	|	|	|
674	1+ 0	0.0604	0.84	|QV	|	|	|	|
675	1+ 1	0.0615	0.84	|QV	|	|	|	|
676	1+ 2	0.0627	0.85	|QV	|	|	|	|
677	1+ 3	0.0639	0.85	|QV	|	|	|	|
678	1+ 4	0.0651	0.85	|QV	|	|	|	|
679	1+ 5	0.0662	0.86	|QV	|	|	|	|
680	1+ 6	0.0674	0.86	|QV	|	|	|	|
681	1+ 7	0.0686	0.86	|QV	|	|	|	|
682	1+ 8	0.0698	0.86	|QV	|	|	|	|
683	1+ 9	0.0710	0.86	|QV	|	|	|	|
684	1+10	0.0722	0.87	|QV	|	|	|	|
685	1+11	0.0734	0.87	|QV	|	|	|	|
686	1+12	0.0746	0.88	|Q V	|	|	|	|
687	1+13	0.0758	0.88	|Q V	|	|	|	|
688	1+14	0.0770	0.88	|Q V	|	|	|	|
689	1+15	0.0782	0.89	|Q V	|	|	|	|
690	1+16	0.0795	0.89	|Q V	|	|	|	|

691	1+17	0.0807	0.90	|Q V |	|	|	|
692	1+18	0.0819	0.90	|Q V |	|	|	|
693	1+19	0.0832	0.90	|Q V |	|	|	|
694	1+20	0.0844	0.91	|Q V |	|	|	|
695	1+21	0.0857	0.91	|Q V |	|	|	|
696	1+22	0.0869	0.91	|Q V |	|	|	|
697	1+23	0.0882	0.91	|Q V |	|	|	|
698	1+24	0.0895	0.91	|Q V |	|	|	|
699	1+25	0.0907	0.92	|Q V |	|	|	|
700	1+26	0.0920	0.92	|Q V |	|	|	|
701	1+27	0.0933	0.93	|Q V |	|	|	|
702	1+28	0.0946	0.94	|Q V |	|	|	|
703	1+29	0.0959	0.94	|Q V |	|	|	|
704	1+30	0.0972	0.95	|Q V |	|	|	|
705	1+31	0.0985	0.95	|Q V |	|	|	|
706	1+32	0.0998	0.95	|Q V |	|	|	|
707	1+33	0.1011	0.96	|Q V |	|	|	|
708	1+34	0.1024	0.96	|Q V |	|	|	|
709	1+35	0.1037	0.96	|Q V |	|	|	|
710	1+36	0.1051	0.96	|Q V |	|	|	|
711	1+37	0.1064	0.97	|Q V |	|	|	|
712	1+38	0.1077	0.97	|Q V |	|	|	|
713	1+39	0.1091	0.98	|Q V |	|	|	|
714	1+40	0.1104	0.98	|Q V |	|	|	|
715	1+41	0.1118	0.99	|Q V |	|	|	|
716	1+42	0.1132	0.99	|Q V |	|	|	|
717	1+43	0.1145	1.00	|Q V |	|	|	|
718	1+44	0.1159	1.01	|Q V |	|	|	|
719	1+45	0.1173	1.01	|Q V |	|	|	|
720	1+46	0.1187	1.02	|Q V |	|	|	|
721	1+47	0.1201	1.02	|Q V |	|	|	|
722	1+48	0.1215	1.02	|Q V |	|	|	|
723	1+49	0.1229	1.02	|Q V |	|	|	|
724	1+50	0.1244	1.03	|Q V |	|	|	|
725	1+51	0.1258	1.03	|Q V |	|	|	|
726	1+52	0.1272	1.03	|Q V |	|	|	|
727	1+53	0.1286	1.04	|Q V |	|	|	|
728	1+54	0.1301	1.05	|Q V |	|	|	|
729	1+55	0.1315	1.06	|Q V |	|	|	|
730	1+56	0.1330	1.06	|Q V |	|	|	|
731	1+57	0.1345	1.07	|Q V |	|	|	|
732	1+58	0.1360	1.08	|Q V |	|	|	|
733	1+59	0.1375	1.08	|Q V |	|	|	|
734	2+ 0	0.1390	1.09	|Q V |	|	|	|
735	2+ 1	0.1405	1.09	|Q V |	|	|	|
736	2+ 2	0.1420	1.10	|Q V |	|	|	|
737	2+ 3	0.1435	1.10	|Q V |	|	|	|
738	2+ 4	0.1450	1.10	|Q V |	|	|	|
739	2+ 5	0.1465	1.11	|Q V |	|	|	|
740	2+ 6	0.1481	1.11	|Q V |	|	|	|
741	2+ 7	0.1496	1.12	|Q V |	|	|	|
742	2+ 8	0.1512	1.13	|Q V |	|	|	|
743	2+ 9	0.1527	1.14	|Q V |	|	|	|
744	2+10	0.1543	1.15	|Q V |	|	|	|
745	2+11	0.1559	1.15	|Q V |	|	|	|
746	2+12	0.1575	1.16	|Q V |	|	|	|
747	2+13	0.1591	1.17	|Q V |	|	|	|
748	2+14	0.1607	1.18	|Q V |	|	|	|
749	2+15	0.1624	1.18	|Q V |	|	|	|
750	2+16	0.1640	1.19	|Q V |	|	|	|
751	2+17	0.1656	1.19	|Q V |	|	|	|
752	2+18	0.1673	1.20	|Q V |	|	|	|
753	2+19	0.1689	1.20	|Q V |	|	|	|
754	2+20	0.1706	1.20	|Q V |	|	|	|
755	2+21	0.1723	1.22	|Q V |	|	|	|
756	2+22	0.1739	1.23	|Q V |	|	|	|
757	2+23	0.1757	1.24	|Q V |	|	|	|
758	2+24	0.1774	1.25	|Q V |	|	|	|
759	2+25	0.1791	1.26	| Q V |	|	|	|

760	2+26	0.1809	1.27	Q V	|	|	|	|
761	2+27	0.1826	1.28	Q V	|	|	|	|
762	2+28	0.1844	1.29	Q V	|	|	|	|
763	2+29	0.1862	1.29	Q V	|	|	|	|
764	2+30	0.1880	1.30	Q V	|	|	|	|
765	2+31	0.1897	1.30	Q V	|	|	|	|
766	2+32	0.1916	1.31	Q V	|	|	|	|
767	2+33	0.1934	1.32	Q V	|	|	|	|
768	2+34	0.1952	1.32	Q V	|	|	|	|
769	2+35	0.1970	1.34	Q V	|	|	|	|
770	2+36	0.1989	1.35	Q V	|	|	|	|
771	2+37	0.2008	1.36	Q V	|	|	|	|
772	2+38	0.2027	1.38	Q V	|	|	|	|
773	2+39	0.2046	1.39	Q V	|	|	|	|
774	2+40	0.2065	1.40	Q V	|	|	|	|
775	2+41	0.2085	1.42	Q V	|	|	|	|
776	2+42	0.2104	1.42	Q V	|	|	|	|
777	2+43	0.2124	1.43	Q V	|	|	|	|
778	2+44	0.2144	1.44	Q V	|	|	|	|
779	2+45	0.2164	1.45	Q V	|	|	|	|
780	2+46	0.2184	1.46	Q V	|	|	|	|
781	2+47	0.2204	1.46	Q V	|	|	|	|
782	2+48	0.2224	1.47	Q V	|	|	|	|
783	2+49	0.2245	1.49	Q V	|	|	|	|
784	2+50	0.2265	1.51	Q V	|	|	|	|
785	2+51	0.2287	1.53	Q V	|	|	|	|
786	2+52	0.2308	1.55	Q V	|	|	|	|
787	2+53	0.2329	1.56	Q V	|	|	|	|
788	2+54	0.2351	1.58	Q V	|	|	|	|
789	2+55	0.2373	1.60	Q V	|	|	|	|
790	2+56	0.2395	1.61	Q V	|	|	|	|
791	2+57	0.2418	1.62	Q V	|	|	|	|
792	2+58	0.2440	1.63	Q V	|	|	|	|
793	2+59	0.2463	1.64	Q V	|	|	|	|
794	3+ 0	0.2486	1.65	Q V	|	|	|	|
795	3+ 1	0.2508	1.66	Q V	|	|	|	|
796	3+ 2	0.2532	1.68	Q V	|	|	|	|
797	3+ 3	0.2555	1.70	Q V	|	|	|	|
798	3+ 4	0.2579	1.73	Q V	|	|	|	|
799	3+ 5	0.2603	1.75	Q V	|	|	|	|
800	3+ 6	0.2627	1.78	Q V	|	|	|	|
801	3+ 7	0.2652	1.81	Q V	|	|	|	|
802	3+ 8	0.2678	1.83	Q V	|	|	|	|
803	3+ 9	0.2703	1.86	Q V	|	|	|	|
804	3+10	0.2729	1.87	Q V	|	|	|	|
805	3+11	0.2755	1.89	Q V	|	|	|	|
806	3+12	0.2781	1.91	Q V	|	|	|	|
807	3+13	0.2808	1.92	Q V	|	|	|	|
808	3+14	0.2834	1.94	Q V	|	|	|	|
809	3+15	0.2861	1.95	Q V	|	|	|	|
810	3+16	0.2889	1.97	Q V	|	|	|	|
811	3+17	0.2916	2.01	Q V	|	|	|	|
812	3+18	0.2945	2.05	Q V	|	|	|	|
813	3+19	0.2973	2.09	Q V	|	|	|	|
814	3+20	0.3003	2.14	Q V	|	|	|	|
815	3+21	0.3033	2.18	Q V	|	|	|	|
816	3+22	0.3063	2.22	Q V	|	|	|	|
817	3+23	0.3094	2.26	Q V	|	|	|	|
818	3+24	0.3126	2.29	Q V	|	|	|	|
819	3+25	0.3158	2.31	Q V	|	|	|	|
820	3+26	0.3190	2.34	Q V	|	|	|	|
821	3+27	0.3223	2.37	Q V	|	|	|	|
822	3+28	0.3256	2.39	Q V	|	|	|	|
823	3+29	0.3289	2.42	Q V	|	|	|	|
824	3+30	0.3323	2.45	Q V	|	|	|	|
825	3+31	0.3358	2.53	Q V	|	|	|	|
826	3+32	0.3393	2.60	Q V	|	|	|	|
827	3+33	0.3430	2.68	Q V	|	|	|	|
828	3+34	0.3468	2.76	Q V	|	|	|	|



898	4+44	0.8799	1.44	| Q	|	|	|	V |
899	4+45	0.8818	1.41	| Q	|	|	|	V |
900	4+46	0.8838	1.39	| Q	|	|	|	V |
901	4+47	0.8856	1.37	| Q	|	|	|	V |
902	4+48	0.8875	1.35	| Q	|	|	|	V |
903	4+49	0.8893	1.33	| Q	|	|	|	V |
904	4+50	0.8911	1.31	| Q	|	|	|	V |
905	4+51	0.8929	1.29	| Q	|	|	|	V |
906	4+52	0.8947	1.28	| Q	|	|	|	V |
907	4+53	0.8964	1.26	| Q	|	|	|	V |
908	4+54	0.8981	1.24	|Q	|	|	|	V |
909	4+55	0.8998	1.23	|Q	|	|	|	V |
910	4+56	0.9015	1.21	|Q	|	|	|	V |
911	4+57	0.9031	1.20	|Q	|	|	|	V |
912	4+58	0.9048	1.18	|Q	|	|	|	V |
913	4+59	0.9064	1.17	|Q	|	|	|	V |
914	5+ 0	0.9080	1.15	|Q	|	|	|	V |
915	5+ 1	0.9095	1.14	|Q	|	|	|	V |
916	5+ 2	0.9111	1.13	|Q	|	|	|	V |
917	5+ 3	0.9126	1.12	|Q	|	|	|	V |
918	5+ 4	0.9142	1.11	|Q	|	|	|	V |
919	5+ 5	0.9157	1.09	|Q	|	|	|	V |
920	5+ 6	0.9172	1.08	|Q	|	|	|	V |
921	5+ 7	0.9186	1.07	|Q	|	|	|	V |
922	5+ 8	0.9201	1.06	|Q	|	|	|	V |
923	5+ 9	0.9215	1.05	|Q	|	|	|	V |
924	5+10	0.9230	1.04	|Q	|	|	|	V |
925	5+11	0.9244	1.03	|Q	|	|	|	V |
926	5+12	0.9258	1.02	|Q	|	|	|	V |
927	5+13	0.9272	1.01	|Q	|	|	|	V |
928	5+14	0.9286	1.00	|Q	|	|	|	V |
929	5+15	0.9299	0.99	|Q	|	|	|	V |
930	5+16	0.9313	0.98	|Q	|	|	|	V |
931	5+17	0.9326	0.97	|Q	|	|	|	V |
932	5+18	0.9339	0.97	|Q	|	|	|	V |
933	5+19	0.9353	0.96	|Q	|	|	|	V |
934	5+20	0.9366	0.95	|Q	|	|	|	V |
935	5+21	0.9379	0.94	|Q	|	|	|	V |
936	5+22	0.9391	0.93	|Q	|	|	|	V |
937	5+23	0.9404	0.92	|Q	|	|	|	V |
938	5+24	0.9417	0.92	|Q	|	|	|	V |
939	5+25	0.9429	0.91	|Q	|	|	|	V |
940	5+26	0.9442	0.90	|Q	|	|	|	V |
941	5+27	0.9454	0.90	|Q	|	|	|	V |
942	5+28	0.9466	0.89	|Q	|	|	|	V |
943	5+29	0.9479	0.88	|Q	|	|	|	V |
944	5+30	0.9491	0.88	|Q	|	|	|	V |
945	5+31	0.9503	0.87	|Q	|	|	|	V |
946	5+32	0.9514	0.86	|Q	|	|	|	V |
947	5+33	0.9526	0.86	|Q	|	|	|	V |
948	5+34	0.9538	0.85	|Q	|	|	|	V |
949	5+35	0.9550	0.84	|Q	|	|	|	V |
950	5+36	0.9561	0.84	|Q	|	|	|	V |
951	5+37	0.9573	0.83	|Q	|	|	|	V |
952	5+38	0.9584	0.83	|Q	|	|	|	V |
953	5+39	0.9595	0.82	|Q	|	|	|	V |
954	5+40	0.9607	0.82	|Q	|	|	|	V |
955	5+41	0.9618	0.81	|Q	|	|	|	V|
956	5+42	0.9629	0.80	|Q	|	|	|	V|
957	5+43	0.9640	0.80	|Q	|	|	|	V|
958	5+44	0.9651	0.79	|Q	|	|	|	V|
959	5+45	0.9662	0.79	|Q	|	|	|	V|
960	5+46	0.9672	0.78	|Q	|	|	|	V|
961	5+47	0.9683	0.78	|Q	|	|	|	V|
962	5+48	0.9694	0.77	|Q	|	|	|	V|
963	5+49	0.9704	0.77	|Q	|	|	|	V|
964	5+50	0.9715	0.77	|Q	|	|	|	V|
965	5+51	0.9726	0.76	|Q	|	|	|	V|
966	5+52	0.9736	0.76	|Q	|	|	|	V|

```
      5+53       0.9746      0.75  |Q        |         |         |         V|
      5+54       0.9757      0.75  |Q        |         |         |         V|
      5+55       0.9767      0.74  |Q        |         |         |         V|
      5+56       0.9777      0.74  |Q        |         |         |         V|
      5+57       0.9787      0.73  |Q        |         |         |         V|
      5+58       0.9797      0.73  |Q        |         |         |         V|
      5+59       0.9807      0.73  |Q        |         |         |         V|
      6+ 0       0.9817      0.72  |Q        |         |         |         V|
      6+ 1       0.9827      0.72  |Q        |         |         |         V|
      6+ 2       0.9837      0.71  |Q        |         |         |         V|
      6+ 3       0.9847      0.71  |Q        |         |         |         V|
      6+ 4       0.9856      0.71  |Q        |         |         |          V
   ------------------------------------------------------------------------
```

```
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Process from Point/Station       12.000 to Point/Station     2003.500
   **** SUBAREA FLOW ADDITION ****

   ----------------------------------------------------------------------
   Rainfall intensity (I) =      7.129(In/Hr) for a   100.0 year storm
   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
   [UNDISTURBED NATURAL TERRAIN                ]
   (Permanent Open Space   )
   Impervious value, Ai = 0.000
   Sub-Area C Value = 0.350
   Time of concentration =     7.12 min.
   Rainfall intensity =      7.129(In/Hr) for a   100.0 year storm
   Effective runoff coefficient used for total area
   (Q=KCIA) is C = 0.349  CA =      4.206
   Subarea runoff =      4.985(CFS) for      1.998(Ac.)
   Total runoff =     29.985(CFS)  Total area =      12.058(Ac.)


   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Process from Point/Station     2003.500 to Point/Station     2003.500
   **** CONFLUENCE OF MINOR STREAMS ****

   ----------------------------------------------------------------------
   Along Main Stream number: 1 in normal stream number 3
   Stream flow area =     12.058(Ac.)
   Runoff from this stream =     29.985(CFS)
   Time of concentration =    7.12 min.
   Rainfall intensity =     7.129(In/Hr)
   Summary of stream data:

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


   1      141.010      8.83             6.207
   2       17.632     12.74             4.901
   3       29.985      7.12             7.129
   Qmax(1) =
          1.000 *    1.000 *   141.010) +
          1.000 *    0.693 *    17.632) +
          0.871 *    1.000 *    29.985) + =     179.341
   Qmax(2) =
          0.790 *    1.000 *   141.010) +
          1.000 *    1.000 *    17.632) +
          0.687 *    1.000 *    29.985) + =     149.590
   Qmax(3) =
          1.000 *    0.807 *   141.010) +
          1.000 *    0.559 *    17.632) +
```

```
        1.000 *    1.000 *    29.985) + =     153.601

Total of 3 streams to confluence:
Flow rates before confluence point:
     141.010      17.632      29.985
Maximum flow rates at confluence using above data:
      179.341      149.590      153.601
Area of streams before confluence:
       64.827        7.056       12.058
Results of confluence:
Total flow rate =    179.341(CFS)
Time of concentration =     8.831 min.
Effective stream area after confluence =     83.941(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.500 to Point/Station     2004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   696.000(Ft.)
Downstream point/station elevation =   676.980(Ft.)
Pipe length  =   637.67(Ft.) Slope =   0.0298  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   179.341(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   179.341(CFS)
Normal flow depth in pipe =   32.11(In.)
Flow top width inside pipe =   40.69(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.26(Ft/s)
Travel time through pipe =    0.50 min.
Time of concentration (TC) =     9.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.000 to Point/Station     2004.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     83.941(Ac.)
Runoff from this stream =    179.341(CFS)
Time of concentration =    9.33 min.
Rainfall intensity =     5.990(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3001.000 to Point/Station     3002.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1283.000(Ft.)
Lowest elevation = 1267.030(Ft.)
Elevation difference =   15.970(Ft.) Slope = 15.970 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  15.97 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.36 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
```

```
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  15.970^(1/3)]=   5.36
Rainfall intensity (I) =      8.564(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      1.897(CFS)
Total initial stream area =        0.633(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3002.000 to Point/Station     3003.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     64.560(CFS)
Depth of flow =   1.051(Ft.), Average velocity =  10.078(Ft/s)
    ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00             10.00
    2             25.00              5.00
    3             47.00              0.00
    4             83.00              5.00
    5            100.00             10.00
Manning's 'N' friction factor =   0.040
----------------------------------------------------------------
Sub-Channel flow  =     64.560(CFS)
  '     '    flow top width =     12.191(Ft.)
  '     '    velocity=   10.078(Ft/s)
  '     '    area =      6.406(Sq.Ft)
  '     '    Froude number =     2.450

Upstream point elevation =  1267.030(Ft.)
Downstream point elevation =   678.000(Ft.)
Flow length =  3324.800(Ft.)
Travel time  =    5.50 min.
Time of concentration =   10.86 min.
Depth of flow =   1.051(Ft.)
Average velocity =  10.078(Ft/s)
Total irregular channel flow =    64.560(CFS)
Irregular channel normal depth above invert elev. =   1.051(Ft.)
Average velocity of channel(s) =  10.078(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.432(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.960
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.348
Rainfall intensity =      5.432(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.348  CA =     23.407
Subarea runoff =    125.250(CFS) for     66.626(Ac.)
Total runoff =    127.148(CFS)  Total area =      67.259(Ac.)
Depth of flow =   1.355(Ft.), Average velocity =  11.938(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3003.000 to Point/Station     3003.000
**** 6 HOUR HYDROGRAPH ****
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =  10.86
Basin Area =   151.20 Acres
6 Hour Rainfall =  3.400 Inches
```

Runoff Coefficient = 0.155
Peak Discharge = 127.15 CFS

Time (Min)	Discharge (CFS)
0	0.000
10	4.762
20	4.850
30	5.041
40	5.143
50	5.366
60	5.486
70	5.750
80	5.894
90	6.213
100	6.390
110	6.786
120	7.008
130	7.515
140	7.806
150	8.485
160	8.885
170	9.854
180	10.451
190	11.979
200	12.989
210	15.876
220	18.083
230	26.551
240	37.410
250	127.148
260	21.296
270	14.248
280	11.148
290	9.338
300	8.127
310	7.250
320	6.580
330	6.049
340	5.614
350	5.251
360	4.943
370	4.677

++

6 - 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

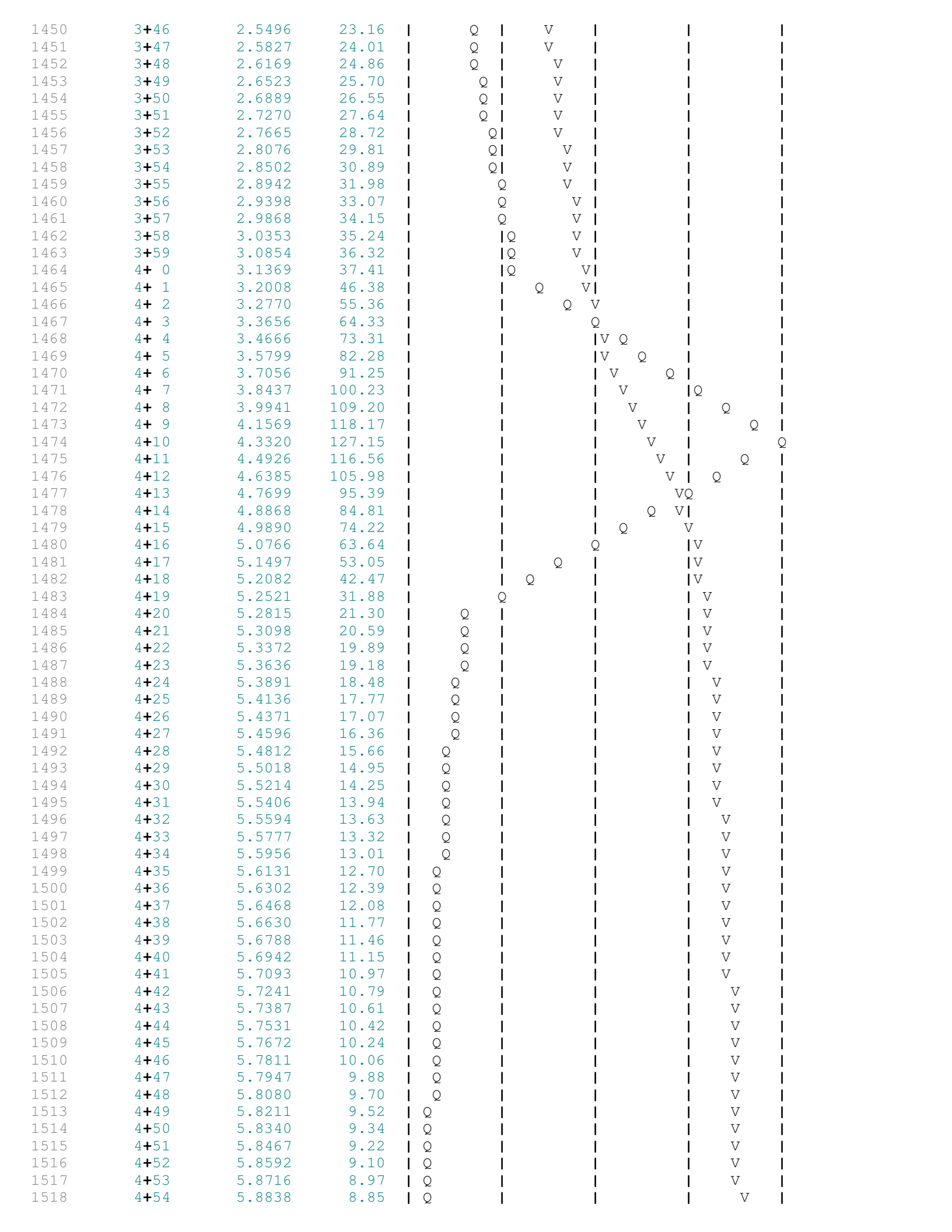
Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	31.8	63.6	95.4	127.1
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0007	0.48	Q	|	|	|	|
0+ 2	0.0020	0.95	Q	|	|	|	|
0+ 3	0.0039	1.43	Q	|	|	|	|
0+ 4	0.0066	1.90	Q	|	|	|	|
0+ 5	0.0098	2.38	Q	|	|	|	|
0+ 6	0.0138	2.86	Q	|	|	|	|
0+ 7	0.0184	3.33	VQ	|	|	|	|
0+ 8	0.0236	3.81	VQ	|	|	|	|
0+ 9	0.0295	4.29	VQ	|	|	|	|
0+10	0.0361	4.76	VQ	|	|	|	|
0+11	0.0426	4.77	VQ	|	|	|	|
0+12	0.0492	4.78	VQ	|	|	|	|
0+13	0.0558	4.79	VQ	|	|	|	|
0+14	0.0624	4.80	VQ	|	|	|	|
0+15	0.0690	4.81	VQ	|	|	|	|
0+16	0.0757	4.81	VQ	|	|	|	|
0+17	0.0823	4.82	VQ	|	|	|	|
0+18	0.0890	4.83	VQ	|	|	|	|

1243	0+19	0.0956	4.84	VQ	|	|	|	|
1244	0+20	0.1023	4.85	VQ	|	|	|	|
1245	0+21	0.1090	4.87	VQ	|	|	|	|
1246	0+22	0.1158	4.89	VQ	|	|	|	|
1247	0+23	0.1225	4.91	VQ	|	|	|	|
1248	0+24	0.1293	4.93	VQ	|	|	|	|
1249	0+25	0.1361	4.95	VQ	|	|	|	|
1250	0+26	0.1430	4.96	VQ	|	|	|	|
1251	0+27	0.1498	4.98	VQ	|	|	|	|
1252	0+28	0.1567	5.00	VQ	|	|	|	|
1253	0+29	0.1636	5.02	|Q	|	|	|	|
1254	0+30	0.1706	5.04	|Q	|	|	|	|
1255	0+31	0.1775	5.05	|Q	|	|	|	|
1256	0+32	0.1845	5.06	|Q	|	|	|	|
1257	0+33	0.1915	5.07	|Q	|	|	|	|
1258	0+34	0.1985	5.08	|Q	|	|	|	|
1259	0+35	0.2055	5.09	|Q	|	|	|	|
1260	0+36	0.2125	5.10	|Q	|	|	|	|
1261	0+37	0.2196	5.11	|Q	|	|	|	|
1262	0+38	0.2266	5.12	|Q	|	|	|	|
1263	0+39	0.2337	5.13	|Q	|	|	|	|
1264	0+40	0.2408	5.14	|Q	|	|	|	|
1265	0+41	0.2479	5.17	|Q	|	|	|	|
1266	0+42	0.2550	5.19	|Q	|	|	|	|
1267	0+43	0.2622	5.21	|Q	|	|	|	|
1268	0+44	0.2694	5.23	|Q	|	|	|	|
1269	0+45	0.2767	5.25	|Q	|	|	|	|
1270	0+46	0.2839	5.28	|Q	|	|	|	|
1271	0+47	0.2912	5.30	|Q	|	|	|	|
1272	0+48	0.2986	5.32	|Q	|	|	|	|
1273	0+49	0.3059	5.34	|Q	|	|	|	|
1274	0+50	0.3133	5.37	|Q	|	|	|	|
1275	0+51	0.3207	5.38	|Q	|	|	|	|
1276	0+52	0.3281	5.39	|QV	|	|	|	|
1277	0+53	0.3356	5.40	|QV	|	|	|	|
1278	0+54	0.3430	5.41	|QV	|	|	|	|
1279	0+55	0.3505	5.43	|QV	|	|	|	|
1280	0+56	0.3580	5.44	|QV	|	|	|	|
1281	0+57	0.3655	5.45	|QV	|	|	|	|
1282	0+58	0.3730	5.46	|QV	|	|	|	|
1283	0+59	0.3806	5.47	|QV	|	|	|	|
1284	1+ 0	0.3881	5.49	|QV	|	|	|	|
1285	1+ 1	0.3957	5.51	|QV	|	|	|	|
1286	1+ 2	0.4034	5.54	|QV	|	|	|	|
1287	1+ 3	0.4110	5.57	|QV	|	|	|	|
1288	1+ 4	0.4187	5.59	|QV	|	|	|	|
1289	1+ 5	0.4265	5.62	|QV	|	|	|	|
1290	1+ 6	0.4342	5.64	|QV	|	|	|	|
1291	1+ 7	0.4421	5.67	|QV	|	|	|	|
1292	1+ 8	0.4499	5.70	|QV	|	|	|	|
1293	1+ 9	0.4578	5.72	|QV	|	|	|	|
1294	1+10	0.4657	5.75	|QV	|	|	|	|
1295	1+11	0.4736	5.76	|QV	|	|	|	|
1296	1+12	0.4816	5.78	|QV	|	|	|	|
1297	1+13	0.4896	5.79	|QV	|	|	|	|
1298	1+14	0.4976	5.81	|Q V	|	|	|	|
1299	1+15	0.5056	5.82	|Q V	|	|	|	|
1300	1+16	0.5136	5.84	|Q V	|	|	|	|
1301	1+17	0.5217	5.85	|Q V	|	|	|	|
1302	1+18	0.5298	5.87	|Q V	|	|	|	|
1303	1+19	0.5379	5.88	|Q V	|	|	|	|
1304	1+20	0.5460	5.89	|Q V	|	|	|	|
1305	1+21	0.5542	5.93	|Q V	|	|	|	|
1306	1+22	0.5624	5.96	|Q V	|	|	|	|
1307	1+23	0.5706	5.99	|Q V	|	|	|	|
1308	1+24	0.5789	6.02	|Q V	|	|	|	|
1309	1+25	0.5873	6.05	|Q V	|	|	|	|
1310	1+26	0.5956	6.09	|Q V	|	|	|	|
1311	1+27	0.6041	6.12	|Q V	|	|	|	|

1312	1+28	0.6125	6.15	|Q V |	|	|	|
1313	1+29	0.6210	6.18	|Q V |	|	|	|
1314	1+30	0.6296	6.21	|Q V |	|	|	|
1315	1+31	0.6382	6.23	|Q V |	|	|	|
1316	1+32	0.6468	6.25	|Q V |	|	|	|
1317	1+33	0.6554	6.27	|Q V |	|	|	|
1318	1+34	0.6641	6.28	|Q V |	|	|	|
1319	1+35	0.6728	6.30	|Q V |	|	|	|
1320	1+36	0.6815	6.32	|Q V |	|	|	|
1321	1+37	0.6902	6.34	|Q V |	|	|	|
1322	1+38	0.6990	6.35	|Q V |	|	|	|
1323	1+39	0.7077	6.37	| Q V |	|	|	|
1324	1+40	0.7165	6.39	| Q V |	|	|	|
1325	1+41	0.7254	6.43	| Q V |	|	|	|
1326	1+42	0.7343	6.47	| Q V |	|	|	|
1327	1+43	0.7433	6.51	| Q V |	|	|	|
1328	1+44	0.7523	6.55	| Q V |	|	|	|
1329	1+45	0.7614	6.59	| Q V |	|	|	|
1330	1+46	0.7705	6.63	| Q V |	|	|	|
1331	1+47	0.7797	6.67	| Q V |	|	|	|
1332	1+48	0.7889	6.71	| Q V |	|	|	|
1333	1+49	0.7982	6.75	| Q V |	|	|	|
1334	1+50	0.8075	6.79	| Q V |	|	|	|
1335	1+51	0.8169	6.81	| Q V |	|	|	|
1336	1+52	0.8263	6.83	| Q V |	|	|	|
1337	1+53	0.8358	6.85	| Q V |	|	|	|
1338	1+54	0.8452	6.87	| Q V |	|	|	|
1339	1+55	0.8547	6.90	| Q V |	|	|	|
1340	1+56	0.8643	6.92	| Q V |	|	|	|
1341	1+57	0.8738	6.94	| Q V |	|	|	|
1342	1+58	0.8834	6.96	| Q V |	|	|	|
1343	1+59	0.8930	6.99	| Q V |	|	|	|
1344	2+ 0	0.9027	7.01	| Q V |	|	|	|
1345	2+ 1	0.9124	7.06	| Q V |	|	|	|
1346	2+ 2	0.9222	7.11	| Q V |	|	|	|
1347	2+ 3	0.9321	7.16	| Q V |	|	|	|
1348	2+ 4	0.9420	7.21	| Q V |	|	|	|
1349	2+ 5	0.9520	7.26	| Q V |	|	|	|
1350	2+ 6	0.9621	7.31	| Q V |	|	|	|
1351	2+ 7	0.9722	7.36	| Q V |	|	|	|
1352	2+ 8	0.9824	7.41	| Q V |	|	|	|
1353	2+ 9	0.9927	7.46	| Q V |	|	|	|
1354	2+10	1.0031	7.52	| Q V |	|	|	|
1355	2+11	1.0135	7.54	| Q V |	|	|	|
1356	2+12	1.0239	7.57	| Q V |	|	|	|
1357	2+13	1.0344	7.60	| Q V |	|	|	|
1358	2+14	1.0449	7.63	| Q V |	|	|	|
1359	2+15	1.0554	7.66	| Q V |	|	|	|
1360	2+16	1.0660	7.69	| Q V |	|	|	|
1361	2+17	1.0767	7.72	| Q V |	|	|	|
1362	2+18	1.0873	7.75	| Q V |	|	|	|
1363	2+19	1.0980	7.78	| Q V |	|	|	|
1364	2+20	1.1088	7.81	| Q V |	|	|	|
1365	2+21	1.1196	7.87	| Q V |	|	|	|
1366	2+22	1.1306	7.94	| Q V |	|	|	|
1367	2+23	1.1416	8.01	| Q V |	|	|	|
1368	2+24	1.1527	8.08	| Q V |	|	|	|
1369	2+25	1.1640	8.15	| Q V |	|	|	|
1370	2+26	1.1753	8.21	| Q V |	|	|	|
1371	2+27	1.1867	8.28	| Q V |	|	|	|
1372	2+28	1.1982	8.35	| Q V |	|	|	|
1373	2+29	1.2098	8.42	| Q V |	|	|	|
1374	2+30	1.2215	8.48	| Q V |	|	|	|
1375	2+31	1.2332	8.52	| Q V |	|	|	|
1376	2+32	1.2450	8.56	| Q V |	|	|	|
1377	2+33	1.2568	8.60	| Q V |	|	|	|
1378	2+34	1.2688	8.65	| Q V |	|	|	|
1379	2+35	1.2807	8.69	| Q V |	|	|	|
1380	2+36	1.2927	8.73	| Q V |	|	|	|

1381	2+37	1.3048	8.77	Q V			
1382	2+38	1.3169	8.81	Q V			
1383	2+39	1.3291	8.85	Q V			
1384	2+40	1.3414	8.89	Q V			
1385	2+41	1.3537	8.98	Q V			
1386	2+42	1.3662	9.08	Q V			
1387	2+43	1.3789	9.18	Q V			
1388	2+44	1.3916	9.27	Q V			
1389	2+45	1.4046	9.37	Q V			
1390	2+46	1.4176	9.47	Q V			
1391	2+47	1.4308	9.56	Q V			
1392	2+48	1.4441	9.66	Q V			
1393	2+49	1.4575	9.76	Q V			
1394	2+50	1.4711	9.85	Q V			
1395	2+51	1.4847	9.91	Q V			
1396	2+52	1.4985	9.97	Q V			
1397	2+53	1.5123	10.03	Q V			
1398	2+54	1.5262	10.09	Q V			
1399	2+55	1.5402	10.15	Q V			
1400	2+56	1.5543	10.21	Q V			
1401	2+57	1.5684	10.27	Q V			
1402	2+58	1.5826	10.33	Q V			
1403	2+59	1.5969	10.39	Q V			
1404	3+ 0	1.6113	10.45	Q V			
1405	3+ 1	1.6259	10.60	Q V			
1406	3+ 2	1.6408	10.76	Q V			
1407	3+ 3	1.6558	10.91	Q V			
1408	3+ 4	1.6710	11.06	Q V			
1409	3+ 5	1.6865	11.21	Q V			
1410	3+ 6	1.7021	11.37	Q V			
1411	3+ 7	1.7180	11.52	Q V			
1412	3+ 8	1.7341	11.67	Q V			
1413	3+ 9	1.7504	11.83	Q V			
1414	3+10	1.7669	11.98	Q V			
1415	3+11	1.7835	12.08	Q V			
1416	3+12	1.8003	12.18	Q V			
1417	3+13	1.8172	12.28	Q V			
1418	3+14	1.8343	12.38	Q V			
1419	3+15	1.8515	12.48	Q V			
1420	3+16	1.8688	12.58	Q V			
1421	3+17	1.8863	12.69	Q V			
1422	3+18	1.9039	12.79	Q V			
1423	3+19	1.9216	12.89	Q V			
1424	3+20	1.9395	12.99	Q V			
1425	3+21	1.9578	13.28	Q V			
1426	3+22	1.9765	13.57	Q V			
1427	3+23	1.9956	13.85	Q V			
1428	3+24	2.0151	14.14	Q V			
1429	3+25	2.0349	14.43	Q V			
1430	3+26	2.0552	14.72	Q V			
1431	3+27	2.0759	15.01	Q V			
1432	3+28	2.0970	15.30	Q V			
1433	3+29	2.1184	15.59	Q V			
1434	3+30	2.1403	15.88	Q V			
1435	3+31	2.1625	16.10	Q V			
1436	3+32	2.1849	16.32	Q V			
1437	3+33	2.2077	16.54	Q V			
1438	3+34	2.2308	16.76	Q V			
1439	3+35	2.2542	16.98	Q V			
1440	3+36	2.2779	17.20	Q V			
1441	3+37	2.3019	17.42	Q V			
1442	3+38	2.3262	17.64	Q V			
1443	3+39	2.3508	17.86	Q V			
1444	3+40	2.3757	18.08	Q V			
1445	3+41	2.4018	18.93	Q V			
1446	3+42	2.4290	19.78	Q V			
1447	3+43	2.4574	20.62	Q V			
1448	3+44	2.4870	21.47	Q V			
1449	3+45	2.5177	22.32	Q V			



1519	4+55	5.8958	8.73	| Q	|	|	|	V |
1520	4+56	5.9077	8.61	| Q	|	|	|	V |
1521	4+57	5.9194	8.49	| Q	|	|	|	V |
1522	4+58	5.9309	8.37	| Q	|	|	|	V |
1523	4+59	5.9423	8.25	| Q	|	|	|	V |
1524	5+ 0	5.9535	8.13	| Q	|	|	|	V |
1525	5+ 1	5.9645	8.04	| Q	|	|	|	V |
1526	5+ 2	5.9755	7.95	| Q	|	|	|	V |
1527	5+ 3	5.9863	7.86	| Q	|	|	|	V |
1528	5+ 4	5.9970	7.78	| Q	|	|	|	V |
1529	5+ 5	6.0076	7.69	| Q	|	|	|	V |
1530	5+ 6	6.0181	7.60	| Q	|	|	|	V |
1531	5+ 7	6.0284	7.51	| Q	|	|	|	V |
1532	5+ 8	6.0387	7.43	| Q	|	|	|	V |
1533	5+ 9	6.0488	7.34	| Q	|	|	|	V |
1534	5+10	6.0588	7.25	| Q	|	|	|	V |
1535	5+11	6.0687	7.18	| Q	|	|	|	V |
1536	5+12	6.0785	7.12	| Q	|	|	|	V |
1537	5+13	6.0882	7.05	| Q	|	|	|	V |
1538	5+14	6.0978	6.98	| Q	|	|	|	V |
1539	5+15	6.1073	6.92	| Q	|	|	|	V |
1540	5+16	6.1167	6.85	| Q	|	|	|	V |
1541	5+17	6.1261	6.78	| Q	|	|	|	V |
1542	5+18	6.1353	6.71	| Q	|	|	|	V |
1543	5+19	6.1445	6.65	| Q	|	|	|	V |
1544	5+20	6.1536	6.58	| Q	|	|	|	V |
1545	5+21	6.1625	6.53	| Q	|	|	|	V |
1546	5+22	6.1715	6.47	| Q	|	|	|	V |
1547	5+23	6.1803	6.42	| Q	|	|	|	V |
1548	5+24	6.1891	6.37	| Q	|	|	|	V |
1549	5+25	6.1978	6.31	|Q	|	|	|	V |
1550	5+26	6.2064	6.26	|Q	|	|	|	V |
1551	5+27	6.2150	6.21	|Q	|	|	|	V |
1552	5+28	6.2234	6.15	|Q	|	|	|	V |
1553	5+29	6.2318	6.10	|Q	|	|	|	V |
1554	5+30	6.2402	6.05	|Q	|	|	|	V |
1555	5+31	6.2484	6.01	|Q	|	|	|	V |
1556	5+32	6.2566	5.96	|Q	|	|	|	V |
1557	5+33	6.2648	5.92	|Q	|	|	|	V |
1558	5+34	6.2729	5.87	|Q	|	|	|	V |
1559	5+35	6.2809	5.83	|Q	|	|	|	V |
1560	5+36	6.2889	5.79	|Q	|	|	|	V |
1561	5+37	6.2968	5.74	|Q	|	|	|	V |
1562	5+38	6.3047	5.70	|Q	|	|	|	V |
1563	5+39	6.3125	5.66	|Q	|	|	|	V |
1564	5+40	6.3202	5.61	|Q	|	|	|	V |
1565	5+41	6.3279	5.58	|Q	|	|	|	V |
1566	5+42	6.3355	5.54	|Q	|	|	|	V |
1567	5+43	6.3431	5.51	|Q	|	|	|	V |
1568	5+44	6.3506	5.47	|Q	|	|	|	V |
1569	5+45	6.3581	5.43	|Q	|	|	|	V |
1570	5+46	6.3655	5.40	|Q	|	|	|	V |
1571	5+47	6.3729	5.36	|Q	|	|	|	V|
1572	5+48	6.3803	5.32	|Q	|	|	|	V|
1573	5+49	6.3875	5.29	|Q	|	|	|	V|
1574	5+50	6.3948	5.25	|Q	|	|	|	V|
1575	5+51	6.4020	5.22	|Q	|	|	|	V|
1576	5+52	6.4091	5.19	|Q	|	|	|	V|
1577	5+53	6.4162	5.16	|Q	|	|	|	V|
1578	5+54	6.4233	5.13	|Q	|	|	|	V|
1579	5+55	6.4303	5.10	|Q	|	|	|	V|
1580	5+56	6.4373	5.07	|Q	|	|	|	V|
1581	5+57	6.4442	5.04	|Q	|	|	|	V|
1582	5+58	6.4511	5.00	|Q	|	|	|	V|
1583	5+59	6.4580	4.97	|Q	|	|	|	V|
1584	6+ 0	6.4648	4.94	|Q	|	|	|	V|
1585	6+ 1	6.4715	4.92	|Q	|	|	|	V|
1586	6+ 2	6.4783	4.89	|Q	|	|	|	V|
1587	6+ 3	6.4850	4.86	|Q	|	|	|	V|

```
     6+ 4       6.4916      4.84  |Q        |         |         |         V|
     6+ 5       6.4983      4.81  |Q        |         |         |         V|
     6+ 6       6.5049      4.78  |Q        |         |         |         V|
     6+ 7       6.5114      4.76  |Q        |         |         |         V|
     6+ 8       6.5179      4.73  |Q        |         |         |         V|
     6+ 9       6.5244      4.70  |Q        |         |         |         V|
     6+10       6.5308      4.68  |Q        |         |         |          V
-------------------------------------------------------------------------------



 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station     3003.000 to Point/Station     3003.000
 **** CONFLUENCE OF MINOR STREAMS ****
 ____________________________________________________________________________
 Along Main Stream number: 2 in normal stream number 1
 Stream flow area =     67.259(Ac.)
 Runoff from this stream =    127.148(CFS)
 Time of concentration =   10.86 min.
 Rainfall intensity =     5.432(In/Hr)


 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station      601.000 to Point/Station      602.000
 **** INITIAL AREA EVALUATION ****
 ____________________________________________________________________________
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 [MEDIUM DENSITY RESIDENTIAL                  ]
 (4.3 DU/A or Less       )
 Impervious value, Ai = 0.300
 Sub-Area C Value = 0.520
 Initial subarea total flow distance  =  100.000(Ft.)
 Highest elevation =  726.020(Ft.)
 Lowest elevation =  726.000(Ft.)
 Elevation difference =    0.020(Ft.) Slope =  0.020 %
 Top of Initial Area Slope adjusted by User to  0.500 %
 INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
 The maximum overland flow distance is 50.00 (Ft)
 for the top area slope value of   0.50 %, in a development type of
  4.3 DU/A or Less
 In Accordance With Figure 3-3
 Initial Area Time of Concentration =   9.30 minutes
 TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
 TC = [1.8*(1.1-0.5200)*(  50.000^.5)/(   0.500^(1/3)]=   9.30
 Rainfall intensity (I) =      6.003(In/Hr) for a   100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
 Subarea runoff =      0.425(CFS)
 Total initial stream area =        0.136(Ac.)


 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station      602.000 to Point/Station      603.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
 ____________________________________________________________________________
 Estimated mean flow rate at midpoint of channel =      8.186(CFS)
 Depth of flow =   0.328(Ft.), Average velocity =   5.353(Ft/s)
     ******* Irregular Channel Data ***********
 ---------------------------------------------------------------
 Information entered for subchannel number 1 :
 Point number      'X' coordinate     'Y' coordinate
     1              0.00              0.70
     2             10.00              0.50
     3             10.00              0.00
```

```
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
-----------------------------------------------------------------
Sub-Channel flow  =      8.186(CFS)
  '      '    flow top width =     12.500(Ft.)
  '      '    velocity=    5.353(Ft/s)
  '      '    area =       1.529(Sq.Ft)
  '      '    Froude number =     2.697

Upstream point elevation =   726.000(Ft.)
Downstream point elevation =   696.540(Ft.)
Flow length =   591.644(Ft.)
Travel time  =    1.84 min.
Time of concentration =   11.14 min.
Depth of flow =   0.328(Ft.)
Average velocity =   5.353(Ft/s)
Total irregular channel flow =     8.186(CFS)
Irregular channel normal depth above invert elev. =   0.328(Ft.)
Average velocity of channel(s) =   5.353(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.342(In/Hr) for a   100.0 year storm
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
[MEDIUM DENSITY RESIDENTIAL                 ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Rainfall intensity =      5.342(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.520  CA =      2.972
Subarea runoff =     15.452(CFS) for      5.579(Ac.)
Total runoff =     15.876(CFS)  Total area =       5.715(Ac.)
Depth of flow =   0.388(Ft.), Average velocity =   6.964(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   693.350(Ft.)
Downstream point/station elevation =   692.230(Ft.)
Pipe length  =   220.00(Ft.) Slope =   0.0051  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.876(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    15.876(CFS)
Normal flow depth in pipe =   19.31(In.)
Flow top width inside pipe =   19.03(In.)
Critical Depth =   17.23(In.)
Pipe flow velocity =      5.86(Ft/s)
Travel time through pipe =    0.63 min.
Time of concentration (TC) =    11.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station     3003.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   696.230(Ft.)
Downstream point/station elevation =   678.000(Ft.)
Pipe length  =    45.28(Ft.) Slope =   0.4026  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.876(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =    15.876(CFS)
Normal flow depth in pipe =    7.42(In.)
Flow top width inside pipe =   11.66(In.)
Critical depth could not be calculated.
```

```
Pipe flow velocity =     31.17(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    11.79 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3003.000 to Point/Station     3003.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 2 in normal stream number 2
Stream flow area =      5.715(Ac.)
Runoff from this stream =     15.876(CFS)
Time of concentration =   11.79 min.
Rainfall intensity =     5.150(In/Hr)
Summary of stream data:

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


1      127.148     10.86             5.432
2       15.876     11.79             5.150
Qmax(1) =
       1.000 *    1.000 *   127.148) +
       1.000 *    0.921 *    15.876) + =     141.767
Qmax(2) =
       0.948 *    1.000 *   127.148) +
       1.000 *    1.000 *    15.876) + =     136.435

Total of 2 streams to confluence:
Flow rates before confluence point:
     127.148      15.876
Maximum flow rates at confluence using above data:
      141.767      136.435
Area of streams before confluence:
       67.259        5.715
Results of confluence:
Total flow rate =    141.767(CFS)
Time of concentration =    10.859 min.
Effective stream area after confluence =     72.974(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3003.000 to Point/Station     3003.000
**** 6 HOUR HYDROGRAPH ****
________________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =  10.86
Basin Area =   156.91 Acres
6 Hour Rainfall =  3.400 Inches
Runoff Coefficient =  0.168
Peak Discharge =   141.77 CFS
     Time (Min)     Discharge (CFS)
       0              0.000
       10              5.366
       20              5.466
       30              5.681
       40              5.796
       50              6.047
       60              6.183
       70              6.480
       80              6.643
       90              7.002
       100              7.201
       110              7.647
       120              7.898
```

130	8.469	
140	8.797	
150	9.562	
160	10.013	
170	11.105	
180	11.777	
190	13.500	
200	14.638	
210	17.891	
220	20.379	
230	29.922	
240	42.159	
250	141.767	
260	23.999	
270	16.057	
280	12.564	
290	10.523	
300	9.159	
310	8.171	
320	7.416	
330	6.817	
340	6.327	
350	5.918	
360	5.571	
370	5.271	

++

6 - H O U R S T O R M

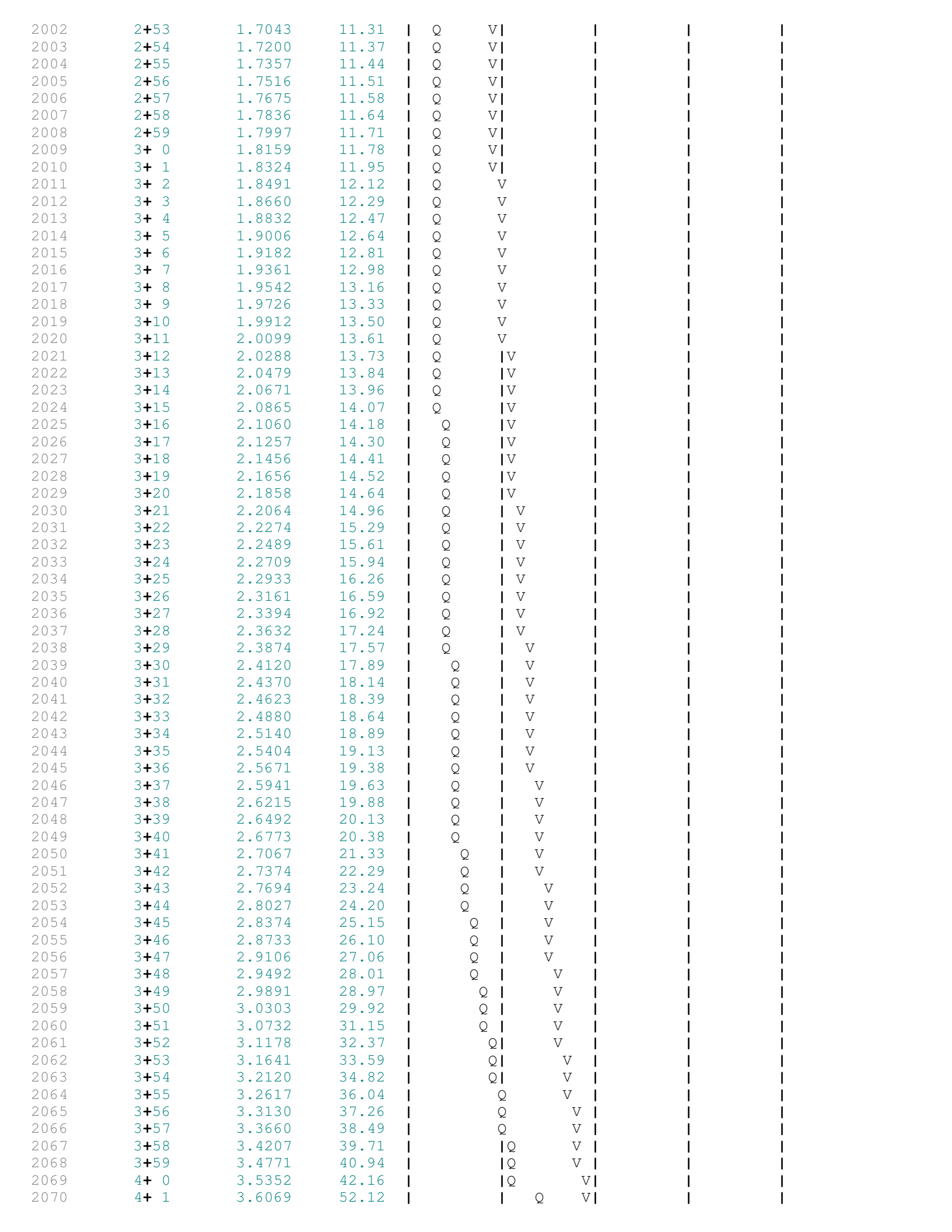
R u n o f f H y d r o g r a p h

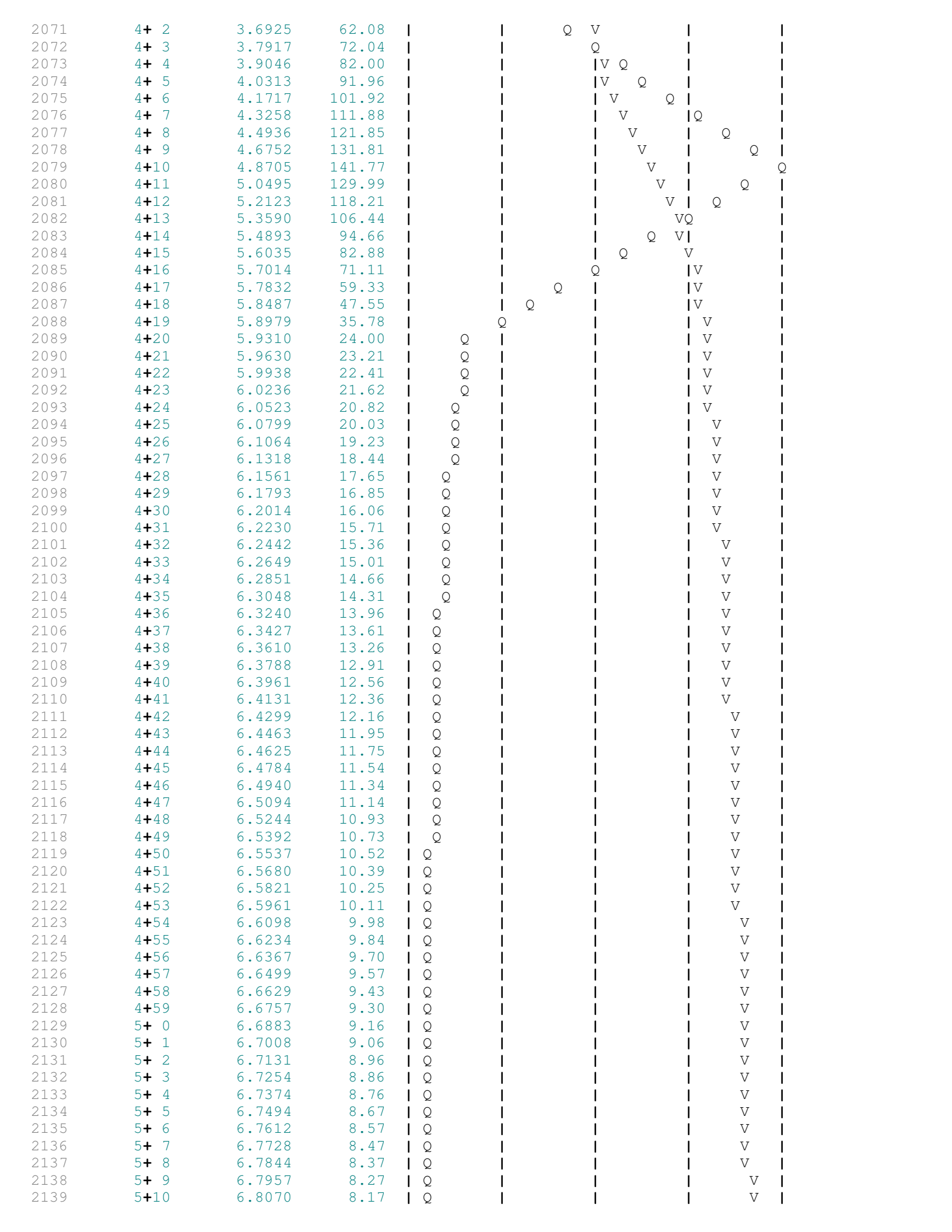
Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	35.4	70.9	106.3	141.8
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0007	0.54	Q	|	|	|	|
0+ 2	0.0022	1.07	Q	|	|	|	|
0+ 3	0.0044	1.61	Q	|	|	|	|
0+ 4	0.0074	2.15	Q	|	|	|	|
0+ 5	0.0111	2.68	Q	|	|	|	|
0+ 6	0.0155	3.22	Q	|	|	|	|
0+ 7	0.0207	3.76	VQ	|	|	|	|
0+ 8	0.0266	4.29	VQ	|	|	|	|
0+ 9	0.0333	4.83	VQ	|	|	|	|
0+10	0.0407	5.37	VQ	|	|	|	|
0+11	0.0481	5.38	VQ	|	|	|	|
0+12	0.0555	5.39	VQ	|	|	|	|
0+13	0.0629	5.40	VQ	|	|	|	|
0+14	0.0704	5.41	VQ	|	|	|	|
0+15	0.0778	5.42	VQ	|	|	|	|
0+16	0.0853	5.43	VQ	|	|	|	|
0+17	0.0928	5.44	VQ	|	|	|	|
0+18	0.1003	5.45	VQ	|	|	|	|
0+19	0.1078	5.46	VQ	|	|	|	|
0+20	0.1153	5.47	VQ	|	|	|	|
0+21	0.1229	5.49	VQ	|	|	|	|
0+22	0.1305	5.51	VQ	|	|	|	|
0+23	0.1381	5.53	VQ	|	|	|	|
0+24	0.1457	5.55	VQ	|	|	|	|
0+25	0.1534	5.57	VQ	|	|	|	|
0+26	0.1611	5.59	VQ	|	|	|	|
0+27	0.1689	5.62	VQ	|	|	|	|
0+28	0.1766	5.64	VQ	|	|	|	|
0+29	0.1844	5.66	|Q	|	|	|	|
0+30	0.1922	5.68	|Q	|	|	|	|
0+31	0.2001	5.69	|Q	|	|	|	|
0+32	0.2079	5.70	|Q	|	|	|	|
0+33	0.2158	5.72	|Q	|	|	|	|
0+34	0.2237	5.73	|Q	|	|	|	|

1864	0+35	0.2316	5.74	|Q	|	|	|	|
1865	0+36	0.2395	5.75	|Q	|	|	|	|
1866	0+37	0.2475	5.76	|Q	|	|	|	|
1867	0+38	0.2554	5.77	|Q	|	|	|	|
1868	0+39	0.2634	5.78	|Q	|	|	|	|
1869	0+40	0.2714	5.80	|Q	|	|	|	|
1870	0+41	0.2794	5.82	|Q	|	|	|	|
1871	0+42	0.2874	5.85	|Q	|	|	|	|
1872	0+43	0.2955	5.87	|Q	|	|	|	|
1873	0+44	0.3036	5.90	|Q	|	|	|	|
1874	0+45	0.3118	5.92	|Q	|	|	|	|
1875	0+46	0.3200	5.95	|Q	|	|	|	|
1876	0+47	0.3282	5.97	|Q	|	|	|	|
1877	0+48	0.3365	6.00	|Q	|	|	|	|
1878	0+49	0.3448	6.02	|Q	|	|	|	|
1879	0+50	0.3531	6.05	|Q	|	|	|	|
1880	0+51	0.3614	6.06	|Q	|	|	|	|
1881	0+52	0.3698	6.07	|QV	|	|	|	|
1882	0+53	0.3782	6.09	|QV	|	|	|	|
1883	0+54	0.3866	6.10	|QV	|	|	|	|
1884	0+55	0.3950	6.11	|QV	|	|	|	|
1885	0+56	0.4035	6.13	|QV	|	|	|	|
1886	0+57	0.4119	6.14	|QV	|	|	|	|
1887	0+58	0.4204	6.16	|QV	|	|	|	|
1888	0+59	0.4289	6.17	|QV	|	|	|	|
1889	1+ 0	0.4374	6.18	|QV	|	|	|	|
1890	1+ 1	0.4460	6.21	|QV	|	|	|	|
1891	1+ 2	0.4546	6.24	|QV	|	|	|	|
1892	1+ 3	0.4632	6.27	|QV	|	|	|	|
1893	1+ 4	0.4719	6.30	|QV	|	|	|	|
1894	1+ 5	0.4806	6.33	|QV	|	|	|	|
1895	1+ 6	0.4894	6.36	|QV	|	|	|	|
1896	1+ 7	0.4982	6.39	|QV	|	|	|	|
1897	1+ 8	0.5070	6.42	|QV	|	|	|	|
1898	1+ 9	0.5159	6.45	|QV	|	|	|	|
1899	1+10	0.5248	6.48	|QV	|	|	|	|
1900	1+11	0.5338	6.50	|QV	|	|	|	|
1901	1+12	0.5427	6.51	|QV	|	|	|	|
1902	1+13	0.5517	6.53	|Q V	|	|	|	|
1903	1+14	0.5608	6.55	|Q V	|	|	|	|
1904	1+15	0.5698	6.56	|Q V	|	|	|	|
1905	1+16	0.5789	6.58	|Q V	|	|	|	|
1906	1+17	0.5879	6.59	|Q V	|	|	|	|
1907	1+18	0.5970	6.61	|Q V	|	|	|	|
1908	1+19	0.6062	6.63	|Q V	|	|	|	|
1909	1+20	0.6153	6.64	|Q V	|	|	|	|
1910	1+21	0.6245	6.68	|Q V	|	|	|	|
1911	1+22	0.6338	6.71	|Q V	|	|	|	|
1912	1+23	0.6431	6.75	|Q V	|	|	|	|
1913	1+24	0.6524	6.79	|Q V	|	|	|	|
1914	1+25	0.6618	6.82	|Q V	|	|	|	|
1915	1+26	0.6713	6.86	|Q V	|	|	|	|
1916	1+27	0.6808	6.89	|Q V	|	|	|	|
1917	1+28	0.6903	6.93	|Q V	|	|	|	|
1918	1+29	0.6999	6.97	|Q V	|	|	|	|
1919	1+30	0.7095	7.00	|Q V	|	|	|	|
1920	1+31	0.7192	7.02	|Q V	|	|	|	|
1921	1+32	0.7289	7.04	|Q V	|	|	|	|
1922	1+33	0.7386	7.06	|Q V	|	|	|	|
1923	1+34	0.7484	7.08	|Q V	|	|	|	|
1924	1+35	0.7582	7.10	| Q V	|	|	|	|
1925	1+36	0.7680	7.12	| Q V	|	|	|	|
1926	1+37	0.7778	7.14	| Q V	|	|	|	|
1927	1+38	0.7877	7.16	| Q V	|	|	|	|
1928	1+39	0.7976	7.18	| Q V	|	|	|	|
1929	1+40	0.8075	7.20	| Q V	|	|	|	|
1930	1+41	0.8175	7.25	| Q V	|	|	|	|
1931	1+42	0.8275	7.29	| Q V	|	|	|	|
1932	1+43	0.8376	7.34	| Q V	|	|	|	|

1933	1+44	0.8478	7.38	Q V			
1934	1+45	0.8580	7.42	Q V			
1935	1+46	0.8683	7.47	Q V			
1936	1+47	0.8787	7.51	Q V			
1937	1+48	0.8891	7.56	Q V			
1938	1+49	0.8995	7.60	Q V			
1939	1+50	0.9101	7.65	Q V			
1940	1+51	0.9206	7.67	Q V			
1941	1+52	0.9312	7.70	Q V			
1942	1+53	0.9419	7.72	Q V			
1943	1+54	0.9526	7.75	Q V			
1944	1+55	0.9633	7.77	Q V			
1945	1+56	0.9740	7.80	Q V			
1946	1+57	0.9848	7.82	Q V			
1947	1+58	0.9956	7.85	Q V			
1948	1+59	1.0064	7.87	Q V			
1949	2+ 0	1.0173	7.90	Q V			
1950	2+ 1	1.0283	7.96	Q V			
1951	2+ 2	1.0393	8.01	Q V			
1952	2+ 3	1.0504	8.07	Q V			
1953	2+ 4	1.0616	8.13	Q V			
1954	2+ 5	1.0729	8.18	Q V			
1955	2+ 6	1.0842	8.24	Q V			
1956	2+ 7	1.0957	8.30	Q V			
1957	2+ 8	1.1072	8.36	Q V			
1958	2+ 9	1.1188	8.41	Q V			
1959	2+10	1.1304	8.47	Q V			
1960	2+11	1.1421	8.50	Q V			
1961	2+12	1.1539	8.53	Q V			
1962	2+13	1.1657	8.57	Q V			
1963	2+14	1.1775	8.60	Q V			
1964	2+15	1.1894	8.63	Q V			
1965	2+16	1.2014	8.67	Q V			
1966	2+17	1.2133	8.70	Q V			
1967	2+18	1.2254	8.73	Q V			
1968	2+19	1.2374	8.76	Q V			
1969	2+20	1.2496	8.80	Q V			
1970	2+21	1.2618	8.87	Q V			
1971	2+22	1.2741	8.95	Q V			
1972	2+23	1.2865	9.03	Q V			
1973	2+24	1.2991	9.10	Q V			
1974	2+25	1.3117	9.18	Q V			
1975	2+26	1.3245	9.26	Q V			
1976	2+27	1.3373	9.33	Q V			
1977	2+28	1.3503	9.41	Q V			
1978	2+29	1.3634	9.49	Q V			
1979	2+30	1.3765	9.56	Q V			
1980	2+31	1.3898	9.61	Q V			
1981	2+32	1.4031	9.65	Q V			
1982	2+33	1.4164	9.70	Q V			
1983	2+34	1.4298	9.74	Q V			
1984	2+35	1.4433	9.79	Q V			
1985	2+36	1.4569	9.83	Q V			
1986	2+37	1.4705	9.88	Q V			
1987	2+38	1.4841	9.92	Q V			
1988	2+39	1.4979	9.97	Q V			
1989	2+40	1.5117	10.01	Q V			
1990	2+41	1.5256	10.12	Q V			
1991	2+42	1.5397	10.23	Q V			
1992	2+43	1.5539	10.34	Q V			
1993	2+44	1.5683	10.45	Q V			
1994	2+45	1.5829	10.56	Q V			
1995	2+46	1.5976	10.67	Q V			
1996	2+47	1.6124	10.78	Q V			
1997	2+48	1.6274	10.89	Q V			
1998	2+49	1.6426	11.00	Q V			
1999	2+50	1.6579	11.11	Q V			
2000	2+51	1.6732	11.17	Q V			
2001	2+52	1.6887	11.24	Q V			





```
      5+11       6.8181      8.10  | Q       |         |         |       V  |
      5+12       6.8292      8.02  | Q       |         |         |       V  |
      5+13       6.8401      7.94  | Q       |         |         |       V  |
      5+14       6.8510      7.87  | Q       |         |         |       V  |
      5+15       6.8617      7.79  | Q       |         |         |       V  |
      5+16       6.8723      7.72  | Q       |         |         |       V  |
      5+17       6.8829      7.64  | Q       |         |         |       V  |
      5+18       6.8933      7.57  | Q       |         |         |       V  |
      5+19       6.9036      7.49  | Q       |         |         |       V  |
      5+20       6.9138      7.42  | Q       |         |         |       V  |
      5+21       6.9240      7.36  | Q       |         |         |       V  |
      5+22       6.9340      7.30  | Q       |         |         |       V  |
      5+23       6.9440      7.24  | Q       |         |         |       V  |
      5+24       6.9539      7.18  | Q       |         |         |       V  |
      5+25       6.9637      7.12  | Q       |         |         |       V  |
      5+26       6.9734      7.06  |Q        |         |         |        V |
      5+27       6.9830      7.00  |Q        |         |         |        V |
      5+28       6.9926      6.94  |Q        |         |         |        V |
      5+29       7.0020      6.88  |Q        |         |         |        V |
      5+30       7.0114      6.82  |Q        |         |         |        V |
      5+31       7.0208      6.77  |Q        |         |         |        V |
      5+32       7.0300      6.72  |Q        |         |         |        V |
      5+33       7.0392      6.67  |Q        |         |         |        V |
      5+34       7.0483      6.62  |Q        |         |         |        V |
      5+35       7.0574      6.57  |Q        |         |         |        V |
      5+36       7.0663      6.52  |Q        |         |         |        V |
      5+37       7.0753      6.47  |Q        |         |         |        V |
      5+38       7.0841      6.42  |Q        |         |         |        V |
      5+39       7.0929      6.38  |Q        |         |         |        V |
      5+40       7.1016      6.33  |Q        |         |         |        V |
      5+41       7.1103      6.29  |Q        |         |         |        V |
      5+42       7.1189      6.25  |Q        |         |         |        V |
      5+43       7.1274      6.20  |Q        |         |         |        V |
      5+44       7.1359      6.16  |Q        |         |         |        V |
      5+45       7.1443      6.12  |Q        |         |         |        V |
      5+46       7.1527      6.08  |Q        |         |         |        V |
      5+47       7.1610      6.04  |Q        |         |         |         V|
      5+48       7.1693      6.00  |Q        |         |         |         V|
      5+49       7.1775      5.96  |Q        |         |         |         V|
      5+50       7.1857      5.92  |Q        |         |         |         V|
      5+51       7.1938      5.88  |Q        |         |         |         V|
      5+52       7.2018      5.85  |Q        |         |         |         V|
      5+53       7.2098      5.81  |Q        |         |         |         V|
      5+54       7.2178      5.78  |Q        |         |         |         V|
      5+55       7.2257      5.74  |Q        |         |         |         V|
      5+56       7.2336      5.71  |Q        |         |         |         V|
      5+57       7.2414      5.67  |Q        |         |         |         V|
      5+58       7.2492      5.64  |Q        |         |         |         V|
      5+59       7.2569      5.61  |Q        |         |         |         V|
      6+ 0       7.2645      5.57  |Q        |         |         |         V|
      6+ 1       7.2722      5.54  |Q        |         |         |         V|
      6+ 2       7.2798      5.51  |Q        |         |         |         V|
      6+ 3       7.2873      5.48  |Q        |         |         |         V|
      6+ 4       7.2948      5.45  |Q        |         |         |         V|
      6+ 5       7.3023      5.42  |Q        |         |         |         V|
      6+ 6       7.3097      5.39  |Q        |         |         |         V|
      6+ 7       7.3171      5.36  |Q        |         |         |         V|
      6+ 8       7.3244      5.33  |Q        |         |         |         V|
      6+ 9       7.3317      5.30  |Q        |         |         |         V|
      6+10       7.3390      5.27  |Q        |         |         |          V
 ------------------------------------------------------------------------


 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 Process from Point/Station     3003.000 to Point/Station     2004.000
```

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

------------------------------------------------------------------------
Upstream point/station elevation =   682.670(Ft.)
Downstream point/station elevation =   676.980(Ft.)
Pipe length  =   100.00(Ft.) Slope =   0.0569  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   141.767(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =   141.767(CFS)
Normal flow depth in pipe =   26.48(In.)
Flow top width inside pipe =   31.75(In.)
Critical depth could not be calculated.
Pipe flow velocity =     25.44(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    10.92 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.000 to Point/Station     2004.000
**** CONFLUENCE OF MAIN STREAMS ****

------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     72.974(Ac.)
Runoff from this stream =    141.767(CFS)
Time of concentration =   10.92 min.
Rainfall intensity =     5.411(In/Hr)
Summary of stream data:

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


1      179.341      9.33             5.990
2      141.767     10.92             5.411
Qmax(1) =
       1.000 *    1.000 *   179.341) +
       1.000 *    0.854 *   141.767) + =     300.428
Qmax(2) =
       0.903 *    1.000 *   179.341) +
       1.000 *    1.000 *   141.767) + =     303.766

Total of 2 main streams to confluence:
Flow rates before confluence point:
     179.341     141.767
Maximum flow rates at confluence using above data:
      300.428      303.766
Area of streams before confluence:
       83.941       72.974


Results of confluence:
Total flow rate =    303.766(CFS)
Time of concentration =    10.925 min.
Effective stream area after confluence  =    156.915(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.000 to Point/Station     2004.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   676.980(Ft.)
Downstream point/station elevation =   643.750(Ft.)
Pipe length  =   761.28(Ft.) Slope =   0.0437  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   303.766(CFS)
Nearest computed pipe diameter  =     51.00(In.)
Calculated individual pipe flow  =   303.766(CFS)
Normal flow depth in pipe =   36.47(In.)
Flow top width inside pipe =   46.04(In.)
Critical depth could not be calculated.
```

```
2278       Pipe flow velocity =     27.97(Ft/s)
2279       Travel time through pipe =    0.45 min.
2280       Time of concentration (TC) =    11.38 min.
2281       End of computations, total study area =         156.915 (Ac.)
2282
2283
2284
```

ATTACHMENT 5

POST-DEVELOPMENT

POC-3

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            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/25/25
--------------------------------------------------------------------------
100 Year Study
24044 Post Development
POC 3
24044postpoc3.rd3
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 *********   Hydrology Study Control Information **********

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Program License Serial Number 6715

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Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


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Process from Point/Station      701.000 to Point/Station      702.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.480
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  772.060(Ft.)
Lowest elevation =  772.040(Ft.)
Elevation difference =    0.020(Ft.) Slope =  0.020 %
Top of Initial Area Slope adjusted by User to  0.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.50 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   9.94 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4800)*(  50.000^.5)/(   0.500^(1/3)]=   9.94
Rainfall intensity (I) =      5.750(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.480
Subarea runoff =      0.963(CFS)
Total initial stream area =        0.349(Ac.)


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Process from Point/Station      702.000 to Point/Station      703.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      6.318(CFS)
Depth of flow =   0.291(Ft.), Average velocity =   5.751(Ft/s)
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      ******* Irregular Channel Data ***********
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Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2             10.00              0.50
    3             10.00              0.00
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      6.318(CFS)
  '     '    flow top width =     10.620(Ft.)
  '     '    velocity=    5.751(Ft/s)
  '     '    area =      1.099(Sq.Ft)
  '     '    Froude number =     3.151

Upstream point elevation =   772.040(Ft.)
Downstream point elevation =   731.070(Ft.)
Flow length =   569.000(Ft.)
Travel time  =    1.65 min.
Time of concentration =   11.59 min.
Depth of flow =   0.291(Ft.)
Average velocity =   5.751(Ft/s)
Total irregular channel flow =     6.318(CFS)
Irregular channel normal depth above invert elev. =   0.291(Ft.)
Average velocity of channel(s) =   5.751(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.208(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.120
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.485
Rainfall intensity =      5.208(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.484  CA =      2.227
Subarea runoff =     10.638(CFS) for      4.249(Ac.)
Total runoff =     11.601(CFS)  Total area =       4.598(Ac.)
Depth of flow =   0.341(Ft.), Average velocity =   6.871(Ft/s)


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Process from Point/Station      703.000 to Point/Station      704.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   728.040(Ft.)
Downstream point/station elevation =   723.000(Ft.)
Pipe length  =   184.00(Ft.) Slope =   0.0274  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.601(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    11.601(CFS)
Normal flow depth in pipe =   10.76(In.)
Flow top width inside pipe =   17.65(In.)
Critical Depth =   15.57(In.)
Pipe flow velocity =     10.54(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =    11.88 min.


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Process from Point/Station      704.000 to Point/Station      704.000
**** 6 HOUR HYDROGRAPH ****
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Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003
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Time of Concentration = 11.88
Basin Area = 4.60 Acres
6 Hour Rainfall = 3.400 Inches
Runoff Coefficient = 0.484
Peak Discharge = 11.60 CFS

Time (Min)	Discharge (CFS)
0	0.000
11	0.451
22	0.460
33	0.480
44	0.491
55	0.515
66	0.527
77	0.556
88	0.572
99	0.607
110	0.627
121	0.672
132	0.699
143	0.759
154	0.795
165	0.882
176	0.935
187	1.072
198	1.162
209	1.421
220	1.618
231	2.376
242	3.348
253	11.601
264	1.906
275	1.275
286	0.998
297	0.836
308	0.727
319	0.649
330	0.589
341	0.541
352	0.502
363	0.470

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6 - 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

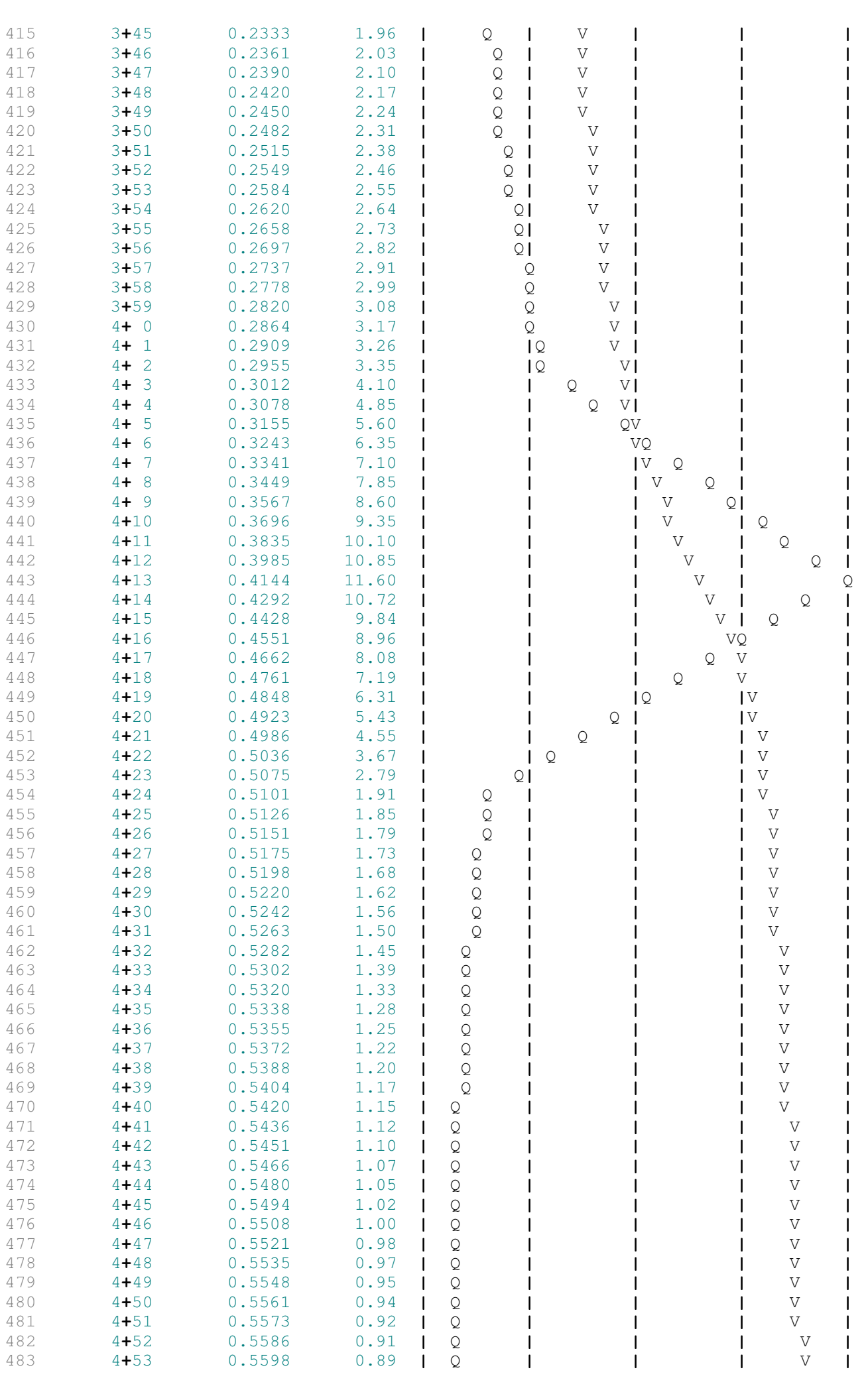
Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.9	5.8	8.7	11.6
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0001	0.04	Q	|	|	|	|
0+ 2	0.0002	0.08	Q	|	|	|	|
0+ 3	0.0003	0.12	Q	|	|	|	|
0+ 4	0.0006	0.16	Q	|	|	|	|
0+ 5	0.0008	0.21	Q	|	|	|	|
0+ 6	0.0012	0.25	Q	|	|	|	|
0+ 7	0.0016	0.29	Q	|	|	|	|
0+ 8	0.0020	0.33	VQ	|	|	|	|
0+ 9	0.0025	0.37	VQ	|	|	|	|
0+10	0.0031	0.41	VQ	|	|	|	|
0+11	0.0037	0.45	VQ	|	|	|	|
0+12	0.0044	0.45	VQ	|	|	|	|
0+13	0.0050	0.45	VQ	|	|	|	|
0+14	0.0056	0.45	VQ	|	|	|	|
0+15	0.0062	0.45	VQ	|	|	|	|
0+16	0.0069	0.46	VQ	|	|	|	|
0+17	0.0075	0.46	VQ	|	|	|	|

208	0+18	0.0081	0.46	VQ	|	|	|	|
209	0+19	0.0087	0.46	VQ	|	|	|	|
210	0+20	0.0094	0.46	VQ	|	|	|	|
211	0+21	0.0100	0.46	VQ	|	|	|	|
212	0+22	0.0106	0.46	VQ	|	|	|	|
213	0+23	0.0113	0.46	VQ	|	|	|	|
214	0+24	0.0119	0.46	VQ	|	|	|	|
215	0+25	0.0126	0.47	VQ	|	|	|	|
216	0+26	0.0132	0.47	VQ	|	|	|	|
217	0+27	0.0138	0.47	VQ	|	|	|	|
218	0+28	0.0145	0.47	VQ	|	|	|	|
219	0+29	0.0151	0.47	VQ	|	|	|	|
220	0+30	0.0158	0.47	|Q	|	|	|	|
221	0+31	0.0165	0.48	|Q	|	|	|	|
222	0+32	0.0171	0.48	|Q	|	|	|	|
223	0+33	0.0178	0.48	|Q	|	|	|	|
224	0+34	0.0184	0.48	|Q	|	|	|	|
225	0+35	0.0191	0.48	|Q	|	|	|	|
226	0+36	0.0198	0.48	|Q	|	|	|	|
227	0+37	0.0204	0.48	|Q	|	|	|	|
228	0+38	0.0211	0.49	|Q	|	|	|	|
229	0+39	0.0218	0.49	|Q	|	|	|	|
230	0+40	0.0224	0.49	|Q	|	|	|	|
231	0+41	0.0231	0.49	|Q	|	|	|	|
232	0+42	0.0238	0.49	|Q	|	|	|	|
233	0+43	0.0245	0.49	|Q	|	|	|	|
234	0+44	0.0251	0.49	|Q	|	|	|	|
235	0+45	0.0258	0.49	|Q	|	|	|	|
236	0+46	0.0265	0.50	|Q	|	|	|	|
237	0+47	0.0272	0.50	|Q	|	|	|	|
238	0+48	0.0279	0.50	|Q	|	|	|	|
239	0+49	0.0286	0.50	|Q	|	|	|	|
240	0+50	0.0293	0.50	|Q	|	|	|	|
241	0+51	0.0300	0.51	|Q	|	|	|	|
242	0+52	0.0307	0.51	|Q	|	|	|	|
243	0+53	0.0314	0.51	|QV	|	|	|	|
244	0+54	0.0321	0.51	|QV	|	|	|	|
245	0+55	0.0328	0.51	|QV	|	|	|	|
246	0+56	0.0335	0.52	|QV	|	|	|	|
247	0+57	0.0342	0.52	|QV	|	|	|	|
248	0+58	0.0349	0.52	|QV	|	|	|	|
249	0+59	0.0356	0.52	|QV	|	|	|	|
250	1+ 0	0.0363	0.52	|QV	|	|	|	|
251	1+ 1	0.0371	0.52	|QV	|	|	|	|
252	1+ 2	0.0378	0.52	|QV	|	|	|	|
253	1+ 3	0.0385	0.52	|QV	|	|	|	|
254	1+ 4	0.0392	0.53	|QV	|	|	|	|
255	1+ 5	0.0400	0.53	|QV	|	|	|	|
256	1+ 6	0.0407	0.53	|QV	|	|	|	|
257	1+ 7	0.0414	0.53	|QV	|	|	|	|
258	1+ 8	0.0421	0.53	|QV	|	|	|	|
259	1+ 9	0.0429	0.54	|QV	|	|	|	|
260	1+10	0.0436	0.54	|QV	|	|	|	|
261	1+11	0.0444	0.54	|QV	|	|	|	|
262	1+12	0.0451	0.54	|QV	|	|	|	|
263	1+13	0.0459	0.55	|QV	|	|	|	|
264	1+14	0.0466	0.55	|Q V	|	|	|	|
265	1+15	0.0474	0.55	|Q V	|	|	|	|
266	1+16	0.0481	0.55	|Q V	|	|	|	|
267	1+17	0.0489	0.56	|Q V	|	|	|	|
268	1+18	0.0497	0.56	|Q V	|	|	|	|
269	1+19	0.0504	0.56	|Q V	|	|	|	|
270	1+20	0.0512	0.56	|Q V	|	|	|	|
271	1+21	0.0520	0.56	|Q V	|	|	|	|
272	1+22	0.0528	0.56	|Q V	|	|	|	|
273	1+23	0.0535	0.56	|Q V	|	|	|	|
274	1+24	0.0543	0.57	|Q V	|	|	|	|
275	1+25	0.0551	0.57	|Q V	|	|	|	|
276	1+26	0.0559	0.57	|Q V	|	|	|	|

277	1+27	0.0567	0.57	|Q V	|	|	|	|
278	1+28	0.0575	0.57	|Q V	|	|	|	|
279	1+29	0.0583	0.58	|Q V	|	|	|	|
280	1+30	0.0590	0.58	|Q V	|	|	|	|
281	1+31	0.0598	0.58	| QV	|	|	|	|
282	1+32	0.0607	0.58	| QV	|	|	|	|
283	1+33	0.0615	0.59	| QV	|	|	|	|
284	1+34	0.0623	0.59	| Q V	|	|	|	|
285	1+35	0.0631	0.59	| Q V	|	|	|	|
286	1+36	0.0639	0.60	| Q V	|	|	|	|
287	1+37	0.0647	0.60	| Q V	|	|	|	|
288	1+38	0.0656	0.60	| Q V	|	|	|	|
289	1+39	0.0664	0.61	| Q V	|	|	|	|
290	1+40	0.0673	0.61	| Q V	|	|	|	|
291	1+41	0.0681	0.61	| Q V	|	|	|	|
292	1+42	0.0689	0.61	| Q V	|	|	|	|
293	1+43	0.0698	0.61	| Q V	|	|	|	|
294	1+44	0.0706	0.62	| Q V	|	|	|	|
295	1+45	0.0715	0.62	| Q V	|	|	|	|
296	1+46	0.0723	0.62	| Q V	|	|	|	|
297	1+47	0.0732	0.62	| Q V	|	|	|	|
298	1+48	0.0741	0.62	| Q V	|	|	|	|
299	1+49	0.0749	0.63	| Q V	|	|	|	|
300	1+50	0.0758	0.63	| Q V	|	|	|	|
301	1+51	0.0767	0.63	| Q V	|	|	|	|
302	1+52	0.0775	0.64	| Q V	|	|	|	|
303	1+53	0.0784	0.64	| Q V	|	|	|	|
304	1+54	0.0793	0.64	| Q V	|	|	|	|
305	1+55	0.0802	0.65	| Q V	|	|	|	|
306	1+56	0.0811	0.65	| Q V	|	|	|	|
307	1+57	0.0820	0.66	| Q V	|	|	|	|
308	1+58	0.0829	0.66	| Q V	|	|	|	|
309	1+59	0.0838	0.66	| Q V	|	|	|	|
310	2+ 0	0.0847	0.67	| Q V	|	|	|	|
311	2+ 1	0.0857	0.67	| Q V	|	|	|	|
312	2+ 2	0.0866	0.67	| Q V	|	|	|	|
313	2+ 3	0.0875	0.68	| Q V	|	|	|	|
314	2+ 4	0.0885	0.68	| Q V	|	|	|	|
315	2+ 5	0.0894	0.68	| Q V	|	|	|	|
316	2+ 6	0.0903	0.68	| Q V	|	|	|	|
317	2+ 7	0.0913	0.69	| Q V	|	|	|	|
318	2+ 8	0.0922	0.69	| Q V	|	|	|	|
319	2+ 9	0.0932	0.69	| Q V	|	|	|	|
320	2+10	0.0941	0.69	| Q V	|	|	|	|
321	2+11	0.0951	0.70	| Q V	|	|	|	|
322	2+12	0.0961	0.70	| Q V	|	|	|	|
323	2+13	0.0970	0.70	| Q V	|	|	|	|
324	2+14	0.0980	0.71	| Q V	|	|	|	|
325	2+15	0.0990	0.72	| Q V	|	|	|	|
326	2+16	0.1000	0.72	| Q V	|	|	|	|
327	2+17	0.1010	0.73	| Q V	|	|	|	|
328	2+18	0.1020	0.73	| Q V	|	|	|	|
329	2+19	0.1030	0.74	| Q V	|	|	|	|
330	2+20	0.1040	0.74	| Q V	|	|	|	|
331	2+21	0.1051	0.75	| Q V	|	|	|	|
332	2+22	0.1061	0.75	| Q V	|	|	|	|
333	2+23	0.1071	0.76	| Q V	|	|	|	|
334	2+24	0.1082	0.76	| Q V	|	|	|	|
335	2+25	0.1093	0.77	| Q V	|	|	|	|
336	2+26	0.1103	0.77	| Q V	|	|	|	|
337	2+27	0.1114	0.77	| Q V	|	|	|	|
338	2+28	0.1124	0.78	| Q V	|	|	|	|
339	2+29	0.1135	0.78	| Q V	|	|	|	|
340	2+30	0.1146	0.78	| Q V	|	|	|	|
341	2+31	0.1157	0.79	| Q V	|	|	|	|
342	2+32	0.1168	0.79	| Q V	|	|	|	|
343	2+33	0.1179	0.79	| Q V	|	|	|	|
344	2+34	0.1189	0.80	| Q V	|	|	|	|
345	2+35	0.1201	0.80	| Q V	|	|	|	|

346	2+36	0.1212	0.81	Q V			
347	2+37	0.1223	0.82	Q V			
348	2+38	0.1234	0.83	Q V			
349	2+39	0.1246	0.83	Q V			
350	2+40	0.1257	0.84	Q V			
351	2+41	0.1269	0.85	Q V			
352	2+42	0.1281	0.86	Q V			
353	2+43	0.1293	0.87	Q V			
354	2+44	0.1305	0.87	Q V			
355	2+45	0.1317	0.88	Q V			
356	2+46	0.1329	0.89	Q V			
357	2+47	0.1342	0.89	Q V			
358	2+48	0.1354	0.90	Q V			
359	2+49	0.1366	0.90	Q V			
360	2+50	0.1379	0.91	Q V			
361	2+51	0.1391	0.91	Q V			
362	2+52	0.1404	0.92	Q V			
363	2+53	0.1417	0.92	Q V			
364	2+54	0.1429	0.93	Q V			
365	2+55	0.1442	0.93	Q V			
366	2+56	0.1455	0.94	Q V			
367	2+57	0.1468	0.95	Q V			
368	2+58	0.1481	0.96	Q V			
369	2+59	0.1495	0.97	Q V			
370	3+ 0	0.1508	0.98	Q V			
371	3+ 1	0.1522	1.00	Q V			
372	3+ 2	0.1536	1.01	Q V			
373	3+ 3	0.1550	1.02	Q V			
374	3+ 4	0.1564	1.03	Q V			
375	3+ 5	0.1579	1.05	Q V			
376	3+ 6	0.1593	1.06	Q V			
377	3+ 7	0.1608	1.07	Q V			
378	3+ 8	0.1623	1.08	Q V			
379	3+ 9	0.1638	1.09	Q V			
380	3+10	0.1653	1.10	Q V			
381	3+11	0.1668	1.10	Q V			
382	3+12	0.1684	1.11	Q V			
383	3+13	0.1699	1.12	Q V			
384	3+14	0.1715	1.13	Q V			
385	3+15	0.1730	1.14	Q V			
386	3+16	0.1746	1.15	Q V			
387	3+17	0.1762	1.15	Q V			
388	3+18	0.1778	1.16	Q V			
389	3+19	0.1794	1.19	Q V			
390	3+20	0.1811	1.21	Q V			
391	3+21	0.1828	1.23	Q V			
392	3+22	0.1845	1.26	Q V			
393	3+23	0.1863	1.28	Q V			
394	3+24	0.1881	1.30	Q V			
395	3+25	0.1899	1.33	Q V			
396	3+26	0.1918	1.35	Q V			
397	3+27	0.1937	1.37	Q V			
398	3+28	0.1956	1.40	Q V			
399	3+29	0.1975	1.42	Q V			
400	3+30	0.1995	1.44	Q V			
401	3+31	0.2015	1.46	Q V			
402	3+32	0.2036	1.47	Q V			
403	3+33	0.2056	1.49	Q V			
404	3+34	0.2077	1.51	Q V			
405	3+35	0.2098	1.53	Q V			
406	3+36	0.2119	1.55	Q V			
407	3+37	0.2141	1.56	Q V			
408	3+38	0.2163	1.58	Q V			
409	3+39	0.2185	1.60	Q V			
410	3+40	0.2207	1.62	Q V			
411	3+41	0.2230	1.69	Q V			
412	3+42	0.2254	1.76	Q V			
413	3+43	0.2280	1.82	Q V			
414	3+44	0.2306	1.89	Q V			



484	4+54	0.5610	0.88	| Q	|	|	|	V |
485	4+55	0.5622	0.87	| Q	|	|	|	V |
486	4+56	0.5634	0.85	| Q	|	|	|	V |
487	4+57	0.5646	0.84	| Q	|	|	|	V |
488	4+58	0.5657	0.83	| Q	|	|	|	V |
489	4+59	0.5668	0.82	| Q	|	|	|	V |
490	5+ 0	0.5679	0.81	| Q	|	|	|	V |
491	5+ 1	0.5690	0.80	| Q	|	|	|	V |
492	5+ 2	0.5701	0.79	| Q	|	|	|	V |
493	5+ 3	0.5712	0.78	| Q	|	|	|	V |
494	5+ 4	0.5722	0.77	| Q	|	|	|	V |
495	5+ 5	0.5733	0.76	| Q	|	|	|	V |
496	5+ 6	0.5743	0.75	| Q	|	|	|	V |
497	5+ 7	0.5753	0.74	| Q	|	|	|	V |
498	5+ 8	0.5763	0.73	| Q	|	|	|	V |
499	5+ 9	0.5773	0.72	| Q	|	|	|	V |
500	5+10	0.5783	0.71	| Q	|	|	|	V |
501	5+11	0.5793	0.71	| Q	|	|	|	V |
502	5+12	0.5802	0.70	| Q	|	|	|	V |
503	5+13	0.5812	0.69	| Q	|	|	|	V |
504	5+14	0.5821	0.68	| Q	|	|	|	V |
505	5+15	0.5831	0.68	| Q	|	|	|	V |
506	5+16	0.5840	0.67	| Q	|	|	|	V |
507	5+17	0.5849	0.66	| Q	|	|	|	V |
508	5+18	0.5858	0.66	| Q	|	|	|	V |
509	5+19	0.5867	0.65	| Q	|	|	|	V |
510	5+20	0.5876	0.64	| Q	|	|	|	V |
511	5+21	0.5885	0.64	| Q	|	|	|	V |
512	5+22	0.5893	0.63	| Q	|	|	|	V |
513	5+23	0.5902	0.63	| Q	|	|	|	V |
514	5+24	0.5910	0.62	| Q	|	|	|	V |
515	5+25	0.5919	0.62	| Q	|	|	|	V |
516	5+26	0.5927	0.61	| Q	|	|	|	V |
517	5+27	0.5936	0.61	| Q	|	|	|	V |
518	5+28	0.5944	0.60	| Q	|	|	|	V |
519	5+29	0.5952	0.59	| Q	|	|	|	V |
520	5+30	0.5960	0.59	| Q	|	|	|	V |
521	5+31	0.5968	0.58	| Q	|	|	|	V |
522	5+32	0.5976	0.58	| Q	|	|	|	V |
523	5+33	0.5984	0.58	|Q	|	|	|	V |
524	5+34	0.5992	0.57	|Q	|	|	|	V |
525	5+35	0.6000	0.57	|Q	|	|	|	V |
526	5+36	0.6008	0.56	|Q	|	|	|	V |
527	5+37	0.6015	0.56	|Q	|	|	|	V |
528	5+38	0.6023	0.55	|Q	|	|	|	V |
529	5+39	0.6031	0.55	|Q	|	|	|	V |
530	5+40	0.6038	0.55	|Q	|	|	|	V |
531	5+41	0.6046	0.54	|Q	|	|	|	V|
532	5+42	0.6053	0.54	|Q	|	|	|	V|
533	5+43	0.6060	0.53	|Q	|	|	|	V|
534	5+44	0.6068	0.53	|Q	|	|	|	V|
535	5+45	0.6075	0.53	|Q	|	|	|	V|
536	5+46	0.6082	0.52	|Q	|	|	|	V|
537	5+47	0.6089	0.52	|Q	|	|	|	V|
538	5+48	0.6096	0.52	|Q	|	|	|	V|
539	5+49	0.6103	0.51	|Q	|	|	|	V|
540	5+50	0.6110	0.51	|Q	|	|	|	V|
541	5+51	0.6117	0.51	|Q	|	|	|	V|
542	5+52	0.6124	0.50	|Q	|	|	|	V|
543	5+53	0.6131	0.50	|Q	|	|	|	V|
544	5+54	0.6138	0.50	|Q	|	|	|	V|
545	5+55	0.6145	0.49	|Q	|	|	|	V|
546	5+56	0.6152	0.49	|Q	|	|	|	V|
547	5+57	0.6158	0.49	|Q	|	|	|	V|
548	5+58	0.6165	0.48	|Q	|	|	|	V|
549	5+59	0.6172	0.48	|Q	|	|	|	V|
550	6+ 0	0.6178	0.48	|Q	|	|	|	V|
551	6+ 1	0.6185	0.48	|Q	|	|	|	V|
552	6+ 2	0.6191	0.47	|Q	|	|	|	V|

```
      6+ 3       0.6198      0.47  |Q        |         |         |         V
 ------------------------------------------------------------------------
 
 
 
 
 
 
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     Process from Point/Station      704.000 to Point/Station      704.100
     **** PIPEFLOW TRAVEL TIME (Program estimated size) ****
     ----------------------------------------------------------------------
     Upstream point/station elevation =   720.000(Ft.)
     Downstream point/station elevation =   719.740(Ft.)
     Pipe length  =    71.90(Ft.) Slope =   0.0036  Manning's N = 0.013
     No. of pipes = 1  Required pipe flow  =    11.601(CFS)
     Nearest computed pipe diameter  =     24.00(In.)
     Calculated individual pipe flow  =    11.601(CFS)
     Normal flow depth in pipe =   17.04(In.)
     Flow top width inside pipe =   21.78(In.)
     Critical Depth =   14.68(In.)
     Pipe flow velocity =      4.86(Ft/s)
     Travel time through pipe =    0.25 min.
     Time of concentration (TC) =    12.13 min.
 
 
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     Process from Point/Station      704.100 to Point/Station      705.000
     **** SUBAREA FLOW ADDITION ****
     ----------------------------------------------------------------------
     Rainfall intensity (I) =      5.058(In/Hr) for a   100.0 year storm
     Decimal fraction soil group A = 0.000
     Decimal fraction soil group B = 0.000
     Decimal fraction soil group C = 1.000
     Decimal fraction soil group D = 0.000
     [LOW DENSITY RESIDENTIAL                    ]
     (1.0 DU/A or Less       )
     Impervious value, Ai = 0.100
     Sub-Area C Value = 0.360
     Time of concentration =    12.13 min.
     Rainfall intensity =      5.058(In/Hr) for a   100.0 year storm
     Effective runoff coefficient used for total area
     (Q=KCIA) is C = 0.458  CA =      2.675
     Subarea runoff =      1.927(CFS) for      1.242(Ac.)
     Total runoff =     13.528(CFS)  Total area =       5.840(Ac.)
 
 
     ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
     Process from Point/Station      705.000 to Point/Station      706.000
     **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
     ----------------------------------------------------------------------
     Estimated mean flow rate at midpoint of channel =     13.702(CFS)
     Depth of flow =   0.729(Ft.), Average velocity =  17.177(Ft/s)
         ******* Irregular Channel Data ***********
     ----------------------------------------------------------------
     Information entered for subchannel number 1 :
     Point number      'X' coordinate     'Y' coordinate
         1              0.00              1.00
         2              1.50              0.00
         3              3.00              1.00
     Manning's 'N' friction factor =   0.016
     ----------------------------------------------------------------
     Sub-Channel flow  =     13.702(CFS)
       '     '    flow top width =      2.188(Ft.)
       '     '    velocity=   17.177(Ft/s)
       '     '    area =      0.798(Sq.Ft)
       '     '    Froude number =     5.013
 
     Upstream point elevation =   723.470(Ft.)
```

```
Downstream point elevation =   642.090(Ft.)
Flow length =   485.000(Ft.)
Travel time  =    0.47 min.
Time of concentration =   12.60 min.
Depth of flow =   0.729(Ft.)
Average velocity =  17.177(Ft/s)
Total irregular channel flow =    13.702(CFS)
Irregular channel normal depth above invert elev. =   0.729(Ft.)
Average velocity of channel(s) =  17.177(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.935(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Rainfall intensity =      4.935(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.448  CA =      2.795
Subarea runoff =      0.264(CFS) for      0.400(Ac.)
Total runoff =     13.792(CFS)  Total area =       6.240(Ac.)
Depth of flow =   0.731(Ft.), Average velocity =  17.205(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      706.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.240(Ac.)
Runoff from this stream =     13.792(CFS)
Time of concentration =   12.60 min.
Rainfall intensity =     4.935(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      706.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.480 given for subarea
Rainfall intensity (I) =      5.729(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       5.73(In/Hr)
Total area =       76.663(Ac.)  Total runoff =     5.897(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      706.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     76.663(Ac.)
Runoff from this stream =      5.897(CFS)
Time of concentration =   10.00 min.
Rainfall intensity =     5.729(In/Hr)
Summary of stream data:

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


1       13.792     12.60             4.935
2        5.897     10.00             5.729
Qmax(1) =
       1.000 *    1.000 *    13.792) +
       0.862 *    1.000 *     5.897) + =      18.873
```

```
Qmax(2) =
       1.000 *    0.794 *    13.792) +
       1.000 *    1.000 *     5.897) + =      16.844

Total of 2 streams to confluence:
Flow rates before confluence point:
      13.792       5.897
Maximum flow rates at confluence using above data:
       18.873       16.844
Area of streams before confluence:
        6.240       76.663
Results of confluence:
Total flow rate =     18.873(CFS)
Time of concentration =    12.599 min.
Effective stream area after confluence =     82.903(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      903.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =    102.853(CFS)
Depth of flow =   1.292(Ft.), Average velocity =   7.963(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              4.00
    2              0.00              0.00
    3             10.00              0.00
    4             10.00              4.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =    102.853(CFS)
  '     '    flow top width =     10.000(Ft.)
  '     '    velocity=    7.963(Ft/s)
  '     '    area =     12.916(Sq.Ft)
  '     '    Froude number =     1.235

Upstream point elevation =   642.090(Ft.)
Downstream point elevation =   639.110(Ft.)
Flow length =   477.500(Ft.)
Travel time  =    1.00 min.
Time of concentration =   13.60 min.
Depth of flow =   1.292(Ft.)
Average velocity =   7.963(Ft/s)
Total irregular channel flow =   102.853(CFS)
Irregular channel normal depth above invert elev. =   1.292(Ft.)
Average velocity of channel(s) =   7.963(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.698(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                    ]
(2.0 DU/A or Less       )
Impervious value, Ai = 0.200
Sub-Area C Value = 0.420
Rainfall intensity =      4.698(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.477  CA =     39.787
Subarea runoff =    168.059(CFS) for      0.462(Ac.)
Total runoff =    186.932(CFS)  Total area =      83.365(Ac.)
Depth of flow =   1.920(Ft.), Average velocity =   9.735(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      903.000
```

```
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     83.365(Ac.)
Runoff from this stream =    186.932(CFS)
Time of concentration =   13.60 min.
Rainfall intensity =     4.698(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      902.000
**** INITIAL AREA EVALUATION ****

------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.360
Initial subarea total flow distance  =   90.500(Ft.)
Highest elevation =  685.720(Ft.)
Lowest elevation =  656.640(Ft.)
Elevation difference =   29.080(Ft.) Slope = 32.133 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  32.13 %, in a development type of
 1.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.19 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3600)*( 100.000^.5)/(  32.130^(1/3)]=   4.19
Calculated TC of    4.190 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =     8.958(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.360
Subarea runoff =      0.290(CFS)
Total initial stream area =        0.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      903.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      6.784(CFS)
Depth of flow =   0.133(Ft.), Average velocity =   1.908(Ft/s)
    ******* Irregular Channel Data ***********
-------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.50
    2            100.00              0.00
    3            200.00              0.50
Manning's 'N' friction factor =   0.030
-------------------------------------------------------------
Sub-Channel flow  =      6.784(CFS)
  '     '    flow top width =     53.336(Ft.)
  '     '    velocity=    1.908(Ft/s)
  '     '    area =      3.556(Sq.Ft)
  '     '    Froude number =     1.302

Upstream point elevation =   656.640(Ft.)
Downstream point elevation =   634.230(Ft.)
Flow length =   408.400(Ft.)
Travel time  =    3.57 min.
Time of concentration =    7.76 min.
Depth of flow =   0.133(Ft.)
Average velocity =   1.908(Ft/s)
```

```
Total irregular channel flow =     6.784(CFS)
Irregular channel normal depth above invert elev. =   0.133(Ft.)
Average velocity of channel(s) =   1.908(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.748(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(7.3 DU/A or Less       )
Impervious value, Ai = 0.400
Sub-Area C Value = 0.540
Rainfall intensity =      6.748(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.536  CA =      1.976
Subarea runoff =     13.046(CFS) for      3.600(Ac.)
Total runoff =     13.337(CFS)  Total area =       3.690(Ac.)
Depth of flow =   0.172(Ft.), Average velocity =   2.259(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.690(Ac.)
Runoff from this stream =     13.337(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     6.748(In/Hr)
Summary of stream data:

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


1      186.932     13.60             4.698
2       13.337      7.76             6.748
Qmax(1) =
       1.000 *    1.000 *   186.932) +
       0.696 *    1.000 *    13.337) + =     196.218
Qmax(2) =
       1.000 *    0.570 *   186.932) +
       1.000 *    1.000 *    13.337) + =     119.977

Total of 2 streams to confluence:
Flow rates before confluence point:
     186.932      13.337
Maximum flow rates at confluence using above data:
      196.218      119.977
Area of streams before confluence:
       83.365        3.690
Results of confluence:
Total flow rate =    196.218(CFS)
Time of concentration =    13.599 min.
Effective stream area after confluence =     87.055(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      903.000
**** 6 HOUR HYDROGRAPH ****
____________________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =  13.60
Basin Area =    87.05 Acres
6 Hour Rainfall =  3.400 Inches
```

Runoff Coefficient = 0.480
Peak Discharge = 196.22 CFS

Time (Min)	Discharge (CFS)
0	0.000
13	8.662
26	8.880
39	9.360
52	9.626
65	10.222
78	10.557
91	11.321
104	11.759
117	12.782
130	13.385
143	14.845
156	15.743
169	18.046
182	19.566
195	23.916
208	27.240
221	39.997
234	56.355
247	196.218
260	32.080
273	21.464
286	16.794
299	14.067
312	12.243
325	10.922
338	9.913
351	9.112
364	8.457

++

6 - 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

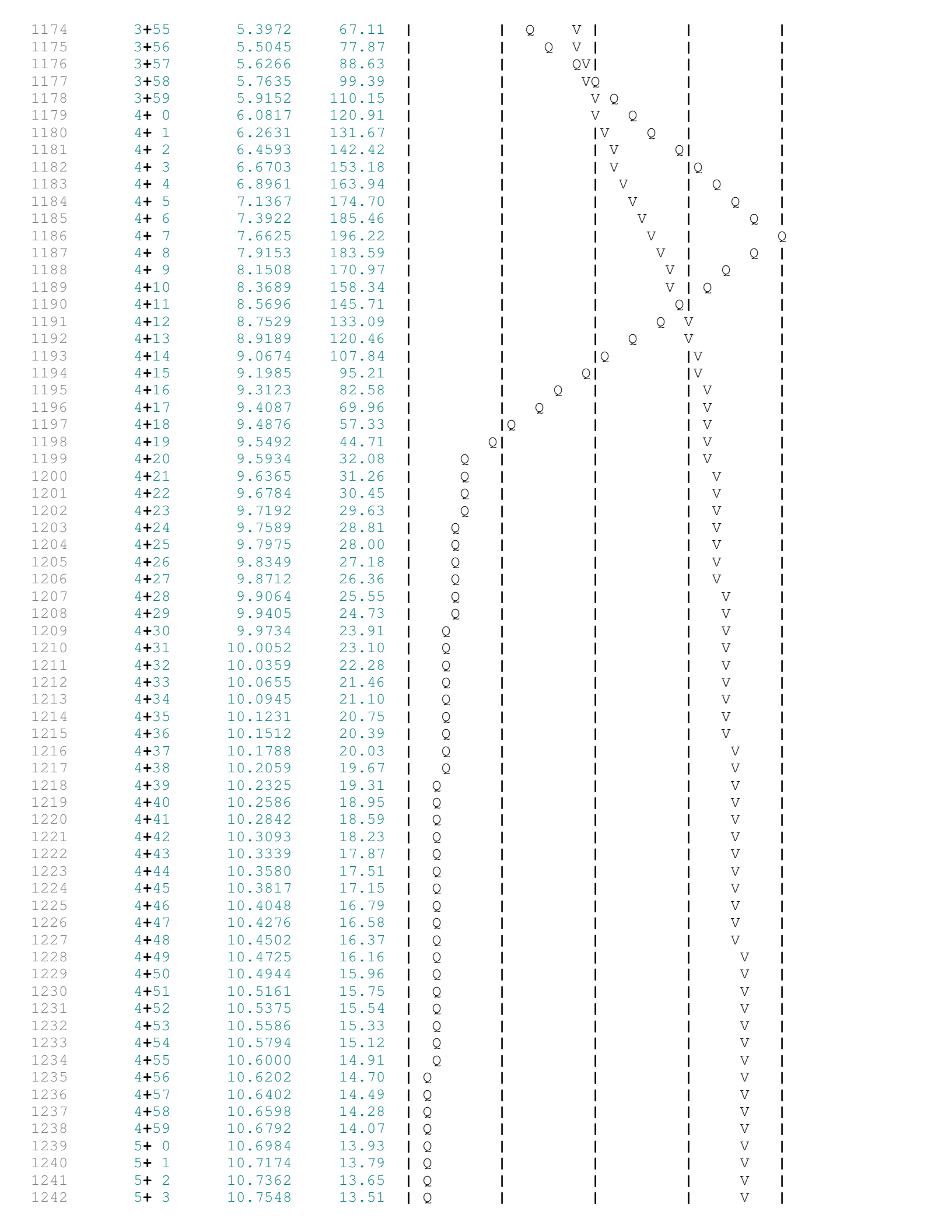
Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	49.1	98.1	147.2	196.2
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0009	0.67	Q	|	|	|	|
0+ 2	0.0028	1.33	Q	|	|	|	|
0+ 3	0.0055	2.00	Q	|	|	|	|
0+ 4	0.0092	2.67	Q	|	|	|	|
0+ 5	0.0138	3.33	Q	|	|	|	|
0+ 6	0.0193	4.00	Q	|	|	|	|
0+ 7	0.0257	4.66	Q	|	|	|	|
0+ 8	0.0330	5.33	VQ	|	|	|	|
0+ 9	0.0413	6.00	VQ	|	|	|	|
0+10	0.0505	6.66	VQ	|	|	|	|
0+11	0.0606	7.33	VQ	|	|	|	|
0+12	0.0716	8.00	VQ	|	|	|	|
0+13	0.0835	8.66	VQ	|	|	|	|
0+14	0.0955	8.68	VQ	|	|	|	|
0+15	0.1074	8.70	VQ	|	|	|	|
0+16	0.1194	8.71	VQ	|	|	|	|
0+17	0.1315	8.73	VQ	|	|	|	|
0+18	0.1435	8.75	VQ	|	|	|	|
0+19	0.1556	8.76	VQ	|	|	|	|
0+20	0.1677	8.78	VQ	|	|	|	|
0+21	0.1798	8.80	VQ	|	|	|	|
0+22	0.1919	8.81	VQ	|	|	|	|
0+23	0.2041	8.83	VQ	|	|	|	|
0+24	0.2163	8.85	VQ	|	|	|	|
0+25	0.2285	8.86	VQ	|	|	|	|
0+26	0.2407	8.88	VQ	|	|	|	|
0+27	0.2530	8.92	VQ	|	|	|	|

967	0+28	0.2653	8.95	VQ	|	|	|	|
968	0+29	0.2777	8.99	VQ	|	|	|	|
969	0+30	0.2902	9.03	VQ	|	|	|	|
970	0+31	0.3026	9.06	|Q	|	|	|	|
971	0+32	0.3152	9.10	|Q	|	|	|	|
972	0+33	0.3278	9.14	|Q	|	|	|	|
973	0+34	0.3404	9.18	|Q	|	|	|	|
974	0+35	0.3531	9.21	|Q	|	|	|	|
975	0+36	0.3658	9.25	|Q	|	|	|	|
976	0+37	0.3786	9.29	|Q	|	|	|	|
977	0+38	0.3915	9.32	|Q	|	|	|	|
978	0+39	0.4044	9.36	|Q	|	|	|	|
979	0+40	0.4173	9.38	|Q	|	|	|	|
980	0+41	0.4302	9.40	|Q	|	|	|	|
981	0+42	0.4432	9.42	|Q	|	|	|	|
982	0+43	0.4562	9.44	|Q	|	|	|	|
983	0+44	0.4692	9.46	|Q	|	|	|	|
984	0+45	0.4823	9.48	|Q	|	|	|	|
985	0+46	0.4954	9.50	|Q	|	|	|	|
986	0+47	0.5085	9.52	|Q	|	|	|	|
987	0+48	0.5217	9.54	|Q	|	|	|	|
988	0+49	0.5348	9.56	|Q	|	|	|	|
989	0+50	0.5480	9.59	|Q	|	|	|	|
990	0+51	0.5613	9.61	|Q	|	|	|	|
991	0+52	0.5745	9.63	|Q	|	|	|	|
992	0+53	0.5878	9.67	|QV	|	|	|	|
993	0+54	0.6012	9.72	|QV	|	|	|	|
994	0+55	0.6147	9.76	|QV	|	|	|	|
995	0+56	0.6282	9.81	|QV	|	|	|	|
996	0+57	0.6418	9.86	| Q	|	|	|	|
997	0+58	0.6554	9.90	| Q	|	|	|	|
998	0+59	0.6691	9.95	| Q	|	|	|	|
999	1+ 0	0.6829	9.99	| Q	|	|	|	|
1000	1+ 1	0.6967	10.04	| Q	|	|	|	|
1001	1+ 2	0.7106	10.08	| Q	|	|	|	|
1002	1+ 3	0.7245	10.13	| Q	|	|	|	|
1003	1+ 4	0.7386	10.18	| Q	|	|	|	|
1004	1+ 5	0.7526	10.22	| Q	|	|	|	|
1005	1+ 6	0.7668	10.25	| Q	|	|	|	|
1006	1+ 7	0.7809	10.27	| Q	|	|	|	|
1007	1+ 8	0.7951	10.30	| Q	|	|	|	|
1008	1+ 9	0.8093	10.33	| Q	|	|	|	|
1009	1+10	0.8236	10.35	| Q	|	|	|	|
1010	1+11	0.8379	10.38	| Q	|	|	|	|
1011	1+12	0.8522	10.40	| Q	|	|	|	|
1012	1+13	0.8666	10.43	| Q	|	|	|	|
1013	1+14	0.8810	10.45	| QV	|	|	|	|
1014	1+15	0.8954	10.48	| QV	|	|	|	|
1015	1+16	0.9099	10.51	| QV	|	|	|	|
1016	1+17	0.9244	10.53	| QV	|	|	|	|
1017	1+18	0.9389	10.56	| QV	|	|	|	|
1018	1+19	0.9535	10.62	| QV	|	|	|	|
1019	1+20	0.9682	10.67	| QV	|	|	|	|
1020	1+21	0.9830	10.73	| QV	|	|	|	|
1021	1+22	0.9979	10.79	| QV	|	|	|	|
1022	1+23	1.0128	10.85	| QV	|	|	|	|
1023	1+24	1.0279	10.91	| QV	|	|	|	|
1024	1+25	1.0430	10.97	| QV	|	|	|	|
1025	1+26	1.0582	11.03	| QV	|	|	|	|
1026	1+27	1.0734	11.09	| QV	|	|	|	|
1027	1+28	1.0888	11.14	| QV	|	|	|	|
1028	1+29	1.1042	11.20	| QV	|	|	|	|
1029	1+30	1.1197	11.26	| QV	|	|	|	|
1030	1+31	1.1353	11.32	| QV	|	|	|	|
1031	1+32	1.1510	11.35	| QV	|	|	|	|
1032	1+33	1.1666	11.39	| Q V	|	|	|	|
1033	1+34	1.1824	11.42	| Q V	|	|	|	|
1034	1+35	1.1982	11.46	| Q V	|	|	|	|
1035	1+36	1.2140	11.49	| Q V	|	|	|	|

1036	1+37	1.2299	11.52	Q V				
1037	1+38	1.2458	11.56	Q V				
1038	1+39	1.2617	11.59	Q V				
1039	1+40	1.2778	11.62	Q V				
1040	1+41	1.2938	11.66	Q V				
1041	1+42	1.3099	11.69	Q V				
1042	1+43	1.3261	11.73	Q V				
1043	1+44	1.3423	11.76	Q V				
1044	1+45	1.3586	11.84	Q V				
1045	1+46	1.3750	11.92	Q V				
1046	1+47	1.3915	12.00	Q V				
1047	1+48	1.4081	12.07	Q V				
1048	1+49	1.4249	12.15	Q V				
1049	1+50	1.4417	12.23	Q V				
1050	1+51	1.4587	12.31	Q V				
1051	1+52	1.4757	12.39	Q V				
1052	1+53	1.4929	12.47	Q V				
1053	1+54	1.5102	12.55	Q V				
1054	1+55	1.5276	12.62	Q V				
1055	1+56	1.5451	12.70	Q V				
1056	1+57	1.5627	12.78	Q V				
1057	1+58	1.5804	12.83	Q V				
1058	1+59	1.5981	12.87	Q V				
1059	2+ 0	1.6159	12.92	Q V				
1060	2+ 1	1.6337	12.97	Q V				
1061	2+ 2	1.6517	13.01	Q V				
1062	2+ 3	1.6697	13.06	Q V				
1063	2+ 4	1.6877	13.11	Q V				
1064	2+ 5	1.7058	13.15	Q V				
1065	2+ 6	1.7240	13.20	Q V				
1066	2+ 7	1.7423	13.25	Q V				
1067	2+ 8	1.7606	13.29	Q V				
1068	2+ 9	1.7789	13.34	Q V				
1069	2+10	1.7974	13.39	Q V				
1070	2+11	1.8160	13.50	Q V				
1071	2+12	1.8347	13.61	Q V				
1072	2+13	1.8536	13.72	Q V				
1073	2+14	1.8727	13.83	Q V				
1074	2+15	1.8919	13.95	Q V				
1075	2+16	1.9112	14.06	Q V				
1076	2+17	1.9308	14.17	Q V				
1077	2+18	1.9504	14.28	Q V				
1078	2+19	1.9703	14.40	Q V				
1079	2+20	1.9903	14.51	Q V				
1080	2+21	2.0104	14.62	Q V				
1081	2+22	2.0307	14.73	Q V				
1082	2+23	2.0511	14.84	Q V				
1083	2+24	2.0717	14.91	Q V				
1084	2+25	2.0923	14.98	Q V				
1085	2+26	2.1130	15.05	Q V				
1086	2+27	2.1339	15.12	Q V				
1087	2+28	2.1548	15.19	Q V				
1088	2+29	2.1758	15.26	Q V				
1089	2+30	2.1969	15.33	Q V				
1090	2+31	2.2181	15.40	Q V				
1091	2+32	2.2394	15.47	Q V				
1092	2+33	2.2608	15.54	Q V				
1093	2+34	2.2823	15.60	Q V				
1094	2+35	2.3039	15.67	Q V				
1095	2+36	2.3256	15.74	Q V				
1096	2+37	2.3475	15.92	Q V				
1097	2+38	2.3697	16.10	Q V				
1098	2+39	2.3921	16.27	Q V				
1099	2+40	2.4148	16.45	Q V				
1100	2+41	2.4377	16.63	Q V				
1101	2+42	2.4608	16.81	Q V				
1102	2+43	2.4842	16.98	Q V				
1103	2+44	2.5079	17.16	Q V				
1104	2+45	2.5317	17.34	Q V				

1105	2+46	2.5559	17.51	| Q V |	|	|	|
1106	2+47	2.5802	17.69	| Q V |	|	|	|
1107	2+48	2.6049	17.87	| Q V |	|	|	|
1108	2+49	2.6297	18.05	| Q V|	|	|	|
1109	2+50	2.6547	18.16	| Q V|	|	|	|
1110	2+51	2.6799	18.28	| Q V|	|	|	|
1111	2+52	2.7052	18.40	| Q V|	|	|	|
1112	2+53	2.7307	18.51	| Q V|	|	|	|
1113	2+54	2.7564	18.63	| Q V|	|	|	|
1114	2+55	2.7822	18.75	| Q V|	|	|	|
1115	2+56	2.8082	18.86	| Q V|	|	|	|
1116	2+57	2.8344	18.98	| Q V|	|	|	|
1117	2+58	2.8607	19.10	| Q V|	|	|	|
1118	2+59	2.8871	19.22	| Q V|	|	|	|
1119	3+ 0	2.9138	19.33	| Q V	|	|	|
1120	3+ 1	2.9406	19.45	| Q V	|	|	|
1121	3+ 2	2.9675	19.57	| Q V	|	|	|
1122	3+ 3	2.9949	19.90	| Q V	|	|	|
1123	3+ 4	3.0228	20.24	| Q V	|	|	|
1124	3+ 5	3.0511	20.57	| Q V	|	|	|
1125	3+ 6	3.0799	20.90	| Q V	|	|	|
1126	3+ 7	3.1092	21.24	| Q V	|	|	|
1127	3+ 8	3.1389	21.57	| Q V	|	|	|
1128	3+ 9	3.1691	21.91	| Q V	|	|	|
1129	3+10	3.1997	22.24	| Q |V	|	|	|
1130	3+11	3.2308	22.58	| Q |V	|	|	|
1131	3+12	3.2624	22.91	| Q |V	|	|	|
1132	3+13	3.2944	23.25	| Q |V	|	|	|
1133	3+14	3.3269	23.58	| Q |V	|	|	|
1134	3+15	3.3598	23.92	| Q |V	|	|	|
1135	3+16	3.3931	24.17	| Q |V	|	|	|
1136	3+17	3.4267	24.43	| Q |V	|	|	|
1137	3+18	3.4607	24.68	| Q |V	|	|	|
1138	3+19	3.4951	24.94	| Q | V	|	|	|
1139	3+20	3.5298	25.19	| Q | V	|	|	|
1140	3+21	3.5648	25.45	| Q | V	|	|	|
1141	3+22	3.6003	25.71	| Q | V	|	|	|
1142	3+23	3.6360	25.96	| Q | V	|	|	|
1143	3+24	3.6721	26.22	| Q | V	|	|	|
1144	3+25	3.7086	26.47	| Q | V	|	|	|
1145	3+26	3.7454	26.73	| Q | V	|	|	|
1146	3+27	3.7826	26.98	| Q | V	|	|	|
1147	3+28	3.8201	27.24	| Q | V	|	|	|
1148	3+29	3.8590	28.22	| Q | V	|	|	|
1149	3+30	3.8992	29.20	| Q | V	|	|	|
1150	3+31	3.9408	30.18	| Q | V	|	|	|
1151	3+32	3.9837	31.17	| Q | V	|	|	|
1152	3+33	4.0280	32.15	| Q | V	|	|	|
1153	3+34	4.0736	33.13	| Q | V	|	|	|
1154	3+35	4.1206	34.11	| Q | V	|	|	|
1155	3+36	4.1689	35.09	| Q | V	|	|	|
1156	3+37	4.2186	36.07	| Q | V	|	|	|
1157	3+38	4.2697	37.05	| Q | V	|	|	|
1158	3+39	4.3220	38.03	| Q | V	|	|	|
1159	3+40	4.3758	39.02	| Q | V	|	|	|
1160	3+41	4.4309	40.00	| Q | V	|	|	|
1161	3+42	4.4877	41.26	| Q | V	|	|	|
1162	3+43	4.5463	42.51	| Q | V	|	|	|
1163	3+44	4.6066	43.77	| Q | V	|	|	|
1164	3+45	4.6686	45.03	| Q| V	|	|	|
1165	3+46	4.7323	46.29	| Q| V	|	|	|
1166	3+47	4.7978	47.55	| Q| V	|	|	|
1167	3+48	4.8651	48.81	| Q| V	|	|	|
1168	3+49	4.9340	50.06	| Q V	|	|	|
1169	3+50	5.0047	51.32	| Q V	|	|	|
1170	3+51	5.0771	52.58	| Q V	|	|	|
1171	3+52	5.1513	53.84	| Q V	|	|	|
1172	3+53	5.2272	55.10	| |Q V	|	|	|
1173	3+54	5.3048	56.36	| |Q V |	|	|	|



5+ 4	10.7732	13.37	| Q	|	|	|	V |
5+ 5	10.7914	13.23	| Q	|	|	|	V |
5+ 6	10.8094	13.08	| Q	|	|	|	V |
5+ 7	10.8273	12.94	| Q	|	|	|	V |
5+ 8	10.8449	12.80	| Q	|	|	|	V |
5+ 9	10.8623	12.66	| Q	|	|	|	V |
5+10	10.8796	12.52	| Q	|	|	|	V |
5+11	10.8967	12.38	| Q	|	|	|	V |
5+12	10.9135	12.24	| Q	|	|	|	V |
5+13	10.9302	12.14	| Q	|	|	|	V |
5+14	10.9468	12.04	| Q	|	|	|	V |
5+15	10.9633	11.94	| Q	|	|	|	V |
5+16	10.9796	11.84	| Q	|	|	|	V |
5+17	10.9957	11.74	| Q	|	|	|	V |
5+18	11.0118	11.63	| Q	|	|	|	V |
5+19	11.0276	11.53	| Q	|	|	|	V |
5+20	11.0434	11.43	| Q	|	|	|	V |
5+21	11.0590	11.33	| Q	|	|	|	V |
5+22	11.0745	11.23	| Q	|	|	|	V |
5+23	11.0898	11.13	| Q	|	|	|	V |
5+24	11.1050	11.02	| Q	|	|	|	V |
5+25	11.1200	10.92	| Q	|	|	|	V |
5+26	11.1350	10.84	| Q	|	|	|	V |
5+27	11.1498	10.77	| Q	|	|	|	V |
5+28	11.1645	10.69	| Q	|	|	|	V |
5+29	11.1791	10.61	| Q	|	|	|	V |
5+30	11.1936	10.53	| Q	|	|	|	V |
5+31	11.2080	10.46	| Q	|	|	|	V |
5+32	11.2223	10.38	| Q	|	|	|	V |
5+33	11.2365	10.30	| Q	|	|	|	V |
5+34	11.2506	10.22	| Q	|	|	|	V |
5+35	11.2646	10.15	| Q	|	|	|	V |
5+36	11.2784	10.07	| Q	|	|	|	V |
5+37	11.2922	9.99	| Q	|	|	|	V |
5+38	11.3059	9.91	| Q	|	|	|	V |
5+39	11.3194	9.85	| Q	|	|	|	V |
5+40	11.3329	9.79	|Q	|	|	|	V |
5+41	11.3463	9.73	|Q	|	|	|	V|
5+42	11.3596	9.67	|Q	|	|	|	V|
5+43	11.3729	9.60	|Q	|	|	|	V|
5+44	11.3860	9.54	|Q	|	|	|	V|
5+45	11.3991	9.48	|Q	|	|	|	V|
5+46	11.4120	9.42	|Q	|	|	|	V|
5+47	11.4249	9.36	|Q	|	|	|	V|
5+48	11.4377	9.30	|Q	|	|	|	V|
5+49	11.4505	9.23	|Q	|	|	|	V|
5+50	11.4631	9.17	|Q	|	|	|	V|
5+51	11.4756	9.11	|Q	|	|	|	V|
5+52	11.4881	9.06	|Q	|	|	|	V|
5+53	11.5005	9.01	|Q	|	|	|	V|
5+54	11.5129	8.96	|Q	|	|	|	V|
5+55	11.5251	8.91	|Q	|	|	|	V|
5+56	11.5374	8.86	|Q	|	|	|	V|
5+57	11.5495	8.81	|Q	|	|	|	V|
5+58	11.5616	8.76	|Q	|	|	|	V|
5+59	11.5735	8.71	|Q	|	|	|	V|
6+ 0	11.5855	8.66	|Q	|	|	|	V|
6+ 1	11.5973	8.61	|Q	|	|	|	V|
6+ 2	11.6091	8.56	|Q	|	|	|	V|
6+ 3	11.6208	8.51	|Q	|	|	|	V|
6+ 4	11.6325	8.46	|Q	|	|	|	V

++

```
Process from Point/Station       18.000 to Point/Station      904.000
**** SUBAREA FLOW ADDITION ****

----------------------------------------------------------------------
Rainfall intensity (I) =      4.698(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.810
[INDUSTRIAL area type                          ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.846
Time of concentration =    13.60 min.
Rainfall intensity =      4.698(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.488  CA =     43.429
Subarea runoff =      7.826(CFS) for      1.968(Ac.)
Total runoff =    204.044(CFS)  Total area =      89.023(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      904.000
**** SUBAREA FLOW ADDITION ****

----------------------------------------------------------------------
Rainfall intensity (I) =      4.698(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.300
[MEDIUM DENSITY RESIDENTIAL                    ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.457
Time of concentration =    13.60 min.
Rainfall intensity =      4.698(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.487  CA =     44.162
Subarea runoff =      3.444(CFS) for      1.604(Ac.)
Total runoff =    207.488(CFS)  Total area =      90.627(Ac.)
End of computations, total study area =          90.627 (Ac.)
```

ATTACHMENT 5

POST-DEVELOPMENT

POC-4

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 09/03/25
--------------------------------------------------------------------------
100 Year Study
24044 Post Development
POC 4
24044postpoc4.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4001.000 to Point/Station     4002.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  805.200(Ft.)
Lowest elevation =  778.410(Ft.)
Elevation difference =   26.790(Ft.) Slope = 26.790 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  26.79 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.81 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3000)*( 100.000^.5)/(  26.790^(1/3)]=   4.81
Calculated TC of    4.813 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      8.958(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.300
Subarea runoff =      0.645(CFS)
Total initial stream area =        0.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4002.000 to Point/Station     4003.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      4.223(CFS)
```

```
Depth of flow =   0.327(Ft.), Average velocity =   7.878(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2              5.00              0.00
    3             10.00              1.00
Manning's 'N' friction factor =   0.020
------------------------------------------------------------------
Sub-Channel flow  =      4.223(CFS)
  '     '    flow top width =      3.274(Ft.)
  '     '    velocity=    7.878(Ft/s)
  '     '    area =      0.536(Sq.Ft)
  '     '    Froude number =     3.431

Upstream point elevation =   778.410(Ft.)
Downstream point elevation =   664.070(Ft.)
Flow length =   887.270(Ft.)
Travel time  =    1.88 min.
Time of concentration =    6.69 min.
Depth of flow =   0.327(Ft.)
Average velocity =   7.878(Ft/s)
Total irregular channel flow =     4.223(CFS)
Irregular channel normal depth above invert elev. =   0.327(Ft.)
Average velocity of channel(s) =   7.878(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      7.425(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Rainfall intensity =      7.425(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.300  CA =      1.043
Subarea runoff =      7.097(CFS) for      3.236(Ac.)
Total runoff =      7.742(CFS)  Total area =       3.476(Ac.)
Depth of flow =   0.411(Ft.), Average velocity =   9.167(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     4004.000 to Point/Station     4003.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      7.425(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.360
Time of concentration =     6.69 min.
Rainfall intensity =      7.425(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.325  CA =      1.914
Subarea runoff =      6.466(CFS) for      2.419(Ac.)
Total runoff =     14.208(CFS)  Total area =       5.895(Ac.)
End of computations, total study area =          5.895 (Ac.)
```

ATTACHMENT 6 – POST-DEVELOPMENT MITIGATED CALCULATIONS

Steps Taken To Analyze This Condition

The Rational Method as outlined in section 3 of the June 2003 San Diego County Hydrology Manual is followed here. The software that we are using is the "*Rational Hydrology Method, San Diego County (2003 Manual)"* module of the CIVILCADD/CIVIL DEISGN Engineering software version 7.9.

Please see subsequent pages for calculations. These calculations are for the Q100. The results are outlined/summarized in Section 6.4.

ATTACHMENT 6

POST-DEVELOPMENT MITIGATED

POC-1

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 09/03/25
--------------------------------------------------------------------------
100 Year Study
24044 Post Dev Mitigated
POC 1
24044postpoc1mit.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1001.000 to Point/Station     1002.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  851.730(Ft.)
Lowest elevation =  843.660(Ft.)
Elevation difference =    8.070(Ft.) Slope =  8.070 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   8.07 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.73 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   8.070^(1/3)]=   6.73
Rainfall intensity (I) =      7.395(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.412(CFS)
Total initial stream area =        0.159(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1002.000 to Point/Station     1003.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      5.265(CFS)
Depth of flow =   0.311(Ft.), Average velocity =   7.259(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              6.00
    2             35.00              1.00
    3             42.00              0.00
    4             50.00              1.00
    5             85.00              6.00
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------
Sub-Channel flow  =      5.265(CFS)
  '     '    flow top width =      4.664(Ft.)
  '     '    velocity=    7.259(Ft/s)
  '     '    area =      0.725(Sq.Ft)
  '     '    Froude number =     3.244

Upstream point elevation =   843.660(Ft.)
Downstream point elevation =   665.330(Ft.)
Flow length =   686.000(Ft.)
Travel time  =    1.57 min.
Time of concentration =    8.31 min.
Depth of flow =   0.311(Ft.)
Average velocity =   7.259(Ft/s)
Total irregular channel flow =     5.265(CFS)
Irregular channel normal depth above invert elev. =   0.311(Ft.)
Average velocity of channel(s) =   7.259(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.457(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      6.457(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      1.552
Subarea runoff =      9.608(CFS) for      4.274(Ac.)
Total runoff =     10.019(CFS)  Total area =       4.433(Ac.)
Depth of flow =   0.396(Ft.), Average velocity =   8.526(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1003.100
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     12.409(CFS)
Depth of flow =   0.978(Ft.), Average velocity =  12.960(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2              1.00              0.00
    3              2.00              1.00
Manning's 'N' friction factor =   0.016
------------------------------------------------------------------
Sub-Channel flow  =     12.409(CFS)
  '     '    flow top width =      1.957(Ft.)
  '     '    velocity=   12.960(Ft/s)
  '     '    area =      0.957(Sq.Ft)
  '     '    Froude number =     3.265

Upstream point elevation =   665.330(Ft.)
Downstream point elevation =   643.520(Ft.)
Flow length =   272.000(Ft.)
Travel time  =    0.35 min.
```

```
Time of concentration =    8.66 min.
Depth of flow =   0.978(Ft.)
Average velocity =  12.960(Ft/s)
Total irregular channel flow =    12.409(CFS)
Irregular channel normal depth above invert elev. =   0.978(Ft.)
Average velocity of channel(s) =  12.960(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.288(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      6.288(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      2.338
Subarea runoff =      4.680(CFS) for      2.246(Ac.)
Total runoff =     14.699(CFS)  Total area =       6.679(Ac.)
Depth of flow =   1.035(Ft.), Average velocity =  13.749(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.100 to Point/Station     1003.200
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
!!Warning: Water is above left or right bank elevations
!!Warning: Water is above left or right bank elevations
!!Warning: Water is above left or right bank elevations
Estimated mean flow rate at midpoint of channel =     14.821(CFS)
Depth of flow =   1.007(Ft.), Average velocity =  14.612(Ft/s)
!!Warning: Water is above left or right bank elevations
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2              1.00              0.00
    3              2.00              1.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =     14.821(CFS)
  '     '    flow top width =      2.000(Ft.)
  '     '    velocity=   14.612(Ft/s)
  '     '    area =      1.014(Sq.Ft)
  '     '    Froude number =     3.616

Upstream point elevation =   643.520(Ft.)
Downstream point elevation =   623.370(Ft.)
Flow length =   236.000(Ft.)
Travel time  =    0.27 min.
Time of concentration =    8.92 min.
Depth of flow =   1.007(Ft.)
Average velocity =  14.612(Ft/s)
Total irregular channel flow =    14.821(CFS)
Irregular channel normal depth above invert elev. =   1.007(Ft.)
Average velocity of channel(s) =  14.612(Ft/s)
!!Warning: Water is above left or right bank elevations
 Adding area flow to channel
Rainfall intensity (I) =      6.165(In/Hr) for a   100.0 year storm
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
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
```

```
Impervious value, Ai = 0.100
Sub-Area C Value = 0.410
Rainfall intensity =      6.165(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.352  CA =      2.415
Subarea runoff =      0.188(CFS) for      0.188(Ac.)
Total runoff =     14.887(CFS)  Total area =       6.867(Ac.)
Depth of flow =   1.009(Ft.), Average velocity =  14.637(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.200 to Point/Station     1004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   623.370(Ft.)
Downstream point/station elevation =   616.370(Ft.)
Pipe length  =    50.00(Ft.) Slope =   0.1400  Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =    14.887(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    14.887(CFS)
Normal flow depth in pipe =    9.34(In.)
Flow top width inside pipe =   14.54(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.53(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     8.97 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.300 to Point/Station     1004.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      6.145(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =     8.97 min.
Rainfall intensity =      6.145(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.355  CA =      2.459
Subarea runoff =      0.223(CFS) for      0.052(Ac.)
Total runoff =     15.110(CFS)  Total area =       6.919(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.400 to Point/Station     1004.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      6.145(In/Hr) for a   100.0 year storm
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
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Time of concentration =     8.97 min.
Rainfall intensity =      6.145(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.363  CA =      2.554
Subarea runoff =      0.583(CFS) for      0.120(Ac.)
Total runoff =     15.693(CFS)  Total area =       7.039(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      7.039(Ac.)
Runoff from this stream =     15.693(CFS)
Time of concentration =    8.97 min.
Rainfall intensity =     6.145(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1006.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Initial subarea total flow distance  =  161.000(Ft.)
Highest elevation =  640.700(Ft.)
Lowest elevation =  639.300(Ft.)
Elevation difference =    1.400(Ft.) Slope =  0.870 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 70.00 (Ft)
for the top area slope value of   0.87 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   9.15 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5200)*(  70.000^.5)/(   0.870^(1/3)]=   9.15
Rainfall intensity (I) =      6.067(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      1.397(CFS)
Total initial stream area =        0.443(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1004.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      4.060(CFS)
Depth of flow =   0.456(Ft.), Average velocity =   6.871(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.50
    2              0.00              0.00
    3              1.50              0.13
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      4.060(CFS)
  '     '    flow top width =      1.500(Ft.)
  '     '    velocity=    6.871(Ft/s)
  '     '    area =      0.591(Sq.Ft)
  '     '    Froude number =     1.929

Upstream point elevation =   639.300(Ft.)
Downstream point elevation =   622.770(Ft.)
Flow length =   694.000(Ft.)
Travel time  =    1.68 min.
Time of concentration =   10.83 min.
```

```
Depth of flow =   0.456(Ft.)
Average velocity =   6.871(Ft/s)
Total irregular channel flow =     4.060(CFS)
Irregular channel normal depth above invert elev. =   0.456(Ft.)
Average velocity of channel(s) =   6.871(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.440(In/Hr) for a   100.0 year storm
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
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Rainfall intensity =      5.440(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.520  CA =      1.226
Subarea runoff =      5.273(CFS) for      1.915(Ac.)
Total runoff =      6.671(CFS)  Total area =       2.358(Ac.)
Depth of flow =   0.598(Ft.), Average velocity =   8.307(Ft/s)
!!Warning: Water is above left or right bank elevations


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.358(Ac.)
Runoff from this stream =      6.671(CFS)
Time of concentration =   10.83 min.
Rainfall intensity =     5.440(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      404.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.353 given for subarea
Rainfall intensity (I) =      4.910(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  12.70 min.  Rain intensity =       4.91(In/Hr)
Total area =       6.054(Ac.)  Total runoff =    10.500(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.100 to Point/Station      404.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      4.910(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    12.70 min.
Rainfall intensity =      4.910(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.353  CA =      2.534
Subarea runoff =      1.941(CFS) for      1.133(Ac.)
Total runoff =     12.441(CFS)  Total area =       7.187(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.200 to Point/Station      404.000
```

```
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      4.910(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    12.70 min.
Rainfall intensity =      4.910(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.352  CA =      2.609
Subarea runoff =      0.369(CFS) for      0.215(Ac.)
Total runoff =     12.810(CFS)  Total area =       7.402(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station     1004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   624.340(Ft.)
Downstream point/station elevation =   616.370(Ft.)
Pipe length  =   479.55(Ft.) Slope =   0.0166  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.810(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    12.810(CFS)
Normal flow depth in pipe =   13.95(In.)
Flow top width inside pipe =   15.04(In.)
Critical Depth =   16.13(In.)
Pipe flow velocity =      8.72(Ft/s)
Travel time through pipe =    0.92 min.
Time of concentration (TC) =    13.62 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      7.402(Ac.)
Runoff from this stream =     12.810(CFS)
Time of concentration =   13.62 min.
Rainfall intensity =     4.694(In/Hr)
Summary of stream data:

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


1       15.693      8.97             6.145
2        6.671     10.83             5.440
3       12.810     13.62             4.694
Qmax(1) =
       1.000 *    1.000 *    15.693) +
       1.000 *    0.828 *     6.671) +
       1.000 *    0.659 *    12.810) + =      29.654
Qmax(2) =
       0.885 *    1.000 *    15.693) +
       1.000 *    1.000 *     6.671) +
       1.000 *    0.796 *    12.810) + =      30.756
Qmax(3) =
       0.764 *    1.000 *    15.693) +
       0.863 *    1.000 *     6.671) +
       1.000 *    1.000 *    12.810) + =      30.554

Total of 3 streams to confluence:
```

```
Flow rates before confluence point:
      15.693       6.671      12.810
Maximum flow rates at confluence using above data:
       29.654       30.756       30.554
Area of streams before confluence:
        7.039        2.358        7.402
Results of confluence:
Total flow rate =     30.756(CFS)
Time of concentration =    10.833 min.
Effective stream area after confluence =     16.799(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.500 to Point/Station     1004.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      5.440(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                          ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.850
Time of concentration =    10.83 min.
Rainfall intensity =      5.440(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.381  CA =      6.412
Subarea runoff =      4.127(CFS) for      0.027(Ac.)
Total runoff =     34.882(CFS)  Total area =      16.826(Ac.)
End of computations, total study area =          16.826 (Ac.)
```

ATTACHMENT 6

POST-DEVELOPMENT MITIGATED

POC-2

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/26/25
--------------------------------------------------------------------------
24044 Post Development Poc 2 Mitigated
File 1 of 2.
100 Year Study
24044post1poc2mit.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2001.000 to Point/Station     2002.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1033.850(Ft.)
Lowest elevation = 1020.630(Ft.)
Elevation difference =   13.220(Ft.) Slope = 13.220 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  13.22 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.71 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  13.220^(1/3)]=   5.71
Rainfall intensity (I) =      8.223(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      1.068(CFS)
Total initial stream area =        0.371(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2002.000 to Point/Station     2003.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     49.875(CFS)
Depth of flow =   1.163(Ft.), Average velocity =  10.772(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              19.62
    2             20.00              11.97
    3             50.00               0.00
    4             80.00               6.91
    5            100.00              13.34
Manning's 'N' friction factor =   0.040
------------------------------------------------------------------
Sub-Channel flow  =     49.875(CFS)
  '     '    flow top width =      7.963(Ft.)
  '     '    velocity=   10.772(Ft/s)
  '     '    area =      4.630(Sq.Ft)
  '     '    Froude number =     2.490

Upstream point elevation =  1020.630(Ft.)
Downstream point elevation =   735.210(Ft.)
Flow length =  1554.100(Ft.)
Travel time  =    2.40 min.
Time of concentration =    8.11 min.
Depth of flow =   1.163(Ft.)
Average velocity =  10.772(Ft/s)
Total irregular channel flow =    49.875(CFS)
Irregular channel normal depth above invert elev. =   1.163(Ft.)
Average velocity of channel(s) =  10.772(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.555(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.010
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.990
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.348
Rainfall intensity =      6.555(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     15.043
Subarea runoff =     97.542(CFS) for     42.791(Ac.)
Total runoff =     98.610(CFS)  Total area =      43.162(Ac.)
Depth of flow =   1.502(Ft.), Average velocity =  12.774(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        7.000 to Point/Station     2003.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      6.555(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.11 min.
Rainfall intensity =      6.555(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     15.153
Subarea runoff =      0.727(CFS) for      0.317(Ac.)
Total runoff =     99.337(CFS)  Total area =      43.479(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2003.100
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
```

```
Upstream point/station elevation =   731.700(Ft.)
Downstream point/station elevation =   718.780(Ft.)
Pipe length  =   404.50(Ft.) Slope =   0.0319  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    99.337(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =    99.337(CFS)
Normal flow depth in pipe =   22.29(In.)
Flow top width inside pipe =   41.92(In.)
Critical Depth =   36.72(In.)
Pipe flow velocity =     19.15(Ft/s)
Travel time through pipe =    0.35 min.
Time of concentration (TC) =     8.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station     2003.100
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.378(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.47 min.
Rainfall intensity =      6.378(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     15.770
Subarea runoff =      1.247(CFS) for      1.761(Ac.)
Total runoff =    100.585(CFS)  Total area =      45.240(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        6.000 to Point/Station     2003.100
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.378(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.47 min.
Rainfall intensity =      6.378(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     18.504
Subarea runoff =     17.440(CFS) for      7.812(Ac.)
Total runoff =    118.024(CFS)  Total area =      53.052(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        8.000 to Point/Station     2003.100
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      6.378(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
```

```
Time of concentration =     8.47 min.
Rainfall intensity =      6.378(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     18.779
Subarea runoff =      1.757(CFS) for      0.787(Ac.)
Total runoff =    119.781(CFS)  Total area =      53.839(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.100 to Point/Station     2003.200
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   718.780(Ft.)
Downstream point/station elevation =   711.360(Ft.)
Pipe length  =   268.50(Ft.) Slope =   0.0276  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   119.781(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =   119.781(CFS)
Normal flow depth in pipe =   26.30(In.)
Flow top width inside pipe =   40.64(In.)
Critical Depth =   38.95(In.)
Pipe flow velocity =     18.90(Ft/s)
Travel time through pipe =    0.24 min.
Time of concentration (TC) =     8.70 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        9.000 to Point/Station     2003.200
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      6.266(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.70 min.
Rainfall intensity =      6.266(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     21.202
Subarea runoff =     13.066(CFS) for      6.921(Ac.)
Total runoff =    132.847(CFS)  Total area =      60.760(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.200 to Point/Station     2003.300
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   711.360(Ft.)
Downstream point/station elevation =   705.160(Ft.)
Pipe length  =   110.50(Ft.) Slope =   0.0561  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   132.847(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =   132.847(CFS)
Normal flow depth in pipe =   22.41(In.)
Flow top width inside pipe =   41.91(In.)
Critical Depth =   39.87(In.)
Pipe flow velocity =     25.44(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     8.78 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station     2003.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
```

```
Rainfall intensity (I) =      6.232(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.78 min.
Rainfall intensity =      6.232(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     22.391
Subarea runoff =      6.702(CFS) for      3.397(Ac.)
Total runoff =    139.549(CFS)  Total area =      64.157(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       11.000 to Point/Station     2003.300
**** SUBAREA FLOW ADDITION ****
----------------------------------------------------------------------------
Rainfall intensity (I) =      6.232(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     8.78 min.
Rainfall intensity =      6.232(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.349  CA =     22.625
Subarea runoff =      1.462(CFS) for      0.670(Ac.)
Total runoff =    141.010(CFS)  Total area =      64.827(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.000 to Point/Station     2003.500
**** PIPEFLOW TRAVEL TIME (User specified size) ****
----------------------------------------------------------------------------
Upstream point/station elevation =   705.160(Ft.)
Downstream point/station elevation =   693.560(Ft.)
Pipe length  =   110.50(Ft.) Slope =   0.1050  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   141.010(CFS)
Given pipe size =     42.00(In.)
Calculated individual pipe flow  =   141.010(CFS)
Normal flow depth in pipe =   19.31(In.)
Flow top width inside pipe =   41.86(In.)
Critical depth could not be calculated.
Pipe flow velocity =     32.66(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =     8.83 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.500 to Point/Station     2003.500
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     64.827(Ac.)
Runoff from this stream =    141.010(CFS)
Time of concentration =    8.83 min.
Rainfall intensity =     6.207(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
```

```
**** INITIAL AREA EVALUATION ****

-------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                 ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  744.020(Ft.)
Lowest elevation =  744.000(Ft.)
Elevation difference =    0.020(Ft.) Slope =  0.020 %
Top of Initial Area Slope adjusted by User to  0.750 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 70.00 (Ft)
for the top area slope value of   0.75 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   9.61 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5200)*(  70.000^.5)/(   0.750^(1/3)]=   9.61
Rainfall intensity (I) =      5.876(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      0.461(CFS)
Total initial stream area =       0.151(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

-------------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      9.087(CFS)
Depth of flow =   0.349(Ft.), Average velocity =   5.081(Ft/s)
    ******* Irregular Channel Data ***********
-------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2             10.00              0.50
    3             10.00              0.00
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
-------------------------------------------------------------------
Sub-Channel flow  =      9.087(CFS)
  '     '    flow top width =     12.500(Ft.)
  '     '    velocity=    5.081(Ft/s)
  '     '    area =      1.788(Sq.Ft)
  '     '    Froude number =     2.367

Upstream point elevation =   744.000(Ft.)
Downstream point elevation =   709.520(Ft.)
Flow length =   944.640(Ft.)
Travel time  =    3.10 min.
Time of concentration =   12.71 min.
Depth of flow =   0.349(Ft.)
Average velocity =   5.081(Ft/s)
Total irregular channel flow =     9.087(CFS)
Irregular channel normal depth above invert elev. =   0.349(Ft.)
Average velocity of channel(s) =   5.081(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.907(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.100
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.900
[MEDIUM DENSITY RESIDENTIAL                 ]
```

```
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.509
Rainfall intensity =      4.907(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.509  CA =      3.593
Subarea runoff =     17.171(CFS) for      6.905(Ac.)
Total runoff =     17.632(CFS)  Total area =       7.056(Ac.)
Depth of flow =   0.419(Ft.), Average velocity =   6.610(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   709.520(Ft.)
Downstream point/station elevation =   695.000(Ft.)
Pipe length  =    43.93(Ft.) Slope =   0.3305  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    17.632(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =    17.632(CFS)
Normal flow depth in pipe =    8.58(In.)
Flow top width inside pipe =   10.84(In.)
Critical depth could not be calculated.
Pipe flow velocity =     29.33(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    12.74 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      104.000 to Point/Station     2003.500
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.056(Ac.)
Runoff from this stream =     17.632(CFS)
Time of concentration =   12.74 min.
Rainfall intensity =     4.901(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     5000.000 to Point/Station     5001.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  231.000(Ft.)
Highest elevation = 1143.640(Ft.)
Lowest elevation = 1087.370(Ft.)
Elevation difference =   56.270(Ft.) Slope = 24.359 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  24.36 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.66 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  24.360^(1/3)]=   4.66
Calculated TC of    4.657 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      8.958(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      1.696(CFS)
```

```
      Total initial stream area =        0.541(Ac.)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station     5001.000 to Point/Station     5002.000
      **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
      ----------------------------------------------------------------------
      Estimated mean flow rate at midpoint of channel =     13.382(CFS)
      Depth of flow =   0.661(Ft.), Average velocity =   8.944(Ft/s)
          ******* Irregular Channel Data ***********
      ----------------------------------------------------------------------
      Information entered for subchannel number 1 :
      Point number      'X' coordinate     'Y' coordinate
          1              0.00              19.62
          2             20.00              11.97
          3             50.00               0.00
          4             80.00               6.91
          5            100.00              13.34
      Manning's 'N' friction factor =   0.040
      ----------------------------------------------------------------------
      Sub-Channel flow  =     13.382(CFS)
        '     '    flow top width =      4.527(Ft.)
        '     '    velocity=    8.944(Ft/s)
        '     '    area =      1.496(Sq.Ft)
        '     '    Froude number =     2.741

      Upstream point elevation =  1087.370(Ft.)
      Downstream point elevation =   731.450(Ft.)
      Flow length =  1324.000(Ft.)
      Travel time  =    2.47 min.
      Time of concentration =    7.12 min.
      Depth of flow =   0.661(Ft.)
      Average velocity =   8.944(Ft/s)
      Total irregular channel flow =    13.382(CFS)
      Irregular channel normal depth above invert elev. =   0.661(Ft.)
      Average velocity of channel(s) =   8.944(Ft/s)
       Adding area flow to channel
      Rainfall intensity (I) =      7.129(In/Hr) for a   100.0 year storm
      Decimal fraction soil group A = 0.010
      Decimal fraction soil group B = 0.000
      Decimal fraction soil group C = 0.000
      Decimal fraction soil group D = 0.990
      [UNDISTURBED NATURAL TERRAIN                ]
      (Permanent Open Space   )
      Impervious value, Ai = 0.000
      Sub-Area C Value = 0.348
      Rainfall intensity =      7.129(In/Hr) for a   100.0 year storm
      Effective runoff coefficient used for total area
      (Q=KCIA) is C = 0.349  CA =      3.507
      Subarea runoff =     23.303(CFS) for      9.519(Ac.)
      Total runoff =     25.000(CFS)  Total area =      10.060(Ac.)
      Depth of flow =   0.836(Ft.), Average velocity =  10.456(Ft/s)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station     5002.000 to Point/Station     5002.000
      **** 6 HOUR HYDROGRAPH ****
      ----------------------------------------------------------------------
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


      Time of Concentration =   7.12
      Basin Area =    81.94 Acres
      6 Hour Rainfall =  3.400 Inches
      Runoff Coefficient =  0.043
      Peak Discharge =    25.00 CFS
           Time (Min)     Discharge (CFS)
             0              0.000
```

7	0.715	
14	0.725	
21	0.744	
28	0.754	
35	0.776	
42	0.788	
49	0.812	
56	0.825	
63	0.852	
70	0.867	
77	0.898	
84	0.915	
91	0.950	
98	0.970	
105	1.012	
112	1.035	
119	1.084	
126	1.111	
133	1.172	
140	1.205	
147	1.280	
154	1.322	
161	1.417	
168	1.472	
175	1.600	
182	1.675	
189	1.858	
196	1.971	
203	2.259	
210	2.449	
217	2.994	
224	3.410	
231	5.007	
238	7.054	
245	25.000	
252	4.016	
259	2.687	
266	2.102	
273	1.761	
280	1.533	
287	1.367	
294	1.241	
301	1.141	
308	1.059	
315	0.990	
322	0.932	
329	0.882	
336	0.838	
343	0.799	
350	0.765	
357	0.734	
364	0.706	

++

6 - 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

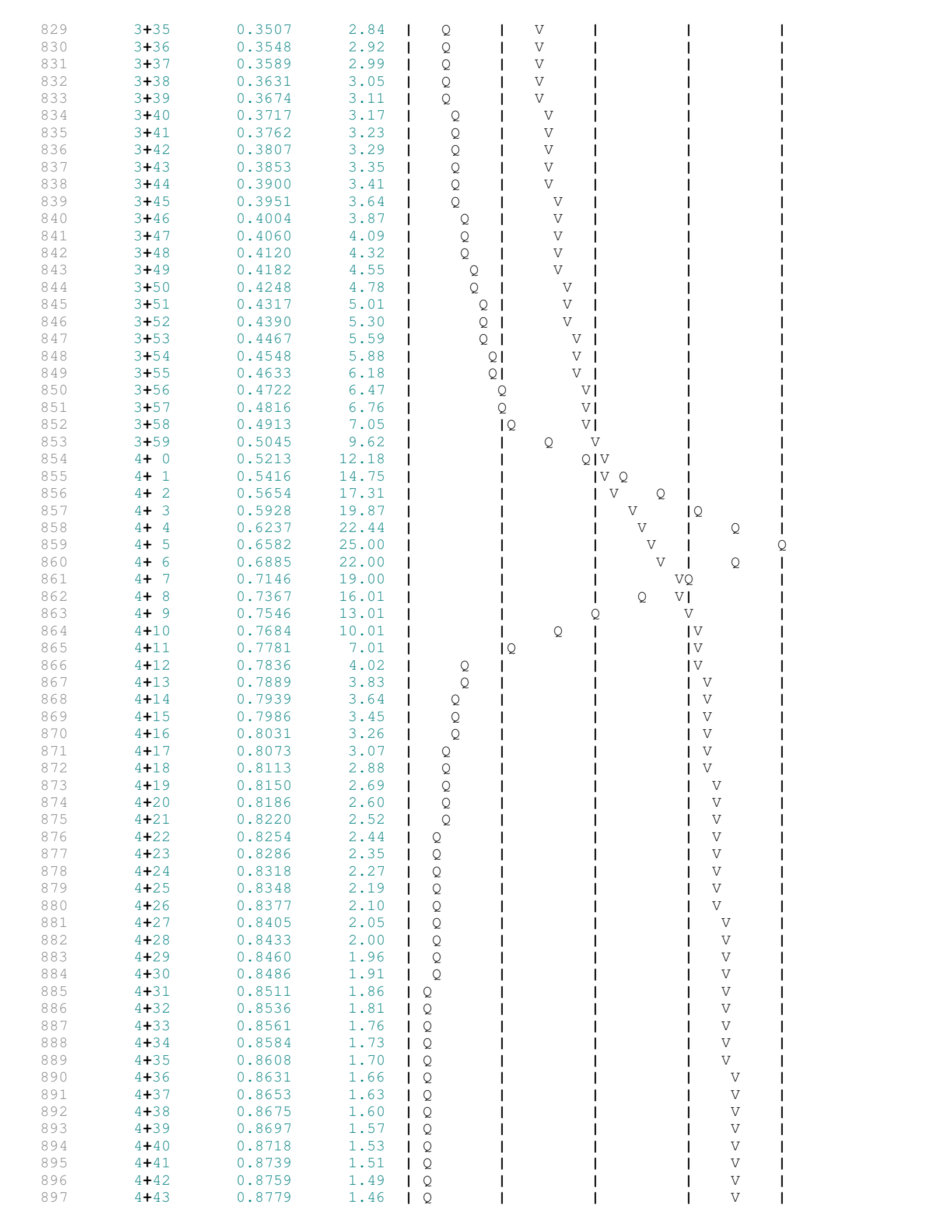
Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	6.2	12.5	18.7	25.0
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0001	0.10	Q	|	|	|	|
0+ 2	0.0004	0.20	Q	|	|	|	|
0+ 3	0.0008	0.31	Q	|	|	|	|
0+ 4	0.0014	0.41	Q	|	|	|	|
0+ 5	0.0021	0.51	Q	|	|	|	|
0+ 6	0.0030	0.61	Q	|	|	|	|
0+ 7	0.0039	0.72	VQ	|	|	|	|

622	0+ 8	0.0049	0.72	VQ	|	|	|	|
623	0+ 9	0.0059	0.72	VQ	|	|	|	|
624	0+10	0.0069	0.72	VQ	|	|	|	|
625	0+11	0.0079	0.72	VQ	|	|	|	|
626	0+12	0.0089	0.72	VQ	|	|	|	|
627	0+13	0.0099	0.72	VQ	|	|	|	|
628	0+14	0.0109	0.72	VQ	|	|	|	|
629	0+15	0.0119	0.73	VQ	|	|	|	|
630	0+16	0.0129	0.73	VQ	|	|	|	|
631	0+17	0.0139	0.73	VQ	|	|	|	|
632	0+18	0.0149	0.74	VQ	|	|	|	|
633	0+19	0.0159	0.74	VQ	|	|	|	|
634	0+20	0.0170	0.74	VQ	|	|	|	|
635	0+21	0.0180	0.74	VQ	|	|	|	|
636	0+22	0.0190	0.75	VQ	|	|	|	|
637	0+23	0.0200	0.75	VQ	|	|	|	|
638	0+24	0.0211	0.75	VQ	|	|	|	|
639	0+25	0.0221	0.75	VQ	|	|	|	|
640	0+26	0.0231	0.75	VQ	|	|	|	|
641	0+27	0.0242	0.75	VQ	|	|	|	|
642	0+28	0.0252	0.75	|Q	|	|	|	|
643	0+29	0.0263	0.76	|Q	|	|	|	|
644	0+30	0.0273	0.76	|Q	|	|	|	|
645	0+31	0.0284	0.76	|Q	|	|	|	|
646	0+32	0.0294	0.77	|Q	|	|	|	|
647	0+33	0.0305	0.77	|Q	|	|	|	|
648	0+34	0.0315	0.77	|Q	|	|	|	|
649	0+35	0.0326	0.78	|Q	|	|	|	|
650	0+36	0.0337	0.78	|Q	|	|	|	|
651	0+37	0.0348	0.78	|Q	|	|	|	|
652	0+38	0.0358	0.78	|Q	|	|	|	|
653	0+39	0.0369	0.78	|Q	|	|	|	|
654	0+40	0.0380	0.78	|Q	|	|	|	|
655	0+41	0.0391	0.79	|Q	|	|	|	|
656	0+42	0.0402	0.79	|Q	|	|	|	|
657	0+43	0.0412	0.79	|Q	|	|	|	|
658	0+44	0.0423	0.79	|Q	|	|	|	|
659	0+45	0.0434	0.80	|Q	|	|	|	|
660	0+46	0.0445	0.80	|Q	|	|	|	|
661	0+47	0.0456	0.80	|Q	|	|	|	|
662	0+48	0.0468	0.81	|Q	|	|	|	|
663	0+49	0.0479	0.81	|Q	|	|	|	|
664	0+50	0.0490	0.81	|Q	|	|	|	|
665	0+51	0.0501	0.82	|QV	|	|	|	|
666	0+52	0.0513	0.82	|QV	|	|	|	|
667	0+53	0.0524	0.82	|QV	|	|	|	|
668	0+54	0.0535	0.82	|QV	|	|	|	|
669	0+55	0.0546	0.82	|QV	|	|	|	|
670	0+56	0.0558	0.82	|QV	|	|	|	|
671	0+57	0.0569	0.83	|QV	|	|	|	|
672	0+58	0.0581	0.83	|QV	|	|	|	|
673	0+59	0.0592	0.84	|QV	|	|	|	|
674	1+ 0	0.0604	0.84	|QV	|	|	|	|
675	1+ 1	0.0615	0.84	|QV	|	|	|	|
676	1+ 2	0.0627	0.85	|QV	|	|	|	|
677	1+ 3	0.0639	0.85	|QV	|	|	|	|
678	1+ 4	0.0651	0.85	|QV	|	|	|	|
679	1+ 5	0.0662	0.86	|QV	|	|	|	|
680	1+ 6	0.0674	0.86	|QV	|	|	|	|
681	1+ 7	0.0686	0.86	|QV	|	|	|	|
682	1+ 8	0.0698	0.86	|QV	|	|	|	|
683	1+ 9	0.0710	0.86	|QV	|	|	|	|
684	1+10	0.0722	0.87	|QV	|	|	|	|
685	1+11	0.0734	0.87	|QV	|	|	|	|
686	1+12	0.0746	0.88	|Q V	|	|	|	|
687	1+13	0.0758	0.88	|Q V	|	|	|	|
688	1+14	0.0770	0.88	|Q V	|	|	|	|
689	1+15	0.0782	0.89	|Q V	|	|	|	|
690	1+16	0.0795	0.89	|Q V	|	|	|	|

691	1+17	0.0807	0.90	|Q V |	|	|	|
692	1+18	0.0819	0.90	|Q V |	|	|	|
693	1+19	0.0832	0.90	|Q V |	|	|	|
694	1+20	0.0844	0.91	|Q V |	|	|	|
695	1+21	0.0857	0.91	|Q V |	|	|	|
696	1+22	0.0869	0.91	|Q V |	|	|	|
697	1+23	0.0882	0.91	|Q V |	|	|	|
698	1+24	0.0895	0.91	|Q V |	|	|	|
699	1+25	0.0907	0.92	|Q V |	|	|	|
700	1+26	0.0920	0.92	|Q V |	|	|	|
701	1+27	0.0933	0.93	|Q V |	|	|	|
702	1+28	0.0946	0.94	|Q V |	|	|	|
703	1+29	0.0959	0.94	|Q V |	|	|	|
704	1+30	0.0972	0.95	|Q V |	|	|	|
705	1+31	0.0985	0.95	|Q V |	|	|	|
706	1+32	0.0998	0.95	|Q V |	|	|	|
707	1+33	0.1011	0.96	|Q V |	|	|	|
708	1+34	0.1024	0.96	|Q V |	|	|	|
709	1+35	0.1037	0.96	|Q V |	|	|	|
710	1+36	0.1051	0.96	|Q V |	|	|	|
711	1+37	0.1064	0.97	|Q V |	|	|	|
712	1+38	0.1077	0.97	|Q V |	|	|	|
713	1+39	0.1091	0.98	|Q V |	|	|	|
714	1+40	0.1104	0.98	|Q V |	|	|	|
715	1+41	0.1118	0.99	|Q V |	|	|	|
716	1+42	0.1132	0.99	|Q V |	|	|	|
717	1+43	0.1145	1.00	|Q V |	|	|	|
718	1+44	0.1159	1.01	|Q V |	|	|	|
719	1+45	0.1173	1.01	|Q V |	|	|	|
720	1+46	0.1187	1.02	|Q V |	|	|	|
721	1+47	0.1201	1.02	|Q V |	|	|	|
722	1+48	0.1215	1.02	|Q V |	|	|	|
723	1+49	0.1229	1.02	|Q V |	|	|	|
724	1+50	0.1244	1.03	|Q V |	|	|	|
725	1+51	0.1258	1.03	|Q V |	|	|	|
726	1+52	0.1272	1.03	|Q V |	|	|	|
727	1+53	0.1286	1.04	|Q V |	|	|	|
728	1+54	0.1301	1.05	|Q V |	|	|	|
729	1+55	0.1315	1.06	|Q V |	|	|	|
730	1+56	0.1330	1.06	|Q V |	|	|	|
731	1+57	0.1345	1.07	|Q V |	|	|	|
732	1+58	0.1360	1.08	|Q V |	|	|	|
733	1+59	0.1375	1.08	|Q V |	|	|	|
734	2+ 0	0.1390	1.09	|Q V |	|	|	|
735	2+ 1	0.1405	1.09	|Q V |	|	|	|
736	2+ 2	0.1420	1.10	|Q V |	|	|	|
737	2+ 3	0.1435	1.10	|Q V |	|	|	|
738	2+ 4	0.1450	1.10	|Q V |	|	|	|
739	2+ 5	0.1465	1.11	|Q V |	|	|	|
740	2+ 6	0.1481	1.11	|Q V |	|	|	|
741	2+ 7	0.1496	1.12	|Q V |	|	|	|
742	2+ 8	0.1512	1.13	|Q V |	|	|	|
743	2+ 9	0.1527	1.14	|Q V |	|	|	|
744	2+10	0.1543	1.15	|Q V |	|	|	|
745	2+11	0.1559	1.15	|Q V |	|	|	|
746	2+12	0.1575	1.16	|Q V |	|	|	|
747	2+13	0.1591	1.17	|Q V |	|	|	|
748	2+14	0.1607	1.18	|Q V |	|	|	|
749	2+15	0.1624	1.18	|Q V |	|	|	|
750	2+16	0.1640	1.19	|Q V |	|	|	|
751	2+17	0.1656	1.19	|Q V |	|	|	|
752	2+18	0.1673	1.20	|Q V |	|	|	|
753	2+19	0.1689	1.20	|Q V |	|	|	|
754	2+20	0.1706	1.20	|Q V |	|	|	|
755	2+21	0.1723	1.22	|Q V |	|	|	|
756	2+22	0.1739	1.23	|Q V |	|	|	|
757	2+23	0.1757	1.24	|Q V |	|	|	|
758	2+24	0.1774	1.25	|Q V |	|	|	|
759	2+25	0.1791	1.26	| Q V |	|	|	|

760	2+26	0.1809	1.27	Q V	|	|	|	|
761	2+27	0.1826	1.28	Q V	|	|	|	|
762	2+28	0.1844	1.29	Q V	|	|	|	|
763	2+29	0.1862	1.29	Q V	|	|	|	|
764	2+30	0.1880	1.30	Q V	|	|	|	|
765	2+31	0.1897	1.30	Q V	|	|	|	|
766	2+32	0.1916	1.31	Q V	|	|	|	|
767	2+33	0.1934	1.32	Q V	|	|	|	|
768	2+34	0.1952	1.32	Q V	|	|	|	|
769	2+35	0.1970	1.34	Q V	|	|	|	|
770	2+36	0.1989	1.35	Q V	|	|	|	|
771	2+37	0.2008	1.36	Q V	|	|	|	|
772	2+38	0.2027	1.38	Q V	|	|	|	|
773	2+39	0.2046	1.39	Q V	|	|	|	|
774	2+40	0.2065	1.40	Q V	|	|	|	|
775	2+41	0.2085	1.42	Q V	|	|	|	|
776	2+42	0.2104	1.42	Q V	|	|	|	|
777	2+43	0.2124	1.43	Q V	|	|	|	|
778	2+44	0.2144	1.44	Q V	|	|	|	|
779	2+45	0.2164	1.45	Q V	|	|	|	|
780	2+46	0.2184	1.46	Q V	|	|	|	|
781	2+47	0.2204	1.46	Q V	|	|	|	|
782	2+48	0.2224	1.47	Q V	|	|	|	|
783	2+49	0.2245	1.49	Q V	|	|	|	|
784	2+50	0.2265	1.51	Q V	|	|	|	|
785	2+51	0.2287	1.53	Q V	|	|	|	|
786	2+52	0.2308	1.55	Q V	|	|	|	|
787	2+53	0.2329	1.56	Q V	|	|	|	|
788	2+54	0.2351	1.58	Q V	|	|	|	|
789	2+55	0.2373	1.60	Q V	|	|	|	|
790	2+56	0.2395	1.61	Q V	|	|	|	|
791	2+57	0.2418	1.62	Q V	|	|	|	|
792	2+58	0.2440	1.63	Q V	|	|	|	|
793	2+59	0.2463	1.64	Q V	|	|	|	|
794	3+ 0	0.2486	1.65	Q V	|	|	|	|
795	3+ 1	0.2508	1.66	Q V	|	|	|	|
796	3+ 2	0.2532	1.68	Q V	|	|	|	|
797	3+ 3	0.2555	1.70	Q V	|	|	|	|
798	3+ 4	0.2579	1.73	Q V	|	|	|	|
799	3+ 5	0.2603	1.75	Q V	|	|	|	|
800	3+ 6	0.2627	1.78	Q V	|	|	|	|
801	3+ 7	0.2652	1.81	Q V	|	|	|	|
802	3+ 8	0.2678	1.83	Q V	|	|	|	|
803	3+ 9	0.2703	1.86	Q V	|	|	|	|
804	3+10	0.2729	1.87	Q V	|	|	|	|
805	3+11	0.2755	1.89	Q V	|	|	|	|
806	3+12	0.2781	1.91	Q V	|	|	|	|
807	3+13	0.2808	1.92	Q V	|	|	|	|
808	3+14	0.2834	1.94	Q V	|	|	|	|
809	3+15	0.2861	1.95	Q V	|	|	|	|
810	3+16	0.2889	1.97	Q V	|	|	|	|
811	3+17	0.2916	2.01	Q V	|	|	|	|
812	3+18	0.2945	2.05	Q V	|	|	|	|
813	3+19	0.2973	2.09	Q V	|	|	|	|
814	3+20	0.3003	2.14	Q V	|	|	|	|
815	3+21	0.3033	2.18	Q V	|	|	|	|
816	3+22	0.3063	2.22	Q V	|	|	|	|
817	3+23	0.3094	2.26	Q V	|	|	|	|
818	3+24	0.3126	2.29	Q V	|	|	|	|
819	3+25	0.3158	2.31	Q V	|	|	|	|
820	3+26	0.3190	2.34	Q V	|	|	|	|
821	3+27	0.3223	2.37	Q V	|	|	|	|
822	3+28	0.3256	2.39	Q V	|	|	|	|
823	3+29	0.3289	2.42	Q V	|	|	|	|
824	3+30	0.3323	2.45	Q V	|	|	|	|
825	3+31	0.3358	2.53	Q V	|	|	|	|
826	3+32	0.3393	2.60	Q V	|	|	|	|
827	3+33	0.3430	2.68	Q V	|	|	|	|
828	3+34	0.3468	2.76	Q V	|	|	|	|



898	4+44	0.8799	1.44	| Q	|	|	|	V |
899	4+45	0.8818	1.41	| Q	|	|	|	V |
900	4+46	0.8838	1.39	| Q	|	|	|	V |
901	4+47	0.8856	1.37	| Q	|	|	|	V |
902	4+48	0.8875	1.35	| Q	|	|	|	V |
903	4+49	0.8893	1.33	| Q	|	|	|	V |
904	4+50	0.8911	1.31	| Q	|	|	|	V |
905	4+51	0.8929	1.29	| Q	|	|	|	V |
906	4+52	0.8947	1.28	| Q	|	|	|	V |
907	4+53	0.8964	1.26	| Q	|	|	|	V |
908	4+54	0.8981	1.24	|Q	|	|	|	V |
909	4+55	0.8998	1.23	|Q	|	|	|	V |
910	4+56	0.9015	1.21	|Q	|	|	|	V |
911	4+57	0.9031	1.20	|Q	|	|	|	V |
912	4+58	0.9048	1.18	|Q	|	|	|	V |
913	4+59	0.9064	1.17	|Q	|	|	|	V |
914	5+ 0	0.9080	1.15	|Q	|	|	|	V |
915	5+ 1	0.9095	1.14	|Q	|	|	|	V |
916	5+ 2	0.9111	1.13	|Q	|	|	|	V |
917	5+ 3	0.9126	1.12	|Q	|	|	|	V |
918	5+ 4	0.9142	1.11	|Q	|	|	|	V |
919	5+ 5	0.9157	1.09	|Q	|	|	|	V |
920	5+ 6	0.9172	1.08	|Q	|	|	|	V |
921	5+ 7	0.9186	1.07	|Q	|	|	|	V |
922	5+ 8	0.9201	1.06	|Q	|	|	|	V |
923	5+ 9	0.9215	1.05	|Q	|	|	|	V |
924	5+10	0.9230	1.04	|Q	|	|	|	V |
925	5+11	0.9244	1.03	|Q	|	|	|	V |
926	5+12	0.9258	1.02	|Q	|	|	|	V |
927	5+13	0.9272	1.01	|Q	|	|	|	V |
928	5+14	0.9286	1.00	|Q	|	|	|	V |
929	5+15	0.9299	0.99	|Q	|	|	|	V |
930	5+16	0.9313	0.98	|Q	|	|	|	V |
931	5+17	0.9326	0.97	|Q	|	|	|	V |
932	5+18	0.9339	0.97	|Q	|	|	|	V |
933	5+19	0.9353	0.96	|Q	|	|	|	V |
934	5+20	0.9366	0.95	|Q	|	|	|	V |
935	5+21	0.9379	0.94	|Q	|	|	|	V |
936	5+22	0.9391	0.93	|Q	|	|	|	V |
937	5+23	0.9404	0.92	|Q	|	|	|	V |
938	5+24	0.9417	0.92	|Q	|	|	|	V |
939	5+25	0.9429	0.91	|Q	|	|	|	V |
940	5+26	0.9442	0.90	|Q	|	|	|	V |
941	5+27	0.9454	0.90	|Q	|	|	|	V |
942	5+28	0.9466	0.89	|Q	|	|	|	V |
943	5+29	0.9479	0.88	|Q	|	|	|	V |
944	5+30	0.9491	0.88	|Q	|	|	|	V |
945	5+31	0.9503	0.87	|Q	|	|	|	V |
946	5+32	0.9514	0.86	|Q	|	|	|	V |
947	5+33	0.9526	0.86	|Q	|	|	|	V |
948	5+34	0.9538	0.85	|Q	|	|	|	V |
949	5+35	0.9550	0.84	|Q	|	|	|	V |
950	5+36	0.9561	0.84	|Q	|	|	|	V |
951	5+37	0.9573	0.83	|Q	|	|	|	V |
952	5+38	0.9584	0.83	|Q	|	|	|	V |
953	5+39	0.9595	0.82	|Q	|	|	|	V |
954	5+40	0.9607	0.82	|Q	|	|	|	V |
955	5+41	0.9618	0.81	|Q	|	|	|	V|
956	5+42	0.9629	0.80	|Q	|	|	|	V|
957	5+43	0.9640	0.80	|Q	|	|	|	V|
958	5+44	0.9651	0.79	|Q	|	|	|	V|
959	5+45	0.9662	0.79	|Q	|	|	|	V|
960	5+46	0.9672	0.78	|Q	|	|	|	V|
961	5+47	0.9683	0.78	|Q	|	|	|	V|
962	5+48	0.9694	0.77	|Q	|	|	|	V|
963	5+49	0.9704	0.77	|Q	|	|	|	V|
964	5+50	0.9715	0.77	|Q	|	|	|	V|
965	5+51	0.9726	0.76	|Q	|	|	|	V|
966	5+52	0.9736	0.76	|Q	|	|	|	V|

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      5+53       0.9746      0.75  |Q        |         |         |         V|
      5+54       0.9757      0.75  |Q        |         |         |         V|
      5+55       0.9767      0.74  |Q        |         |         |         V|
      5+56       0.9777      0.74  |Q        |         |         |         V|
      5+57       0.9787      0.73  |Q        |         |         |         V|
      5+58       0.9797      0.73  |Q        |         |         |         V|
      5+59       0.9807      0.73  |Q        |         |         |         V|
      6+ 0       0.9817      0.72  |Q        |         |         |         V|
      6+ 1       0.9827      0.72  |Q        |         |         |         V|
      6+ 2       0.9837      0.71  |Q        |         |         |         V|
      6+ 3       0.9847      0.71  |Q        |         |         |         V|
      6+ 4       0.9856      0.71  |Q        |         |         |          V
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   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Process from Point/Station       12.000 to Point/Station     2003.500
   **** SUBAREA FLOW ADDITION ****

   ----------------------------------------------------------------------
   Rainfall intensity (I) =      7.129(In/Hr) for a   100.0 year storm
   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
   [UNDISTURBED NATURAL TERRAIN                ]
   (Permanent Open Space   )
   Impervious value, Ai = 0.000
   Sub-Area C Value = 0.350
   Time of concentration =     7.12 min.
   Rainfall intensity =      7.129(In/Hr) for a   100.0 year storm
   Effective runoff coefficient used for total area
   (Q=KCIA) is C = 0.349  CA =      4.206
   Subarea runoff =      4.985(CFS) for      1.998(Ac.)
   Total runoff =     29.985(CFS)  Total area =      12.058(Ac.)


   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
   Process from Point/Station     2003.500 to Point/Station     2003.500
   **** CONFLUENCE OF MINOR STREAMS ****

   ----------------------------------------------------------------------
   Along Main Stream number: 1 in normal stream number 3
   Stream flow area =     12.058(Ac.)
   Runoff from this stream =     29.985(CFS)
   Time of concentration =    7.12 min.
   Rainfall intensity =     7.129(In/Hr)
   Summary of stream data:

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


   1      141.010      8.83             6.207
   2       17.632     12.74             4.901
   3       29.985      7.12             7.129
   Qmax(1) =
          1.000 *    1.000 *   141.010) +
          1.000 *    0.693 *    17.632) +
          0.871 *    1.000 *    29.985) + =     179.341
   Qmax(2) =
          0.790 *    1.000 *   141.010) +
          1.000 *    1.000 *    17.632) +
          0.687 *    1.000 *    29.985) + =     149.590
   Qmax(3) =
          1.000 *    0.807 *   141.010) +
          1.000 *    0.559 *    17.632) +
```

```
        1.000 *    1.000 *    29.985) + =     153.601

Total of 3 streams to confluence:
Flow rates before confluence point:
     141.010      17.632      29.985
Maximum flow rates at confluence using above data:
      179.341      149.590      153.601
Area of streams before confluence:
       64.827        7.056       12.058
Results of confluence:
Total flow rate =    179.341(CFS)
Time of concentration =     8.831 min.
Effective stream area after confluence =     83.941(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2003.500 to Point/Station     2004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   696.000(Ft.)
Downstream point/station elevation =   676.980(Ft.)
Pipe length  =   637.67(Ft.) Slope =   0.0298  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   179.341(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   179.341(CFS)
Normal flow depth in pipe =   32.11(In.)
Flow top width inside pipe =   40.69(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.26(Ft/s)
Travel time through pipe =    0.50 min.
Time of concentration (TC) =     9.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.000 to Point/Station     2004.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =     83.941(Ac.)
Runoff from this stream =    179.341(CFS)
Time of concentration =    9.33 min.
Rainfall intensity =     5.990(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.249 given for subarea
Rainfall intensity (I) =      4.255(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  15.86 min.  Rain intensity =       4.25(In/Hr)
Total area =       72.974(Ac.)  Total runoff =    77.252(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     3003.000 to Point/Station     2004.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   682.670(Ft.)
Downstream point/station elevation =   676.980(Ft.)
Pipe length  =   100.00(Ft.) Slope =   0.0569  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    77.252(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    77.252(CFS)
Normal flow depth in pipe =   20.11(In.)
Flow top width inside pipe =   28.21(In.)
```

```
Critical depth could not be calculated.
Pipe flow velocity =     22.09(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    15.93 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.000 to Point/Station     2004.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =     72.974(Ac.)
Runoff from this stream =     77.252(CFS)
Time of concentration =   15.93 min.
Rainfall intensity =     4.242(In/Hr)
Summary of stream data:

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


1      179.341      9.33             5.990
2       77.252     15.93             4.242
Qmax(1) =
       1.000 *    1.000 *   179.341) +
       1.000 *    0.586 *    77.252) + =     224.581
Qmax(2) =
       0.708 *    1.000 *   179.341) +
       1.000 *    1.000 *    77.252) + =     204.247

Total of 2 main streams to confluence:
Flow rates before confluence point:
     179.341      77.252
Maximum flow rates at confluence using above data:
      224.581      204.247
Area of streams before confluence:
       83.941       72.974


Results of confluence:
Total flow rate =    224.581(CFS)
Time of concentration =     9.331 min.
Effective stream area after confluence  =    156.915(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.000 to Point/Station     2004.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   676.980(Ft.)
Downstream point/station elevation =   643.750(Ft.)
Pipe length  =   761.28(Ft.) Slope =   0.0437  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   224.581(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   224.581(CFS)
Normal flow depth in pipe =   33.05(In.)
Flow top width inside pipe =   39.75(In.)
Critical depth could not be calculated.
Pipe flow velocity =     25.85(Ft/s)
Travel time through pipe =    0.49 min.
Time of concentration (TC) =     9.82 min.
End of computations, total study area =         156.915 (Ac.)
```

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/26/25
--------------------------------------------------------------------------
100 Year Study Mitigated
24044 Post Hydrology
POC 2
24044post2poc2mit.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
___________________________________________________________________________
Decimal fraction soil group A = 0.660
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.340
[MEDIUM DENSITY RESIDENTIAL                 ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.447
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  710.390(Ft.)
Lowest elevation =  709.890(Ft.)
Elevation difference =    0.500(Ft.) Slope =  0.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.50 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =  10.47 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.4474)*(  50.000^.5)/(   0.500^(1/3)]=  10.47
Rainfall intensity (I) =      5.563(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.447
Subarea runoff =      0.717(CFS)
Total initial stream area =        0.288(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
___________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.215(CFS)
Depth of flow =   0.303(Ft.), Average velocity =   4.221(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2             10.00              0.50
    3             10.00              0.00
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      5.215(CFS)
  '     '    flow top width =     11.307(Ft.)
  '     '    velocity=    4.221(Ft/s)
  '     '    area =      1.236(Sq.Ft)
  '     '    Froude number =     2.250

Upstream point elevation =   709.480(Ft.)
Downstream point elevation =   689.220(Ft.)
Flow length =   562.500(Ft.)
Travel time  =    2.22 min.
Time of concentration =   12.69 min.
Depth of flow =   0.303(Ft.)
Average velocity =   4.221(Ft/s)
Total irregular channel flow =     5.215(CFS)
Irregular channel normal depth above invert elev. =   0.303(Ft.)
Average velocity of channel(s) =   4.221(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.914(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.760
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.240
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.436
Rainfall intensity =      4.914(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.437  CA =      1.966
Subarea runoff =      8.944(CFS) for      4.210(Ac.)
Total runoff =      9.661(CFS)  Total area =       4.498(Ac.)
Depth of flow =   0.355(Ft.), Average velocity =   5.186(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   686.270(Ft.)
Downstream point/station elevation =   684.250(Ft.)
Pipe length  =    22.20(Ft.) Slope =   0.0910  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.661(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     9.661(CFS)
Normal flow depth in pipe =    8.89(In.)
Flow top width inside pipe =   10.51(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.48(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =    12.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.000 to Point/Station      204.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      4.908(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    12.71 min.
Rainfall intensity =      4.908(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.384  CA =      4.463
Subarea runoff =     12.244(CFS) for      7.135(Ac.)
Total runoff =     21.904(CFS)  Total area =      11.633(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.000 to Point/Station      204.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------------
Rainfall intensity (I) =      4.908(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    12.71 min.
Rainfall intensity =      4.908(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.382  CA =      4.676
Subarea runoff =      1.044(CFS) for      0.608(Ac.)
Total runoff =     22.949(CFS)  Total area =      12.241(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------------
Upstream point/station elevation =   679.130(Ft.)
Downstream point/station elevation =   644.850(Ft.)
Pipe length  =   861.00(Ft.) Slope =   0.0398  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    22.949(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    22.949(CFS)
Normal flow depth in pipe =   13.27(In.)
Flow top width inside pipe =   20.26(In.)
Critical Depth =   19.84(In.)
Pipe flow velocity =     14.33(Ft/s)
Travel time through pipe =    1.00 min.
Time of concentration (TC) =    13.71 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      205.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     12.241(Ac.)
Runoff from this stream =     22.949(CFS)
Time of concentration =   13.71 min.
Rainfall intensity =     4.673(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****

------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
```

```
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Initial subarea total flow distance  =   89.300(Ft.)
Highest elevation =  688.450(Ft.)
Lowest elevation =  688.000(Ft.)
Elevation difference =    0.450(Ft.) Slope =  0.504 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.50 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   9.30 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5200)*(  50.000^.5)/(   0.500^(1/3)]=   9.30
Rainfall intensity (I) =      6.003(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      0.587(CFS)
Total initial stream area =        0.188(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.146(CFS)
Depth of flow =   0.297(Ft.), Average velocity =   4.396(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2             10.00              0.50
    3             10.00              0.00
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      5.146(CFS)
  '     '    flow top width =     10.986(Ft.)
  '     '    velocity=    4.396(Ft/s)
  '     '    area =      1.171(Sq.Ft)
  '     '    Froude number =     2.374

Upstream point elevation =   688.000(Ft.)
Downstream point elevation =   652.600(Ft.)
Flow length =   875.500(Ft.)
Travel time  =    3.32 min.
Time of concentration =   12.62 min.
Depth of flow =   0.297(Ft.)
Average velocity =   4.396(Ft/s)
Total irregular channel flow =     5.146(CFS)
Irregular channel normal depth above invert elev. =   0.297(Ft.)
Average velocity of channel(s) =   4.396(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.930(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.520
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.480
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.463
Rainfall intensity =      4.930(In/Hr) for a   100.0 year storm
```

```
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.465  CA =      1.955
Subarea runoff =      9.054(CFS) for      4.014(Ac.)
Total runoff =      9.641(CFS)  Total area =      4.202(Ac.)
Depth of flow =   0.349(Ft.), Average velocity =   5.365(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      303.000 to Point/Station      304.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   655.770(Ft.)
Downstream point/station elevation =   655.250(Ft.)
Pipe length  =    25.88(Ft.) Slope =   0.0201  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.641(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.641(CFS)
Normal flow depth in pipe =   10.55(In.)
Flow top width inside pipe =   17.73(In.)
Critical Depth =   14.39(In.)
Pipe flow velocity =      8.96(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    12.67 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      304.000 to Point/Station      305.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   653.000(Ft.)
Downstream point/station elevation =   652.110(Ft.)
Pipe length  =   148.20(Ft.) Slope =   0.0060  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.641(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     9.641(CFS)
Normal flow depth in pipe =   14.02(In.)
Flow top width inside pipe =   19.79(In.)
Critical Depth =   13.86(In.)
Pipe flow velocity =      5.65(Ft/s)
Travel time through pipe =    0.44 min.
Time of concentration (TC) =    13.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        3.000 to Point/Station      305.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      4.812(In/Hr) for a   100.0 year storm
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    13.11 min.
Rainfall intensity =      4.812(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.401  CA =      3.815
Subarea runoff =      8.714(CFS) for      5.312(Ac.)
Total runoff =     18.355(CFS)  Total area =      9.514(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       13.000 to Point/Station      305.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      4.812(In/Hr) for a   100.0 year storm
```

```
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    13.11 min.
Rainfall intensity =      4.812(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.392  CA =      4.516
Subarea runoff =      3.375(CFS) for      2.004(Ac.)
Total runoff =     21.730(CFS)  Total area =      11.518(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      305.000 to Point/Station      205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   652.110(Ft.)
Downstream point/station elevation =   644.850(Ft.)
Pipe length  =    58.23(Ft.) Slope =   0.1247  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    21.730(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    21.730(CFS)
Normal flow depth in pipe =   11.70(In.)
Flow top width inside pipe =   12.43(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.15(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    13.15 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      205.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     11.518(Ac.)
Runoff from this stream =     21.730(CFS)
Time of concentration =   13.15 min.
Rainfall intensity =     4.801(In/Hr)
Summary of stream data:

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


1       22.949     13.71             4.673
2       21.730     13.15             4.801
Qmax(1) =
       1.000 *    1.000 *    22.949) +
       0.973 *    1.000 *    21.730) + =      44.101
Qmax(2) =
       1.000 *    0.959 *    22.949) +
       1.000 *    1.000 *    21.730) + =      43.740

Total of 2 streams to confluence:
Flow rates before confluence point:
      22.949      21.730
Maximum flow rates at confluence using above data:
       44.101       43.740
Area of streams before confluence:
       12.241       11.518
Results of confluence:
Total flow rate =     44.101(CFS)
Time of concentration =    13.712 min.
Effective stream area after confluence =     23.759(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station     2004.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   644.850(Ft.)
Downstream point/station elevation =   643.750(Ft.)
Pipe length  =   188.30(Ft.) Slope =   0.0058  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    44.101(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    44.101(CFS)
Normal flow depth in pipe =   25.85(In.)
Flow top width inside pipe =   32.39(In.)
Critical Depth =   25.96(In.)
Pipe flow velocity =      8.12(Ft/s)
Travel time through pipe =    0.39 min.
Time of concentration (TC) =    14.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.500 to Point/Station     2004.500
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     23.759(Ac.)
Runoff from this stream =     44.101(CFS)
Time of concentration =   14.10 min.
Rainfall intensity =     4.590(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.040
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.960
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.516
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  698.500(Ft.)
Lowest elevation =  698.000(Ft.)
Elevation difference =    0.500(Ft.) Slope =  0.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.50 %, in a development type of
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   9.37 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5156)*(  50.000^.5)/(   0.500^(1/3)]=   9.37
Rainfall intensity (I) =      5.974(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.516
Subarea runoff =      1.269(CFS)
Total initial stream area =        0.412(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      8.933(CFS)
Depth of flow =   0.352(Ft.), Average velocity =   4.871(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
```

```
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.70
    2             10.00              0.50
    3             10.00              0.00
    4             11.50              0.13
    5             22.50              0.33
Manning's 'N' friction factor =   0.015
-----------------------------------------------------------------
Sub-Channel flow  =      8.933(CFS)
   '     '    flow top width =     12.500(Ft.)
   '     '    velocity=    4.871(Ft/s)
   '     '    area =      1.834(Sq.Ft)
   '     '    Froude number =     2.241

Upstream point elevation =   698.000(Ft.)
Downstream point elevation =   656.960(Ft.)
Flow length =  1264.800(Ft.)
Travel time  =    4.33 min.
Time of concentration =   13.70 min.
Depth of flow =   0.352(Ft.)
Average velocity =   4.871(Ft/s)
Total irregular channel flow =     8.933(CFS)
Irregular channel normal depth above invert elev. =   0.352(Ft.)
Average velocity of channel(s) =   4.871(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.676(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.470
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.140
Decimal fraction soil group D = 0.390
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.463
Rainfall intensity =      4.676(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.466  CA =      3.532
Subarea runoff =     15.248(CFS) for      7.175(Ac.)
Total runoff =     16.517(CFS)  Total area =       7.587(Ac.)
Depth of flow =   0.418(Ft.), Average velocity =   6.216(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   654.350(Ft.)
Downstream point/station elevation =   653.250(Ft.)
Pipe length  =    29.50(Ft.) Slope =   0.0373  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.517(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    16.517(CFS)
Normal flow depth in pipe =   12.34(In.)
Flow top width inside pipe =   16.71(In.)
Critical depth could not be calculated.
Pipe flow velocity =     12.79(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    13.74 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station     2004.500
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   648.000(Ft.)
Downstream point/station elevation =   643.750(Ft.)
Pipe length  =    88.56(Ft.) Slope =   0.0480  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.517(CFS)
```

```
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    16.517(CFS)
Normal flow depth in pipe =   11.29(In.)
Flow top width inside pipe =   17.41(In.)
Critical depth could not be calculated.
Pipe flow velocity =     14.16(Ft/s)
Travel time through pipe =    0.10 min.
Time of concentration (TC) =    13.84 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.500 to Point/Station     2004.500
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      7.587(Ac.)
Runoff from this stream =     16.517(CFS)
Time of concentration =   13.84 min.
Rainfall intensity =     4.645(In/Hr)


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Process from Point/Station     2004.500 to Point/Station     2004.500
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.247 given for subarea
Rainfall intensity (I) =      5.796(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   9.82 min.  Rain intensity =       5.80(In/Hr)
Total area =      156.915(Ac.)  Total runoff =   224.581(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.500 to Point/Station     2004.500
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =    156.915(Ac.)
Runoff from this stream =    224.581(CFS)
Time of concentration =    9.82 min.
Rainfall intensity =     5.796(In/Hr)
Summary of stream data:

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


1       44.101     14.10             4.590
2       16.517     13.84             4.645
3      224.581      9.82             5.796
Qmax(1) =
       1.000 *    1.000 *    44.101) +
       0.988 *    1.000 *    16.517) +
       0.792 *    1.000 *   224.581) + =     238.281
Qmax(2) =
       1.000 *    0.982 *    44.101) +
       1.000 *    1.000 *    16.517) +
       0.801 *    1.000 *   224.581) + =     239.793
Qmax(3) =
       1.000 *    0.697 *    44.101) +
       1.000 *    0.709 *    16.517) +
       1.000 *    1.000 *   224.581) + =     267.017

Total of 3 streams to confluence:
Flow rates before confluence point:
      44.101      16.517     224.581
Maximum flow rates at confluence using above data:
     238.281      239.793      267.017
Area of streams before confluence:
```

```
       23.759        7.587      156.915
Results of confluence:
Total flow rate =    267.017(CFS)
Time of concentration =     9.820 min.
Effective stream area after confluence =    188.261(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.500 to Point/Station     2004.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   643.750(Ft.)
Downstream point/station elevation =   633.440(Ft.)
Pipe length  =   140.00(Ft.) Slope =   0.0736  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   267.017(CFS)
Nearest computed pipe diameter  =     42.00(In.)
Calculated individual pipe flow  =   267.017(CFS)
Normal flow depth in pipe =   33.61(In.)
Flow top width inside pipe =   33.59(In.)
Critical depth could not be calculated.
Pipe flow velocity =     32.34(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =     9.89 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       14.000 to Point/Station     2004.600
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      5.769(In/Hr) for a   100.0 year storm
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
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Time of concentration =     9.89 min.
Rainfall intensity =      5.769(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.278  CA =     52.905
Subarea runoff =     38.186(CFS) for      1.801(Ac.)
Total runoff =    305.203(CFS)  Total area =     190.062(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2004.600 to Point/Station     2005.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   633.440(Ft.)
Downstream point/station elevation =   627.320(Ft.)
Pipe length  =   101.50(Ft.) Slope =   0.0603  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   305.203(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   305.203(CFS)
Normal flow depth in pipe =   34.50(In.)
Flow top width inside pipe =   43.16(In.)
Critical depth could not be calculated.
Pipe flow velocity =     31.60(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     9.95 min.


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Process from Point/Station     2005.000 to Point/Station     2005.000
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------
The following data inside Main Stream is listed:
```

```
In Main Stream number: 1
Stream flow area =    190.062(Ac.)
Runoff from this stream =    305.203(CFS)
Time of concentration =    9.95 min.
Rainfall intensity =     5.749(In/Hr)
Program is now starting with Main Stream No. 2


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Process from Point/Station      801.000 to Point/Station      804.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

------------------------------------------------------------------------
User specified 'C' value of 0.176 given for subarea
Rainfall intensity (I) =      4.306(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  15.57 min.  Rain intensity =       4.31(In/Hr)
Total area =        8.528(Ac.)  Total runoff =     6.665(CFS)


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Process from Point/Station     2005.000 to Point/Station     2005.000
**** CONFLUENCE OF MAIN STREAMS ****

------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      8.528(Ac.)
Runoff from this stream =      6.665(CFS)
Time of concentration =   15.57 min.
Rainfall intensity =     4.306(In/Hr)
Summary of stream data:

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


1      305.203      9.95             5.749
2        6.665     15.57             4.306
Qmax(1) =
       1.000 *    1.000 *   305.203) +
       1.000 *    0.639 *     6.665) + =     309.460
Qmax(2) =
       0.749 *    1.000 *   305.203) +
       1.000 *    1.000 *     6.665) + =     235.244

Total of 2 main streams to confluence:
Flow rates before confluence point:
     305.203       6.665
Maximum flow rates at confluence using above data:
      309.460      235.244
Area of streams before confluence:
      190.062        8.528


Results of confluence:
Total flow rate =    309.460(CFS)
Time of concentration =     9.946 min.
Effective stream area after confluence  =    198.590(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2005.000 to Point/Station     2006.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

------------------------------------------------------------------------
Upstream point/station elevation =   633.000(Ft.)
Downstream point/station elevation =   630.000(Ft.)
Pipe length  =   147.00(Ft.) Slope =   0.0204  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   309.460(CFS)
Nearest computed pipe diameter  =     57.00(In.)
Calculated individual pipe flow  =   309.460(CFS)
```

```
Normal flow depth in pipe =   44.53(In.)
Flow top width inside pipe =   47.13(In.)
Critical depth could not be calculated.
Pipe flow velocity =     20.84(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =    10.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       17.000 to Point/Station      804.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      5.705(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.300
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.457
Time of concentration =    10.06 min.
Rainfall intensity =      5.705(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.276  CA =     55.334
Subarea runoff =      6.242(CFS) for      2.030(Ac.)
Total runoff =    315.703(CFS)  Total area =     200.620(Ac.)


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Process from Point/Station     2006.000 to Point/Station     2006.000
**** 6 HOUR HYDROGRAPH ****
------------------------------------------------------------------------
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =  10.06
Basin Area =   200.62 Acres
6 Hour Rainfall =  3.400 Inches
Runoff Coefficient =  0.276
Peak Discharge =   315.70 CFS
     Time (Min)      Discharge (CFS)
       0               0.000
       10              11.256
       20              11.466
       30              11.916
       40              12.159
       50              12.684
       60              12.969
       70              13.593
       80              13.934
       90              14.688
       100              15.106
       110              16.041
       120              16.567
       130              17.765
       140              18.453
       150              20.058
       160              21.004
       170              23.295
       180              24.705
       190              28.318
       200              30.704
       210              37.530
       220              42.747
       230              62.766
       240              88.435
       250             315.703
```

260	50.342	
270	33.682	
280	26.354	
290	22.074	
300	19.213	
310	17.140	
320	15.556	
330	14.299	
340	13.272	
350	12.414	
360	11.685	
370	11.056	

++

6 - H O U R S T O R M

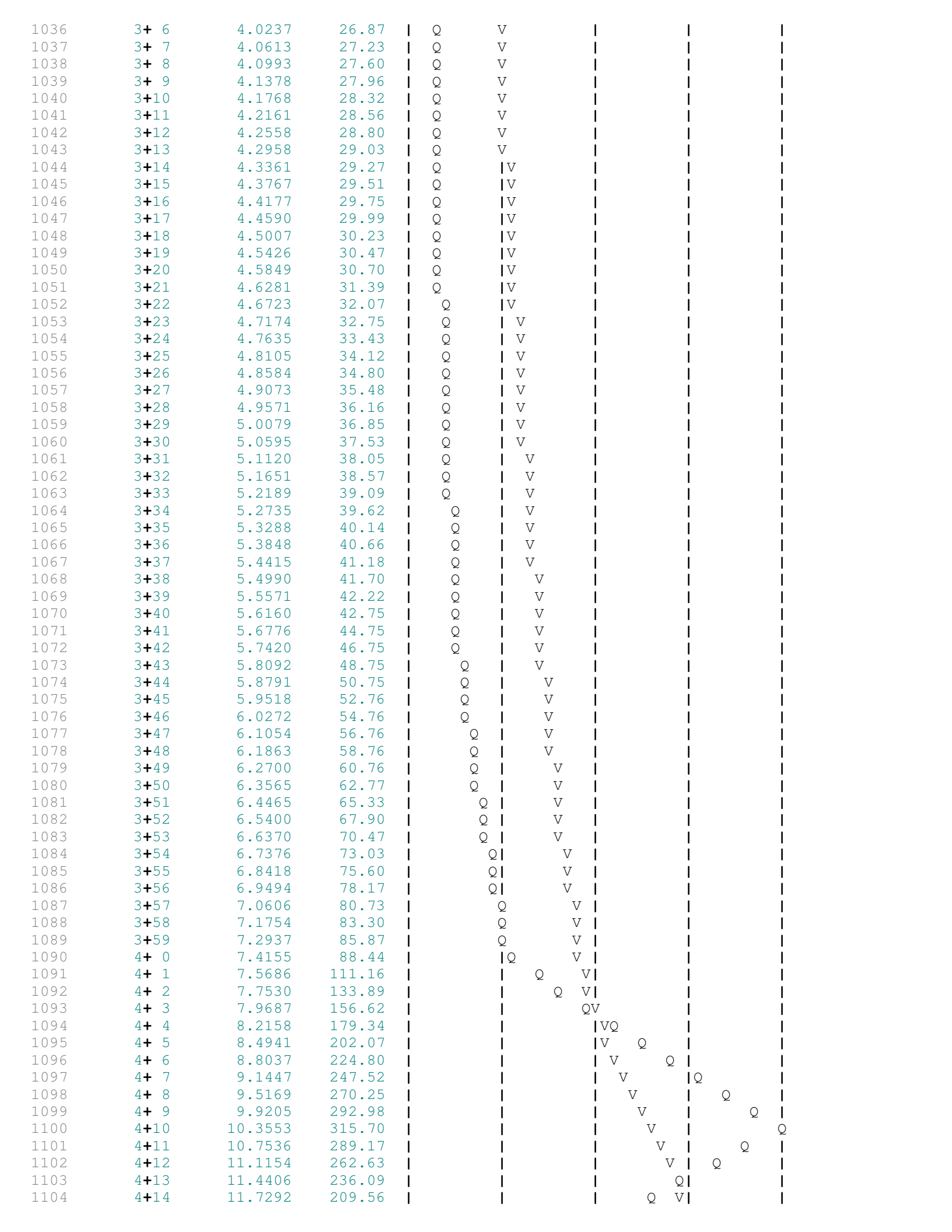
R u n o f f H y d r o g r a p h

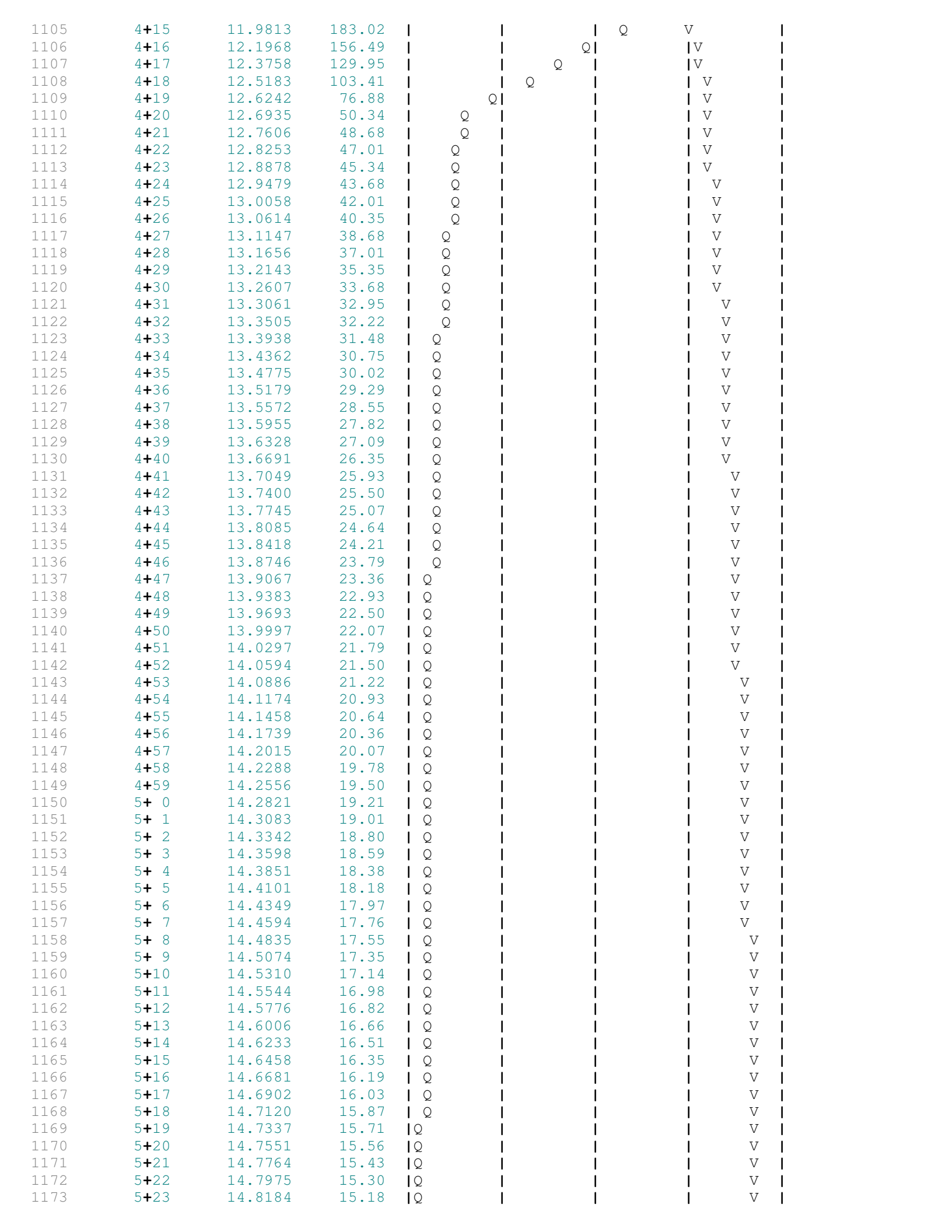
Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	78.9	157.9	236.8	315.7
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0016	1.13	Q	|	|	|	|
0+ 2	0.0047	2.25	Q	|	|	|	|
0+ 3	0.0093	3.38	Q	|	|	|	|
0+ 4	0.0155	4.50	Q	|	|	|	|
0+ 5	0.0233	5.63	Q	|	|	|	|
0+ 6	0.0326	6.75	Q	|	|	|	|
0+ 7	0.0434	7.88	Q	|	|	|	|
0+ 8	0.0558	9.00	VQ	|	|	|	|
0+ 9	0.0698	10.13	VQ	|	|	|	|
0+10	0.0853	11.26	VQ	|	|	|	|
0+11	0.1008	11.28	VQ	|	|	|	|
0+12	0.1164	11.30	VQ	|	|	|	|
0+13	0.1320	11.32	VQ	|	|	|	|
0+14	0.1476	11.34	VQ	|	|	|	|
0+15	0.1632	11.36	VQ	|	|	|	|
0+16	0.1789	11.38	VQ	|	|	|	|
0+17	0.1946	11.40	VQ	|	|	|	|
0+18	0.2103	11.42	VQ	|	|	|	|
0+19	0.2261	11.44	VQ	|	|	|	|
0+20	0.2419	11.47	VQ	|	|	|	|
0+21	0.2578	11.51	VQ	|	|	|	|
0+22	0.2737	11.56	VQ	|	|	|	|
0+23	0.2897	11.60	VQ	|	|	|	|
0+24	0.3057	11.65	VQ	|	|	|	|
0+25	0.3218	11.69	VQ	|	|	|	|
0+26	0.3380	11.74	VQ	|	|	|	|
0+27	0.3542	11.78	VQ	|	|	|	|
0+28	0.3705	11.83	VQ	|	|	|	|
0+29	0.3868	11.87	VQ	|	|	|	|
0+30	0.4032	11.92	|Q	|	|	|	|
0+31	0.4197	11.94	|Q	|	|	|	|
0+32	0.4362	11.96	|Q	|	|	|	|
0+33	0.4527	11.99	|Q	|	|	|	|
0+34	0.4692	12.01	|Q	|	|	|	|
0+35	0.4858	12.04	|Q	|	|	|	|
0+36	0.5024	12.06	|Q	|	|	|	|
0+37	0.5191	12.09	|Q	|	|	|	|
0+38	0.5357	12.11	|Q	|	|	|	|
0+39	0.5525	12.13	|Q	|	|	|	|
0+40	0.5692	12.16	|Q	|	|	|	|
0+41	0.5860	12.21	|Q	|	|	|	|
0+42	0.6029	12.26	|Q	|	|	|	|
0+43	0.6199	12.32	|Q	|	|	|	|
0+44	0.6369	12.37	|Q	|	|	|	|
0+45	0.6540	12.42	|Q	|	|	|	|
0+46	0.6712	12.47	|Q	|	|	|	|
0+47	0.6885	12.53	|Q	|	|	|	|

898	0+48	0.7058	12.58	|Q	|	|	|	|
899	0+49	0.7232	12.63	|Q	|	|	|	|
900	0+50	0.7407	12.68	|Q	|	|	|	|
901	0+51	0.7582	12.71	|Q	|	|	|	|
902	0+52	0.7757	12.74	|Q	|	|	|	|
903	0+53	0.7933	12.77	|QV	|	|	|	|
904	0+54	0.8109	12.80	|QV	|	|	|	|
905	0+55	0.8286	12.83	|QV	|	|	|	|
906	0+56	0.8463	12.86	|QV	|	|	|	|
907	0+57	0.8641	12.88	|QV	|	|	|	|
908	0+58	0.8818	12.91	|QV	|	|	|	|
909	0+59	0.8997	12.94	|QV	|	|	|	|
910	1+ 0	0.9175	12.97	|QV	|	|	|	|
911	1+ 1	0.9355	13.03	|QV	|	|	|	|
912	1+ 2	0.9535	13.09	|QV	|	|	|	|
913	1+ 3	0.9716	13.16	|QV	|	|	|	|
914	1+ 4	0.9899	13.22	|QV	|	|	|	|
915	1+ 5	1.0081	13.28	|QV	|	|	|	|
916	1+ 6	1.0265	13.34	|QV	|	|	|	|
917	1+ 7	1.0450	13.41	|QV	|	|	|	|
918	1+ 8	1.0635	13.47	|QV	|	|	|	|
919	1+ 9	1.0822	13.53	|QV	|	|	|	|
920	1+10	1.1009	13.59	|QV	|	|	|	|
921	1+11	1.1197	13.63	|QV	|	|	|	|
922	1+12	1.1385	13.66	|QV	|	|	|	|
923	1+13	1.1574	13.70	|QV	|	|	|	|
924	1+14	1.1763	13.73	|Q V	|	|	|	|
925	1+15	1.1952	13.76	|Q V	|	|	|	|
926	1+16	1.2142	13.80	|Q V	|	|	|	|
927	1+17	1.2333	13.83	|Q V	|	|	|	|
928	1+18	1.2524	13.87	|Q V	|	|	|	|
929	1+19	1.2715	13.90	|Q V	|	|	|	|
930	1+20	1.2907	13.93	|Q V	|	|	|	|
931	1+21	1.3100	14.01	|Q V	|	|	|	|
932	1+22	1.3294	14.09	|Q V	|	|	|	|
933	1+23	1.3489	14.16	|Q V	|	|	|	|
934	1+24	1.3685	14.24	|Q V	|	|	|	|
935	1+25	1.3882	14.31	|Q V	|	|	|	|
936	1+26	1.4081	14.39	|Q V	|	|	|	|
937	1+27	1.4280	14.46	|Q V	|	|	|	|
938	1+28	1.4480	14.54	|Q V	|	|	|	|
939	1+29	1.4681	14.61	|Q V	|	|	|	|
940	1+30	1.4884	14.69	|Q V	|	|	|	|
941	1+31	1.5086	14.73	|Q V	|	|	|	|
942	1+32	1.5290	14.77	|Q V	|	|	|	|
943	1+33	1.5494	14.81	|Q V	|	|	|	|
944	1+34	1.5699	14.86	|Q V	|	|	|	|
945	1+35	1.5904	14.90	|Q V	|	|	|	|
946	1+36	1.6110	14.94	|Q V	|	|	|	|
947	1+37	1.6316	14.98	|Q V	|	|	|	|
948	1+38	1.6523	15.02	|Q V	|	|	|	|
949	1+39	1.6730	15.06	|Q V	|	|	|	|
950	1+40	1.6938	15.11	|Q V	|	|	|	|
951	1+41	1.7148	15.20	|Q V	|	|	|	|
952	1+42	1.7358	15.29	|Q V	|	|	|	|
953	1+43	1.7570	15.39	|Q V	|	|	|	|
954	1+44	1.7784	15.48	|Q V	|	|	|	|
955	1+45	1.7998	15.57	|Q V	|	|	|	|
956	1+46	1.8214	15.67	|Q V	|	|	|	|
957	1+47	1.8431	15.76	|Q V	|	|	|	|
958	1+48	1.8649	15.85	| Q V	|	|	|	|
959	1+49	1.8869	15.95	| Q V	|	|	|	|
960	1+50	1.9090	16.04	| Q V	|	|	|	|
961	1+51	1.9312	16.09	| Q V	|	|	|	|
962	1+52	1.9534	16.15	| Q V	|	|	|	|
963	1+53	1.9757	16.20	| Q V	|	|	|	|
964	1+54	1.9981	16.25	| Q V	|	|	|	|
965	1+55	2.0206	16.30	| Q V	|	|	|	|
966	1+56	2.0431	16.36	| Q V	|	|	|	|

967	1+57	2.0657	16.41	Q V			
968	1+58	2.0884	16.46	Q V			
969	1+59	2.1111	16.51	Q V			
970	2+ 0	2.1339	16.57	Q V			
971	2+ 1	2.1569	16.69	Q V			
972	2+ 2	2.1801	16.81	Q V			
973	2+ 3	2.2034	16.93	Q V			
974	2+ 4	2.2269	17.05	Q V			
975	2+ 5	2.2505	17.17	Q V			
976	2+ 6	2.2743	17.29	Q V			
977	2+ 7	2.2983	17.41	Q V			
978	2+ 8	2.3224	17.53	Q V			
979	2+ 9	2.3467	17.65	Q V			
980	2+10	2.3712	17.77	Q V			
981	2+11	2.3958	17.83	Q V			
982	2+12	2.4204	17.90	Q V			
983	2+13	2.4452	17.97	Q V			
984	2+14	2.4700	18.04	Q V			
985	2+15	2.4950	18.11	Q V			
986	2+16	2.5200	18.18	Q V			
987	2+17	2.5452	18.25	Q V			
988	2+18	2.5704	18.32	Q V			
989	2+19	2.5957	18.38	Q V			
990	2+20	2.6211	18.45	Q V			
991	2+21	2.6468	18.61	Q V			
992	2+22	2.6726	18.77	Q V			
993	2+23	2.6987	18.93	Q V			
994	2+24	2.7250	19.09	Q V			
995	2+25	2.7515	19.26	Q V			
996	2+26	2.7783	19.42	Q V			
997	2+27	2.8052	19.58	Q V			
998	2+28	2.8324	19.74	Q V			
999	2+29	2.8598	19.90	Q V			
1000	2+30	2.8875	20.06	Q V			
1001	2+31	2.9152	20.15	Q V			
1002	2+32	2.9431	20.25	Q V			
1003	2+33	2.9711	20.34	Q V			
1004	2+34	2.9993	20.44	Q V			
1005	2+35	3.0275	20.53	Q V			
1006	2+36	3.0560	20.63	Q V			
1007	2+37	3.0845	20.72	Q V			
1008	2+38	3.1132	20.82	Q V			
1009	2+39	3.1420	20.91	Q V			
1010	2+40	3.1709	21.00	Q V			
1011	2+41	3.2001	21.23	Q V			
1012	2+42	3.2297	21.46	Q V			
1013	2+43	3.2596	21.69	Q V			
1014	2+44	3.2898	21.92	Q V			
1015	2+45	3.3203	22.15	Q V			
1016	2+46	3.3511	22.38	Q V			
1017	2+47	3.3823	22.61	Q V			
1018	2+48	3.4137	22.84	Q V			
1019	2+49	3.4455	23.07	Q V			
1020	2+50	3.4776	23.30	Q V			
1021	2+51	3.5099	23.44	Q V			
1022	2+52	3.5423	23.58	Q V			
1023	2+53	3.5750	23.72	Q V			
1024	2+54	3.6079	23.86	Q V			
1025	2+55	3.6409	24.00	Q V			
1026	2+56	3.6742	24.14	Q V			
1027	2+57	3.7076	24.28	Q V			
1028	2+58	3.7413	24.42	Q V			
1029	2+59	3.7751	24.56	Q V			
1030	3+ 0	3.8091	24.70	Q V			
1031	3+ 1	3.8436	25.07	Q V			
1032	3+ 2	3.8787	25.43	Q V			
1033	3+ 3	3.9142	25.79	Q V			
1034	3+ 4	3.9502	26.15	Q V			
1035	3+ 5	3.9867	26.51	Q V			





```
      5+24      14.8391     15.05  |Q        |         |         |      V  |
      5+25      14.8597     14.93  |Q        |         |         |      V  |
      5+26      14.8800     14.80  |Q        |         |         |       V |
      5+27      14.9003     14.68  |Q        |         |         |       V |
      5+28      14.9203     14.55  |Q        |         |         |       V |
      5+29      14.9402     14.42  |Q        |         |         |       V |
      5+30      14.9599     14.30  |Q        |         |         |       V |
      5+31      14.9794     14.20  |Q        |         |         |       V |
      5+32      14.9988     14.09  |Q        |         |         |       V |
      5+33      15.0181     13.99  |Q        |         |         |       V |
      5+34      15.0372     13.89  |Q        |         |         |       V |
      5+35      15.0562     13.79  |Q        |         |         |       V |
      5+36      15.0751     13.68  |Q        |         |         |       V |
      5+37      15.0938     13.58  |Q        |         |         |       V |
      5+38      15.1123     13.48  |Q        |         |         |       V |
      5+39      15.1308     13.37  |Q        |         |         |       V |
      5+40      15.1490     13.27  |Q        |         |         |       V |
      5+41      15.1672     13.19  |Q        |         |         |       V |
      5+42      15.1852     13.10  |Q        |         |         |       V |
      5+43      15.2032     13.01  |Q        |         |         |       V |
      5+44      15.2210     12.93  |Q        |         |         |       V |
      5+45      15.2387     12.84  |Q        |         |         |       V |
      5+46      15.2562     12.76  |Q        |         |         |        V|
      5+47      15.2737     12.67  |Q        |         |         |        V|
      5+48      15.2910     12.59  |Q        |         |         |        V|
      5+49      15.3082     12.50  |Q        |         |         |        V|
      5+50      15.3253     12.41  |Q        |         |         |        V|
      5+51      15.3423     12.34  |Q        |         |         |        V|
      5+52      15.3592     12.27  |Q        |         |         |        V|
      5+53      15.3760     12.20  |Q        |         |         |        V|
      5+54      15.3927     12.12  |Q        |         |         |        V|
      5+55      15.4093     12.05  |Q        |         |         |        V|
      5+56      15.4258     11.98  |Q        |         |         |        V|
      5+57      15.4422     11.90  |Q        |         |         |        V|
      5+58      15.4585     11.83  |Q        |         |         |        V|
      5+59      15.4747     11.76  |Q        |         |         |        V|
      6+ 0      15.4908     11.69  |Q        |         |         |        V|
      6+ 1      15.5068     11.62  |Q        |         |         |        V|
      6+ 2      15.5227     11.56  |Q        |         |         |        V|
      6+ 3      15.5386     11.50  |Q        |         |         |        V|
      6+ 4      15.5543     11.43  |Q        |         |         |        V|
      6+ 5      15.5700     11.37  |Q        |         |         |        V|
      6+ 6      15.5856     11.31  |Q        |         |         |        V|
      6+ 7      15.6011     11.24  |Q        |         |         |        V|
      6+ 8      15.6165     11.18  |Q        |         |         |        V|
      6+ 9      15.6318     11.12  |Q        |         |         |        V|
      6+10      15.6470     11.06  |Q        |         |         |         V
    --------------------------------------------------------------------


    End of computations, total study area =         200.620 (Ac.)
```

ATTACHMENT 6

POST-DEVELOPMENT MITIGATED

POC-3

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 11/28/25
--------------------------------------------------------------------------
100 Year Study
24044 Post Development Mitigated
POC 3
24044postpoc3mit.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6715

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.400
24 hour precipitation(inches) =  6.000
P6/P24 =    56.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      400.000 to Point/Station      401.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------
User specified 'C' value of 0.411 given for subarea
Rainfall intensity (I) =      4.433(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  14.88 min.  Rain intensity =       4.43(In/Hr)
Total area =        4.600(Ac.)  Total runoff =     8.634(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      704.000 to Point/Station      704.100
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   720.000(Ft.)
Downstream point/station elevation =   719.740(Ft.)
Pipe length  =    71.90(Ft.) Slope =   0.0036  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.634(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =     8.634(CFS)
Normal flow depth in pipe =   15.66(In.)
Flow top width inside pipe =   18.29(In.)
Critical Depth =   13.11(In.)
Pipe flow velocity =      4.49(Ft/s)
Travel time through pipe =    0.27 min.
Time of concentration (TC) =    15.15 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      704.100 to Point/Station      705.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Rainfall intensity (I) =      4.383(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
```

```
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.360
Time of concentration =    15.15 min.
Rainfall intensity =      4.383(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.400  CA =      2.338
Subarea runoff =      1.611(CFS) for      1.242(Ac.)
Total runoff =     10.245(CFS)  Total area =       5.842(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      705.000 to Point/Station      706.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     10.421(CFS)
Depth of flow =   0.658(Ft.), Average velocity =  16.041(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2              1.50              0.00
    3              3.00              1.00
Manning's 'N' friction factor =   0.016
------------------------------------------------------------------
Sub-Channel flow  =     10.421(CFS)
  '     '    flow top width =      1.974(Ft.)
  '     '    velocity=   16.041(Ft/s)
  '     '    area =      0.650(Sq.Ft)
  '     '    Froude number =     4.928

Upstream point elevation =   723.470(Ft.)
Downstream point elevation =   642.090(Ft.)
Flow length =   485.000(Ft.)
Travel time  =    0.50 min.
Time of concentration =   15.65 min.
Depth of flow =   0.658(Ft.)
Average velocity =  16.041(Ft/s)
Total irregular channel flow =    10.421(CFS)
Irregular channel normal depth above invert elev. =   0.658(Ft.)
Average velocity of channel(s) =  16.041(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.291(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Rainfall intensity =      4.291(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.394  CA =      2.458
Subarea runoff =      0.301(CFS) for      0.400(Ac.)
Total runoff =     10.546(CFS)  Total area =       6.242(Ac.)
Depth of flow =   0.661(Ft.), Average velocity =  16.089(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      706.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      6.242(Ac.)
Runoff from this stream =     10.546(CFS)
```

```
Time of concentration =   15.65 min.
Rainfall intensity =     4.291(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      706.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------------
User specified 'C' value of 0.480 given for subarea
Rainfall intensity (I) =      5.729(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =  10.00 min.  Rain intensity =       5.73(In/Hr)
Total area =       76.663(Ac.)  Total runoff =     5.897(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      706.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     76.663(Ac.)
Runoff from this stream =      5.897(CFS)
Time of concentration =   10.00 min.
Rainfall intensity =     5.729(In/Hr)
Summary of stream data:

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


1       10.546     15.65             4.291
2        5.897     10.00             5.729
Qmax(1) =
       1.000 *    1.000 *    10.546) +
       0.749 *    1.000 *     5.897) + =      14.964
Qmax(2) =
       1.000 *    0.639 *    10.546) +
       1.000 *    1.000 *     5.897) + =      12.635

Total of 2 streams to confluence:
Flow rates before confluence point:
      10.546       5.897
Maximum flow rates at confluence using above data:
       14.964       12.635
Area of streams before confluence:
        6.242       76.663
Results of confluence:
Total flow rate =     14.964(CFS)
Time of concentration =    15.651 min.
Effective stream area after confluence =     82.905(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      706.000 to Point/Station      903.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     88.602(CFS)
Depth of flow =   1.172(Ft.), Average velocity =   7.560(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              4.00
    2              0.00              0.00
    3             10.00              0.00
    4             10.00              4.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =     88.602(CFS)
```

```
'     '    flow top width =     10.000(Ft.)
'     '    velocity=    7.560(Ft/s)
'     '    area =     11.720(Sq.Ft)
'     '    Froude number =     1.231

Upstream point elevation =   642.090(Ft.)
Downstream point elevation =   639.110(Ft.)
Flow length =   477.500(Ft.)
Travel time  =    1.05 min.
Time of concentration =   16.70 min.
Depth of flow =   1.172(Ft.)
Average velocity =   7.560(Ft/s)
Total irregular channel flow =    88.602(CFS)
Irregular channel normal depth above invert elev. =   1.172(Ft.)
Average velocity of channel(s) =   7.560(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.115(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                        ]
(2.0 DU/A or Less       )
Impervious value, Ai = 0.200
Sub-Area C Value = 0.420
Rainfall intensity =      4.115(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.473  CA =     39.450
Subarea runoff =    147.361(CFS) for      0.462(Ac.)
Total runoff =    162.325(CFS)  Total area =      83.367(Ac.)
Depth of flow =   1.746(Ft.), Average velocity =   9.295(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     83.367(Ac.)
Runoff from this stream =    162.325(CFS)
Time of concentration =   16.70 min.
Rainfall intensity =     4.115(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      902.000
**** INITIAL AREA EVALUATION ****

------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                        ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.360
Initial subarea total flow distance  =   90.500(Ft.)
Highest elevation =  685.720(Ft.)
Lowest elevation =  656.640(Ft.)
Elevation difference =   29.080(Ft.) Slope = 32.133 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  32.13 %, in a development type of
 1.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.19 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3600)*( 100.000^.5)/(  32.130^(1/3)]=   4.19
Calculated TC of    4.190 minutes is less than 5 minutes,
```

```
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      8.958(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.360
Subarea runoff =      0.290(CFS)
Total initial stream area =        0.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      903.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      6.784(CFS)
Depth of flow =   0.133(Ft.), Average velocity =   1.908(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.50
    2            100.00              0.00
    3            200.00              0.50
Manning's 'N' friction factor =   0.030
------------------------------------------------------------------------
Sub-Channel flow  =      6.784(CFS)
  '      '    flow top width =     53.336(Ft.)
  '      '    velocity=    1.908(Ft/s)
  '      '    area =      3.556(Sq.Ft)
  '      '    Froude number =     1.302

Upstream point elevation =   656.640(Ft.)
Downstream point elevation =   634.230(Ft.)
Flow length =   408.400(Ft.)
Travel time  =    3.57 min.
Time of concentration =    7.76 min.
Depth of flow =   0.133(Ft.)
Average velocity =   1.908(Ft/s)
Total irregular channel flow =     6.784(CFS)
Irregular channel normal depth above invert elev. =   0.133(Ft.)
Average velocity of channel(s) =   1.908(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.748(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL                 ]
(7.3 DU/A or Less       )
Impervious value, Ai = 0.400
Sub-Area C Value = 0.540
Rainfall intensity =      6.748(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.536  CA =      1.976
Subarea runoff =     13.046(CFS) for      3.600(Ac.)
Total runoff =     13.337(CFS)  Total area =       3.690(Ac.)
Depth of flow =   0.172(Ft.), Average velocity =   2.259(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.690(Ac.)
Runoff from this stream =     13.337(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     6.748(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       18.000 to Point/Station      904.000
```

```
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      6.748(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.810
[INDUSTRIAL area type                          ]
(Limited Industrial       )
Impervious value, Ai = 0.900
Sub-Area C Value = 0.846
Time of concentration =     7.76 min.
Rainfall intensity =      6.748(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.644  CA =      3.642
Subarea runoff =     24.577(CFS) for      1.968(Ac.)
Total runoff =     24.577(CFS)  Total area =       5.658(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station      904.000
**** SUBAREA FLOW ADDITION ****

------------------------------------------------------------------------
Rainfall intensity (I) =      6.748(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.500
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.200
Decimal fraction soil group D = 0.300
[MEDIUM DENSITY RESIDENTIAL                    ]
(4.3 DU/A or Less         )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.457
Time of concentration =     7.76 min.
Rainfall intensity =      6.748(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.602  CA =      4.375
Subarea runoff =      4.946(CFS) for      1.604(Ac.)
Total runoff =     29.523(CFS)  Total area =       7.262(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****

------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      7.262(Ac.)
Runoff from this stream =     29.523(CFS)
Time of concentration =    7.76 min.
Rainfall intensity =     6.748(In/Hr)
Summary of stream data:

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


1      162.325     16.70             4.115
2       13.337      7.76             6.748
3       29.523      7.76             6.748
Qmax(1) =
       1.000 *    1.000 *   162.325) +
       0.610 *    1.000 *    13.337) +
       0.610 *    1.000 *    29.523) + =     188.459
Qmax(2) =
       1.000 *    0.464 *   162.325) +
       1.000 *    1.000 *    13.337) +
       1.000 *    1.000 *    29.523) + =     118.250
Qmax(3) =
       1.000 *    0.464 *   162.325) +
       1.000 *    1.000 *    13.337) +
```

```
             1.000 *    1.000 *    29.523) + =     118.250

  Total of 3 streams to confluence:
  Flow rates before confluence point:
       162.325      13.337      29.523
  Maximum flow rates at confluence using above data:
        188.459      118.250      118.250
  Area of streams before confluence:
         83.367        3.690        7.262
  Results of confluence:
  Total flow rate =    188.459(CFS)
  Time of concentration =    16.704 min.
  Effective stream area after confluence =     94.319(Ac.)


  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
  Process from Point/Station      903.000 to Point/Station      903.000
  **** 6 HOUR HYDROGRAPH ****
  ________________________________________________________________________
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
  Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003

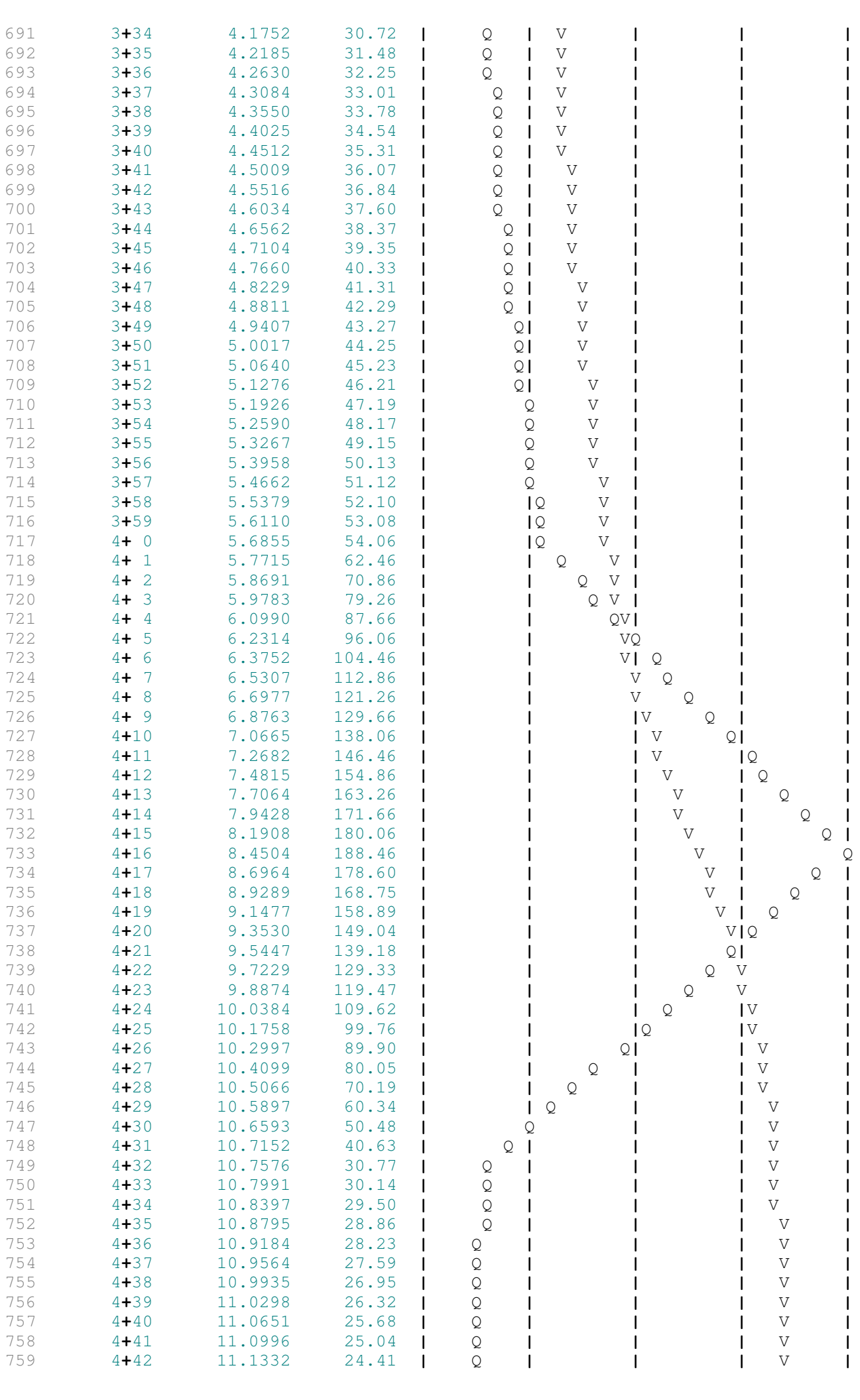

  Time of Concentration =  16.70
  Basin Area =    90.63 Acres
  6 Hour Rainfall =  3.400 Inches
  Runoff Coefficient =  0.505
  Peak Discharge =   188.46 CFS
       Time (Min)     Discharge (CFS)
         0               0.000
         16               9.234
         32               9.805
         48              10.127
         64              10.859
         80              11.280
         96              12.261
         112              12.839
         128              14.240
         144              15.101
         160              17.310
         176              18.769
         192              22.941
         208              26.130
         224              38.367
         240              54.058
         256             188.459
         272              30.772
         288              20.589
         304              16.110
         320              13.493
         336              11.744
         352              10.477
         368               9.509
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      6 - 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   1   Minute intervals ((CFS))

  ------------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0       47.1      94.2     141.3     188.5
------------------------------------------------------------------------
  0+ 0       0.0000      0.00  Q         |         |         |         |
  0+ 1       0.0008      0.58  Q         |         |         |         |
  0+ 2       0.0024      1.15  Q         |         |         |         |
  0+ 3       0.0048      1.73  Q         |         |         |         |
  0+ 4       0.0079      2.31  Q         |         |         |         |
  0+ 5       0.0119      2.89  Q         |         |         |         |
  0+ 6       0.0167      3.46  Q         |         |         |         |
```

484	0+ 7	0.0223	4.04	Q	|	|	|	|
485	0+ 8	0.0286	4.62	Q	|	|	|	|
486	0+ 9	0.0358	5.19	VQ	|	|	|	|
487	0+10	0.0437	5.77	VQ	|	|	|	|
488	0+11	0.0525	6.35	VQ	|	|	|	|
489	0+12	0.0620	6.93	VQ	|	|	|	|
490	0+13	0.0723	7.50	VQ	|	|	|	|
491	0+14	0.0835	8.08	VQ	|	|	|	|
492	0+15	0.0954	8.66	VQ	|	|	|	|
493	0+16	0.1081	9.23	VQ	|	|	|	|
494	0+17	0.1209	9.27	VQ	|	|	|	|
495	0+18	0.1337	9.31	VQ	|	|	|	|
496	0+19	0.1466	9.34	VQ	|	|	|	|
497	0+20	0.1595	9.38	VQ	|	|	|	|
498	0+21	0.1724	9.41	VQ	|	|	|	|
499	0+22	0.1855	9.45	V Q	|	|	|	|
500	0+23	0.1985	9.48	V Q	|	|	|	|
501	0+24	0.2116	9.52	V Q	|	|	|	|
502	0+25	0.2248	9.56	V Q	|	|	|	|
503	0+26	0.2380	9.59	V Q	|	|	|	|
504	0+27	0.2513	9.63	V Q	|	|	|	|
505	0+28	0.2646	9.66	V Q	|	|	|	|
506	0+29	0.2779	9.70	V Q	|	|	|	|
507	0+30	0.2913	9.73	V Q	|	|	|	|
508	0+31	0.3048	9.77	V Q	|	|	|	|
509	0+32	0.3183	9.81	V Q	|	|	|	|
510	0+33	0.3318	9.83	|VQ	|	|	|	|
511	0+34	0.3454	9.85	|VQ	|	|	|	|
512	0+35	0.3590	9.87	|VQ	|	|	|	|
513	0+36	0.3726	9.89	|VQ	|	|	|	|
514	0+37	0.3862	9.91	|VQ	|	|	|	|
515	0+38	0.3999	9.93	|VQ	|	|	|	|
516	0+39	0.4136	9.95	|VQ	|	|	|	|
517	0+40	0.4273	9.97	|VQ	|	|	|	|
518	0+41	0.4411	9.99	|VQ	|	|	|	|
519	0+42	0.4549	10.01	|VQ	|	|	|	|
520	0+43	0.4687	10.03	|VQ	|	|	|	|
521	0+44	0.4825	10.05	|VQ	|	|	|	|
522	0+45	0.4964	10.07	|VQ	|	|	|	|
523	0+46	0.5103	10.09	|VQ	|	|	|	|
524	0+47	0.5242	10.11	|VQ	|	|	|	|
525	0+48	0.5382	10.13	|VQ	|	|	|	|
526	0+49	0.5522	10.17	|VQ	|	|	|	|
527	0+50	0.5663	10.22	|VQ	|	|	|	|
528	0+51	0.5804	10.26	|VQ	|	|	|	|
529	0+52	0.5946	10.31	|VQ	|	|	|	|
530	0+53	0.6089	10.36	|VQ	|	|	|	|
531	0+54	0.6232	10.40	|VQ	|	|	|	|
532	0+55	0.6376	10.45	|VQ	|	|	|	|
533	0+56	0.6520	10.49	| Q	|	|	|	|
534	0+57	0.6665	10.54	| Q	|	|	|	|
535	0+58	0.6811	10.58	| Q	|	|	|	|
536	0+59	0.6958	10.63	| Q	|	|	|	|
537	1+ 0	0.7105	10.68	| Q	|	|	|	|
538	1+ 1	0.7252	10.72	| Q	|	|	|	|
539	1+ 2	0.7401	10.77	| Q	|	|	|	|
540	1+ 3	0.7550	10.81	| Q	|	|	|	|
541	1+ 4	0.7699	10.86	| Q	|	|	|	|
542	1+ 5	0.7849	10.89	| Q	|	|	|	|
543	1+ 6	0.7999	10.91	| Q	|	|	|	|
544	1+ 7	0.8150	10.94	| Q	|	|	|	|
545	1+ 8	0.8301	10.96	| Q	|	|	|	|
546	1+ 9	0.8453	10.99	| Q	|	|	|	|
547	1+10	0.8604	11.02	| Q	|	|	|	|
548	1+11	0.8756	11.04	| Q	|	|	|	|
549	1+12	0.8909	11.07	| Q	|	|	|	|
550	1+13	0.9062	11.10	| Q	|	|	|	|
551	1+14	0.9215	11.12	| Q	|	|	|	|
552	1+15	0.9368	11.15	| Q	|	|	|	|

553	1+16	0.9522	11.17	Q				
554	1+17	0.9677	11.20	QV				
555	1+18	0.9831	11.23	QV				
556	1+19	0.9986	11.25	QV				
557	1+20	1.0142	11.28	QV				
558	1+21	1.0298	11.34	QV				
559	1+22	1.0455	11.40	QV				
560	1+23	1.0613	11.46	QV				
561	1+24	1.0772	11.52	QV				
562	1+25	1.0931	11.59	QV				
563	1+26	1.1092	11.65	QV				
564	1+27	1.1253	11.71	QV				
565	1+28	1.1415	11.77	QV				
566	1+29	1.1578	11.83	QV				
567	1+30	1.1742	11.89	QV				
568	1+31	1.1906	11.95	QV				
569	1+32	1.2072	12.02	QV				
570	1+33	1.2238	12.08	QV				
571	1+34	1.2406	12.14	QV				
572	1+35	1.2574	12.20	QV				
573	1+36	1.2742	12.26	QV				
574	1+37	1.2912	12.30	Q V				
575	1+38	1.3082	12.33	Q V				
576	1+39	1.3252	12.37	Q V				
577	1+40	1.3423	12.41	Q V				
578	1+41	1.3594	12.44	Q V				
579	1+42	1.3766	12.48	Q V				
580	1+43	1.3939	12.51	Q V				
581	1+44	1.4111	12.55	Q V				
582	1+45	1.4285	12.59	Q V				
583	1+46	1.4459	12.62	Q V				
584	1+47	1.4633	12.66	Q V				
585	1+48	1.4808	12.69	Q V				
586	1+49	1.4983	12.73	Q V				
587	1+50	1.5159	12.77	Q V				
588	1+51	1.5335	12.80	Q V				
589	1+52	1.5512	12.84	Q V				
590	1+53	1.5690	12.93	Q V				
591	1+54	1.5870	13.01	Q V				
592	1+55	1.6050	13.10	Q V				
593	1+56	1.6232	13.19	Q V				
594	1+57	1.6415	13.28	Q V				
595	1+58	1.6599	13.36	Q V				
596	1+59	1.6784	13.45	Q V				
597	2+ 0	1.6970	13.54	Q V				
598	2+ 1	1.7158	13.63	Q V				
599	2+ 2	1.7347	13.71	Q V				
600	2+ 3	1.7537	13.80	Q V				
601	2+ 4	1.7728	13.89	Q V				
602	2+ 5	1.7921	13.98	Q V				
603	2+ 6	1.8115	14.06	Q V				
604	2+ 7	1.8310	14.15	Q V				
605	2+ 8	1.8506	14.24	Q V				
606	2+ 9	1.8703	14.29	Q V				
607	2+10	1.8900	14.35	Q V				
608	2+11	1.9099	14.40	Q V				
609	2+12	1.9298	14.45	Q V				
610	2+13	1.9498	14.51	Q V				
611	2+14	1.9698	14.56	Q V				
612	2+15	1.9900	14.62	Q V				
613	2+16	2.0102	14.67	Q V				
614	2+17	2.0304	14.72	Q V				
615	2+18	2.0508	14.78	Q V				
616	2+19	2.0712	14.83	Q V				
617	2+20	2.0917	14.89	Q V				
618	2+21	2.1123	14.94	Q V				
619	2+22	2.1330	14.99	Q V				
620	2+23	2.1537	15.05	Q V				
621	2+24	2.1745	15.10	Q V				

622	2+25	2.1955	15.24	| Q V |	|	|	|
623	2+26	2.2167	15.38	| Q V |	|	|	|
624	2+27	2.2380	15.52	| Q V |	|	|	|
625	2+28	2.2596	15.65	| Q V |	|	|	|
626	2+29	2.2813	15.79	| Q V |	|	|	|
627	2+30	2.3033	15.93	| Q V |	|	|	|
628	2+31	2.3254	16.07	| Q V |	|	|	|
629	2+32	2.3477	16.21	| Q V |	|	|	|
630	2+33	2.3702	16.34	| Q V |	|	|	|
631	2+34	2.3930	16.48	| Q V |	|	|	|
632	2+35	2.4158	16.62	| Q V |	|	|	|
633	2+36	2.4389	16.76	| Q V |	|	|	|
634	2+37	2.4622	16.90	| Q V |	|	|	|
635	2+38	2.4857	17.03	| Q V |	|	|	|
636	2+39	2.5093	17.17	| Q V |	|	|	|
637	2+40	2.5332	17.31	| Q V |	|	|	|
638	2+41	2.5571	17.40	| Q V |	|	|	|
639	2+42	2.5812	17.49	| Q V |	|	|	|
640	2+43	2.6054	17.58	| Q V |	|	|	|
641	2+44	2.6298	17.67	| Q V |	|	|	|
642	2+45	2.6543	17.77	| Q V |	|	|	|
643	2+46	2.6789	17.86	| Q V |	|	|	|
644	2+47	2.7036	17.95	| Q V |	|	|	|
645	2+48	2.7284	18.04	| Q V |	|	|	|
646	2+49	2.7534	18.13	| Q V |	|	|	|
647	2+50	2.7785	18.22	| Q V |	|	|	|
648	2+51	2.8037	18.31	| Q V |	|	|	|
649	2+52	2.8291	18.40	| Q V |	|	|	|
650	2+53	2.8545	18.50	| Q V |	|	|	|
651	2+54	2.8801	18.59	| Q V|	|	|	|
652	2+55	2.9059	18.68	| Q V|	|	|	|
653	2+56	2.9317	18.77	| Q V|	|	|	|
654	2+57	2.9579	19.03	| Q V|	|	|	|
655	2+58	2.9845	19.29	| Q V|	|	|	|
656	2+59	3.0114	19.55	| Q V|	|	|	|
657	3+ 0	3.0387	19.81	| Q V|	|	|	|
658	3+ 1	3.0664	20.07	| Q V|	|	|	|
659	3+ 2	3.0944	20.33	| Q V|	|	|	|
660	3+ 3	3.1227	20.59	| Q V|	|	|	|
661	3+ 4	3.1515	20.85	| Q V|	|	|	|
662	3+ 5	3.1805	21.12	| Q V|	|	|	|
663	3+ 6	3.2100	21.38	| Q V	|	|	|
664	3+ 7	3.2398	21.64	| Q V	|	|	|
665	3+ 8	3.2700	21.90	| Q V	|	|	|
666	3+ 9	3.3005	22.16	| Q V	|	|	|
667	3+10	3.3314	22.42	| Q V	|	|	|
668	3+11	3.3626	22.68	| Q V	|	|	|
669	3+12	3.3942	22.94	| Q V	|	|	|
670	3+13	3.4261	23.14	| Q V	|	|	|
671	3+14	3.4582	23.34	| Q V	|	|	|
672	3+15	3.4906	23.54	| Q V	|	|	|
673	3+16	3.5233	23.74	| Q |V	|	|	|
674	3+17	3.5563	23.94	| Q |V	|	|	|
675	3+18	3.5896	24.14	| Q |V	|	|	|
676	3+19	3.6231	24.34	| Q |V	|	|	|
677	3+20	3.6569	24.54	| Q |V	|	|	|
678	3+21	3.6909	24.73	| Q |V	|	|	|
679	3+22	3.7253	24.93	| Q |V	|	|	|
680	3+23	3.7599	25.13	| Q |V	|	|	|
681	3+24	3.7948	25.33	| Q |V	|	|	|
682	3+25	3.8300	25.53	| Q |V	|	|	|
683	3+26	3.8654	25.73	| Q | V	|	|	|
684	3+27	3.9011	25.93	| Q | V	|	|	|
685	3+28	3.9371	26.13	| Q | V	|	|	|
686	3+29	3.9742	26.89	| Q | V	|	|	|
687	3+30	4.0123	27.66	| Q | V	|	|	|
688	3+31	4.0514	28.42	| Q | V	|	|	|
689	3+32	4.0916	29.19	| Q | V	|	|	|
690	3+33	4.1329	29.95	| Q | V	|	|	|



760	4+43	11.1660	23.77	| Q |	|	|	| V |
761	4+44	11.1979	23.13	| Q |	|	|	| V |
762	4+45	11.2288	22.50	| Q |	|	|	| V |
763	4+46	11.2590	21.86	| Q |	|	|	| V |
764	4+47	11.2882	21.23	| Q |	|	|	| V |
765	4+48	11.3165	20.59	| Q |	|	|	| V |
766	4+49	11.3445	20.31	| Q |	|	|	| V |
767	4+50	11.3721	20.03	| Q |	|	|	| V |
768	4+51	11.3993	19.75	| Q |	|	|	| V |
769	4+52	11.4261	19.47	| Q |	|	|	| V |
770	4+53	11.4526	19.19	| Q |	|	|	| V |
771	4+54	11.4786	18.91	| Q |	|	|	| V |
772	4+55	11.5043	18.63	| Q |	|	|	| V |
773	4+56	11.5295	18.35	| Q |	|	|	| V |
774	4+57	11.5544	18.07	| Q |	|	|	| V |
775	4+58	11.5789	17.79	| Q |	|	|	| V |
776	4+59	11.6030	17.51	| Q |	|	|	| V |
777	5+ 0	11.6268	17.23	| Q |	|	|	| V |
778	5+ 1	11.6501	16.95	| Q |	|	|	| V |
779	5+ 2	11.6731	16.67	| Q |	|	|	| V |
780	5+ 3	11.6957	16.39	| Q |	|	|	| V |
781	5+ 4	11.7179	16.11	| Q |	|	|	| V |
782	5+ 5	11.7398	15.95	| Q |	|	|	| V |
783	5+ 6	11.7616	15.78	| Q |	|	|	| V |
784	5+ 7	11.7831	15.62	| Q |	|	|	| V |
785	5+ 8	11.8044	15.46	| Q |	|	|	| V |
786	5+ 9	11.8254	15.29	| Q |	|	|	| V |
787	5+10	11.8463	15.13	| Q |	|	|	| V |
788	5+11	11.8669	14.96	| Q |	|	|	| V |
789	5+12	11.8873	14.80	| Q |	|	|	| V |
790	5+13	11.9074	14.64	| Q |	|	|	| V |
791	5+14	11.9274	14.47	| Q |	|	|	| V |
792	5+15	11.9471	14.31	| Q |	|	|	| V |
793	5+16	11.9666	14.15	| Q |	|	|	| V |
794	5+17	11.9858	13.98	| Q |	|	|	| V |
795	5+18	12.0049	13.82	| Q |	|	|	| V |
796	5+19	12.0237	13.66	| Q |	|	|	| V |
797	5+20	12.0423	13.49	| Q |	|	|	| V |
798	5+21	12.0607	13.38	| Q |	|	|	| V |
799	5+22	12.0790	13.27	| Q |	|	|	| V |
800	5+23	12.0971	13.17	| Q |	|	|	| V |
801	5+24	12.1151	13.06	| Q |	|	|	| V |
802	5+25	12.1329	12.95	| Q |	|	|	| V |
803	5+26	12.1506	12.84	| Q |	|	|	| V |
804	5+27	12.1681	12.73	| Q |	|	|	| V |
805	5+28	12.1855	12.62	| Q |	|	|	| V |
806	5+29	12.2027	12.51	| Q |	|	|	| V |
807	5+30	12.2198	12.40	| Q |	|	|	| V |
808	5+31	12.2368	12.29	| Q |	|	|	| V |
809	5+32	12.2535	12.18	| Q |	|	|	| V |
810	5+33	12.2702	12.07	| Q |	|	|	| V |
811	5+34	12.2866	11.96	| Q |	|	|	| V |
812	5+35	12.3030	11.85	| Q |	|	|	| V |
813	5+36	12.3191	11.74	| Q |	|	|	| V |
814	5+37	12.3352	11.66	| Q |	|	|	| V |
815	5+38	12.3512	11.59	| Q |	|	|	| V |
816	5+39	12.3670	11.51	| Q |	|	|	| V |
817	5+40	12.3828	11.43	| Q |	|	|	| V |
818	5+41	12.3984	11.35	| Q |	|	|	| V |
819	5+42	12.4139	11.27	| Q |	|	|	| V |
820	5+43	12.4293	11.19	| Q |	|	|	| V |
821	5+44	12.4446	11.11	| Q |	|	|	| V |
822	5+45	12.4598	11.03	| Q |	|	|	| V |
823	5+46	12.4749	10.95	| Q |	|	|	| V|
824	5+47	12.4899	10.87	| Q |	|	|	| V|
825	5+48	12.5048	10.79	| Q |	|	|	| V|
826	5+49	12.5195	10.71	| Q |	|	|	| V|
827	5+50	12.5342	10.64	| Q |	|	|	| V|
828	5+51	12.5487	10.56	| Q |	|	|	| V|

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      5+52      12.5631     10.48  | Q       |         |         |         V|
      5+53      12.5775     10.42  | Q       |         |         |         V|
      5+54      12.5917     10.36  | Q       |         |         |         V|
      5+55      12.6059     10.30  | Q       |         |         |         V|
      5+56      12.6200     10.23  | Q       |         |         |         V|
      5+57      12.6340     10.17  | Q       |         |         |         V|
      5+58      12.6480     10.11  | Q       |         |         |         V|
      5+59      12.6618     10.05  | Q       |         |         |         V|
      6+ 0      12.6756      9.99  | Q       |         |         |         V|
      6+ 1      12.6893      9.93  | Q       |         |         |         V|
      6+ 2      12.7029      9.87  | Q       |         |         |         V|
      6+ 3      12.7164      9.81  | Q       |         |         |         V|
      6+ 4      12.7298      9.75  | Q       |         |         |         V|
      6+ 5      12.7432      9.69  | Q       |         |         |         V|
      6+ 6      12.7564      9.63  | Q       |         |         |         V|
      6+ 7      12.7696      9.57  | Q       |         |         |         V|
      6+ 8      12.7827      9.51  | Q       |         |         |          V
    ---------------------------------------------------------------------------



    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
    Process from Point/Station      903.000 to Point/Station      903.000
    **** CONFLUENCE OF MINOR STREAMS ****
    ----------------------------------------------------------------------
    Along Main Stream number: 1 in normal stream number 2
    Stream flow area =     94.319(Ac.)
    Runoff from this stream =    188.459(CFS)
    Time of concentration =   16.70 min.
    Rainfall intensity =     4.115(In/Hr)
    Summary of stream data:

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


    1      162.325     16.70             4.115
    Qmax(1) =
           1.000 *    1.000 *   162.325) + =     162.325

    Total of 1 streams to confluence:
    Flow rates before confluence point:
         162.325
    Maximum flow rates at confluence using above data:
          162.325
    Area of streams before confluence:
           83.367
    Results of confluence:
    Total flow rate =    162.325(CFS)
    Time of concentration =    16.704 min.
    Effective stream area after confluence =     83.367(Ac.)


    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
    Process from Point/Station      903.000 to Point/Station      903.000
    **** USER DEFINED FLOW INFORMATION AT A POINT ****
    ----------------------------------------------------------------------
    User specified 'C' value of 0.480 given for subarea
    Calculated TC of    2.000 minutes is less than 5 minutes,
     resetting TC to 5.0 minutes for rainfall intensity calculations
    Rainfall intensity (I) =      8.958(In/Hr) for a   100.0 year storm
    User specified values are as follows:
    TC =   2.00 min.  Rain intensity =       8.96(In/Hr)
    Total area =        0.010(Ac.)  Total runoff =     8.000(CFS)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****

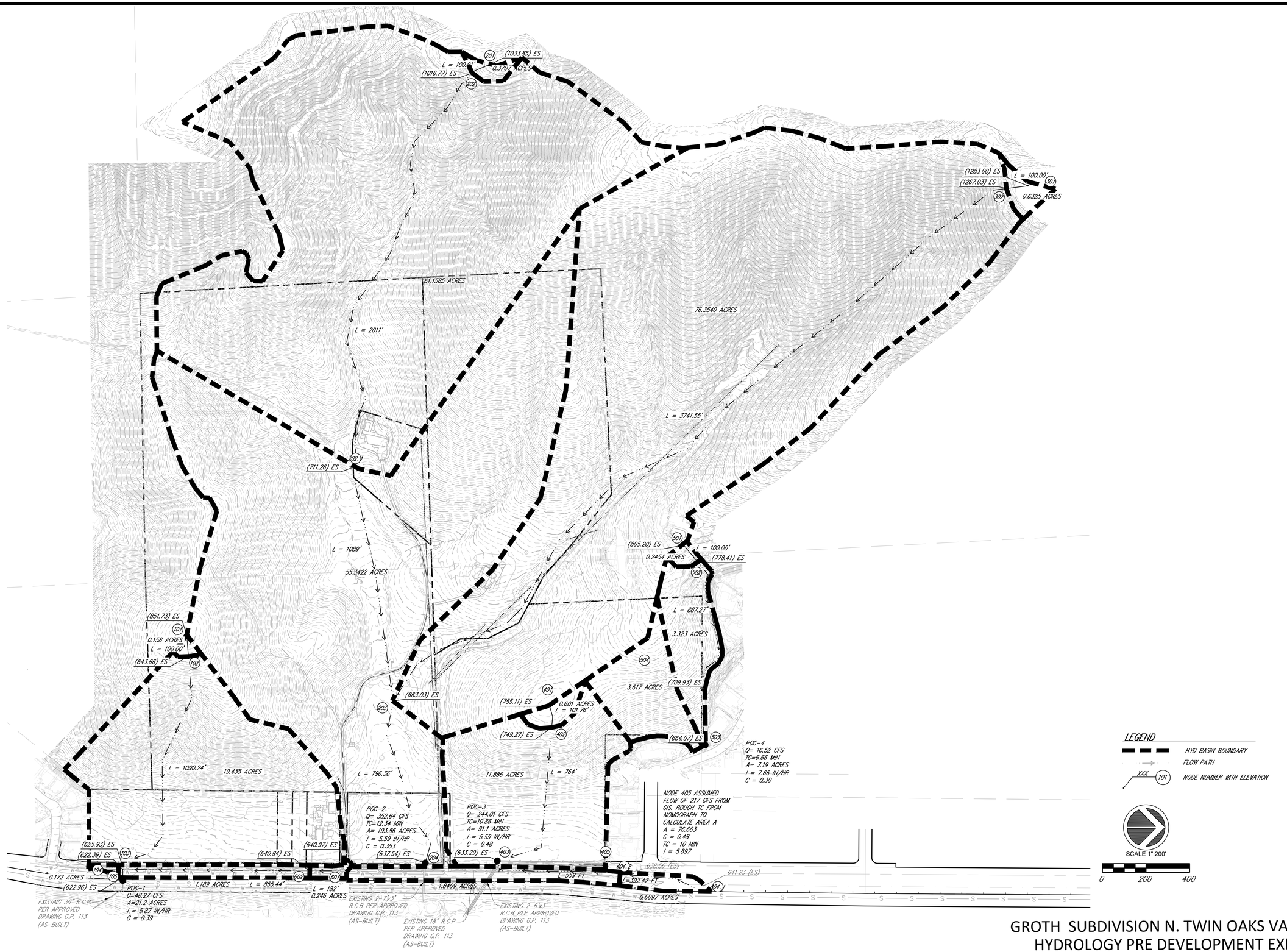
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.010(Ac.)
Runoff from this stream =      8.000(CFS)
Time of concentration =    2.00 min.
Rainfall intensity =     8.958(In/Hr)
Summary of stream data:

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


1      162.325     16.70             4.115
2        8.000      2.00             8.958
Qmax(1) =
       1.000 *    1.000 *   162.325) +
       0.459 *    1.000 *     8.000) + =     165.999
Qmax(2) =
       1.000 *    0.120 *   162.325) +
       1.000 *    1.000 *     8.000) + =      27.436

Total of 2 streams to confluence:
Flow rates before confluence point:
     162.325       8.000
Maximum flow rates at confluence using above data:
      165.999       27.436
Area of streams before confluence:
       83.367        0.010
Results of confluence:
Total flow rate =    165.999(CFS)
Time of concentration =    16.704 min.
Effective stream area after confluence =     83.377(Ac.)
End of computations, total study area =          90.639 (Ac.)
```

ATTACHMENT 7 – HYDROLOGY MAP EXHIBITS



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GROTH SUBDIVISION N. TWIN OAKS VALLEY RD.
HYDROLOGY PRE DEVELOPMENT EXHIBIT

K:\24044\Storm-SDP\Working Files\Hyd\24044-Pre Dev-Exhibit.dwg 9/3/2025 2:27 PM ORIGINAL PLOT SIZE: SETUP2



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OAKCREST SUBDIVISION N. TWIN OAKS VALLEY RD.
HYDROLOGY POST DEVELOPMENT EXHIBIT
SHEET 1 OF 2

V:\24\24044\Engineering\EW\DI\Storm-SDP\Working Files\Hyd\24044-Post Dev-Exhibit-updated.dwg 11/20/2025 5:04 PM ORIGINAL PLOT SIZE: ----

FOR ANY OFFSITE INFORMATION PLEASE REFER TO POST DEVELOPMENT SHEET 1 OF 2

HYD-SUB 84 1.761ACRES
HYD-SUB 79 6.921ACRES
HYD-SUB 77 9.519ACRES
HYD-SUB 97 0.317ACRES
HYD-SUB 95 0.787ACRES
HYD-SUB 90 3.397ACRES
HYD-SUB 92 0.670ACRES
HYD-SUB 87 6.108ACRES
HYD-SUB 96 1.998ACRES
HYD-SUB 93 0.608ACRES
HYD-SUB 10 0.136ACRES
HYD-SUB 100 5.578ACRES
HYD-SUB 102 0.412ACRES
HYD-SUB 98 1.801ACRES
HYD-SUB 80 4.210ACRES
HYD-SUB 110 7.135ACRES
HYD-SUB 26 0.159ACRES
HYD-SUB 109 0.788ACRES
HYD-SUB 111 2.004ACRES
HYD-SUB 17 4.274ACRES
HYD-SUB 81 7.175ACRES
HYD-SUB 94 5.312ACRES
HYD-SUB 108 4.014ACRES
HYD-SUB 106 0.667ACRES
HYD-SUB 10 0.349ACRES
HYD-SUB 99 1.459ACRES
HYD-SUB 11 4.249ACRES
HYD-SUB 156 1.604ACRES
HYD-SUB 105 3.434ACRES
HYD-SUB 104 0.685ACRES
HYD-SUB 16 0.400ACRES
HYD-SUB 27 2.246ACRES
HYD-SUB 25 0.215ACRES
HYD-SUB 28 1.133ACRES
HYD-SUB 24 0.188ACRES
HYD-SUB 113 0.511ACRES
HYD-SUB 20 5.543ACRES
HYD-SUB 21 0.170ACRES
HYD-SUB 103 2.101ACRES
HYD-SUB 13 3.600ACRES
HYD-SUB 14 0.090ACRES
HYD-SUB 18 0.443ACRES
HYD-SUB 19 4.915ACRES
HYD-SUB 23 0.027ACRES
HYD-SUB 112 2.030ACRES
HYD-SUB 12 1.968ACRES
HYD-SUB 15 0.460ACRES
SUB AREA 1 TO 204
SUB AREA 2 TO 204
SUB AREA 3 TO 305
SUB AREA 5 TO 2003.1
SUB AREA 7 TO 2003.1
SUB AREA 8 TO 2003.1
SUB AREA 9 TO 2003.2
SUB AREA 10 TO 2003.3
SUB AREA 11 TO 2003.3
SUB AREA 12 TO 2003.3
SUB AREA 15 TO 804
SUB AREA 16 TO 804
SUB AREA 17 TO 2004
SUB AREA 19 TO 4003
SUB AREA 1 TO 204
10.307 AC
4.9407 ACRES
2.4187 ACRES
3.4813 ACRES
0.6080 ACRES
0.0081 ACRES

POC-1
PREQ=16.81 CFS
POSTO=48.589 CFS
POSTOMIT=34.88 CFS
A=16.826 ACRES
I = 5.44 IN/HR
C = 0.39

POC-2
PREQ=324.27 CFS
POSTO=196.3 CFS
POSTOMIT=315.70 CFS
A=200.62 ACRES
I = 5.71 IN/HR
C = 0.28

POC-3
PREQ=244.67 CFS
POSTO=207.49 CFS
POSTOMIT=165.70 CFS
A=90.157 ACRES
I = 4.69 IN/HR
C = 0.49

POC-4
PREQ=16.02 CFS
POSTO=14.21 CFS
A=5.90 ACRES
I = 4.65 IN/HR
C = 0.32

NODE 706 ASSUMED FLOW OF 217 CFS FROM GIS. ROUGH TC FROM NOMOGRAPH TO CALCULATE AREA A
A = 76.663
C = 0.48
TC = 10 MIN
I = 5.897

EXISTING 72"-R.C.P. PER APPROVED DRAWING G.P. 1112 (AS-BUILT)
EXISTING 2-6'x3' R.C.B. PER APPROVED DRAWING G.P. 1112 (AS-BUILT)
EXISTING 78" R.C.P. PER APPROVED DRAWING G.P. 1112 (AS-BUILT)
EXISTING 2-6'x3' R.C.B. PER APPROVED DRAWING G.P. 1112 (AS-BUILT)

LEGEND
HYD BASIN BOUNDARY
FLOW PATH
XXX 101 NODE NUMBER WITH ELEVATION

SCALE 1":120'
0 120 240

OAKCREST SUBDIVISION N. TWIN OAKS VALLEY RD.
HYDROLOGY POST DEVELOPMENT EXHIBIT

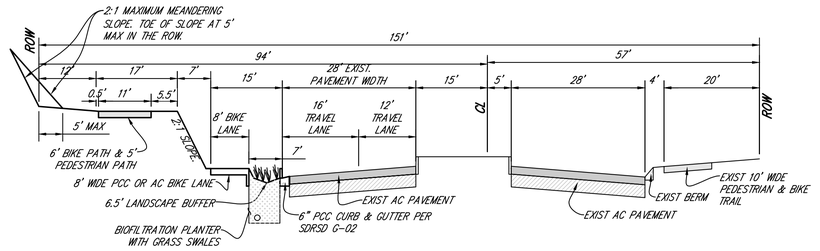
SHEET 2 OF 2

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40 STATE PLACE, ESCONDIDO, CA 92029
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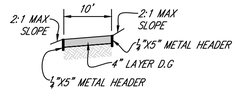
V:\24\24044\Engineering\TM\TM 01\Storm-SDP\Working Files\Hyd\24044-Post Dev-Exhibit-updated.dwg 11/28/2025 4:48 PM ORIGINAL PLOT SIZE: PDF 24X36

ATTACHMENT 8 – HYDROGRAPHS

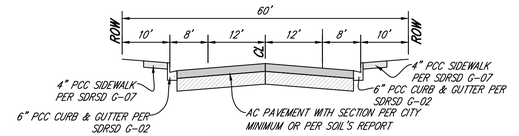




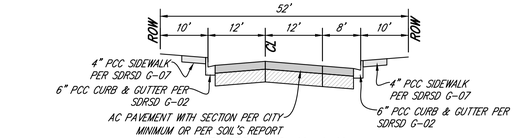
TWIN OAKS ROAD (WITH GRASS SWALES)
NOT TO SCALE



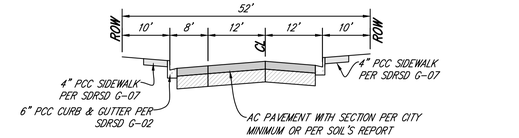
10' STABILIZED DG TRAIL
NOT TO SCALE



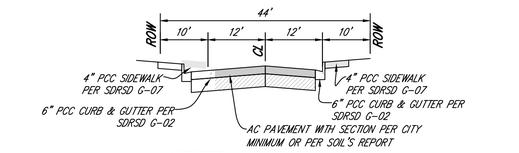
STREETS A, C, K
NOT TO SCALE



STREETS B, C, H, J, K
NOT TO SCALE



STREETS C, K
NOT TO SCALE



STREETS A, D, E, F, G, H, I
NOT TO SCALE

LEGEND

PROJECT BOUNDARY	
PROPERTY LINE	-PL-
RIGHT OF WAY	-RW-
EXIST MAJOR CONTOUR	100
EXIST MINOR CONTOUR	
PROPOSE MAJOR CONTOUR	100
PROPOSE MINOR CONTOUR	
GEOGRID TYPE RETAINING	
CMU TYPE RETAINING	
SOIL NAIL TYPE RETAINING	
EXIST WATER MAIN	
EXIST SEWER MAIN	
NEW WATER MAIN	
NEW SEWER MAIN	
FLOW LINE	
PCC BROW DITCH	
EXIST. FIRE LINE	
FIRE HYDRANT	
STREET/PARKING LIGHT	
STORM DRAIN INLETS/CLEANOUTS	
WATER SERVICE LATERAL	W
SEWER SERVICE LATERAL	S
FIRE SERVICE LATERAL	F
PCC CURB	
PCC CURB & GUTTER	
LOT / UNIT NO.	
PAD EL	500.00

SHEET 1 OF 1 SHEET
SITEPLAN

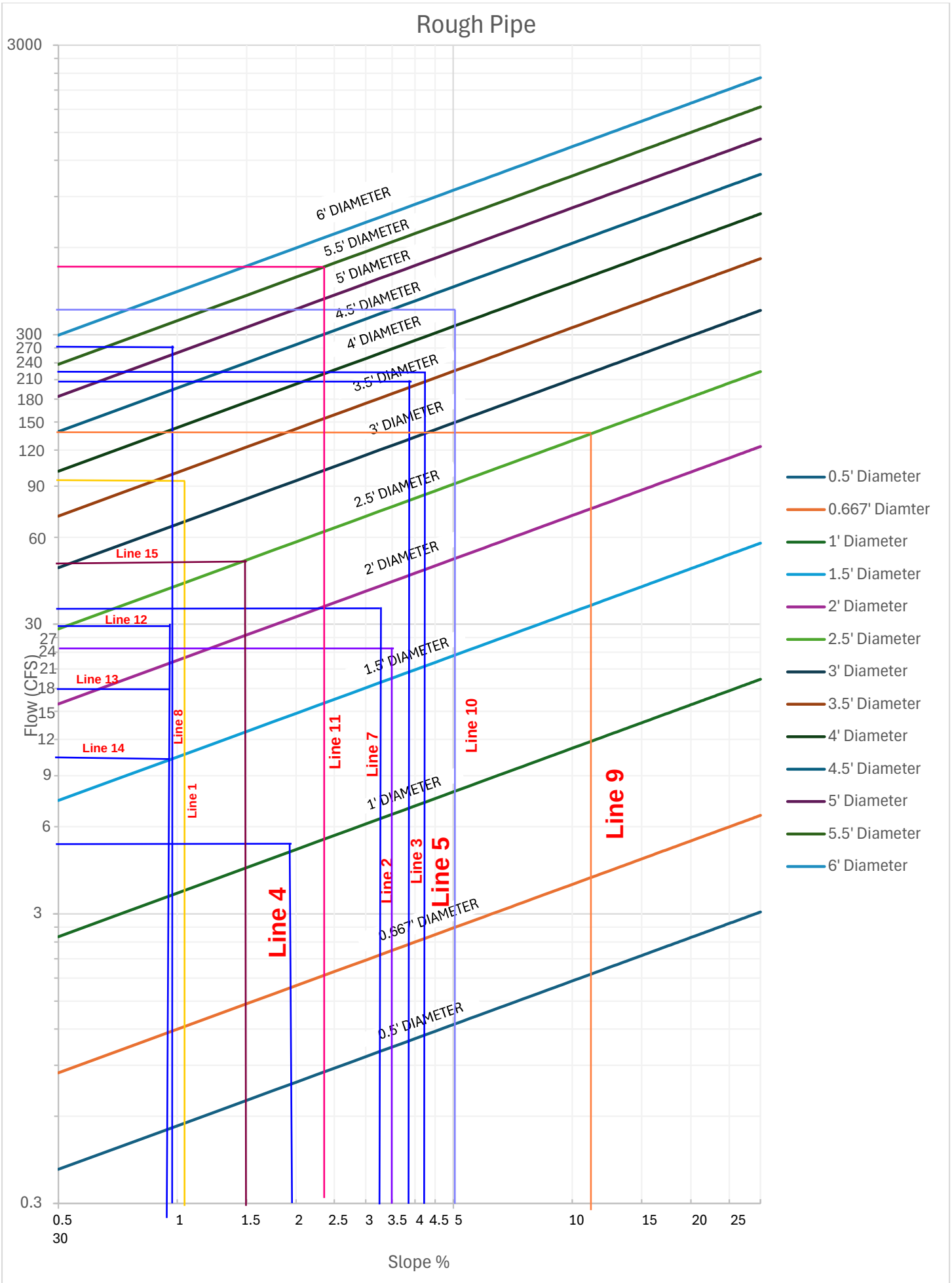
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N. TWIN OAKS VALLEY RD
SAN MARCOS, CA

NOT FOR CONSTRUCTION

M:\24\24044\Engineering\SDP\SDP 01\Exhibits\Siteplan\24044 OP SITEPLAN.dwg 12/17/2024 1:55 PM ORIGINAL PLOT SIZE: ---

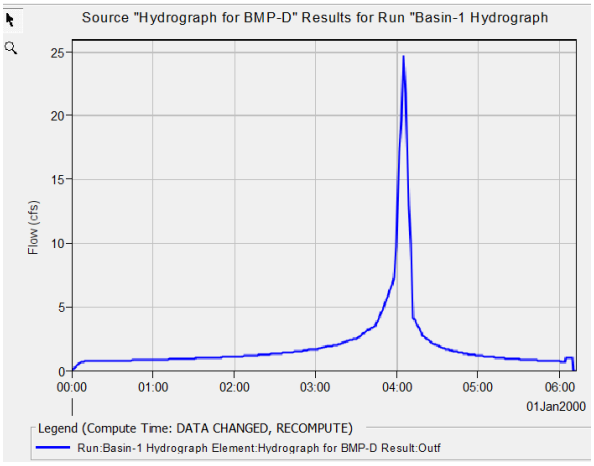

Rough Pipe
Flow (CFS)
Slope %
3000
300
270
240
210
180
150
120
90
60
30
27
24
21
18
15
12
9
6
3
0.3
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
10
15
20
25
30
6' DIAMETER
5.5' DIAMETER
5' DIAMETER
4.5' DIAMETER
4' DIAMETER
3.5' DIAMETER
3' DIAMETER
2.5' DIAMETER
2' DIAMETER
1.5' DIAMETER
1' DIAMETER
0.667' DIAMETER
0.5' DIAMETER
Line 1
Line 2
Line 3
Line 4
Line 5
Line 7
Line 8
Line 9
Line 10
Line 11
Line 12
Line 13
Line 14
Line 15
0.5' Diameter
0.667' Diamter
1' Diameter
1.5' Diameter
2' Diameter
2.5' Diameter
3' Diameter
3.5' Diameter
4' Diameter
4.5' Diameter
5' Diameter
5.5' Diameter
6' Diameter

ROUGH PIPE SIZING					
	Adjustment factor		0.3		
Line Name	Q from Nearest Node (CFS)	Slope	Q modified from Nearest Node (CFS)	Recommended Pipe Size (ft)	Recommended Pipe Size (in)
Line 1	102.5	1.1	133.25	3.5	42
Line 2	18.78	3.6	24.414	1.5	18
Line 3	155.983	3.8	202.7779	3.5	42
Line 4	3.39	1.9	4.407	1	12
Line 5	175.5	4.2	228.15	3.5	42
Line 6	Same as Line 2		-	2.5	30
Line 7	28.16	3.2	36.608	2	24
Line 8	212	0.9	275.6	5	60
Line 9	149	10.5	193.7	2.5	30
Line 10	338	5	439.4	4	48
Line 11	390	2.3	507	5.5	66
Line 12	23.5	1	30.55	2	24
Line 13	13.7	1	17.81	2	24
Line 14	8.5	1	11.05	1.5	18
Line 15	41	1.5	53.3	2.5	30
Line 16		0.31		38x60 elliptical	
Line 17	28	3.2	36.4	2	24

8A. Hydrograph Report

Hydrograph for BMP-D

Hydrograph for BMP-D



Summary Results for Source "Hydrograph for BMP-D"

Project: 24-044-Groth-Post Simulation Run: Basin-1 Hydrograph
Source: Hydrograph for BMP-D

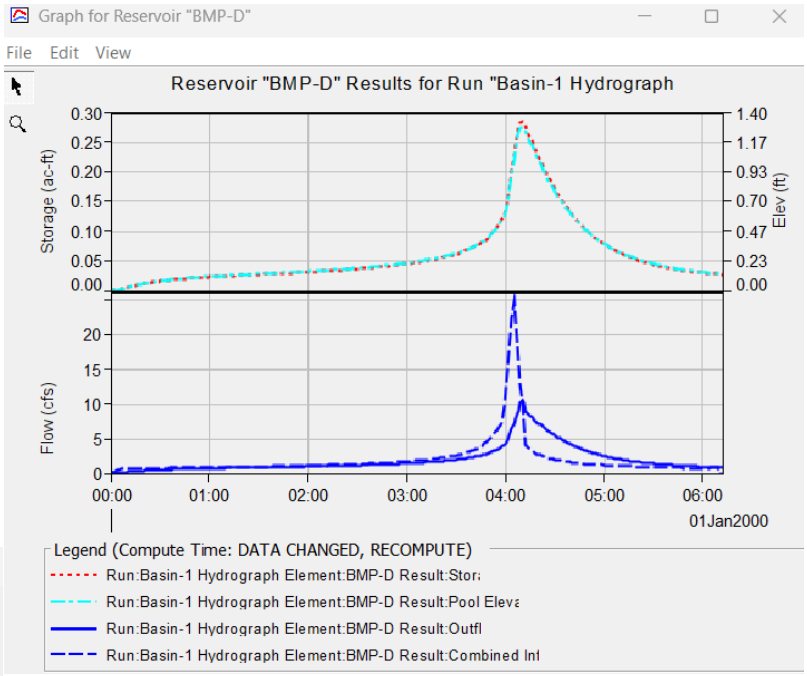
Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	Time of Analysis

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Discharge:	24.7 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:05
Volume:	n/a		

BMP-D



Summary Results for Reservoir "BMP-D"

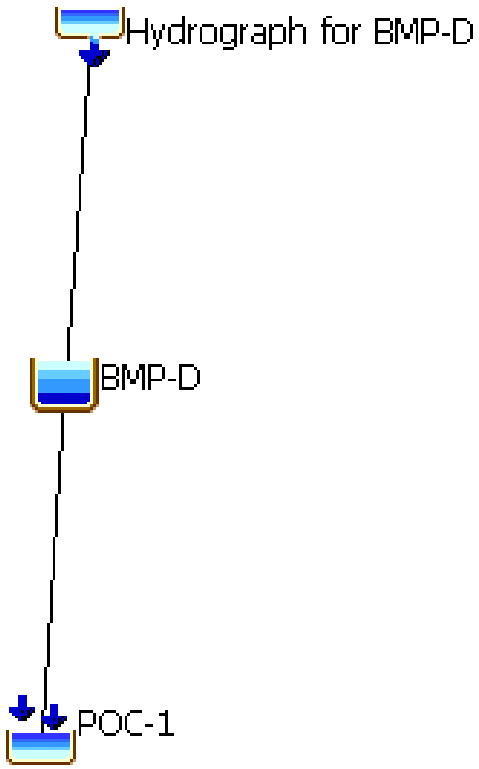
Project: 24-044-Groth-Post Simulation Run: Basin-1 Hydrograph
Reservoir: BMP-D

Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	Time of Analysis

Volume Units: (•) IN ( ) ACRE-FT

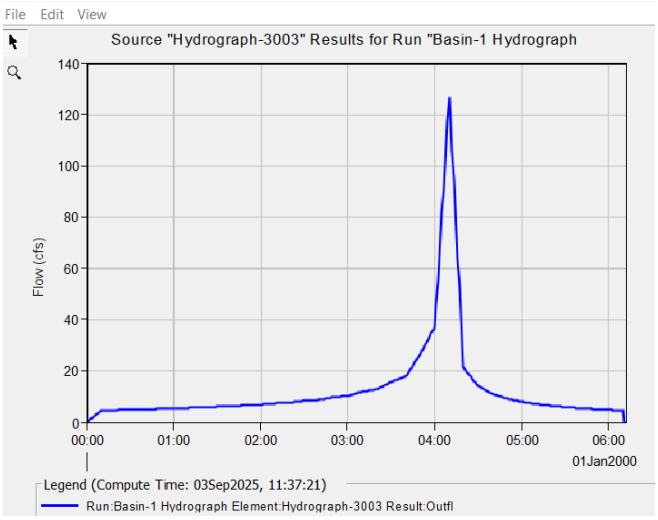
Computed Results

Peak Inflow:	24.7 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:05
Peak Discharge:	10.5 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:10
Inflow Volume:	n/a	Peak Storage:	0.3 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	1.3 (FT)



Hydrograph for Reservoir for Node 3003

Hydrograph for Node 3003



Summary Results for Source "Hydrograph-3003"

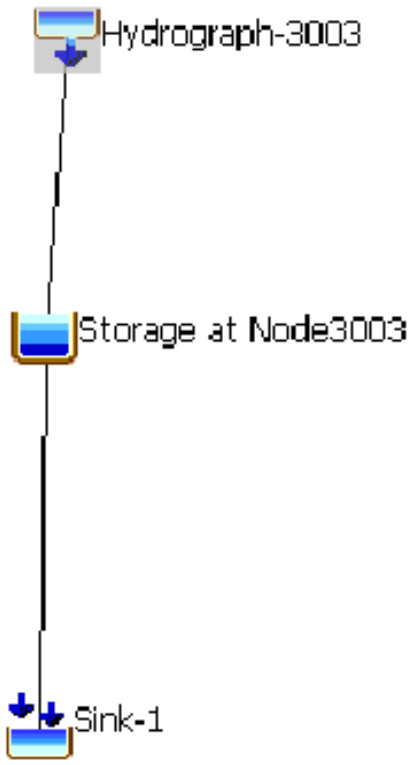
Project: 24-044-Groth-Post Simulation Run: Basin-1 Hydrograph
Source: Hydrograph-3003

Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	03Sep2025, 11:37:21	Control Specifications:	Time of Analysis

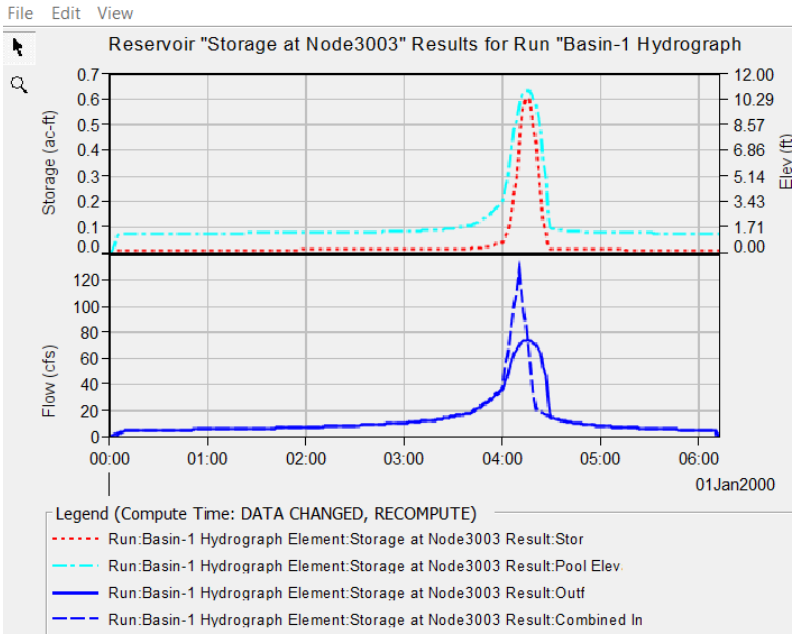
Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Discharge:	126.8 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:10
Volume:	n/a		



Reservoir for Node 3003



Summary Results for Reservoir "Storage at Node3003"

Project: 24-044-Groth-Post Simulation Run: Basin-1 Hydrograph
Reservoir: Storage at Node3003

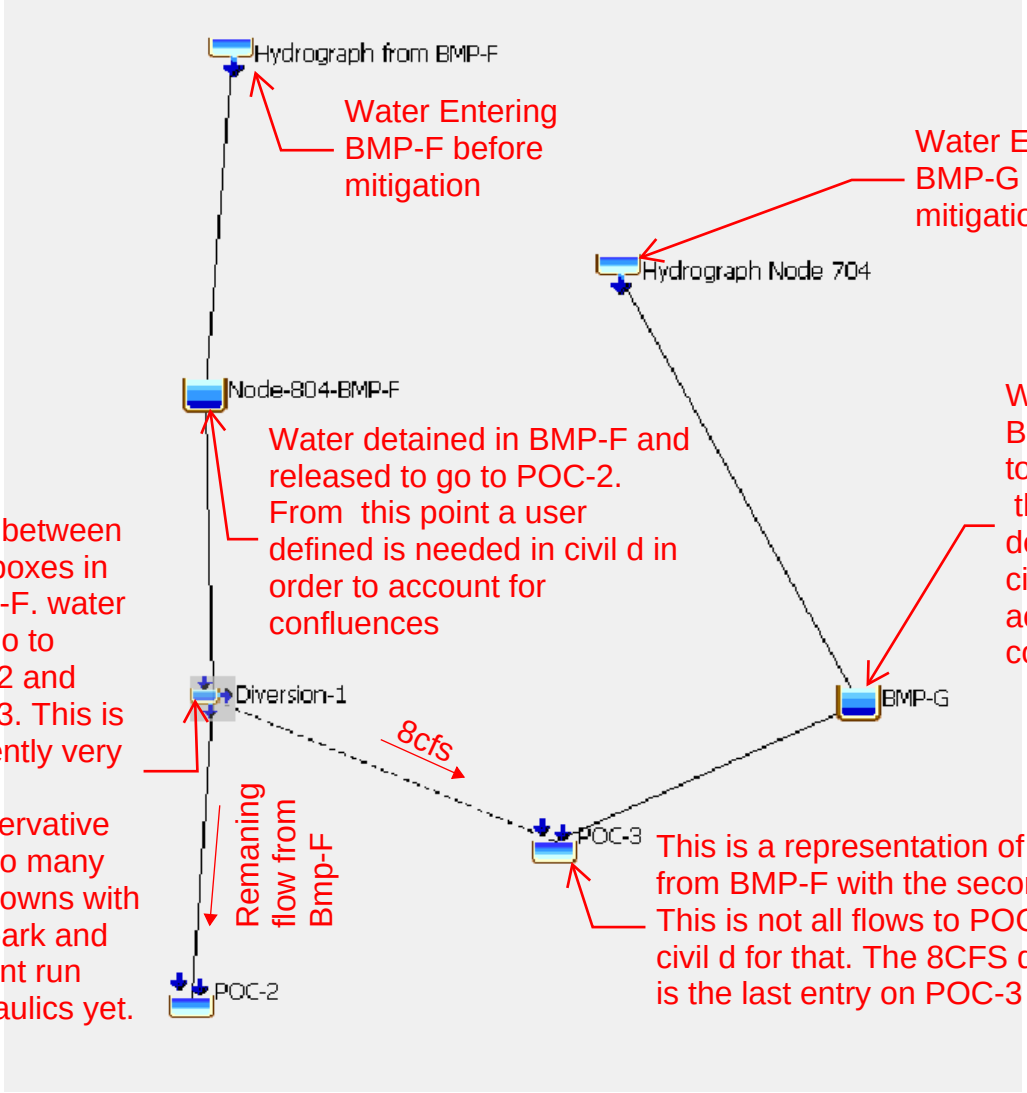
Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	DATA CHANGED, RECOMPUTE	Control Specifications:	Time of Analysis

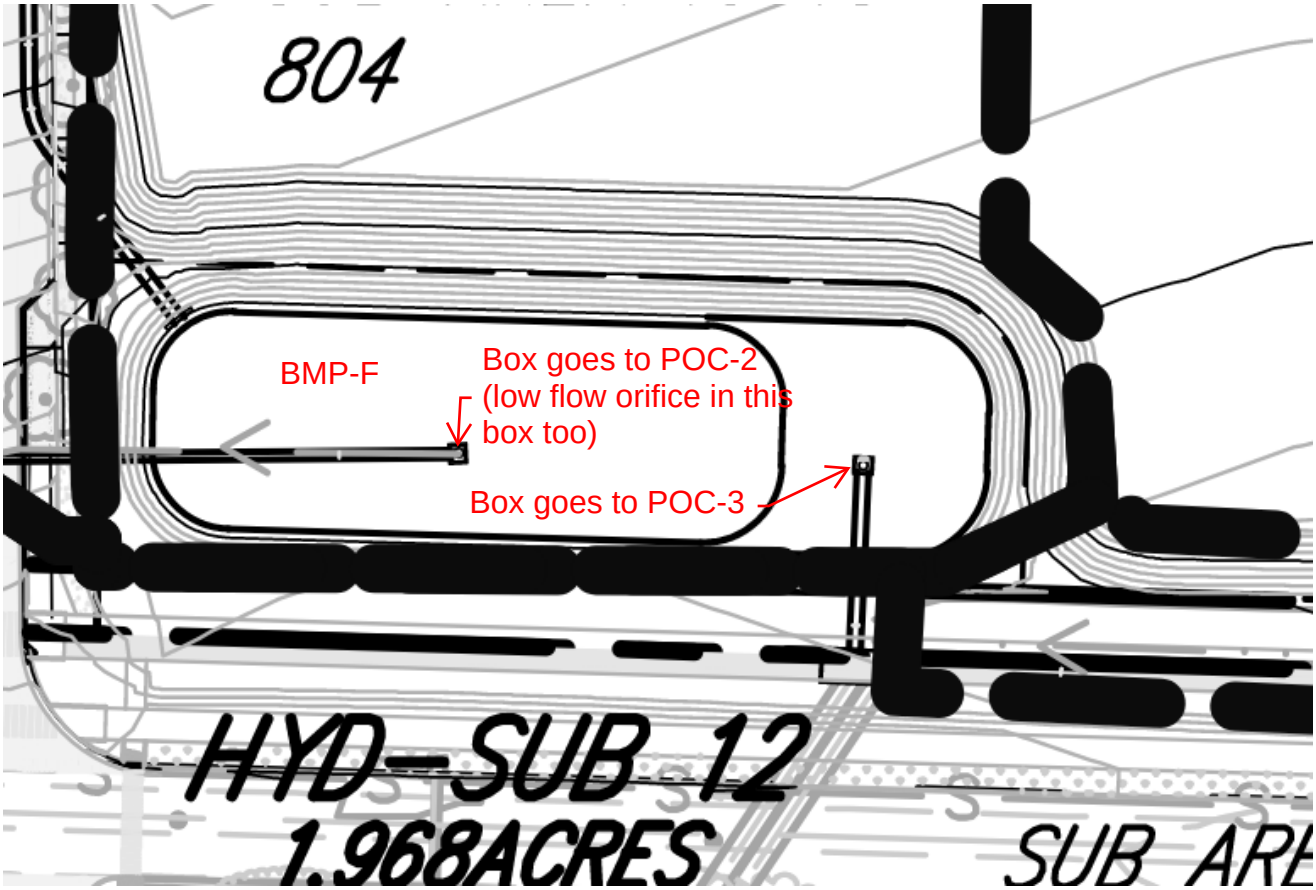
Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Inflow:	126.8 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:10
Peak Discharge:	74.4 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:15
Inflow Volume:	n/a	Peak Storage:	0.6 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	10.8 (FT)

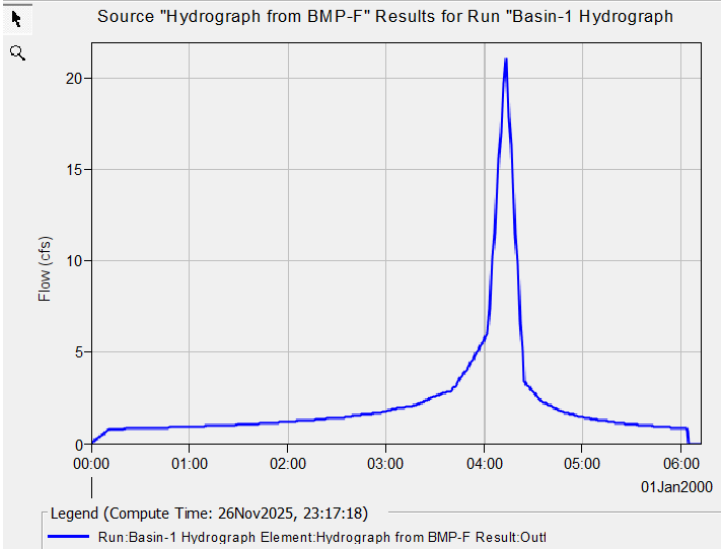
Hydrograph for water discharging from BMPs F and G to POC-2 and 3. Not all calculations can be done here as confluencing has to be done separate per County of San Diego Methodology




804
BMP-F
Box goes to POC-2
(low flow orifice in this
box too)
Box goes to POC-3
HYD-SUB 12
1.968ACRES
SUB ARE

Graph for Source "Hydrograph from BMP-F"

File Edit View



Summary Results for Source "Hydrograph from BMP-F"

Project: 24044_Groth_Post Simulation Run: Basin-1 Hydrograph
Source: Hydrograph from BMP-F

Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	28Nov2025, 13:37:08	Control Specifications:	Time of Analysis

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Discharge:	21.13000 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:13
Volume:	n/a		

Summary Results for Reservoir "Node-804-BMP-F"

Project: 24044_Groth_Post Simulation Run: Basin-1 Hydrograph
Reservoir: Node-804-BMP-F

Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	28Nov2025, 13:37:08	Control Specifications:	Time of Analysis

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Inflow:	21.13000 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:13
Peak Discharge:	14.66478 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:17
Inflow Volume:	n/a	Peak Storage:	0.16044 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	0.66229 (FT)

Summary Results for Diversion "Diversion-1"

Project: 24044_Groth_Post Simulation Run: Basin-1 Hydrograph
Diversion: Diversion-1

Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	28Nov2025, 13:37:08	Control Specifications:	Time of Analysis

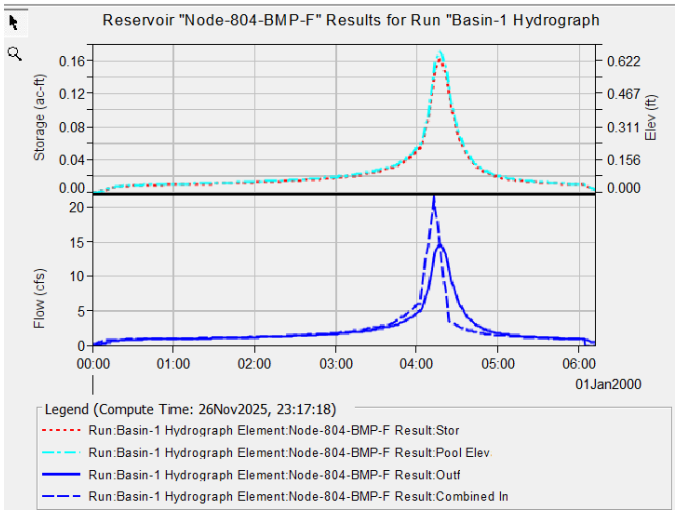
Volume Units: (•) IN ( ) ACRE-FT

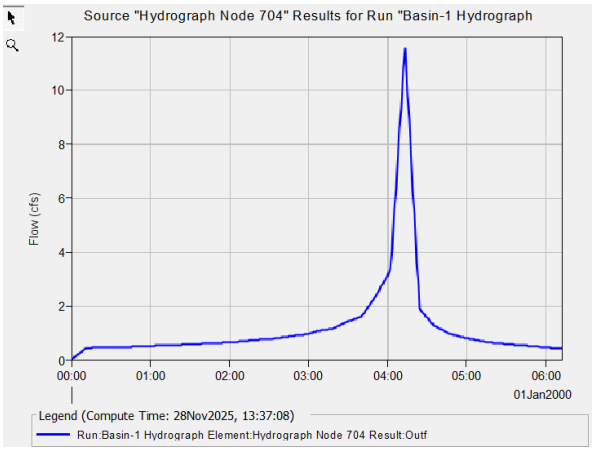
Computed Results

Peak Inflow:	14.66478 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:17
Peak Discharge:	6.66478 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:17
Peak Diversion:	8.00000 (CFS)	Date/Time of Peak Diversion:	01Jan2000, 04:09
Inflow Volume:	n/a		
Discharge Volume:	n/a	Diversion Volume:	n/a

Graph for Reservoir "Node-804-BMP-F"

File Edit View





Summary Results for Source "Hydrograph Node 704"

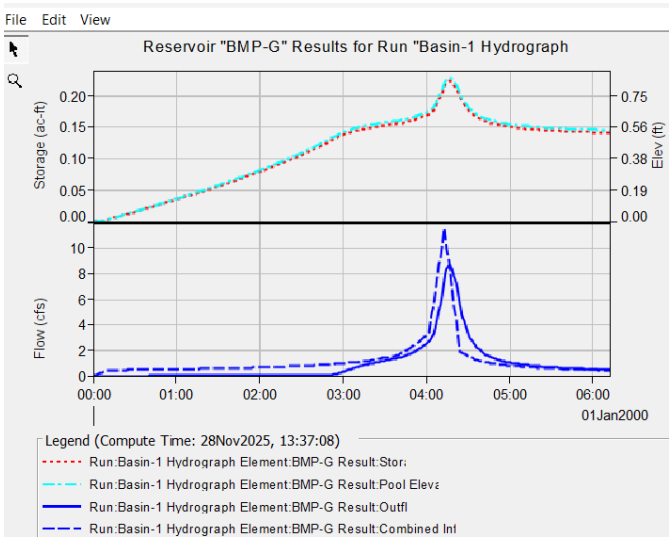
Project: 24044_Groth_Post Simulation Run: Basin-1 Hydrograph
Source: Hydrograph Node 704

Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	28Nov2025, 13:37:08	Control Specifications:	Time of Analysis

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Discharge:	11.60000 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:13
Volume:	n/a		



Summary Results for Reservoir "BMP-G"

Project: 24044_Groth_Post Simulation Run: Basin-1 Hydrograph
Reservoir: BMP-G

Start of Run:	01Jan2000, 00:00	Basin Model:	Sub-Basin-1
End of Run:	01Jan2000, 06:12	Meteorologic Model:	Precipatation
Compute Time:	28Nov2025, 13:37:08	Control Specifications:	Time of Analysis

Volume Units: (•) IN ( ) ACRE-FT

Computed Results

Peak Inflow:	11.60000 (CFS)	Date/Time of Peak Inflow:	01Jan2000, 04:13
Peak Discharge:	8.63386 (CFS)	Date/Time of Peak Discharge:	01Jan2000, 04:16
Inflow Volume:	n/a	Peak Storage:	0.22373 (ACRE-FT)
Discharge Volume:	n/a	Peak Elevation:	0.85652 (FT)

8B. Runoff Coefficient C After Detention Structure Calculations

CALCULATION AFTER THE DETENTION STRUCTURE

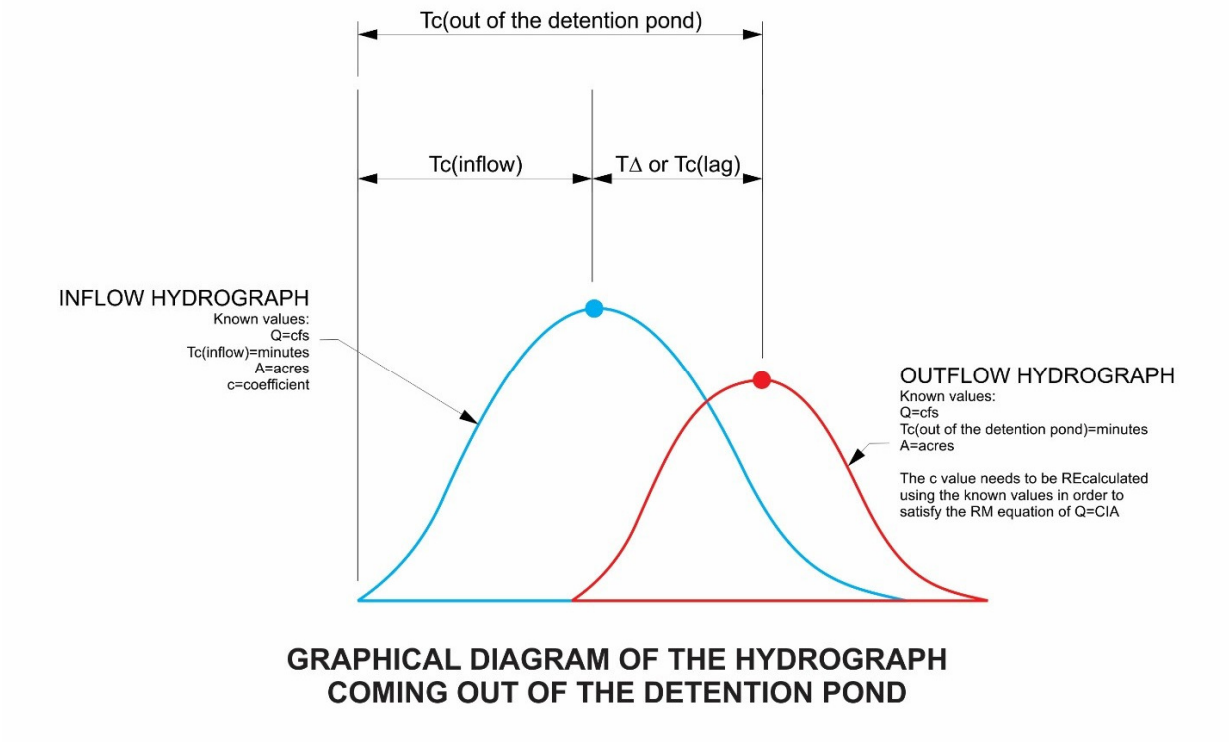
The purpose of the detention structure is to alter the peak flow and or time to peak of a given storm so it will not have a negative impact on the downstream facilities. There are different methods on how to use the resulting values of the outflow hydrograph.

For the purposes of this example there will be an association of the following values:

Q_{in} = Is equal to the inflow value that will enter the basin before storage
Q_{out} = Is equal to the outflow value that will exit the basin after storage
Tc_{in} = Is equal to the Time of Concentration flowing into the basin before detention
Tc_{out} = Is equal to the Time of Concentration exiting the basin after detention
A = Area of the tributary area being examined; (This value does not change)
C_{inflow} = The runoff coefficient going into the basin for detention
C_{out} = The runoff coefficient recalculated to account for water detained in the pond/pipe

One method is to keep the value of c(inflow) and solve for the I=intensity & Tc(outflow). In this interpretation, we will get a Tc that will not match the value of the $Tc_{(out\ of\ the\ detention\ structure)}$ of the outflow hydrograph that was calculated using the detention pond. The Tc Using this method shows a disruption on the coherence & continuity of the outflow hydrograph & the formula Q=CIA.

The second method; that is the method we are using is to recalculate the C=coefficient based on the fix values of Tc and Q from the outflow hydrograph to achieve a C_{out} . This value uses the C_{inflow} from the flow into the detention basin and then is recalculated by the output of the hydrograph software using Q=CIA; translated as C=Q/IA. This method preserves the formula Q=CIA & does not alter the $Tc_{(out\ of\ the\ detention\ structure)}$. This method shows that to maintain mathematical integrity of the rational equation (Q=CIA), the detention structure alters the runoff coefficient which is the only unknown in the equation.



GRAPHICAL DIAGRAM OF THE HYDROGRAPH COMING OUT OF THE DETENTION POND

The routing of the runoff through the detention structure gives us the $Q_{(\text{out of the detention structure})}$ and TΔ time lag between $Q_{(\text{inflow})}$ & $Q_{(\text{out of the detention structure})}$.

The known fix values coming out of the detention structure are:

- Q = cfs
- $Tc_{(\text{out of the detention structure})}$ = minutes
- A = acres
- *Please note that c=coefficient is not given directly from the resulting hydrograph coming out of the detention pond.*

In order to satisfy the rational equation of Q=CIA (see Section 3 of the 2003 San Diego County Hydrology Manual) coming out of the detention structure, we will calculate the only unknown value of the equation which is the outlet runoff coefficient, $C_{(\text{outlet})}$. By using the $Tc_{(\text{out of the detention structure})}$ we can solve for the intensity, I. With the intensity (I) value calculated, we can solve for the outlet runoff coefficient, $C_{(\text{outlet})}$.

The following equations are used in this stage:

$Q = CIA$ $I = 7.44P_6D^{-0.645}$

Where:

$Q_{(\text{out of the detention structure})}$ = runoff (cfs), known value

$Tc_{(\text{inflow})}$ = detention structure inflow time of concentration (D) (minutes)

TΔ = time lag between $Q_{(\text{inflow})}$ & $Q_{(\text{out of the detention structure})}$ (minutes) $Tc_{(\text{out of the detention structure})} = Tc_{(\text{inflow})}$ + TΔ (minutes)

P_6 = 6 hour precipitation (inches), known value.
I = intensity (inches/hour), calculated based on the value of $Tc_{(out\ of\ the\ detention\ structure)}$
A = tributary area of the detention structure (acres), known value
$C_{(outflow)}$ = runoff coefficient (unitless), value to be solved

CALCULATIONS For Nodes 801 to 804; BMP-F			
LINE	ITEM	AT THE OUTFLOW OF NODE	REMARKS
1	P6 inch	3.5	KNOWN VALUE
2	TC (inflow) mins	11.57	KNOWN VALUE
3	I inches/hour (inflow)	5.368	KNOWN VALUE FROM THE CONTRIBUTING BASIN(S)
4	c(inflow)	0.462	KNOWN VALUE FROM THE CONTRIBUTING BASIN(S)
5	Q(Inflow) cfs	21.13	KNOWN VALUE
6	A (inflow=outflow)	8.528	KNOWN VALUE
7	TC (lag) mins	4	FROM THE OUTFLOW HYDROGRAPH
8	TC (ouflow) mins	15.57	LINE 2+3
9	I inches/hour (outflow)	4.432	FROM THE INTENSITY FORMULA
10	Q(outflow) cfs	6.66478	KNOWN VALUE
11	**c(outflow)**	**0.176**	CALCULATED FROM C=Q/IA

CALCULATIONS For Nodes 701 to 704; BMP-G			
LINE	ITEM	AT THE OUTFLOW OF NODE	REMARKS
1	P6 inch	3.5	KNOWN VALUE
2	TC (inflow) mins	11.88	KNOWN VALUE
3	I inches/hour (inflow)	5.277	KNOWN VALUE FROM THE CONTRIBUTING BASIN(S)
4	c(inflow)	0.478	KNOWN VALUE FROM THE CONTRIBUTING BASIN(S)
5	Q(Inflow) cfs	11.6	KNOWN VALUE
6	A (inflow=outflow)	4.6	KNOWN VALUE
7	TC (lag) mins	3	FROM THE OUTFLOW HYDROGRAPH
8	TC (ouflow) mins	14.88	LINE 2+3
9	I inches/hour (outflow)	4.564	FROM THE INTENSITY FORMULA
10	Q(outflow) cfs	8.63386	KNOWN VALUE
11	**c(outflow)**	**0.411**	CALCULATED FROM C=Q/IA

P_6 = 6 hour precipitation (inches), known value.
I = intensity (inches/hour), calculated based on the value of $Tc_{(out\ of\ the\ detention\ structure)}$
A = tributary area of the detention structure (acres), known value
$C_{(outflow)}$ = runoff coefficient (unitless), value to be solved

CALCULATIONS For Nodes 401 to 404; BMP-D			
LINE	ITEM	AT THE OUTFLOW OF NODE	REMARKS
1	P6 inch	3.4	KNOWN VALUE
2	TC (inflow) mins	7.7	KNOWN VALUE
3	I inches/hour (inflow)	6.781	KNOWN VALUE FROM THE CONTRIBUTING
4	c(inflow)	0.602	KNOWN VALUE FROM THE CONTRIBUTING
5	Q(Inflow) cfs	24.7	KNOWN VALUE
6	A (inflow=outflow)	6.054	KNOWN VALUE
7	TC (lag) mins	5	FROM THE OUTFLOW HYDROGRAPH
8	TC (ouflow) mins	12.7	LINE 2+3
9	I inches/hour (outflow)	4.91	FROM THE INTENSITY FORMULA
10	Q(outflow) cfs	10.5	KNOWN VALUE
11	**c(outflow)**	**0.353**	CALCULATED FROM C=Q/IA

CALCULATIONS For Nodes 3003			
LINE	ITEM	AT THE OUTFLOW OF NODE	REMARKS
1	P6 inch	3.4	KNOWN VALUE
2	TC (inflow) mins	10.859	KNOWN VALUE
3	I inches/hour (inflow)	5.432	KNOWN VALUE FROM THE CONTRIBUTING
4	c(inflow)	0.358	KNOWN VALUE FROM THE CONTRIBUTING
5	Q(Inflow) cfs	141.767	KNOWN VALUE
6	A (inflow=outflow)	72.974	KNOWN VALUE
7	TC (lag) mins	5	FROM THE OUTFLOW HYDROGRAPH
8	TC (ouflow) mins	15.859	LINE 2+3
9	I inches/hour (outflow)	4.255	FROM THE INTENSITY FORMULA
10	Q(outflow) cfs	77.25156	KNOWN VALUE
11	**c(outflow)**	**0.249**	CALCULATED FROM C=Q/IA

P_6 = 6 hour precipitation (inches), known value.
I = intensity (inches/hour), calculated based on the value of $Tc_{(out\ of\ the\ detention\ structure)}$
A = tributary area of the detention structure (acres), known value
$C_{(outflow)}$ = runoff coefficient (unitless), value to be solved

The highlighted data above is then used to continue the modified rational method calculations downstream of the detention structure.

In summary these are the steps of the calculations presented here:

1. Hydrologic methods of calculation as laid out in the 2003 San Diego Hydrology Manual was used upstream of the detention structure. These includes the methods of determining c, Tc and confluence of a junction. The c values used in the proposed conditions range from "undisturbed natural terrain" to "low & high density residential" or other land use that is appropriate for the contributing basin.
2. At the outflow of the detention structure, the C value was recalculated using C=Q/IA and with the Tc, Q & A values from the resulting outflow hydrograph. Modifying the C value is necessary to maintain the integrity of Q=CIA consider the reduced values of Q and Tc for the same given area.
3. The values determined in step 2 were used in the continuation of the calculations using the Modified Rational method calculation as laid out in the 2003 San Diego Hydrology Manual downstream of the detention structure. This includes the methods of determining C, Tc and confluence of a junction. The C values used in the proposed conditions range from "undisturbed natural terrain" to "low & high density residential" whichever is appropriate for the contributing basin.

DRAWING NUMBER As-Built
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
DRAWING NUMBER 1112
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
DRAWING NUMBER G.P.
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
DRAWING NUMBER
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA

GRADING AND DRAINAGE PLAN FOR TWIN OAKS VALLEY ROAD FROM BORDEN ROAD TO LA CIENEGA RD. T.S.M. 339

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE INSTALLATION OF DRAINAGE IMPROVEMENTS AND SHALL BE DONE IN ACCORDANCE WITH THESE PLANS, AND THE FOLLOWING:

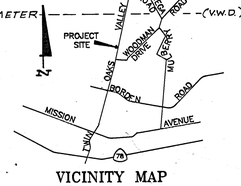
1. STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (1988 EDITION).
2. STANDARD SPECIAL PROVISIONS (JANUARY 1988 EDITION).
3. SAN DIEGO REGIONAL STANDARD DRAWINGS (SEPTEMBER 1988).
4. DEPARTMENT OF TRANSPORTATION STANDARD PLANS (JANUARY 1988).
5. VALLECITOS WATER DISTRICT(VWD) JULY 1, 1990 AND AUGUST 1, 1990.

(1) PROTECT IN PLACE
(2) CLEAR AND GRUBB (LIMITS AS SHOWN ON PLANS)
(3) THE REMOVAL OF EXISTING A.C. PAVING, FENCE, STRUCTURES AND MISC. AS SHOWN ON PLANS
(4) REMOVE AND/OR RELOCATE EXISTING UTILITY BY CONTRACTOR
(5) ADJUST TO PROPOSED FINISHED GRADE

DESCRIPTION	DRAWING NO.	SYMBOL	QUANTITY/UNIT
MOBILIZATION			1 L.S.
CLEAR AND GRUBB			12.9 AC.
TRAFFIC CONTROL			1 L.S.
REMOVAL AND DISPOSAL OF EXISTING STORM DRAIN PIPE	PER PLAN		360 L.F.
REMOVAL AND DISPOSAL OF EXISTING DRAINAGE STRUCTURES	PER PLAN		14 EA.
REMOVAL AND DISPOSAL OF EXISTING ASPHALT PAVING (TRENCH RESURFACE)	PER PLAN		1,820 S.F.
REMOVAL AND DISPOSAL OF EXISTING BARBED WIRE FENCING	PER PLAN		10,800 L.F.
REMOVAL AND *DISPOSAL* OF EXISTING MAILBOXES	PER PLAN		5 EA.
REMOVE AND SALVAGE OF EXISTING 12" WATER LINE	PER PLAN		272 L.F.
⚠CONSTRUCTION OF SEWER MANHOLE	(VW.D.) S-1		22 EA.
ROADWAY GRADING	PER PLAN		53,995 C.Y.
REMEDIAL GRADING	PER PLAN		5,000 C.Y.
HYDROSEEDING	PER PLAN		156,000 S.F.
⚠CONSTRUCTION OF 12" V.C.P. SEWER MAIN	PER PLAN		6,701 L.F.
⚠CONSTRUCTION OF 12" D.I.P. SEWER MAIN	PER PLAN		979 L.F.
CONSTRUCTION OF 8" D.I.P. SEWER MAIN	PER PLAN		98 L.F.
CONSTRUCTION OF SINGLE 6' X 2' R.C.B.	D-80		31 C.Y.
CONSTRUCTION OF SINGLE 8' X 3' R.C.B.	D-80		173 C.Y.
CONSRTUCTION OF DOUBLE 6' X 3' R.C.B.	D-80		168 C.Y.
CONSTRUCTION OF DOUBLE 7' X 3' R.C.B.	D-80		105 C.Y.
CONSTRUCTION OF TRIPLE 8' X 3' R.C.B.	D-80,D-81		343 C.Y.
CONSTRUCTION OF 18" R.C.P. (2000-D) STORM DRAIN	(SDRS) D-60		503 L.F.
CONSTRUCTION OF 27" R.C.P. (2000-D) STORM DRAIN	(SDRS) D-60		338 L.F.
CONSTRUCTION OF 30" R.C.P. (2000-D) STORM DRAIN	(SDRS) D-60		271 L.F.
CONSRTUCTION OF 36" R.C.P. (2000-D) STORM DRAIN	(SDRS) D-60		68 L.F.
CONSTRUCTION OF 4" GUNITE LINING AT SUMP INLETS	D-75		1,828 S.F.
CONSTRUCTION OF WING AND U TYPE HEADWALLS	D-84		77 EA.
CONSTRUCTION OF "L" TYPE HEADWALL	(SDRS) D-36		3 EA.
CONSTRUCTION OF LIGHT CLASS RIP-RAP	(SDRS) D-40		4 C.Y.
CONSTRUCTION OF FACING CLASS RIP-RAP	(SDRS) D-40		39 C.Y.
CONSTRUCTION OF 1/4 TON RIP-RAP	(SDRS) D-40		104 C.Y.
CONSTRUCTION OF TYPE "B-1" INLET MODIFIED	(SDRS) D-2		1 EA.
CONSTRUCTION OF TYPE "B-1" INLET (L=7'-10')	(SDRS) D-2		1 EA.
CONSTRUCTION OF TYPE "B-1" INLET (L=11'-14')	(SDRS) D-2		6 EA.
CONSTRUCTION OF TYPE "B-1" INLET (L=15'-23')	(SDRS) D-2		4 EA.
CONSTRUCTION OF "G" CATCH BASIN	(SDRS) D-7		1 EA.
CONSTRUCTION OF "F" CATCH BASIN	(SDRS) D-8		7 EA.
CONSTRUCTION OF CONCRETE PIPE COLLAR	(SDRS) D-62		2 EA.
CONSTRUCTION OF CONCRETE LUG	(SDRS) D-63		1 EA.
CONSTRUCTION OF MODIFIED CSP INLET, TYPE "B" (OPENING EA. SIDE)	D-16		2 EA.
CONSTRUCTION OF "A" CLEANOUT	(SDRS) D-9		2 EA.
CONSTRUCTION OF "A" MODIFIED CLEANOUT	(SDRS) D-9		1 EA.
CONSTRUCTION OF GRASS CHANNEL (HYDROSEEDING)			325 C.Y.
CONSTRUCTION OF LINED CHANNEL	D-70		1,765 S.F.
CONSTRUCTION OF LINED DRAINAGE DITCH, TYPE D	D-75		240 L.F.
CONSTRUCTION OF A BLADED SWALE	PER PLAN		2,020 L.F.

(V.W.D.) INDICATES PER VALLECITOS WATER DISTRICT STANDARD DRAWINGS & SPECIFICATIONS

DESCRIPTION	DRAWING NO.	SYMBOL	QUANTITY/UNIT
CONSTRUCTION OF 12" A.C.P. WATER MAIN	(VWD) W-17,W-18		142 L.F.
CONSTRUCTION OF 12" STEEL WATER MAIN C.M.L.&C.	(VWD) W-17, W-18		130 L.F.
ADJUST M.H. RIM TO GRADE (PRES. RED. STA.)	*PER PLAN*		*1 EA.*
CONSTRUCTION OF 1" COMBINATION AIR VALVE	(VWD) W-2		1 EA.
CONSTRUCTION OF 2" BLOW OFF ASSEMBLEY	(VWD) W-1		3 EA.
CONSTRUCTION OF ANCHOR BLOCK	(VWD) W-15		12 EA.
RELOCATE FIRE HYDRANT	(VWD) W-4, W-5		2 EA.
SAND BAGS	PER EROSION CONTROL PLAN		23,900 EA.
METAL BEAM GUARD RAIL	M-7		341 L.F.
CHAIN LINK FENCE	M-6		749 L.F.
TEMP. HIGH LINE FOR WATER MAIN RELOCATION	*PER DETAIL OF SHT. 2*		272 L.F.
⚠CONSTRUCTION OF 4" SEWER LATERAL	(V.W.D.) S-4, S-9		100 L.F.
⚠CONSTRUCTION OF FIRE HYDRANT ASSEMBLY	(V.W.D.) W-4, W-5		2 EA.
⚠CONSTRUCTION OF 1"SERVICE, 1" METER	(V.W.D.) W-6		1 EA.
⚠CONSTRUCTION OF 2"SERVICE, 2" METER	(V.W.D.) W-7		1 EA.



VICINITY MAP
N.T.S.

GRADING SPECIFICATION

ALL GRADING SHALL BE DONE UNDER THE OBSERVATION OF A QUALIFIED SOILS ENGINEER AND ENGINEERING GEOLOGIST, IN ACCORDANCE WITH THE RECOMMENDATIONS SET FORTH IN THE SIOLS AND GEOLOGICAL REPORTS.

SOILS ENGINEER'S CERTIFICATE

I, Claude B. Parker, A REGISTERED CIVIL ENGINEER OF THE STATE OF CALIFORNIA, PRINCIPALLY DOING BUSINESS IN THE FIELD OF APPLIED SOILS MECHANICS, HEREBY CERTIFY THAT A SAMPLING AND A STUDY OF THE SOIL CONDITIONS PRESENT WITHIN THIS SITE WAS MADE BY ME OR UNDER MY DIRECTION BETWEEN THE DATES OF 17 July 89 AND ONE (1) COMPLETE COPY OF THE SOILS REPORT COMPILED FROM THIS STUDY, WITH MY RECOMMENDATIONS, HAS BEEN SUBMITTED TO THE OFFICE OF THE CITY ENGINEER.

BY: Pacific Soils Eng. Inc. DATE 7-28-93

R.C.E. GE668 Claude B. Parker Exp. 06/30/93

EXPIRATION DATE: 6/30/93

REGISTERED GEOLOGIST JOHN A. HANSON No. 990 CERTIFIED ENGINEERING GEOLOGIST Exp. 6/30/93 STATE OF CALIFORNIA

REGISTERED GEOTECHNICAL ENGINEER No. 668 Exp. 06/30/93 STATE OF CALIFORNIA

By: John A. Hanson 11/28/90
C.E.G. 990

OWNERS'S CERTIFICATE

I (WE) HEREBY CERTIFY THAT A REGISTERED SOILS ENGINEER OR GEOLOGIST HAS BEEN OR WILL BE RETAINED TO SUPERVISE OVER-ALL GRADING ACTIVITY AND ADVISE ON THE COMPACTION AND STABILITY OF THIS SITE.

By Davis, V.P. DATE: 11-30-90

ENGINEER'S STATEMENT

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT. THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF THE PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN MARCOS IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

MASSON & ASSOCIATES, INC.
311 EAST WASHINGTON AVENUE
ESCONDIDO, CALIFORNIA 92025
(619) 741-3570

BY: R. W. Magboo 11-30-90
ROLANDO H. MAGBOO, R.C.E. 23943 DATE
DISCIPLINE — CIVIL
EXPIRATION DATE 12/31/93

REGISTERED PROFESSIONAL ENGINEER ROLANDO H. MAGBOO No. 23943 Exp. 12-31-93 CIVIL STATE OF CALIFORNIA

AS THE ENGINEER OF WORK, I HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELEIF, THE IMPROVEMENTS SHOWN ON THIS SET OF CONSTRUCTION PLANS, SHEET 1 THROUGH SHEET 16 HAVE BEEN INSTALLED AND CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THESE AS-BUILT PLANS, INCLUDING ALL APPROPRIATE STANDARDS AND ANY DISCRETIONARY APPROVAL (S) FOR THE PROJECT.

SIGNED Ron J. Mayers DATE 9-30-94
PRINTED NAME RON J. MAYERS P.E. NO. 38474
DISCIPLINE CIVIL MY REGISTRATION EXPIRES 3-31-97

SITE ADDRESS

TWIN OAKS VALLEY ROAD
FROM BORDEN RD. TO LA CIENEGA RD.
SAN MARCOS, CALIFORNIA 92069

PREPARED FOR

M. J. BROCK & SONS, INC.
16855 WEST BERNARDO DRIVE
SUITE 100
SAN DIEGO, CALIFORNIA 92127
(619) 487-2364

LEGAL DESCRIPTION

TWIN OAKS VALLEY ROAD IN THE RANCHO LOS VALLECITOS DE SAN MARCOS, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE MAP OF SAID RESUBDIVISION NO. 833, FIELD IN THE OFFICE OF THE COUNTY RECORDER OF SAID SAN DIEGO COUNTY, JUNE 14, 1897.

UNDERCUT QUANTITIES

	CUT	FILL
RAW QUANTITIES	5,135 C.Y.	53,995 C.Y.
IMPORT FROM CHANNEL	0	48,860 C.Y.
CUT & FILL SLOPE RATIOS:	PER PLAN	PER PLAN

THE SOILS REPORT TITLED: PRELIMINARY GEOTECHNICAL INVEST., PORTION OF TWIN OAKS RANCH EAST OF TWIN OAKS RD. SOUTH OF LA CIENEGA RD. PREPARED BY: PACIFIC SOILS ENG. DATED: JULY 17, 1990 SHALL BE CONSIDERED A PART OF THIS GRADING PLAN. ALL GRADING SHALL BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN SAID SOILS REPORT.....

GENERAL NOTES

CALL THE CITY OF SAN MARCOS PUBLIC WORKS DEPARTMENT (744-9240) 24 HOURS BEFORE COMMENCING WORK.

1. IMPORTED MATERIAL SHALL BE OBTAINED FROM A LEGAL SITE.
2. ALL SLOPES (FILL AND CUT SLOPES) SHALL BE PLANTED WITH A MIXTURE OF TREES, SHRUBS, AND GROUND COVER TO CONTROL EROSION. SLOPE LANDSCAPING SHALL BE INSTALLED AS SOON AS PRACTICAL. IRRIGATION SYSTEMS ARE REQUIRED AND SHALL BE INSTALLED FOR PERPETUAL MAINTENANCE OF THE PLANT LIFE USED FOR SLOPE STABILIZATION IN ACCORDANCE WITH SECTION 6-36 OF THE GRADING ORDINANCE.
3. THE CONTRACTOR SHALL VERIFY THE EXISTENCE AND LOCATION OF ALL UTILITIES BEFORE COMMENCING WORK.
4. APPROVAL OF THESE PLANS BY THE CITY DOES NOT AUTHORIZE ANY WORK OR GRADING TO BE PERFORMED UNTIL THE PROPERTY OWNER'S PERMISSION IS OBTAINED.
5. ALL OPERATIONS CONDUCTED ON THE PREMISES, INCLUDING THE WARMING UP, REPAIR, ARRIVAL, DEPARTURE OR RUNNING OF ANY EQUIPMENT SHALL BE LIMITED TO THE HOURS OF 7:00 A.M. TO 4:30 P.M., MONDAY THRU FRIDAY. NO WORKS SHALL BE PERFORMED ON THE PREMISES ON SATURDAY, SUNDAY, OR HOLIDAYS.
6. ALL MAJOR SLOPES SHALL BE ROUNDED INTO EXISTING SLOPES TO PRODUCE A CONTOURED TRANSITION FROM CUT OR FILL FACES TO NATURAL GROUND AND ASBUTTING CUT OR FILL SLOPES.
7. NOTWITHSTANDING THE MINIMUM STANDARDS SET FORTH IN THE GRADING ORDINANCE AND NOTWITHSTANDING THE APPROVAL OF THESE GRADING PLANS, THE PERMITTEE IS RESPONSIBLE FOR THE PREVENTION OF DAMAGE TO ADJACENT PROPERTY. NO PERSON SHALL EXCAVATE ON LAND SO CLOSE TO THE PROPERTY LINE AS TO ENDANGER ANY SYSTEM, OR ANY OTHER PUBLIC OR PRIVATE PROPERTY WITHOUT SUPPORTING AND PROTECTING SUCH PROPERTY FROM SETTLING, CRACKING, EROSION SILTING, SCOUR OR OTHER DAMAGE WHICH MIGHT RESULT FROM THE GRADING DESCRIBED ON THIS PLAN. THE CITY WILL HOLD THE PERMITTEE RESPONSIBLE FOR CORRECTION OF NON-DEDICATED IMPROVEMENTS WHICH DAMAGE ADJACENT PROPERTY.
8. DUST CONTROL MEASURES SHALL BE UTILIZED AT ALL TIMES DURING CONSTRUCTION TO THE SATISFACTION OF THE BUILDING DIRECTOR.
9. ALL WORK SHOWN ON THESE PLANS TO BE COMPLETED IN ACCORDANCE WITH CITY CODE OF ORDINANCES AND ARTICLE VIII, SECTOIN 6-23 THROUGH 6-42
10. ALL GRADING SHALL BE SUPERVISED BY AN INDIVIDUAL APPROPRIATELY LICENSED UNDER THE BUSINESS AND PROFESSIONS CODE.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE ADJOINING STREETS IN A CLEAN CONDITION.
12. A PERMIT MUST BE OBTAINED FROM THE SAN MARCOS FIRE PROTECTION DISTRICT PRIOR TO ANY BLASTING. A SEPARATE PERMIT FROM THE CITY WILL BE REQUIRED PRIOR TO ANY CONSTRUCTION, EXCAVATION, STORAGE OF MATERIALS OR ANY OTHER ENCROACHMENTS.
13. A CONSTRUCTION, EXCAVATION, OR ENCROACHMENT PERMIT WILL BE REQUIRED FOR ANY WORK WITHIN THE CITY RIGHT-OF-WAY.
14. HANDICAPPED PARKING SPACE(S) MUST HAVE A MAXIMUM SLOPE NO GREATER THAN 2% IN ANY DIRECTION.
15. ALL RETAINING WALLS TO BE CONSTRUCTED UNDER SEPARATE PERMIT WHICH MUST BE OBTAINED FROM THE BUILDING DEPARTMENT PRIOR TO GRADING PERMIT.

G:\ACADDWGS\88-91\TVR\TVR-GD1

VALLECITOS WATER DISTRICT NOTES

1. ALL WATER AND SEWER LINES TO BE INSTALLED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS OF THE VALLECITOS WATER DISTRICT FOR THE CONSTRUCTION OF WATER AND SEWER FACILITIES.
2. WATER LINES SHALL HAVE A MINIMUM COVER OF 36 INCHES. SEWER LINES SHALL HAVE A MINIMUM COVER OF 5 FEET.
3. CONTRACTOR SHALL NOTIFY THE FOLLOWING AGENCIES 48 HOURS PRIOR TO CONSTRUCTION.
   VALLECITOS WATER DISTRICT (619) 744-0460
   S.D.G.& E. 1-800-422-4133
   PACIFIC TELEPHONE 1-800-422-4133
   UNDERGROUND SERVICE ALERT 1-800-422-4133
4. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION OF ALL SUBSTRUCTURES, WHETHER SHOWN ON THE PLANS OR NOT, AND PROTECT THEM FROM DAMAGE. THE ACTUAL LOCATION AND DEPTH OF ALL EXISTING WATER AND SEWER LINES IS TO BE VERIFIED BY THE CONTRACTOR AND ANY DISCREPANCY IS TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF WORK FOR CORRECTION AND THEN SUBMITTED TO THE DISTRICT FOR APPROVAL.
5. NEITHER THE ENGINEER, OWNER NOR THE VALLECITOS WATER DISTRICT SHALL BE RESPONSIBLE FOR THE ENFORCEMENT OF SAFETY STANDARDS.
6. A PRECONSTRUCTION CONFERENCE MEETING SHALL BE HELD A MINIMUM OF THREE (3) DAYS PRIOR TO CONSTRUCTION.
7. A SIGNED SET OF IMPROVEMENT PLANS DOES NOT IMPLY THAT CONSTRUCTION MAY BEGIN. THE CONTRACTOR MUST CONTACT THE VALLECITOS WATER DISTRICT ENGINEERING DEPARTMENT TO CONFIRM.
8. ANY CHANGES IN THE APPROVED IMPROVEMENT PLANS MUST BE REVIEWED AND APPROVED BY THE DISTRICT PRIOR TO THE INSTALLATION OF SUCH CHANGES AND THE CHANGES SHALL BE SHOWN ON THE IMPROVEMENT PLANS.
9. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER TO MAINTAIN AT ALL TIMES ON THE JOB SITE, AN "AS-BUILT" RECORD OF ALL WATER AND SEWER MAINS AND APPURTENANCES INSTALLED UNDER HIS CONTRACT AND PROVIDE SAID RECORD TO THE ENGINEER AT THE COMPLETION OF THE CONTRACT. THE ENGINEER SHALL PROVIDE TWO (2) BLUELINE SETS OF "AS-BUILTS" TO THE DISTRICT PRIOR TO THE WATER AND SEWER SYSTEM BEING PLACED INTO SERVICE, AND A FINAL "AS-BUILT" MYLAR AS A CONDITION OF ACCEPTANCE OF THE WATER AND SEWER SYSTEM.
10. ALL CONTRACTORS WORKING IN THE PUBLIC, RIGHTS-OF-WAY SHALL OBTAIN A SEPARATE ENCROACHMENT PERMIT OR EXCAVATION PERMIT FROM THE APPROPRIATE AGENCY. INSPECTION OF ALL WORK IS REQUIRED. FORTY-EIGHT (48) HOURS ADVANCE NOTICE IS REQUIRED FOR INSPECTION. NO WORK SHALL BE PERFORMED IN THE PUBLIC RIGHT-OF-WAY ON SATURDAYS, SUNDAYS OR LEGAL HOLIDAYS WITHOUT THE EXPRESS PERMISSION OF THE DISTRICT ENGINEER.
11. UNLESS OTHERWISE SHOWN, SEWER LATERALS AND WATER SERVICES SHALL BE RUN PERPENDICULAR TO THE MAIN.
12. ALL WATER LINES SHALL BE ASBESTOS CONCRETE PIPE, CLASS 150, OR AS NOTED. ALL SEWER LINES SHALL BE BELL AND SPIGOT VITRIFIED CLAY PIPE, OR AS NOTED.
13. THE CONTRACTOR SHALL TEST HIS LINES AGAINST HIS OWN BLOCKING AND NOT AGAINST DISTRICT VALVES.
14. ALL WATER SERVICE OUTLETS SHALL BE ONE INCH (1") DIAMETER COPPER PIPE UNLESS OTHERWISE NOTED, AND SHALL BE MARKED ON THE FACE OF CURB WITH "W".
15. UPON CONNECTION OF THE NEW WATER SYSTEM TO THE EXISTING SYSTEM, ALL VALVES ON THE EXISTING AND NEW SYSTEM SHALL BE OPERATED ONLY BY DISTRICT PERSONNEL. THE DEVELOPER OR CONTRACTOR SHALL NOTIFY DISTRICT 24 HOURS IN ADVANCE OF ANY PLANNED SHUTDOWN TO HAVE DISTRICT OPERATE VALVES.
16. ALL ABANDONED SEWER LATERALS SHALL BE CAPPED AT THE PROPERTY LINE. ALL ABANDONED WATER SERVICES SHALL BE SHUT OFF AT THE MAIN, AND THE CONNECTION SEVERED.
17. ALL LATERALS SHALL BE CONSTRUCTED TO A MINIMUM FIVE-FOOT (5') DEPTH (TO TOP OF PIPE) AT PROPERTY LINE AND SHALL BE CLEAR OF DRIVEWAYS. ALL LATERALS SHALL BE CLEARLY MARKED WITH AN "S" ON THE CURB AND SHALL BE SHOWN ON THE "AS-BUILT" DRAWINGS.
18. SINGLE-FAMILY RESIDENTIAL LOTS SHALL BE SERVED BY A FOUR-INCH (4") V.C.P. LATERAL SET AT A MINIMUM GRADE OF TWO PERCENT (2.0%) WITH A MINIMUM DROP OF 0.3 FEET.
19. PRIOR TO ACCEPTANCE OF ANY SEWER LINE BY THE DISTRICT, ALL MAINS SHALL BE PRESSURE TESTED, AND FLUSHED CLEAN USING THE "WAYNE" BALL METHOD.
20. THE DISTRICT WILL NOT SUPPLY WATER OR SEWER SERVICE TO ANY PROJECT UNTIL ALL PROVISIONS OF THE DISTRICT STANDARD AND IMPROVEMENT PLANS HAVE BEEN MET, AND FINAL ACCEPTANCE OF THE PROJECT HAS BEEN GRANTED BY THE DISTRICT BOARD OF DIRECTORS.
21. RELOCATION OR EXTENSION OF AN EXISTING WATER METER SHALL MEAN INSTALLATION OF THE METER AT A LOCATION IN CONFORMANCE WITH DISTRICT SPECIFICATIONS AS DIRECTED BY THE ENGINEER AND PERPENDICULAR TO THE MAINLINE CONNECTION, UNLESS OTHERWISE NOTED. SERVICE LATERALS OTHER THAN COPPER SHALL BE REPLACED TO THE MAIN. BAILS AND SERVICE SADDLES OTHER THAN BRASS SHALL ALSO BE REPLACED.
22. WATER SERVICES WHICH ARE DAMAGED DURING CONSTRUCTION SHALL BE REPLACED IN FULL BY A COPPER SERVICE PER DISTRICT SPECIFICATIONS AS DIRECTED BY THE ENGINNER.

"AS-BUILT"
MASSON & ASSOCIATES INC
PLANNING · · ENGINEERING · · SURVEYING
311 EAST WASHINGTON AVE
ESCONDIDO · CA · 92025-2881 · (619) 741-3570

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT TO BE LIMITED TO NORMAL WORKING HOURS AND CONSTRUCTION CONTRACTOR AGREES TO DEFEND, INDEMNIFY AND HOLD CITY OF SAN MARCOS AND DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

SAN MARCOS FIRE PROTECTION DISTRICT	VALLECITOS WATER DISTRICT	ENGINEER OF WORK
BY: Matthew Emm	BY: Gene Madison	BY: MASSON & ASSOC. INC DATE: 9-26-90
FIRE MARSHAL DATE: 10-17-90	GENE MADISON DISTRICT ENGINEER DATE: 1-28-91	NAME: R. W. Magboo ROLANDO H. MAGBOO
		DAN M. DRAWN BY: R.C.E. 23943 EXP. 12-31-93

CITY APPROVED CHANGES			
No.	Description	Approved by	Date
1	ADD 3 CONST. NOTES & QUANTITIES		
2	ADD SEWER NOTES & QUANTITIES		

BENCH MARK
DESCRIPTION: V.C. 59
LOCATION: @ INT. OF TWIN OAKS VALLEY ROAD & DEL ROY DR., @ W'LY END OF THE S.W. CURB RET. ±4.4' SOUTH OF CURB FACE ±22.4' SOUTH OF & DEL ROY DR.(SCSMM) T.B. P.G.16 D3
RECORD FROM: CITY OF SAN MARCOS
ELEVATION: 648.650 DATUM: M.S.L.

SHEET 1	CITY OF SAN MARCOS ENGINEERING DEPARTMENT — 25 SHEETS
GRADING AND DRAINAGE PLANS FOR:	TWIN OAKS VALLEY ROAD FROM BORDEN ROAD TO LA CIENEGA ROAD T.S.M. 339
RECOMMENDED FOR APPROVAL:	Michele Patterson 02-27-91 SENIOR CIVIL ENGINEER
APPROVED:	Charles D. Storch CITY ENGINEER C-42347
CHECKED BY	
APPROVAL DATE	3/19/91

1112

V.W.D. LN. 90-61 88-91

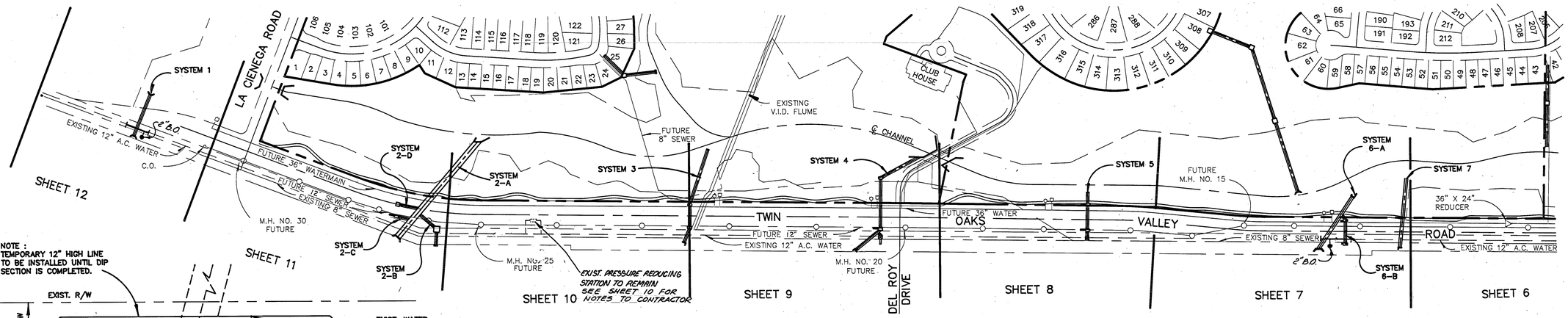
DRAWING NUMBER AS-BUILT

DRAWING NUMBER 1113

DRAWING NUMBER G.P.

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA



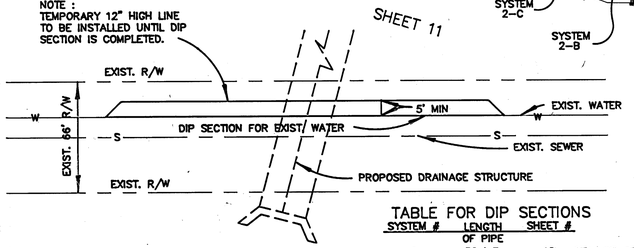
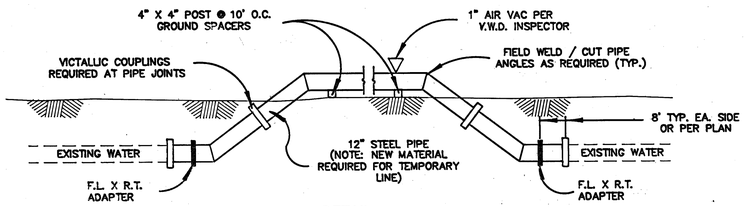


TABLE FOR DIP SECTIONS

SYSTEM #	LENGTH OF PIPE	SHEET #	
1	56 LF.	12	STA. 97+07 TO STA. 97+63
6-A & B	150 LF.	7	STA. 47+80 TO STA. 49+30
10-A	66 LF.	4	STA. 16+91 TO STA. 17+53

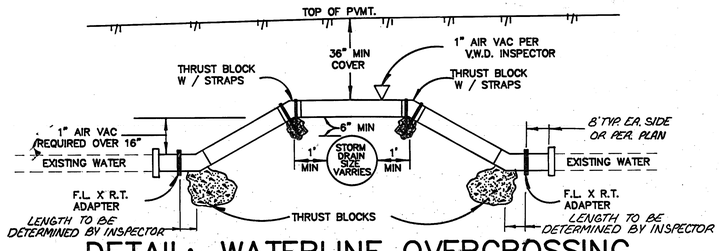
PLAN VIEW



DETAIL:

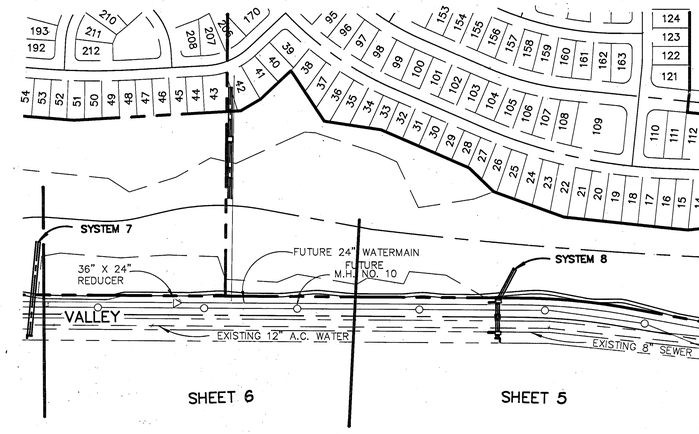
TEMPORARY HIGH-LINE FOR 12" WATER MAIN

N.T.S.



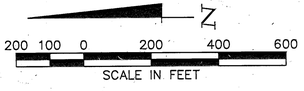
DETAIL: WATERLINE OVERCROSSING

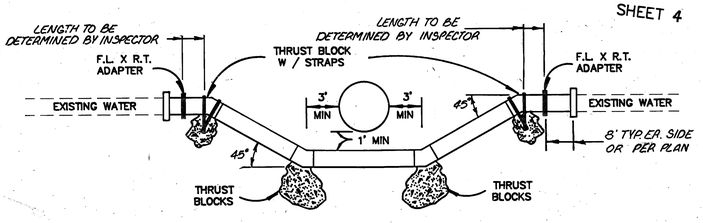
N.T.S.



INDEX MAP

SCALE 1"=200'





DETAIL: WATERLINE UNDERCROSSING

N.T.S.

"AS BUILT"

Dru J. Mayers (SIGNATURE) DATE: 9-30-94

DRU J. MAYERS (PRINTED NAME) P.E. NO. 38474

MY REGISTRATION EXPIRES 3-31-97 DISCIPLINE CIVIL

INSPECTED AND RECOMMENDED FOR ACCEPTANCE

George Wright PUBLIC WORKS INSPECTOR 10/12/94 DATE

REGISTERED PROFESSIONAL ENGINEER ROLANDO H. MAGBOO No. 23943 Exp. 12-31-93 Civil STATE OF CALIFORNIA

G:\ACADDWGS\88-91\TVR\TVR-GD2

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT TO BE LIMITED TO NORMAL WORKING HOURS AND CONSTRUCTION CONTRACTOR AGREES TO DEFEND, INDEMNIFY AND HOLD CITY OF SAN MARCOS AND DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

SAN MARCOS FIRE PROTECTION DISTRICT	VALLECITOS WATER DISTRICT	ENGINEER OF WORK
BY: _____ FIRE MARSHALL DATE: _____	BY: GENÉ MADISON DISTRICT ENGINEER DATE: 9-28-94	BY: MASSON & ASSOC. INC DATE: 9-26-90 D.A.M. DRAWN BY: ROLANDO H. MAGBOO R.C.E. 23943 EXP. 12-31-93

CITY APPROVED CHANGES			
No.	Description	Approved by	Date

BENCH MARK

DESCRIPTION: V.C. 59
LOCATION: @ INT. OF TWIN OAKS VALLEY ROAD & DEL ROY DR. @ W'LY END OF THE S.W. CURB RET. ±4.4' SOUTH OF CURB FACE ±22.4' SOUTH OF ℄ DEL ROY DR. (SCSMM) T.B. P.G.16 D3
RECORD FROM: CITY OF SAN MARCOS
ELEVATION: 648.650 DATUM: M.S.L.

"AS-BUILT"

MASSON & ASSOCIATES INC
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SHEET 2 | CITY OF SAN MARCOS ENGINEERING DEPARTMENT | 25 SHEETS

GRADING AND DRAINAGE PLANS FOR:
TWIN OAKS VALLEY ROAD
FROM BORDEN ROAD TO LA CIENEGA ROAD
T.S.M. 339

RECOMMENDED FOR APPROVAL: Michelle Fletcher 02-23-91 SENIOR CIVIL ENGINEER

APPROVED: Charles D. Fruh CITY ENGINEER C-24247

CHECKED BY

APPROVAL DATE 3/19/91

1113

V.W.D. LN. 90-61 88-91

DRAWING NUMBER AS-BUILT

PLAN HOLD DISPOSITION • IRVINE, CALIFORNIA

REORDER BY NUMBER DISPLAY

POSITION LOCK BY PENCIL ON VELLUM

DRAWING NUMBER 1115

PLAN HOLD DISPOSITION • IRVINE, CALIFORNIA

REORDER BY NUMBER DISPLAY

POSITION LOCK BY PENCIL ON VELLUM

DRAWING NUMBER G.P.

PLAN HOLD DISPOSITION • IRVINE, CALIFORNIA

REORDER BY NUMBER DISPLAY

POSITION LOCK BY PENCIL ON VELLUM

DRAWING NUMBER

PLAN HOLD DISPOSITION • IRVINE, CALIFORNIA

REORDER BY NUMBER DISPLAY

POSITION LOCK BY PENCIL ON VELLUM

"AS BUILT"

Drew J. Mayers (SIGNATURE)

DRU J. MAYERS (PRINTED NAME)

P.E. NO. 38474

MY REGISTRATION EXPIRES 3-31-97 DISCIPLINE CIVIL

DATE: 5-30-95

INSPECTED AND RECOMMENDED FOR ACCEPTANCE

Barry Brandt 10/2/95

PUBLIC WORKS INSPECTOR DATE

SYSTEM 10 A

SEE PROFILE SHT 14

CAUTION!
RELOCATION OF EXISTING UTILITIES IN THIS AREA

PROFILE

SCALE: HORIZ. 1" = 40' VERT. 1" = 4'

PLAN

SCALE: 1" = 40'

CENTERLINE STREET DATA

NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 6°07'33" E	—	576.94'	
2	△ = 3°51'24"	5000'	336.57'	
3	N 9°58'58" E	—	86.49'	

STORM DRAIN DATA SYSTEM 10

NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	△ 7°26'54" ↓	100.00'	12.27'	6'x2.0' R.C. BOX △
2	△ 31°58'21"	100.00'	54.53'	8'x3.0" R.C. BOX △
3	N 89°52'16" W		13.62'	8'x3.0" R.C. BOX
4	NOT USED			
5	FUTURE			13" R.C.P. (2000-D)
6	N 6°07'33" E		22.30'	18" R.C.P. (S-700-D)
7	N 83°52'27" W		36.75'	18" R.C.P. (2000-D)
8	N 46°46'10" W		20.50'	DBL. 36" R.C.P. (2000D) △

△ SEWER DATA

NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 06°07'33"E		300.00'	12" V.C.P. SEWER
2	N 08°20'17"E		350.78'	" "
3	N 06°12'09"E		351.60'	" "

CURB DATA

NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 7°16'19" E	—	180.04'	TYPE "E" A.C. BERM
2	N 7°16'19" E	—	53.24'	
3	N 6°07'33" E	—	309.72'	
4	△ = 2°07'19"	5041'	186.68'	
5	△ = 1°26'22"	5041'	126.64'	
6	N 9°10'33" E	—	86.50'	
7	N 10°47'22" E	—	86.50'	
8	△ = 3°51'24"	4959'	333.81'	
9	N 6°07'33" E	—	309.72'	
10	N 4°58'47" E	—	72.24'	
11	N 4°58'47" E	—	74.02'	
12	N 4°58'47" E	—	41.01'	
13	N 6°07'33" E	—	576.94'	
14	△ = 3°51'24"	4991'	335.96'	
15	N 10°47'22" E	—	86.50'	
16	N 9°10'33" E	—	86.50'	
17	△ = 3°51'24"	5009'	337.17'	
18	N 6°07'33" E	—	576.94'	TYPE "E" A.C. BERM

SEE LETTER OF PERMISSION TO GRADE, DATED 10-3-90 BY: MR. ALBERT COLUCCI, MR. SAMMY COLUCCI

STORMDRAIN DATA SYSTEM 9

Nº	DELTA OR BEARING	RADIUS	LENGTH	DESCRIPTION
1	S 81° 19' 05" E		27.50'	30" R.C.P. (2000-D)
2	S 81° 19' 05" E		49.00'	30" R.C.P. (2000-D)

WATERLINE DATA (SEE DESCRIPTION)

NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 6°07'33" E	—	576.94'	24" W.M.
2	△ = 3°51'24"	4963'	334.07'	"
3	N 10°47'22" E	—	86.50'	"
4	N 6°07 33 E	—	40'±	LOWER EXIST 12" WATER MAIN

SYSTEM 9

FOR CONTINUATION OF 30" R.C.P. SEE GRADING & IMPROVEMENTS PLANS FOR FLOOD CONTROL CHANNEL DWG. # 1064 SHT. 6

20' DRAINAGE EASEMENT PER DOC Nº 90-540743 DATE: 10-3-90

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

"AS-BUILT"
TOPO PLOT 4-14-89

MASSON & ASSOCIATES INC
PLANNING · ENGINEERING · SURVEYING
311 EAST WASHINGTON AVE.
ESCONDIDO · CA · 92025-22881 · (619) 741-3570

REGISTERED PROFESSIONAL ENGINEER ROLAND W. MASSON No. 23943 Exp. 12-31-93 CIVIL STATE OF CALIFORNIA

SAN MARCOS FIRE PROTECTION DIST.	VALLECITOS WATER DISTRICT	ENGINEER OF WORK	CITY APPROVED CHANGES	APP'D	DATE
By: Fire Marshall Date:	By: GENE MADISON District Engineer Date: 1-18-94	FOR: MASSON & ASSOCIATES, INC. By: R.W. Masson Date: 5-30-95 Name: ROLANDO W. MASSON R.C.E. 23943 exp. 12-31-95	1 ADD WATER & GAS RELOCATION, SYSTEM 10 & D.		
			2 REVISE INLET ELEV. SYSTEM 10-B D		
			3 SHOW CONSTRUCTION OF 12" SEWER		
		Drawn By	4 REVISE FENCING SYSTEM 10B, D PER AS-BUILT		

Recommended for Approval
By: Michele Pletcher
R.C.E. 44913 exp. 03-31-94
Date: 02-27-91

Approved for Construction
By: Charles D. Stark City Engineer
R.C.E. 37427 exp. 03/31/93
Date: 3/19/91

BENCH MARK
DESCRIPTION: V.C.S.D.
LOCATION: @ INT. OF TWIN OAKS VALLEY ROAD & DEL ROY DR., @ W'LY END OF THE S.W. CURB RET., 19.4' SOUTH OF CURB FACE & 22.4' SOUTH OF ℄ DEL ROY DR. (SCSMM) T.B. P.G. 16 D3
RECORD FROM: CITY OF SAN MARCOS
ELEVATION: 648.690 DATUM: M.S.L.

CITY OF SAN MARCOS

GRADING AND DRAINAGE PLAN FOR
TWIN OAKS VALLEY ROAD
STA 15+00 TO STA 25+00

T.S.M.: 339

Drawing No. 1115

Sheet 4 of 25

V.W.D. LN. 90-61

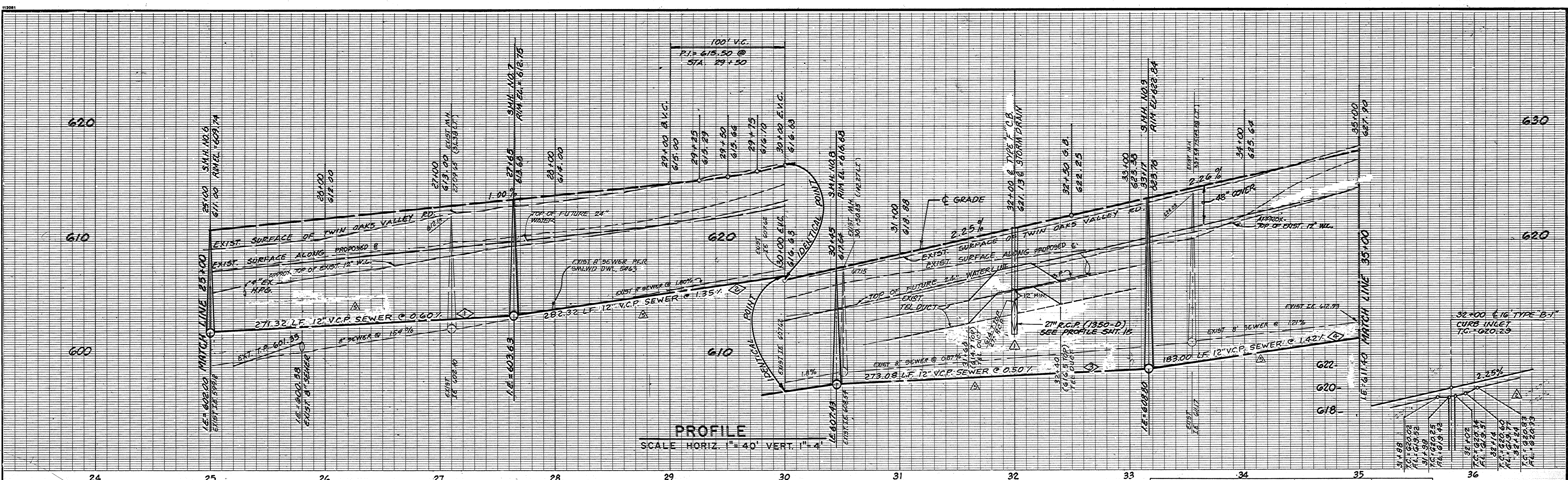
J.N. 88-91

DRAWING NUMBER AS-BUILT
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 075AR
POSITION EDGE OF PRINT ON THIS LINE

DRAWING NUMBER 1116
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 075AR
POSITION EDGE OF PRINT ON THIS LINE

DRAWING NUMBER G.P.
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 075AR
POSITION EDGE OF PRINT ON THIS LINE

DRAWING NUMBER
PLAN HOLD CORPORATION • IRVINE, CALIFORNIA
REORDER BY NUMBER 075AR
POSITION EDGE OF PRINT ON THIS LINE



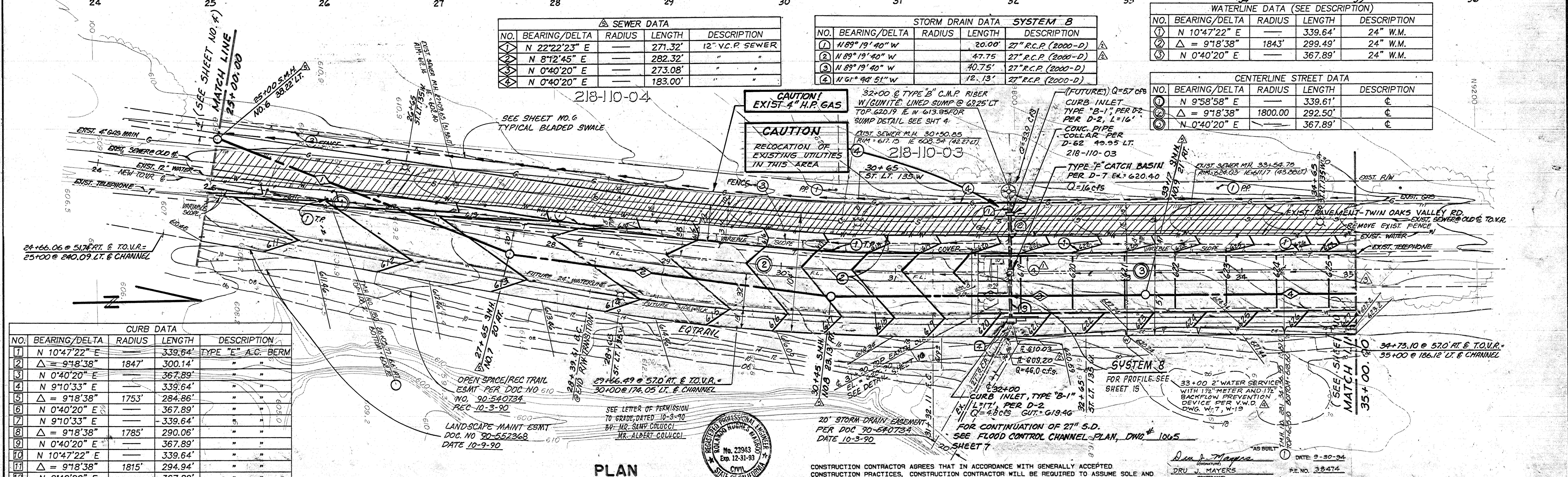
PROFILE
SCALE HORIZ. 1"= 40' VERT. 1"= 4'

△5 SEWER DATA				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 22°22'23" E	—	271.32'	12" V.C.P. SEWER
2	N 8°12'45" E	—	282.32'	" "
3	N 0°40'20" E	—	273.08'	" "
4	N 0°40'20" E	—	183.00'	" "

STORM DRAIN DATA SYSTEM 8				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 89° 19' 40" W		20.00'	27" R.C.P. (2000-D) △2
2	N 89° 19' 40" W		47.75	27" R.C.P. (2000-D) △2
3	N 89° 19' 40" W		40.75'	27" R.C.P. (2000-D)
4	N 61° 44' 51" W		12.13'	27" R.C.P. (2000-D)

WATERLINE DATA (SEE DESCRIPTION)				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 10°47'22" E	—	339.64'	24" W.M.
2	△ = 9°18'38"	1843'	299.49'	24" W.M.
3	N 0°40'20" E	—	367.89'	24" W.M.

CENTERLINE STREET DATA				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 9°58'58" E	—	339.61'	℄
2	△ = 9°18'38"	1800.00	292.50'	℄
3	N 0°40'20" E	—	367.89'	℄



CURB DATA				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 10°47'22" E	—	339.64'	TYPE "E" A.C. BERM
2	△ = 9°18'38"	1847'	300.14'	" "
3	N 0°40'20" E	—	367.89'	" "
4	N 9°10'33" E	—	339.64'	" "
5	△ = 9°18'38"	1753'	284.86'	" "
6	N 0°40'20" E	—	367.89'	" "
7	N 9°10'33" E	—	339.64'	" "
8	△ = 9°18'38"	1785'	290.06'	" "
9	N 0°40'20" E	—	367.89'	" "
10	N 10°47'22" E	—	339.64'	" "
11	△ = 9°18'38"	1815'	294.94'	" "
12	N 0°40'20" E	—	367.89'	" "

PLAN
SCALE: 1" = 40'
40 20 0 40 80 120

REGISTERED PROFESSIONAL ENGINEER ROLANDO HUGHES MAGBOO No. 23943 Exp. 12-31-93 CIVIL STATE OF CALIFORNIA

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL.

"AS BUILT"
Dru J. Mayers (SIGNATURE) DATE: 9-30-94
DRU J. MAYERS (PRINTED NAME) P.E. NO. 38474
MY REGISTRATION EXPIRES 3-31-97 DISCIPLINE CIVIL

INSPECTED AND RECOMMENDED FOR ACCEPTANCE
George Knight 10/12/94
PUBLIC WORKS INSPECTOR DATE

"AS-BUILT"
TOPO PLOT 4-14-89

MASSON & ASSOCIATES INC
PLANNING · ENGINEERING · SURVEYING
311 EAST WASHINGTON AVE
ESCONDIDO · CA · 92025-22881 · (619) 741-3570

SAN MARCOS FIRE PROTECTION DIST.
By: ______ Fire Marshall Date: ______

VALLECITOS WATER DISTRICT
By: GENE MADISON, District Engineer Date: 1-28-91

Drawn By

ENGINEER OF WORK
FOR: MASSON & ASSOC., INC.
By: R.H. Magboo Date: 3-30-90
Name: ROLANDO H. MAGBOO
R.C.E. 23943 exp: 12-31-93

CITY APPROVED CHANGES	APP'D	DATE
△1 ADDED TEL. RELOCATION - SYSTEM 8		
△2 REVISE INLET ELEVATIONS, SYSTEM 8		
△3 REVISE INTERIM GRADES		
△4 ADD WATER SERVICE		
△5 SHOW CONSTRUCTION OF 12" SEWER		

Recommended for Approval
By: Mikele Pletcher R.C.E. 44913 exp: 03-31-91 Date: 02-27-91

Approved for Construction
By: Charles D. Stuck, City Engineer R.C.E. 24247 exp: 12/31/93 Date: 3/19/91

BENCH MARK
DESCRIPTION: V.C. 59
LOCATION: @ INT. OF TWIN OAKS VALLEY ROAD & DEL ROY DR. @ W'LY END OF THE S.W. CURB RET. ±4.4' SOUTH OF CURB FACE ±22.4' SOUTH OF ℄ DEL ROY DR. (SCSMM) T.B. P.G. 16 D3
RECORD FROM: CITY OF SAN MARCOS
ELEVATION: 648.650 DATUM: M.S.L.

CITY OF SAN MARCOS
GRADING AND DRAINAGE PLAN FOR:
TWIN OAKS VALLEY ROAD
STA 25+00 TO STA 35+00
T.S.M. 339

Drawing No. 1116
Sheet 5 of 25

V.W.D. LN 90-61
J.N. 88-91

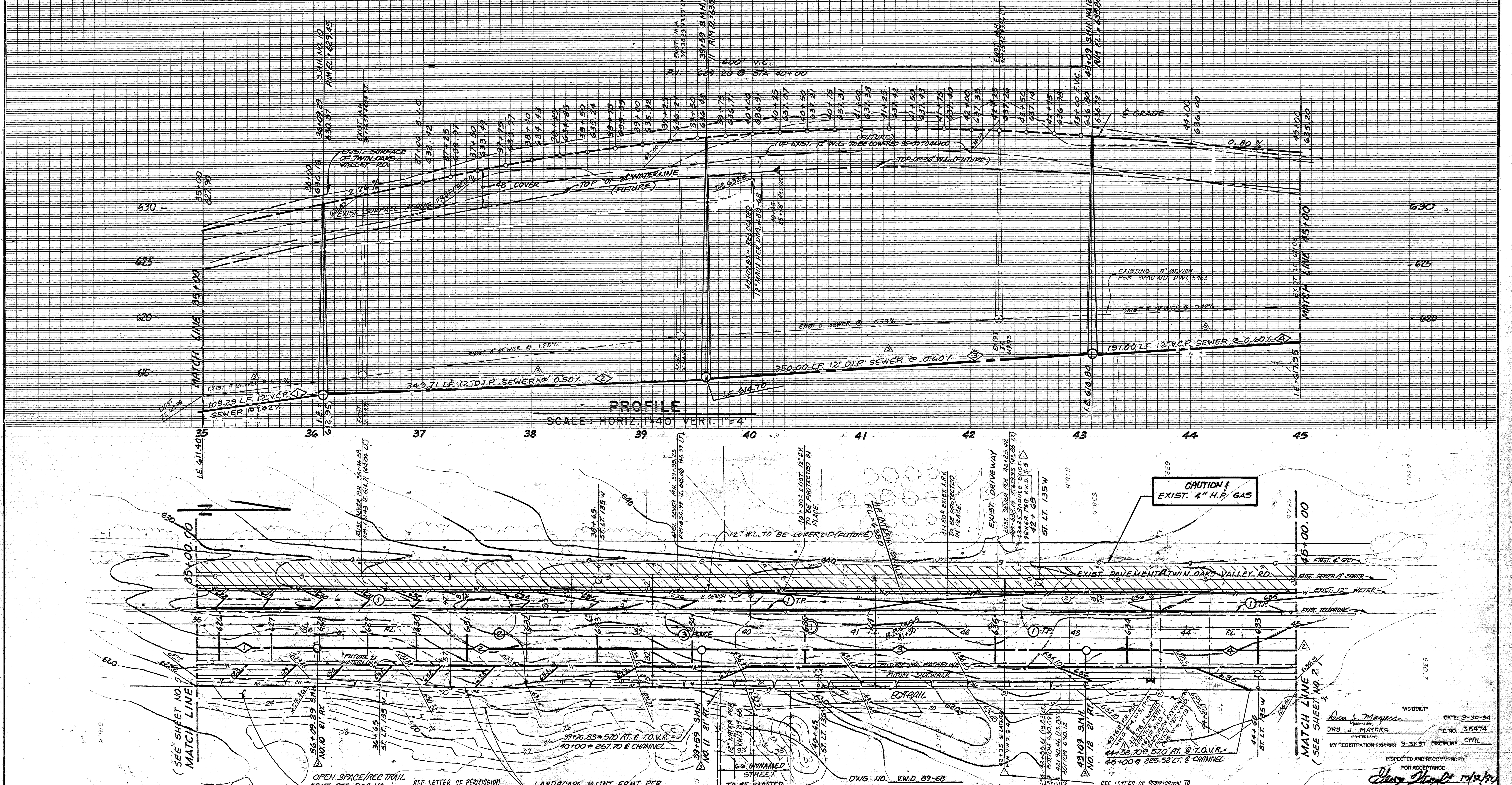
DRAWING NUMBER AS-BUILT

DRAWING NUMBER 1117

DRAWING NUMBER G.P.

DRAWING NUMBER

PLAN HOLD CORPORATION • IRVINE, CALIFORNIA REORDER BY NUMBER 075AR



SEWER LATERAL

℄ STATION 42+35
I.E. @ MAIN (619.97)
I.E. @ P/L 623.60

CURB DATA				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 0°40'20" E	—	1000.00'	TYPE "E" A.C. BERM
2	N 0°40'20" E	—	1000.00'	"
3	N 0°40'20" E	—	1000.00'	"
4	N 0°40'20" E	—	1000.00'	TYPE "E" A.C. BERM

CENTERLINE STREET DATA				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 0°40'20" E	—	1000.00'	℄

WATERLINE DATA (SEE DESCRIPTION)				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 0°40'20" E	—	1000.00'	36" W.M.
1	N 0°40'20" E	—	1120.±	LOWER EXIST 12" WATER

3 SEWER DATA				
NO.	BEARING/DELTA	RADIUS	LENGTH	DESCRIPTION
1	N 0°40'20" E	—	109.29'	12" V.C.P. SEWER
2	N 0°40'20" E	—	349.71'	12" D.I.P. CL50
3	N 0°40'20" E	—	350.00"	12" D.I.P. CL50
4	N 0°40'20" E	—	191.00'	12" V.C.P. SEWER

PLAN

SCALE: 1" = 40'

40 20 0 40 80 120

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INSPECTED AND RECOMMENDED FOR ACCEPTANCE
[signature] 10/12/94
PUBLIC WORKS INSPECTOR DATE

REGISTERED PROFESSIONAL ENGINEER ROLANDO HUGHES MAGBOO No. 23943 Exp. 12-31-93 CIVIL STATE OF CALIFORNIA

DETAIL GRADED CHANNEL SECTION A-A

"AS-BUILT"

TOPO PLOT 4-14-89

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By: R. H. Magboo Date: 3-30-90
Name: ROLANDO H. MAGBOO
R.C.E. 23943 exp. 12-31-93
Drawn By

CITY APPROVED CHANGES	APP'D	DATE
1 ADD SEWER AND WATER SERVICES.		
2 REVISE INTERIM GRADES		
3 SHOW CONSTRUCTION OF 12" SEWER		

Recommended for Approval
By: Mikele Pletcher R.C.E. 44913 exp: 03-31-94 Date: 02-27-91

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CITY OF SAN MARCOS
GRADING AND DRAINAGE PLAN FOR:
TWIN OAKS VALLEY ROAD
STA 35+00 TO STA 45+00

Drawing No. 1117
Sheet 6 of 25

V.W.D LN 90-61

J.N.88-91

END OF REPORT